



The role of occupational exposure limits in the health and safety systems of EU Member States

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The role of occupational exposure limits in the health and safety systems of EU Member States

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This report presents a review of structures and procedures for setting OELs and their legal status in EU Member States, an analysis of the methods and practices of the regulatory agencies in several member states to help achieve compliance with specific OELs and a discussion of the different meanings associated with compliance with OELs generally. It sets these findings in a wider discussion of the implications of OELs within the regulation of occupational health and safety management.

The study finds broadly comparable structures and systems for setting OELs in all member states, as well as similar problems confronting their use at the level of the workplace to those previously identified in the UK. At the same time it reports on a variety of strategies undertaken in different countries to improve managing risks of working with hazardous chemicals and suggests that such approaches could be usefully taken into account in the revision of the framework for OELs in the UK.

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EXECUTIVE SUMMARY

1 AIMS AND OBJECTIVES

The study had three main objectives, which were to:

- present a review of current procedures for setting OELs in all EU Member States, including an analysis of their legal status, and their relationship to the IOELV Directive
- undertake a detailed analysis of the methods and practices of the regulatory agencies in several member states on achieving compliance with specific OELs and a discussion of the different meanings associated with compliance with OELs generally
- set these findings in a wider discussion of the role of OELs within the regulation of occupational health and safety management.

2 STRUCTURE OF THE REPORT

The full report is in two parts. Beginning with an overview of current issues for the use of OELs in the regulation of chemical risks, the first part concerns the structures and procedures for setting and applying OELs within the member states of the European Union. A subsection is devoted to each country. For ease of comparison roughly the same structure has been used in each country subsection. Part 2 deals with the practice of using OELs in five EU countries selected on the basis of features of their economies and regulatory systems. The countries were:

- Germany
- Greece
- Italy
- The Netherlands
- Sweden

Research was conducted in each of these countries through a mixture of literature review and interviews with key informants from regulatory agencies, trade unions and specialist researchers/professionals, all of whom were considered to be well informed and well placed to comment on the realities of workplace practices. Their views, documented policy and literature were sought to help us understand:

- The role of OELs in determining what control measures for chemical risks were in use in OHSM at the workplace
- The extent to which reference was made to OELs in monitoring OHSM by the labour inspectorate
- What other measures were used in addition to or instead of OELs to determine control measures and good OHSM practice in dealing with chemical hazards at the workplace.

To facilitate ease of comparison and to keep the study manageable, it was intended to focus only on two substances, toluene and wood-dust, and to identify sectors in which there was relevant experience of exposure, in which a reasonable range of workplace size, work processes and health and safety risks were represented. Therefore, interviews concentrated on the following three sectors:

- Furniture
- Printing
- Metal manufacturing.

However, in practice it was often found necessary to be more wide-ranging, both in terms of hazardous substances and the industries concerned, in order to understand practices of risk management adequately.

3 FINDINGS

PART 1: Structures and procedures for setting and applying OELs within the member states of the European Union.

There are strong similarities between the various systems for setting and achieving compliance with OELs in the EU. The ACGIH list of TLVs has clearly been of major influence as, to a lesser extent, have been practices in Nordic countries and in Germany. Latterly, the influence of the EU has been responsible for further convergence. These similarities however, do not entirely override national differences apparent in the setting, status and use of OELs as well as in their legal context.

3.1 Regulatory system and responsible bodies

There is legislation on health and safety in the use of chemical substances in all countries. In most cases it is in the form of some kind of framework provision supplemented by more specific requirements relating to chemical substances. The influence of both the EU Framework Directive and EU Directives on chemical agents is evident in the structure and content of national provisions and in their increased emphasis on process based approaches to the management of risk. There is further similarity in the broad nature of the responsible bodies involved. National organisations for monitoring compliance with legal requirements on health and safety are present in all countries. They usually operate under the authority of a central Government Department or Ministry and mostly have some form of overall responsibility in both the setting and enforcement of OELs. There are differences between countries in the extent to which such national authorities:

- are regionalised in their operation,
- deal exclusively with health and safety or with labour inspection of other aspects of working conditions more generally,
- have specialised field inspectors and support services in relation to chemical safety
- are sole enforcing authorities or share this function with other agencies.

Similarities are also evident in the role of national research institutes for health and safety, which appear to play a strong, independent, advisory role in the setting and adoption of OELs in most countries.

One significant difference between countries is found in the role of social insurance associations. Their engagement in regulation is most marked in Germany (also evident in Austria), where they have rule making and enforcement authority in addition to that of the state inspectorate. The French approach and the role of the CNAM/CRAM share some of these features in their emphasis of the powers of the social insurance bodies. Another

departure from the predominant pattern of organisation of regulatory structures is found in Italy where in practice the responsibilities for seeking compliance with health and safety provisions lies with regional and local structures of the public health system (although the Labour Inspectorate has some national responsibilities and some residual shared role in especially hazardous sectors).

A further difference is seen in the role of external prevention services in matters concerning OELs. In countries where there is a legislative requirement or strong tradition for integrated occupational health services, they play a significant role in helping firms achieve compliance with requirements that involve OELs. This is the case in Nordic countries and in the Netherlands. It also appears to be the aspiration in some southern European countries such as Spain and in Greece (although it is questionable whether there is sufficient infrastructure in place in these countries).

3.2 Procedures for setting OELs

There is a strong similarity in the way in which structures for setting or adopting OELs allow for stakeholder participation. They are mostly based on tripartite models, with the addition of 'independent' expertise. In countries in which OELs are set there are also broad similarities in the procedures involved. Mostly there is a two stage processes in which the scientific/health-based issues are dealt with, usually by 'experts' (sometimes representing economic interests sometimes not, and sometimes a mixture of both) and a second process in which economic/technical issues of feasibility are considered. Here economic interests and the social partners are represented.

There are two broad patterns evident in the 14 countries studied. There are a group of countries in which there is quite detailed discussion and procedures in place for both setting and complying with OELs. These are essentially the larger northern European countries, the Nordic countries and the Netherlands. These too are the major players in setting limits at the level of the EU. There are several other countries in which systems are less developed and which adopt values from elsewhere. In these countries there was concern about the continuation in force of values that could be traced to older lists, especially those of the ACGIH, for which there was now new scientific evidence available concerning the effects of exposure. Such has been the widespread historic use of TLVs, that the speed with which these can be reviewed and if necessary, replaced is of concern in most countries regardless of whether or not they currently set their own new standards. In countries such as Italy there seems to be another level of concern about the meaning and use of OELs as legal standards. This derives from a fear that adoption at national level of EU 'pragmatic' standards that take economic considerations into account will undermine workers' constitutional right to healthy and safe workplaces. According to this argument the assumption of a level risk that is implicit in such standards is fundamentally at odds with workers' rights to health that are enshrined in the constitution.

As far as the limits themselves are concerned there are differences of detail in the values adopted. Terminology used to define them is international, such as time weighted averages, short-term exposure limits, ceiling values and annotations for special risks such as carcinogenicity, skin absorption, allergenic substances etc., but there are differences in the detail of its application to different substances in different countries. Further comparative study would be required to explore the significance of such detail.

3.3 Legal status of Occupational Exposure Limits

In most countries there are a number of OELs that are legally binding limits. In the guidance that accompanies OELs in all countries in which it was available, it is made clear that they are not regarded as *safe* limits and they are frequently accompanied by recommendations to reduce exposures to as low as is possible below the limit.

In some countries there are more than one kind of limit that has some kind of legal meaning as in the UK (although not necessarily with the same definition applying), in others there is only one limit that has a legal definition but there may be others that have the status of guidance. It is not clear from information available whether this has a significant or measurable impact on the use and enforcement of limits. Nor is it clear whether it affects the understanding of the meaning of limits by users. Further variation occurs which reflects broader variation in the regulatory systems of the countries. Thus in Italy, older OELs derived from the ACGIH list may be legally binding in some sectors because they are referred to in collective agreements which themselves have a legal status within the Italian labour relations system. In the Netherlands the social partners have achieved an agreement on the controversial use of OELs in relation to non-substitutable carcinogens in which a certain level of risk is accepted in exchange for the likelihood of increased safe working environments overall. In Germany so-called TRK values have been derived for more than 70 carcinogens. However, only recently has the decision for a systematic review of these limit values been taken.

3.4 Enforcement activity and compliance

Breach of requirements relating to binding values is either a criminal or administrative offence (or both) depending on the national regulatory system and the seriousness of the breach. Penalties are most commonly fines, the levels of which are defined usually in the relevant legislation. However the extent of the use of such penalties is difficult to determine. Enforcement activity in general has proven difficult to document from available sources. What is clear from the overview in Part 1 is that while OELs form part of the enforcement scenario in most countries the way in which such enforcement is undertaken varies. In some cases the emphasis of inspectorates is on firms achieving compliance with requirements concerning the management of the overall processes of production. Compliance with OELs as such, is therefore evidence of health and safety management working effectively, as lack of compliance would indicate the opposite. They are also enforced (at least in theory) in their own right, where there is evidence that they may be exceeded. It is accepted that there are situations in which measurement of airborne pollution will be required to assess and manage risks. While this is the responsibility of employers, in practice it is often undertaken by external expertise and the role of prevention services is important in several countries. Generally regulatory inspectorates rarely engage in proactive acts of monitoring compliance with specific OELs themselves. However, where there is concern over workplace airborne pollution that may be approaching or exceeding limits, there are requirements in some countries to inform and involve the regulatory agencies in monitoring. It is not clear how much this happens in practice.

3.5 The role and functions of OELs

The problems of understanding and use identified in the HSC's Discussion Document on the UK situation are borne out by experience in other EU countries. In the legislation and official guidance of most countries it is made clear that OELs are not solely health based, nor therefore 'safe levels'. Nevertheless, tendencies to regard them as 'safe levels' are persistent. In all countries it is recognised that small company owner managers generally have limited awareness and understanding of the meaning of OELs and therefore little capacity to apply them adequately in their risk management strategies. Their capacity to do so is also severely constrained by their limited access to support from prevention services.

It would seem that OELs have a variety of functions in the countries we have studied:

- They are used as reference tools for monitoring systematic management of chemical risks in larger organisations where there is experience and support for such a task either within the organisation or through the use of technical assistance from external prevention services/occupational hygiene consultants. This is important in sectors of industry where dangerous chemicals are in use, where substitution is not possible and specification standards for machinery and processes do not mitigate the need for monitoring performance standards. Their use in these situations may have some benchmarking value for other workplaces, however, strong evidence of widespread transfer of good practice is hard to find.
- Their use as reference tools in monitoring workplace exposures in such firms is also a useful indicator of adequate risk assessment for regulatory agencies in enforcement practices in firms in which hazardous chemicals are in use and where it is suspected that exposure levels are high. Their role in this respect is not pursued rigorously everywhere, but its existence is nonetheless important and particularly useful in seeking improvements at the 'dirty end' of industrial activities. Compliance with standards for which OELs are a reference point remains a useful indicator of good practice.
- OELs are also useful reference tools, from a scientific/technical perspective, for large scale surveillance of exposure such as has been practiced in relation to various substances in Germany, and which has helped to contribute to understanding concerning the health effects of exposures.
- They provide an important informative and educative role in raising awareness on chemical risks. Even though there is considerable ignorance of their detailed meaning (and in some cases of their existence), they are nevertheless an important reference point and objective standard for informing discourse on prevention strategies. They may also be useful 'norms' for larger employers to follow. While monitoring airborne exposures may prove difficult, the existence of OELs creates an important pressure on suppliers to provide information about the safe use of hazardous chemical products. As such they have a role in several different loci in risk assessment cycles. Moreover, they are important in determining the approach to risk assessment and in alerting employers, workers and their representatives to the need to take seriously risk management issues involved in processes concerning the use or substitution of such substances. A caveat concerning their use in this respect however concerns the need for a proper understanding of their meaning. For example, if notions that they represent safe levels, or even values above or below which dramatically different effects occur are persistent, they undermine their role and contribute to their misuse.

- Provided the caveat concerning proper understanding of their meaning applies, they may have a helpful role in defining specification standards that can be used in determining risk management issues concerning the purchase and installation of new plant. In some situations where monitoring is anyway extremely unlikely, such specification standards may obviate the need for its use.

While these are all ‘positive uses’, they also need to be seen in the context of the enormous levels of ignorance about OELs amongst users of chemical products. British research has demonstrated this quantitatively. In all countries studied, there was a strong consensus amongst interviewees that exactly the same situation prevailed in their countries. This of course leads us to question the extent to which the above ideal situations of OEL usage actually occur in practice. It also helps to explain the strong orientation amongst prevention specialists, trade unions and regulators towards the use of substitution, specification standards and technological development as means of dealing with chemical risks.

Perhaps, it is important to distinguish amongst the positive uses, those applying at national and sectoral levels that relate to organisations of employers, workers and regulators that are engaged in discourse on policy in regulating and managing hazardous chemicals; and those that apply (often to individuals) at the level of the workplace. In the former case, OELs function in a variety of ways with a number of different levels of meaning and understanding. The caveats concerning understanding notwithstanding, the majority of these functions are useful contributions to policy discourse and strategic planning concerning the regulation of risk management of hazardous substances. At the level of the individual workplace however, while the above list of functions includes some important positive uses for OELs in specific situations, there are many facets of the wider context of work that militate strongly against them applying in *all* work situations. Moreover, inspectors and trade unionists recognise many situations in which measurement of exposure to test compliance with OELs is *not* the most appropriate or practical means of achieving good risk management in the use of hazardous substances. Pragmatic strategies to achieve good practice in such situations often involve more holistic or subjective approaches, in which the notions of measurement implied by OELs are regarded as unhelpful distractions from the main business of improving the work environment. There are important changes in status and meaning that occur when OELs become part of the regulatory system. Comments received from regulatory inspectors suggest a concern that giving OELs a form of regulatory status, while having the positive effects outlined, also creates both the potential for misinterpretation and equally unwanted limitations to inspectors’ discretion.

3.6 The role of regulation and enforcement

In all of the countries in the study, post-Framework Directive moves towards process regulation of OHS management dominated the approach of the regulatory agencies. Thus, regulatory strategies focused on the means of securing compliance with a systematic approach to health and safety management rather than with breaches of individual provisions. Interviews with subjects in all countries suggest that, as in the UK, compliance (or otherwise) with OELs is not a major subject for enforcement action — nor indeed is it even a significant aspect of regulatory actions that involve hazardous chemicals.

There seem to be several linked reasons for this, most of which relate to the limited resources of both inspectors and inspected as well as to a perception that there are frequently other, more appropriate means of achieving improved risk management of chemical hazards. Thus, inspectors frequently do not have the capacity to do more than demand evidence of

measurement. They are often neither equipped nor skilled sufficiently to be able to undertake such measurement themselves. It is widely understood to be the responsibility of duty-holders to undertake measurement. This may be reasonably well acted-upon in large companies that use hazardous chemicals, but is far more seldom exercised by the owner managers of small enterprises that are also substantial users of hazardous chemicals.

A further factor in the relatively low profile of enforcement actions in relation to OELs in some countries may be the involvement of regulatory agencies in various means of securing compliance through exemplary ‘projects’ and especially through voluntary agreements such as the ‘covenants’ found in the Netherlands. These are forms of ‘reflexive regulation’ (in the sense that they represent efforts on the part of the regulatory agencies to encourage self-regulation by agreement between employers and trade unions) that often imply a changed approach to enforcement activity. Participating organizations, having agreed to meet particular specifications and to aim for performance targets agreed between themselves and the regulatory authorities, are spared external inspection of the minutiae of their activities since they are monitoring their own performance. The nature of such enforcement action that may occur in these situations is more likely to relate to failures in meeting generic systematic OHS management than it is to failures in relation to individual requirements such as monitoring of hazardous substances.

It is also the case that enforcement actions in which issues of chemical risk management are addressed, including those in which OELs may be implicated, are recorded in ways in which these aspects are not prominent. The emphasis that regulatory agency inspectors and officials placed on ‘holistic’ approaches to ensuring compliance with systematic risk management, coupled with the difficulties in interpreting recorded enforcement data mean that a considerably more detailed study of inspection practices in process regulation is required before it is possible to make a definitive statement concerning true extent of enforcement actions in which OELs are involved in the countries studies. It is unlikely however, that they would be found to be more significant than has been already demonstrated in the UK.

3.7 Monitoring workplace air

Measurement to assess risks and monitor risk management is often undertaken by prevention services and/or a variety of other consultants. A major difference between the UK and most other continental European countries is in the nature of the legislative provisions that oblige employers to use prevention services to support their management of OHS, and the further provisions that serve to define the competence of the services found in these countries. In most countries in our study such services were perceived as having a front-line role in monitoring workplace airborne exposures to hazardous substances. In some countries an additional significant role is also played by a variety of other ‘consultants’. We identified several problems with this (theoretical) position, which may contribute to undermine its effectiveness. They include:

- Variation in quality and competence of external prevention services/consultants. Despite requirements on competence, many prevention services may not possess the expertise required for sophisticated monitoring of OELs. Concerns were expressed in Sweden and the Netherlands, where it was suggested that the frequency of measurement undertaken by occupational health services had declined over the last decade even though such services were relatively abundant. The absence of a clear regulatory definition of what should constitute the technical resources and role of occupational health services and the increased trend towards the commercialisation of such services means that they are driven

by market forces to provide the kind of service that employers want. Employers who themselves are generally ignorant of the role and significance of OELs, frequently do not wish preventive services to carry out monitoring, preferring instead to concentrate their requirements more in areas such as medical surveillance.

- In Italy there has been considerable debate surrounding provisions to ensure quality of prevention services that are a product of the Law 626 (implementing the Framework Directive 89/391). But it is unclear what, if any, will be the legislative outcome of such discussion or what effect, if any, it will have on the capacity of such services to undertake airborne monitoring.
- In Greece although much is expected of their role, external prevention services for OHS are a recent development that at present means there are extremely few of such services, they reach only limited numbers of enterprises and it is unlikely they all possess the capacity to undertake sophisticated monitoring of OELs.

Whatever the capacity of prevention services to deliver monitoring of chemical pollutants in workplace atmospheres, a more significant problem concerns the limited access to such services enjoyed by the majority of enterprises. This seems to be the case regardless of the legislative provisions that control such services and require employers to use them.

It is a widespread problem and especially significant in small enterprises. It is generally acknowledged that for a host of reasons these are least well serviced by external prevention services, and relatively inaccessible to inspectorates. It is therefore far from clear how frequently or how thoroughly monitoring actually takes place in practice in such firms, or with what results.

One corollary of poor access to and service by expert prevention services is poor awareness of the existence/meaning of OELs. This is a well-documented feature of owner/managers in many small enterprises that use chemicals in the UK. Regulators and trade union specialists in other countries who were interviewed during the study were often only too aware of this problem and it was one of the reasons why they advocated alternative strategies on chemical risk management such as substitution, specification standards and generally the reliance on technological change.

4. CONCLUSIONS

If we compare the salient points of our findings with the key objectives for the revised British system that are identified in the HSC's Discussion Document, we find a broad congruence of actions and issues covered:

HSC Key Objective 1. OELs should control risks to health

They should provide standards that can be used along with other information to decide on appropriate control measures and to assess the adequacy of measures in place.

Controlling risks to health was clearly the aim of all of the OEL systems we investigated. The extent to which they were able to do so however, was subject to considerable limitations, of scope, application and user understanding that are similar to those experienced in the UK. However, none of the systems we investigated had been subject to any detailed quantitative evaluation concerning their effectiveness, either in terms of health outcomes or, more narrowly, in terms of their use in risk assessment. The qualitative evaluations on which we drew suggested broad agreement about the limitations of OELs but at the same time pointed to a widespread belief in their necessity.

HSC Key Objective 2. OELs should be readily understood and accessible

The OEL framework should be based on a clear and coherent set of concepts that employers and employees understand, but application at the workplace needs professional input.

There were variations in the extent that it could be argued that OELs were based on clear and coherent principles but widespread agreement that nowhere were they either readily understood by the majority of employers or accessible to them. As far as professional input in their use was concerned, despite the existence of legal requirements on prevention services in most of the countries we investigated, there was shortage of professional input in the application of OELs in workplaces in these countries (Germany may be a possible exception). There was a widespread belief that such input was least accessible to employers in small and medium sized enterprises and that these were the duty holders that were least aware of the significance and role of OELs. There was also a worrying notion expressed in some countries that there had been a decline in the extent to which prevention services still had the capacity to provide the professional input required.

HSC Key Objective 3. OELs should be legally enforceable

They should provide legally enforceable standards for the adequacy of control by inhalation and they are for use when prevention of exposure is not reasonably practicable

OELs were theoretically legally enforceable in all countries. The extent to which they are enforced however is not great. Records are hard to locate or understand, but the strong evidence of observers was that in all countries enforcement is not an option practised widely. The practice of substitution is an important driver of improved chemical risk management through technological change in most countries. It shows that in some cases (such as with toluene in printing for example) exposure has been prevented and it is possible to make a more concentrated effort to use OELs in assessing risks in the remaining situations where hazardous substances cannot be substituted (such as in gravure printing, for example). At the same time, regulation is widely perceived as an important driver of improved chemical risk management. However, OELs are regarded as only one aspect of such regulation and their enforcement is not viewed as particularly significant in the regulation of chemical hazards overall.

HSC Key Objective 4. OELs should be comprehensive

The OEL Framework must be comprehensive and capable of application to all substances. It should be capable of application to generic groups of substances. It must be developed and presented in such a way that it will not encourage employers to use substances without OELs that are not adequately evaluated.

The systems we examined in northern Europe are as sophisticated and as highly developed as that of the UK. Similar issues to those identified in HSE Objective 4 are of concern to those engaged in their further development. Thus, we note that even the most developed systems only deal with a small minority of chemical substances that are in use in industry. There is therefore discussion of the means with which such frameworks for OELs could be applied to generic groups of substances. Generally, strategies of substitution are based on quite thorough investigation of possible effects of alternative substances and the ethos of substitution is not one that would encourage the introduction of inadequately evaluated and potentially harmful substances. However we were not aware of any specific strategies to prevent employers from using substances without OELs that were not properly evaluated. The situation in southern European countries was less well developed and it was unclear the extent to which it was capable of addressing all these issues (although in Italy at least, there is considerable discussion of them).

HSC Key Objective 5. OELs should comply with EC legislation.

This is an issue that is under review in all of the countries we studied in detail. The anticipated division between north and south is evident. The concerns of northern European countries are with the extent to which existing systems need to be adapted and the extent to which the achievement of compatibility with EC requirements can be achieved without reducing the quality of these existing systems. In southern European countries EC requirements are necessitating more fundamental reforms. There is some questioning of compatibility of these changes with national approaches (such as the constitutional debates in Italy) and the possible influence on quality. In addition, there are issues in Italy and Greece, mainly concerning the extent of duties under the legislation introduced to transpose the EC requirements and the possibility of exemptions from its coverage, that are subject to debate.

HSC Key Objective 6. OELs should be flexible and able to take on board new developments in science and technology

In the northern European countries systems for setting and reviewing OELs were as thorough and detailed as those in the UK (in some cases possibly more so). There was some concern in these countries about delays that occurred in the process of review and the resource intensive nature of the process of evaluating new information and reconsidering OELs in its light. In terms of applications at the workplace level, technological change seemed to be the driving force for improvement in all countries. OEL systems were generally flexible enough to allow for the development of substitution and specification standards. The position in relation to the discretion of inspectors to demand improvement of exposures to below the OEL was less clear. Concerns were suggested about the role of an OEL regulatory framework in which numerical values are not properly understood, resulting in employer resistance to reducing exposure to as low as is technically feasible.

HSC Key Objective 7. OELs should provide incentives to reduce exposures

A similar situation applies here. Concerns were raised about the misuse of OELs that result from faulty understanding of their meaning (especially the notion that they represent safe limits/limits beyond which it is not necessary for employers to further reduce exposures), which could contribute a barrier to demands for the application of good practice from regulatory inspectors.

The Discussion Document identified several options for reform. The continental European experiences we have analysed would seem to indicate that Options 2 and 2A, represent the best way forward: in which good practice is either supported by a single limit or a two tier system combining good practice with special arrangements for carcinogens. Either of these approaches is consistent with our findings concerning the positive uses of OELs. They would for example:

- encourage (or at least not *discourage*) the development of substitution strategies and the greater use of specification standards within a broader framework for chemical risk regulation
- not prevent inspectors from requiring improvements that were technically feasible
- help to reduce some of the misconceptions around the notion of ‘a safe limit’
- allow the enforcement of good practice and avoid the necessity of sophisticated monitoring in some situations where it is neither economically feasible nor really necessary

Our review of the issues that confront regulating chemical risks in other EU countries suggests that the current discussion of reforms to the regulatory framework for using OELs in the UK are steps in the right direction. However, it is by no means certain that such reforms would alone be sufficient to address the problems of achieving widespread compliance with measures to assess and manage chemical risks. They will not solve the problems of risk perception and risk communication that seem to be inherent in all the national systems for setting and using OELs that we have considered. While they may help improve the practice of risk management of hazardous chemicals amongst *some* duty-holders that currently fail to deal adequately with this subject, our analysis of wider European experience suggests there is no ‘one size fits all’ approach that can be applied successfully to this subject. Such reforms that are currently being canvassed are unlikely to reach all users. In particular, they will not guarantee that the practice of understanding and using OELs would be extended to *substantially* more duty-holders amongst owner managers in small enterprises, since their problems of compliance are considerably more wide ranging than can be addressed by this type of reform alone. They also do not address other concerns that we have raised, such as the question of access to services with the competence and resources to undertake monitoring or the extent to which the regulatory inspectorates are themselves sufficiently resourced and skilled to always deal adequately with OELs.

We conclude therefore, that if substantial improvement is sought in the way in which *all* firms manage the risks of using hazardous chemicals, the kind of revision that is currently under discussion for the system of OELs in the UK would need to be part of a wider reform. It would need especially to address the issue of risk communication in rather more fundamental ways than are currently proposed. It would require integration within additional reforms that would go some way to ensure the availability and use of professional preventive services that are sufficiently competent to undertake the monitoring of hazardous chemicals. Means to effect such availability and use would also have to take account of the particular challenges represented by small enterprises, which would additionally require special attention being paid to their education and information needs. Above all, the creation of an ethos of risk awareness for all involved in the use of hazardous chemicals is necessary. Some small steps can be made in this direction by clearer meanings for OELs such as suggested in the Discussion Document. But best practice in countries such as the Netherlands and in Sweden indicates that other measures to encourage participation, to make use of the skills and experience of trade union health and safety representatives and to engage with manufacturers and suppliers are also required.

CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE PRESENT STUDY

This study was commissioned by the Health and Safety Executive (HSE) on behalf of the Health and Safety Commission's (HSC) Advisory Committee on Toxic Substances (ACTS).

In the spring of 2002 the HSC's Advisory Committee on Toxic Substances (ACTS) produced a Discussion Document (HSC 2002) that considered ways to improve the contribution that OELs made to workers' health. Its release was prompted by concerns about the present UK system, in which OELs are standards under health and safety law that determine the amount of substance allowable in workplace air. They consist essentially of two types: Occupational Exposure Standards and Maximum Exposure Limits. The present system of OELs was established in its current form with the introduction of the Control of Substances Hazardous to Health Regulations 1988. Concerns about the role of OELs arising since the implementation of these regulations in 1989 include:

- Evidence that OELs are little understood, with many employers, especially those in small enterprises, not knowing how to determine whether exposure levels in their workplaces comply with the relevant OELs
- Problems of interpretation and meaning of OELs and especially with the notion that OELs represent 'safe limits'
- Difficulties in the practicalities of applying the criteria of the system to certain substances, to the extent that it has not been possible to assign them an OEL
- Incompatibility with the EU wide system for setting OELs established by the European Commission

The Discussion Document was intended to stimulate responses to suggestions concerning the revision of the existing system. These suggestions range from relatively minor changes to advocacy of replacing the current two tier system of Occupational Exposure Standards (OES) and Maximum Exposure Limits (MEL) with the introduction of a new approach. The basis of such a new approach would be a set of single limit values more explicitly linked to good practice advice following that given in COSHH Essentials on how to control exposure to hazardous substances.

The present study was commissioned to help inform discussion of responses to the Discussion Document by providing information on OEL systems in other EU countries and how they are used in practice

1.1 AIMS AND OBJECTIVES

The study has three main objectives, which are to:

- present a review of current procedures for setting OELs in all EU Member States, including an analysis of their legal status, and their relationship to the IOELV Directive

- undertake a detailed analysis of the methods and practices of the regulatory agencies in several member states used to help achieve compliance with specific OELs and a discussion of the different meanings associated with compliance with OELs generally
- set these findings in a wider discussion of the implications of the role of OELs within the regulation of occupational health and safety management.

1.2 RESEARCH PROTOCOL, METHODS AND COUNTRIES STUDIED

There were essentially two parts to the research project. The first was to establish what were the structures and practices for setting OELs in different EU member states. The second was to consider their use in practice and especially to consider their role in regulatory efforts to secure compliance with regulatory standards for managing risks in occupational exposures to chemical substances.

In the overview that was the subject of the first part of our research we have looked at current procedures for setting OELs in all EU Member States, discussed their legal status and described the structures and procedures involved in their setting and review. We have also tried to present some flavour of the discourse in other European countries concerning the different meanings associated with OELs, compliance with them and the implications of the EU IOELV Directive for each country.

Initially we intended to limit our review to published sources and to use the information to enable us to develop the focus for the next, more detailed and fieldwork orientated part of the study. However, we encountered major difficulties when we began to search for material. International and European Union sources were both dated and very limited in detail. Scientific analysis on occupational exposure limits was largely concerned with matters that were tangential to the focus of our inquiry. National published sources of information on OEL systems in different EU countries also proved to be enormously variable in content and detail and frequently failed to address the issues that were of concern to us. There was also a substantial problem of language that we needed to overcome within our quite limited resources. To deal with these challenges in a reasonable timeframe we have made use of a network of contacts in the various countries concerned to supplement and sort the sometimes rather meagre information available from official sources. The time constraints that we imposed upon ourselves mean that the findings we have presented in this section of the report are far from complete (they are, however, considerably more complete than any other single source of information we have been able to review). Despite the gaps in information provided, we have gone further in describing national systems across the EU than we had originally intended. Their limitations notwithstanding, we hope these descriptions will prove sufficiently detailed and informative to provide a useful background to the second part of the research study.

The second phase of the project was intended as a study of practice in a selection of a small number of EU countries. Two substances were chosen as the main focus of the country studies. They were toluene and wood-dust, for which, all EU member states should have exposure limits. In practice however, to explain and understand national practices, we found it necessary not to restrict the study to experiences associated only with these substances and a more general view of practice in relation to OELs was often sought.

The selection of countries was on the basis of their providing a variety of national situations that reflected a requirement for the research — spelled out in the specification for the study — that choice of countries should aim:

“ to select Member States so as to give the full range of approaches used — from highly developed OEL systems to minimal systems.”

Ideally our choice should have included the full range of regulatory and socio-economic systems in the European Union. It should have reflected some consideration to the size, complexity and economic importance of the countries and the range of different frameworks for the setting and use of OELs that are identified in the first part of the study. However, to do this adequately would have required the choice of something in the order of seven or eight countries. Unfortunately our resources did not allow such freedom. Therefore we needed to make some compromises. We selected:

- Sweden — as a representative Nordic country with advanced regulatory provisions for OHS and a long involvement in setting and using national OELs
- The Netherlands — because of the innovative approaches that appear to be in use in relation both to managing chemical risks and in OHS more widely. Also because it represents a hybrid of Nordic and Germanic approaches to both labour relations and regulating OHS
- Germany — because of its size, economic importance and complexity, its dual system for OHS regulation, its approach to labour relations and its long history of setting and using exposure limits
- Italy — because it is a large and economically important southern European country with some unique regulatory features in its OHS system, with interesting differences in approach to that of northern Europe. As well, it had a traditional approach to exposure standards that was different to that required under the Chemical Agents Directive.
- Greece — as an example of a smaller and economically weaker southern European country with underdeveloped systems for the wider regulation of OHS as well as for setting and using OELs

In each country we undertook to identify and review available literature, focusing on:

- issues in relation to securing improved management of chemical health and safety, including:
 - perceptions of the problem
 - risk assessment
 - employer/worker awareness
 - securing compliance with OELs
- specific issues in relation to OHSM and securing compliance in relation to exposures incurred in working with processes involving wood-dust and toluene.
- status of controls for airborne exposures to these substances in each country
- degree to which such controls are applied
- measures used to achieve and monitor compliance and the extent of compliance itself.

It was anticipated that the literature would be rather limited in most countries and would not deal directly with many of these issues. This was indeed the case and other sources of information were sought. The timescale and resources of the project prevented a detailed, systematic investigation, and the approach adopted was therefore intended to be indicative rather than comprehensive. Essentially, we focused our attentions on a limited number of key informants in each country. They were a mixture of regulatory agency personnel, trade union officials and specialist researchers/professionals, all of whom were considered to be well informed and well placed to comment on the realities of workplace practices. Their views were compared with documented policy as well as with existing literature on the issues under

investigation in order to enhance and develop the picture of national practice. Specific information was sought from interviews concerning:

- the role of OELs in determining what control measures were in use in OHSM at the workplace
- the extent to which reference was made to OELs in monitoring OHSM by the labour inspectorate
- what other measures were used in addition to or instead of OELs to determine control measures and good OHSM practice.

In several countries it was possible to identify sectors in which there was relevant experience of exposure to toluene or wood-dust, in which a reasonable range of workplace size, work processes and health and safety risks were represented. Generally, the industries on which we based our interviews were:

- furniture — wood-dust and toluene, predominantly small workplaces but some medium-sized ones too
- printing — toluene, small and medium-sized workplaces
- to a lesser extent, metal manufacture — toluene, some small, but also large workplaces.

In other countries the level of information available meant that it was necessary to search more widely in a variety of sectors for relevant material.

1.3 STRUCTURE OF THE REPORT

The following report begins with an overview of current issues for the use of OELs in the regulation of chemical risks. Although the overview is based on the international literature on the subject, it focuses on matters perceived to be most relevant to current British debates and it is especially concerned with the implications of these issues for regulating the management of chemical risks at the workplace. It aims to set the scene for the investigation that follows.

Part 1 of the investigation concerned the structures and procedures for setting and applying OELs within the member states of the European Union. A subsection is devoted to each country. For ease of comparison roughly the same structure has been used in each country subsection. This is followed by discussion of the main features of comparison that emerge from the country-by-country presentations. Part 2 deals with the practice of using OELs in five EU countries selected on the basis of the features of their economies and regulatory systems described previously. It reports the findings of the interviews and literature reviews undertaken in each of the countries that we studied in more detail. It is especially concerned with the role of OELs in regulating OHS management at the level of the enterprise. In doing so however, it also takes in wider perspectives both in relation to perceptions of the value of OELs in managing chemical risks and in terms of structures and processes for OHS regulation. The national variations in these structures and processes are of direct relevance to the strategic significance or otherwise of OELs in the process of regulation. Therefore their role, and implementing and operationalising strategies cannot be appreciated fully without an understanding of this wider regulatory scenario.

Finally, a concluding chapter provides a discussion in which the two elements of the study are linked and some of the lessons for British practice that might be learned from European experience are presented.

CHAPTER 2

CURRENT ISSUES FOR THE ROLE OF OCCUPATIONAL EXPOSURE LIMITS IN MANAGING WORK WITH CHEMICAL RISKS

2.1 INTRODUCTION

Occupational Exposure Limits (OELs) are regulatory standards that are part of the current approach to regulating the management of hazardous substances at work. They fit within the wider regulation of the process of occupational health and safety management that has its roots in the recommendations of the Robens Report, enacted in the General Duties sections of the Health and Safety at Work etc. Act 1974 and given greater focus by more recent measures to implement and operationalise EU requirements, especially the Management of Safety and Health at Work Regulations. Within this general regulatory framework, they relate to provisions that deal with managing the risks involved in using hazardous substances such as the Control of Substances Hazardous to Health Regulations that provide a structure for regulating the management of all hazardous chemical substances at work, as well as to various provisions, dealing with specific substances such as lead, benzene, and VCM and those on carcinogenic substances. All these regulations and their parent Act, the HSW Act 1974 are examples of 'modern' regulatory instruments in as much as they largely concern the regulation of the *process* of managing occupational health and safety and they endeavour to provide a structure within which employers and workers can be encouraged towards achieving self-regulation of the risks of their workplaces. As one observer of the development of this international trend in the regulation of the working environment has put it, they are measures that aim to *regulate self-regulation*¹.

Exposure limits themselves however are prescriptive standards in as much as they set specific requirements concerning the precise measures of particular substances that are allowed in the air of the workplace. They are based on scientific evidence concerning what is known about the biological effects of certain chemical substances combined with what is considered to be technically and economically feasible in achieving their control. Such standards are themselves not new, they had been used as technical guidance in occupational hygiene for several decades before they were included in British regulation in 1984². However, their inclusion within the regulatory framework gave them a different status to the one they held previously and thereby raised a number of questions and concerns about their role. Such concerns have become more prominent over the last decade as evidence questioning their usefulness within the system for regulating self-regulation has mounted. This is especially so given the limited degree to which they are known and understood by duty holders³. Clearly, if many employers, especially those in small enterprises, do not know how to determine whether exposure levels in their workplaces comply with the relevant OELs, the role of such limits, in

¹ See Ayres and Braithewaite (1992). For a more recent discussion of this point see Walters (ed) 2002: 271-275

² Control limits were first introduced in 1979 followed by the HSE's EH40 Occupational Exposure Limits in 1984.

³ The results of HSE commissioned research showed that only 16 per cent of a sample of respondents from establishments manufacturing or using chemicals mentioned complying with COSHH or OELs as legal requirements for work in such situations. They demonstrated an almost complete absence of detailed knowledge or understanding of the duties associated with OELs and MELs (HSE 1997).

practice, is open to question. However, perhaps even more fundamental are questions concerning the meaning of OELs — especially ones that address the extent to which they are misconceived to represent ‘safe limits’ by users. Such questions penetrate to the core of current thinking on risk communication and risk regulation. If the definition of the level of risk represented by an exposure limit for a ‘hazardous substance’ is prone to a misinterpretation concerning its meaning and limitations, then the whole system is also likely to suffer a loss of both sense and credibility. One of the major shifts that has occurred in public policy in recent years has been the greater attention paid to societal perception of risk that has followed from the (somewhat belated) realisation that public perceptions of risk and especially of risk regulation are essential considerations if strategies on the governance of risk are to be successful. Following the catastrophic loss of public trust precipitated by governmental and ‘expert’ handling of issues such as BSE, foot and mouth disease and genetic manipulation, taking account of public trust has become a more significant aspect of regulation of risk in public policy. To do so, at very least requires a participatory approach, and a blend of clarity and transparency in both the decision-making processes and their end results.

There are also technical questions for the existing British system concerning problematic details such as the difficulties encountered in applying its criteria to certain substances, so that it is not possible to give them an OEL despite their known hazards. Such problems have contributed to a growing recognition of the need for reform.

A further matter is the need for compatibility with EU standard setting procedures. There are several reasons for this including the obvious requirement for general harmonisation in OHS regulation. More specifically, the question of the meaning of exposure limits, their toxicological basis and the issue of economic and technical feasibility of achieving best practice in the workplace have taxed regulators and practitioners for decades. There is consequently a history of standard setting structures, processes and outcomes at European level, the consequences of which policy makers and regulators are obliged to take account of at national level.

These background issues are amongst the reasons behind the decision of the HSC to review the British system. They extend far beyond the aims of the present research. However in order to place these aims in perspective it is important to be able to understand something of their wider context. Since in this study we are primarily interested in reviewing structures and procedures for setting OELs in EU Member States and analysing methods and practices used by regulatory agencies to achieve compliance with them, our discussion of the background is undertaken with these main interests in mind. We therefore begin with a brief outline of what occupational exposure limits are, and how they have developed from scientific/technical standards to regulatory ones. In doing this we also consider some of the key issues that have exercised participants in the process of setting limits and in particular, questions of technical and economic feasibility that lie at the core of many of the debates surrounding regulating the risks of chemical substances. This leads to consideration of some relevant aspects of the relationship between societal risk perception and regulating the management of hazardous chemicals at work. Finally, we draw these various threads together with some comments on the likely role of OELs in modern European approaches to regulating the management of hazardous chemicals at the workplace and identify some of the policy questions for regulating the (systematic) management of workplace chemical risks in the EU.

2.2 WHAT ARE OCCUPATIONAL EXPOSURE LIMITS AND HOW HAVE THEY DEVELOPED?

Occupational exposure limits for airborne concentrations of hazardous substances are essentially measurable values of airborne (and therefore breathable) contamination by chemical substances that are points of reference for the development of workplace strategies to protect workers from health risks associated with inhalation of chemical substances. Beyond this extremely vague generalisation lie a number of levels of complexity and contradiction about which space precludes any more than the most circumspect outline.

Exposure limits have been proposed by individual researchers for particular substances and classes of substances since the late 19th and early 20th centuries (Hanson 1998). Several lists were published in Europe and the US in the 1920s and 1930s but the most influential was that of the American Conference of Governmental Hygienists (ACGIH) which published its first Threshold Limit Values (TLVs) in 1946. The list was adopted by the US federal government as its official standards in 1969. Although from the outset certain other countries such as the USSR and the Federal Republic of Germany have determined their own limits, the dominant role that the ACGIH TLVs have played as a reference list for exposure standards in industrialised countries is well documented.⁴

The development of single figure exposure limits such as were found in the ACGIH list has been well described by Piney (1998) who applies Kuhn's (1970) theoretical explanation of the role of the paradigm concept in scientific communities to trace the development of TLVs in the US. He suggests that in the 1940s the history of science-based exposure standard setting, which until then could be characterised as being in a (pre-scientific) pre-paradigmatic stage, changed into a (scientific) paradigmatic period that was shared by both the science-based professions of industrial hygiene and industrial toxicology⁵. Fundamental to this approach was the notion that it was theoretically possible to prevent risks to health through a combination of industrial toxicology and occupational hygiene that could quantify exposure levels of hazardous substances in workplace atmospheres with an exactness that would enable distinguishing between those atmospheres in which there was no risk to health and those in which levels of contamination with hazardous chemicals posed a threat. Unfortunately, reality has proved to be more complicated than this. While the approach and the ACGIH TLV list itself have been enormously influential in industrialised countries worldwide, for many reasons, it is an approach now recognised to have considerable flaws.

From the 1970s, other countries, notably those in the EU, began to develop their own lists, although the influence of the ACGIH list was still widely felt in these separate national approaches. It is generally acknowledged that the TLV list is the most widely circulated and

⁴ See for example, Cook 1985, Hanson 1998, Mendeloff 1988, Piney 1998, Stokinger 1984, 1988 and Ziem and Castleman 1988 for accounts of the history of the development and use of TLVs

⁵ What this means essentially is that prior to the 1940s several approaches to exposure standards can be traced, in particular the use of specification standards in which controls were specified but control effectiveness was not. The development of the profession of industrial hygiene was strongly linked to the measurement of the effectiveness of controls and hence to the use of exposure standards. Combined with the professional concerns of industrial toxicology (health effects of exposures) such standards could be used to achieve (theoretically) risk free atmospheres. Thus the paradigm of single value exposure limits was a powerful binding notion for the two science-based professions to develop a truly preventive approach to preventing damage to workers' health. While acknowledging oversimplification (which does not account for the criticism of the OEL paradigm from within the industrial hygiene community), this explanation of the mutually reinforcing growth of the profession of occupational hygiene and that of the status of the TLV list is nevertheless persuasive (see also Piney 1989).

significant set of exposure standards in the industrialised world and its formal and informal influence on various national policies and practice is considerable. The varying degrees of this influence are evident in arrangements for exposure limits that are in place in the countries that are the detailed concern of Part 2 of this report. For example:

- Germany's limits (Maximale Arbeitsplatzkonzentrationen — MAKs) have developed separately from ACGIH and are said to be based exclusively on scientific information about health effects. Its documentation states that 'scientific criteria for the prevention of adverse effects on health are decisive, not technical or economical feasibility'⁶. Carcinogens and genotoxic substances are given TRK values because it is accepted that such limits cannot be based exclusively on health considerations⁷. There is no longer any explicit influence of the ACGIH on the development of exposure limits although they were used historically.
- In Greece, occupational exposure limits are a relatively late addition to national regulation of occupational health and safety. There is an agreement between the Greek national health and safety institute (ELINYAE) and the ACGIH and since 1997 the latter's list is translated and published in Greece.
- Italy has a history of not including limit values in national legislation, preferring a general requirement on employers to reduce levels of workers' exposure to as low as is technically feasible⁸. However, certain collective agreements such as for example the one that exists in the chemicals industry provides for the adoption of the exposure limits in the ACGIH list. Since such agreements have legal status in Italy this means that the standards in the list are also legally binding.
- In the Netherlands until 1977, the ACGIH TLV list was used. The first official Dutch list of MACs was published in 1978 but it consisted largely of the ACGIH TLV list of 1977. Since then, new MACs and changes in existing MACs have been established according to a procedure which separates evidence on health effects from issues of economic and technical feasibility. However a large number of current OELs remain those adopted from the ACGIH list (around 300 such substances are currently under review⁹).
- Sweden also has had its own system since 1969 — although the list issued at this time was based almost entirely on the TLVs of the ACGIH. Since 1978 it has made a concerted effort to separate the decision-making processes dealing with scientific issues concerning the health effects of chemicals from those that deal with economic and technical feasibility. This has had an effect of gradually reducing the levels of exposure limits. According to Hanson (1998) there has been a 3.9 per cent average yearly reduction of the values of exposure limits overall, a 5 per cent reduction for solvents and a 10 per cent reduction for carcinogens, generally giving Sweden the lowest limit values in Europe.

Discussion on exposure limits at EU level was an inevitable development of Directives intended to address the control of hazardous chemical agents that made their appearance

⁶ See *Senatskommission 1996:9*.

⁷ "the present theory of chemical carcinogenesis indicates that even the lowest doses will produce some genotoxic damage irrespective if the observation or non-observation of tumour formation in finite experimental conditions (*Henschler 1991:15 quoted in Hanson 1998:37*)

⁸ *But implementation of the IOELV Directive clearly changes this (see chapter 6)*

⁹ *A similar situation exists in the UK where something like 350 substances have an OES that is unchanged since the last TLV list of 1980 and have not been assessed by the ACTS/WATCH committee to see if the OES criteria are met.*

during the 1970s and 1980s¹⁰. Stemming from such legislative actions came moves towards setting European exposure limits during the 1990s. Reflecting national concerns about the meaning of exposure limits, debate about the scientific basis and meaning of limit values (see below) was a central feature. A Scientific Committee on Occupational Exposure Limits (SCOEL) was established to make proposals for both ‘health based’ OELs and ‘pragmatic’ OELs. Proposals for ‘health based’ OELs are those it defines as limits that have been made where a clear threshold dose can be defined from the total available scientific data, below which the exposure to the substance in question is not likely to lead to adverse health effects (known as Indicative Occupational Exposure Limits — IOELVs). Proposals for ‘pragmatic’ limits are those set despite the knowledge that for some adverse effects (such as for example genotoxicity and carcinogenicity) it is not possible to define a threshold of activity and in such cases any level of exposure represents a risk (known as Binding Occupational Exposure Limit Values — BOELVs¹¹).

These proposals are the first step in the process in which EC limits are made. Following opportunities for comment from government trade union and industry representatives in member states, they are forwarded to a tripartite group at European level that considers issues of feasibility. The European Commission includes the limits that are the final outcome of these processes in an Indicative Occupational Exposure Limit Value (IOELV) Directive. They are then considered by a committee of representatives of member states (known as a Technical Progress Committee) and adopted by qualified majority voting.

Under the framework of the Chemical Agents Directive, which sets requirements on compliance with limits for substances with IOELVs, the IOELV Directive requires member states to set a limit that takes account of the IOELV. In the following chapters we will examine the extent to which national structures and processes reflect these requirements in relation to the structures and processes for setting OELs and their legal status (Part 1) and in regulatory strategies to improve the management of occupational health and safety for hazardous substances (Part 2).

2.3 SOME KEY ISSUES IN UNDERSTANDING THE MEANING AND USE OF EXPOSURE LIMITS

OELs have moved from the domain of occupational hygiene and industrial toxicology, where they were originally conceived essentially as reference material for specialists involved in monitoring occupational exposures to hazardous chemicals, to legally enforceable limits that feature in regulatory strategies. This has meant that the key issues involved in understanding the meaning and use of OELs, have both increased in significance and altered in nature. Such

¹⁰ For example, in 1974 the European Council initiated a Social Action Programme that included specific reference to health and safety. It led to new Directives on safety signs, and vinyl chloride monomer. In 1978 the first Action Programme specifically on health and safety was announced. The most significant legislation made under this programme was a framework Directive on the control of chemical physical and biological agents at work, known as the “harmful agents directive” (80/610/EEC, later amended by 88/642/EEC). There were further directives on asbestos, lead and noise. Outcomes that were achieved at this level had a significant impact within member states, where the approach of the directives towards the assessment of risk, was arguably an influence on the development of national strategies in the UK on the control of substances hazardous to health.

¹¹ For BOELVs member states are required to set a limit based on but not exceeding the BOELV. Few BOELVs have been set either by the Chemical Agents Directive (CAD) or the Carcinogens Directive. For those set under the CAD, the duties on employers are the same as those required for IOELVs. For those set under the Carcinogens Directive the requirement is to reduce exposures to as low as is technically possible.

issues are critical aspects that influence the development of policies on OELs and in the user and public understanding of such policies. The predominant ways in which these changes have been interpreted and applied in the different countries in the study has helped to shape the way that OELs are perceived, valued and used. An outline of the general background to some of the key issues of meaning and application of OELs is therefore relevant.

Health based values and what is technically feasible — Recent discourse on the OELs that are used in practice in the countries of the EU, goes to some lengths to be clear that they do not represent ‘safe levels’ of exposure for all workers, nor is it intended that they should set a limit below which it is unnecessary or undesirable to reduce exposures further. The SCOEL is quite clear about this, stating for example:

“It should however be emphasised that it is always prudent to reduce exposure as far below OELs as can reasonably be achieved, in order to provide the greatest degree of health protection”

The introduction to the ACGIH TLV list explains that TLVs are intended for use in the practice of industrial hygiene, they do not represent fine lines between safe and dangerous concentrations of hazardous chemicals. However, the originators of the list were confident that TLVs would protect the majority of workers from harm and they have been thus extensively promulgated as essentially safe levels of exposure under which “*nearly all workers may be repeatedly exposed, day after day, without adverse health effects*¹²”

There are a number of well-documented reasons to believe that it is a fundamental misconception to regard TLVs as ‘safe levels’. The evidence on which they are based has in many cases been shown to be alarmingly incomplete. Historically it has been reliant on a substantial amount of unpublished (and unevaluated) corporate information, and the ACGIH committee itself has been accused of being prone to corporate bias (Castleman and Ziem 1988). Since TLVs are intended to protect ‘normal’ workers but not those that may be particularly sensitive to chemical exposures, it is clear that ‘normality’ excludes a substantial proportion of workers. Perhaps most tellingly, harmful effects at levels below TLVs are easily found in the ACGIH’s own documentation (Roach and Rappaport 1990), as well as elsewhere in the scientific literature and (Ziem and Castleman 1989).

One reason why the US ACGIH system attracted so much criticism once it took on a degree of federal regulatory significance is the considerable blurring in its approach between the procedure used to derive a so called ‘health based’ standard and the question of technical and economic feasibility¹³. Modern civil society demands far more clarity and transparency on issues of risk assessment than was evident in the ACGIH procedures, which, at best, could be described as a form of expert risk assessment in which the expert’s own socially constructed assumptions about risk (that is those influenced by their own social as well as scientific experiences) remained unquestioned and at worst, a system in which key economic considerations of industry covertly determined levels that purported to be scientifically derived health based standards.

¹² *Quoted from the preamble to the TLV List still appearing in the 1990s (ACGIH 1996: 3, in Hanson 1998: 21)*

¹³ *Technical and economic feasibility are terms that appear frequently in the literature qualifying and explaining the setting of OELs. Within a UK context the terms largely equate with notions of reasonable practicability such as defined by British case-law. Where technical feasibility appears alone it might appear to mean something that could be technically possible to achieve without regard to cost. However in practice, it is seldom used to mean this as it is almost impossible to distinguish something that is technically feasible from consideration of the costs involved in its technical achievement. We have therefore tried to reflect this by using the term ‘technically and economically feasible wherever possible.*

Once OELs started to play a role in regulatory policies, European policy makers have attempted to avoid this confusion by creating clearer demarcations between the procedures that deal with the science of deriving a health-based limit and those that deal with setting a value that is believed to be technically and economically achievable. The first of these procedures involves the scientific assessment of evidence of the harmful effects of a substance, undertaken by persons judged to possess the scientific competence to do so. The second engages the involvement of stakeholders in debate about the extent to which it is possible to agree measures to protect workers, that are at the same time economically and technically feasible to implement in the workplaces affected.

One size fits all and the ‘dirty end’ — Different processes (and sometimes industries) cause different distributions of exposure. The major problem for standard setters in setting single all encompassing figures as limits is how to deal with those processes (industries) causing the greatest exposure. If single level exposure limits are set to accommodate, for example, a powerful lobby from a particular branch of industry that argues it is not economically or technically feasible to reduce exposure below a certain point in that industry, the same OEL is likely to apply to exposures in other industrial sectors, even though in such sectors it may be technically and economically possible to reduce levels of exposure to well below this OEL. Critics of existing OEL systems point out that in many cases it is the so-called ‘dirty end’ of industry (i.e., the sector of industry in which exposures are greatest and most difficult to control) that in fact plays a powerful role in determining the value that is eventually agreed to be economically and technically feasible, despite this sector of industry perhaps only accounting for the exposure of a relative minority of workers. While it may be argued that there is nothing that prevents the rest of industry reducing the level of exposure to as low as possible below the OEL, and in many cases regulatory agencies recommend building safety factors into the use of the limits (such as working to a percentage of the value that represents the actual limit), the message that is conveyed by the legal status of the limit is that employers are only required to do as much as is necessary to demonstrate they are within it. There is often no legal incentive to do more than this. Since exposure limits do not represent safe levels for the health of workers, this approach potentially has the effect of unnecessarily increasing the risks faced by the majority of workers to suit the technical and economic needs of a minority of employers in parts of industry in which exposures are greatest.

Participatory approaches to standard setting — The European approach is also a product of a regulatory strategy for occupational risks in which an orientation towards process regulation has been a feature characterising regulatory systems for OHS in northern European countries since the 1970s. This is especially the case in the Netherlands, the UK and in Scandinavian countries, but latterly it is also true more generally across the EU, as EU Directives based on this approach are implemented and operationalised in all EU countries. In efforts to ‘regulate the self regulation’ of risks at work the characteristic elements of defining the extent of employers’ duties, information and consultation rights for workers and levels of competence for support services are (more recently) coupled with measures to ensure that the management of risks is undertaken in a manner in which employers discharge their duties competently, (with the assistance of competent prevention services for example), and systematically (by integrating OHSM into the core management of the enterprise and by through assessing and controlling the risks of their activities) and involving workers and their representatives in participative approaches to OHSM. At the sectoral and national levels, risk assessment and control is also largely envisaged as a participatory process in which stakeholders, primarily employers and trade union representatives, (that is, those that ‘create the risks and those that work with them’),¹⁴ engage with representatives of regulatory bodies in both developing and

¹⁴ To paraphrase the words of one of the significant harbingers of this system, Lord Alfred Robens (Robens 1972)

implementing strategies of risk assessment and control. The means and structures by which OELs are discussed and defined are part of this approach and are probably best understood as an aspect of this wider development rather than as unique structures and procedures for dealing with the regulation of chemical risks.

Chemical hazards and ‘risk society’: OELs, the social construction of risk and risk communication — Whatever the infrastructural context of OELs-in-the-making, the importance of the status, clarity and transparency of the decision-making involved has become fundamental in societies in which concepts of risk, governmental roles and responsibilities in its regulation and accountability of duty holders to the public have all gained increased prominence. In the ‘risk society’ described by social analysts of late modernity¹⁵ it is often the ‘invisible risks’ of life that characterise societal concerns. Issues of trust and public understanding of the scientific reasoning behind decision-making in environmental matters have become such that regulators and decision-makers have been forced to rethink their approaches to risk analysis and take both public perceptions of their activities and public engagement with them more seriously. The political consequences of not doing so have been shown to be of sufficient significance to force governmental policy makers to give at least some consideration of the notion that expert risk analysis is itself not free from social constructions of reality and to move towards systems for decision-making on public policy on risk regulation in which such considerations can be addressed.

Debate on the relationship between regulation and risk has burgeoned in recent years and discourse has become increasingly sophisticated as analysis of the subject has deepened¹⁶. As Hutter elaborates, regulation is a form of control in which risk itself is not prohibited, rather it is an attempt to manage it, in which structures, routines and procedures are constituted ‘*which will be incorporated into organisational routines and also become part of everyday individual activity. Where this fails the law can intervene through more overt forms of control, notably external regulation and sanctions.*’ (Hutter 2001:5).

In the case of OELs, what this means is that the participants in the processes of setting limits and the information generated as a result of the process should be more representative of users as well as experts. They should be clear that what is being set by their contribution to the process, is not a ‘safe limit’ but rather a tool in the assessment and management of risk, which, if it is properly applied should contribute to more effective and systematic management of health and safety in the use of hazardous chemicals. Unfortunately (even if this were true) it does not necessarily follow that actual users of OELs will be in the same position. Indeed, one of the most significant problems with the current British system is the considerable absence of understanding amongst employers and managers, especially in smaller firms, about OELs and how to comply with them (HSC 2002:19) coupled with a widely held belief that they are ‘safe’ limits. As HSC points out this latter view is probably reinforced by the fact that once a limit has been met the employer has fulfilled his/her legal obligations. As we shall see in the other countries that are the focus of Part 2 of the present

¹⁵ *Social science approaches to risk in society since the 1990s have been particularly influenced by the work of Giddens (1990) and Beck (1992).*

¹⁶ *See for example, Ayres and Braithewaite 1992, Gunningham and Johnstone 1999, Hutter, 1997 and Hutter 1999, in relation to the development of regulation on occupational health and safety and the environment. More generally see Colebatch 1989, Bardach and Kagan 1982, Hancher and Moran 1989 and Selznick 1980 for the theoretical analysis of the role and meaning of regulation in advanced industrial societies. See Ericson and Haggarty on the relationship between risk and regulation, Jassanoff et al 1995, Nelkin 1992 and Wynne 1994 and 1996 on the relationship between risk and science and for a more specific attempt to relate the theoretical analyses of risk and regulation to occupational health and safety management see Hutter 2001: 2 – 23.*

study, such problems are also much in evidence in systems that do not share either the particular history or the features of the present British approach.

While it may be that some of these problems of user understanding could in practice be tempered by a revision of the system to include a clearer obligation on employers to reduce risks to as low as technically feasible below the OEL for example, it is far from certain that they would dispel the myth that the OEL represents a safe level. A much broader question which also perhaps should be stated, is: to what extent has the introduction of a system of limit values with the legitimacy of legality, contributed to the development of a totemic significance for the notion of a numerical value that can *delimit* one state such as safety, from another, such as danger, in the use of hazardous chemicals. Clearly, if this is the case it is part of a much wider problem of perception in which the notion of *measurement* implies the existence of numerical values that can distinguish precisely between one such state and another. This is a misrepresentation of reality, but one likely to require widespread re-education and policy reorientation to dispel. One of the side aspects of the investigations of ways of achieving compliance with OELs in other member states that are the subject of Part 2 of this report is the extent to which these issues feature in other European national systems. It is a question we will return to in the final chapter of this report.

2.4 CONCLUSIONS: BUT WHAT ABOUT USING OELS?

As we have tried to demonstrate in the foregoing sections, there is a wealth of material analysing the origins, development and status of occupational exposure limits. There is also much critical discussion of the reliability of the evidence on which different kinds of exposure limits have been set as well as what they actually mean in terms of the protection of workers' health. It is far beyond the scope of the present chapter to present anything more than an outline of some of the salient aspects of this material. Similarly, there is a substantial field of literature dealing with approaches to regulating risks in society, dealing *inter alia* with assessing risks, the social construction of risk and risk communication, all of which are relevant to strategies on setting exposure limits. There is also a growing literature on changing approaches to regulation of the occupational environment. Again we have been able to do little more than touch upon a few of the relevant issues from these fields that have a bearing on our interests in occupational exposure limits.

While there is an abundance of material that considers the issues surrounding OELs at the level of their making, status and meaning, the same cannot be said about literature that analyses their use at the workplace. Indeed in a review of the extensive literature on OELs, such issues as how they are actually used (or *if* they are actually used) are conspicuous largely by their absence. It is disconcerting to discover that such limited attention appears to have been devoted in the literature to what is actually done in practice with OELs following the extensive debate that has taken place concerning their status and meaning. This is especially so given that what little information that does exist suggests that at least in the UK there are a majority of employers who neither understand their meaning nor use OELs appropriately, despite being significant users of chemicals in their work operations (HSE 1997, Piney 2001).

In Part 2 of the report we will seek an indication of practices in other European countries. This will include considering practices amongst duty-holders with responsibilities concerning risk assessment in the use of hazardous chemicals that imply a possible requirement to understand and use OELs. It will also mean gaining an indication of the role and level of risk assessment in strategies for systematic OHSM that are in place in the different countries and the approach taken by the regulatory inspectorates to achieve this form of process regulation.

Suggestions of a similar experience in these countries to that found in the UK concerning the understanding and use of OELs amongst this group, will lead us to some further discussion of these issues in the final chapter of the report.

PART 1 A REVIEW OF SYSTEMS FOR SETTING OELS AND THEIR LEGAL STATUS IN EU COUNTRIES

Part 1 contains an outline of the national situations for setting and achieving compliance with Occupational Exposure Limits in 14 member states of the European Union. The countries covered are:

Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden

CHAPTER 3

A REVIEW OF SYSTEMS FOR SETTING OELS AND THEIR LEGAL STATUS IN EU COUNTRIES

In this chapter, Member States have been arranged in alphabetical order. To facilitate ease of comparison, information has been structured in the same way for each member state. This inevitably results in a certain amount of repetition in description. Also, because there is more documentation available for some countries than others it means that there is considerable variation in detail between countries and there are some instances where there is so little meaningful information available in relation to some of the headings in our structure that for these countries they have been omitted.

Following the description of the systems for setting OELs and their legal status in each of the fourteen countries reviewed, we present some general conclusions.

3.1 AUSTRIA

Regulatory system and responsible bodies^{17 18} — The Ministry responsible for H&S is the Federal Ministry for Economy and Labour (“Bundesministerium für Wirtschaft und Arbeit” – BMWA). It took over in mid-2001 from the Federal Ministry of Labour, Health and Social Affairs (“Bundesministerium für Arbeit, Gesundheit und Soziales”). Within the Ministry, Section IX, department 4 is responsible for Labour Inspection and workers’ protection.

The EU Directives 80/1107/EEC and 89/391/EEC have been transposed into national law by the Federal Law on Safety and Health at Work (“Bundesgesetz über Sicherheit und Gesundheit bei der Arbeit” - ArbeitnehmerInnenschutzgesetz – AschG).¹⁹

Limit values are developed and adopted in a three-step procedure involving a scientific committee, the Central Labour Inspectorate and the Advisory Committee for Workers Protection (“Arbeitnehmerschutzbeirat”).²⁰ The Ministry has recently published a new list of OELs (“Grenzwerteverordnung”).²¹

Within the Ministry, the Central Labour Inspectorate (“Zentral-Arbeitsinspektorat”) is responsible for the surveillance and enforcement of the OELs.²²

Occupational Exposure Limits²³ — The Austrian system recognises two types of OEL:

- Maximum Workplace Concentrations (“Maximale Arbeitsplatzkonzentrationen” – MAK)
- Technical Guidance Concentrations (“Technische Richtkonzentrationen” – TRK)

¹⁷ <http://www.bmwa.gv.at/gp/b302.htm>

¹⁸ <http://www.bmags.gv.at/bmags/OHSa/at/information/organisaNA.htm>

¹⁹ *Bundesgesetzblatt für die Republik Österreich*, 17 June 1994, updated the last time in 1998

²⁰ *Grenzwerteverordnung 2001*, *Bundesgesetzblatt für die Republik Österreich*, 27 July 2001, p. 1469ff

²¹ *Grenzwerteverordnung 2001*, *Bundesgesetzblatt für die Republik Österreich*, 27 July 2001, p. 1469ff

²² http://www.bmwa.gv.at/org02/org_fs.htm

²³ *Grenzwerteverordnung 2001*, *Bundesgesetzblatt für die Republik Österreich*, 27 July 2001, p. 1469ff

A MAK value is a time-weighted average, which represents the maximum allowable concentration in the workplace of a working material in the form of gas, vapour, or air-suspended matter which, according to the present state of knowledge, generally does not impair the health of the workers even through repeated and prolonged exposure. They are established for persons of employable age.

A TRK value is the time-weighted average, which represents the concentration of a dangerous working material in the form of gas, vapour, or air-suspended matter in the air at the workplace, which can be achieved according to the state of the art in technology.

TRK values are only established for those dangerous substances for which no health-based values can be established. Compliance with TRK values only reduces the risk of adverse health effects, but cannot exclude them.

The MAK and TRK values were published in the Federal Law Gazette for the Republic of Austria (“Bundesgesetzblatt für die Republik Österreich”) of 27 July 2001. This law also contains a list of carcinogens in Annex III.

Definitions against which exposure is assessed²⁴ — MAK and TRK values are time-weighted for a shift average of normally 8 hours daily in an average weekly working-time of 40 hours. For a 4-shift-premise, the basis is 42 hours per week on average for four consecutive weeks. For some substances, the average is calculated over the period of a year.

Short-term exposure values are normally established for a period of 15 minutes. They are only allowed for a maximum of one hour within the 8-hour period. The given short-term exposure values, when characterised as ceiling values, must not be exceeded at any time.

MAK and TRK values are established for single substances (not for mixtures), expressed in ml/m³ — (equivalent to parts per million (ppm) for volatile substances and in mg/m³ for non-volatile substances, and defined at 20°C and 101.3 hPa. Additional regulations are given on how to deal with mixtures, carcinogens and wood dust.

Notations are given for the following effects:

- “S” for sensitising substances which cause allergic reaction even if the MAK value is not exceeded
- “H” for substances, which can penetrate the skin easily and for which therefore the risk of being absorbed via the skin is much higher than risk being inhaled

Procedure for setting of OELs — The only two legally established ‘bodies’ which deal with health and safety protection of workers are Section IX of the Ministry of Economy and Labour and the Arbeitnehmerschutzbeirat²⁵.

The Arbeitnehmerschutzbeirat is composed of representatives of the social partners, Labour Inspectors, the responsible Ministry and other Ministries affected by the issues discussed, and the Insurance Association for Occupational Accidents etc. It meets regularly and is chaired by the head of the Central Labour Inspectorate. Its main task is to act as an advisory committee for the Ministry on basic questions of health and safety at work, including the review of the

²⁴ Grenzwerteverordnung 2001, Bundesgesetzblatt für die Republik Österreich, 27 July 2001, p. 1469ff

²⁵ <http://at.OHSa.eu.int/systems/arbaufsicht.stm#12>

existing OEL list. It also considers drafts of proposed laws and regulations. It has the power to establish specialised working groups, one of which is the expert group for OELs, which develops the recommendations for occupational exposure limit values. Members of the expert Committee are nominated by the various interest groups (amongst which are the employers and the trade union confederations) according to the statute of the Arbeitnehmerschutzbeirat. In addition, the Committee can consult additional experts including scientists in the field of occupational health and safety, occupational hygienists, epidemiologists, experts representing the social partners, occupational physicians etc.²⁶ Because the expert group on OELs is ‘only’ a working group of the Advisory Committee, it doesn't have an official name.

Proposals for changes/amendments/new OELs are submitted by either the Ministry (Section IX) or by social partners, and less often by members of the scientific expert group itself. In contrast to the German MAK Commission, the expert group does not act on its own initiative. The agenda is prepared by the Central Labour Inspectorate or “Zentrales Arbeitsinspektorat” (as part of the Ministry and Section IX) which also chairs the meetings.

The Committee evaluates available data in the scientific literature. In contrast to the German MAK Commission, no criteria are defined for extrapolating results from animal tests to health effects for human beings. The Committee takes case-by-case decisions: for example when it has more up-to-date data available than those on which the German MAK values are based or if for example the Nordic countries publish criteria documents justifying lower limit values. This is the place where social-economic aspects are taken into consideration including technical feasibility and possible economic consequences for industry.

Based on its evaluation, the Committee develops a list of criteria documents (Begründungen), which the Central Labour Inspectorate (“Zentral-Arbeitsinspektorat”) presents to the Advisory Committee for Workers Protection. The list is normally not further discussed in the Committee because the interest groups are also represented in its expert group on OELs. The changes of the OEL values or changes in the content (e.g. in criteria, definition, the text etc.) then undergo a type of legal ‘screening’ by Section IX in order to make them compatible with other laws and legislation. After having been sent out for the final comments of Social Partners, other Interest Groups and all other Ministries, the Minister of Economy and Labour publishes them in the Official Gazette.

Legal status of occupational exposure limits^{27 28} — OELs published in the Grenzwerteverordnung are legally binding within the frame of the exemptions given within the regulation. Infringements of the provisions foreseen in the relevant legislation (Arbeitnehmerschutzgesetz in conjunction with the Gefahrstoffverordnung) can be punished with fines between 145 to 7,260 EUROS, in cases of repeated violation a fine between 290 and 14,530 EUROS is possible.

A weakness of the procedure is that the regional authority which is responsible for pursuing the issue and deciding about fines and enforcement actions, is also - within the scope of another legal procedure - the official authority which approves/authorises the running of a plant. This can lead to a conflict of interests.

²⁶ This and the following information was provided by the Austrian SCOEL member

²⁷ Bundesgesetzblatt für die Republik Österreich, 17 June 1994, updated the last time in 1998

²⁸ Verordnung zum Schutz vor gefährlichen Stoffen (Gefahrstoffverordnung - GetStoffV). Vom 26.10.1993 (BGBl. I S. 1783), ber. S. 2049, geändert durch Art. 1 der Verordnung vom 10.11.1993 (BGBl. I S. 1870)

What is meant by compliance? — The obligations of employers are dealt with in Section IV of the Arbeitnehmerschutzgesetz.²⁹ According to the provisions in this section, employers have to assess the possible risks associated with the use of chemical agents and must ensure that MAK values are not exceeded. They have to aim at values far below the established values. For substances with a TRK value, employers are obliged to reduce the concentration of the substance as low as possible.

Employers have to establish emergency measures in cases where the limit values might be exceeded accidentally. For dangerous substances for which neither a MAK nor a TRK value is established, employers must ensure that the concentration as a gas, vapour or dust is as low as possible. In cases where a substance is assigned an OEL, exposure has to be measured regularly either by an internal or an external service. In cases where the OEL is not exceeded, measurements have to be repeated regularly. The time interval between these measurements depends on how close the measured concentration is to the established OEL. In cases where the OEL is exceeded, immediate measures have to be taken to remedy the situation.

Who enforces the exposure limits? ^{30 31 32} — The surveillance and achievement of compliance with the workers' protection legislation is dealt with in the Law on Labour Inspection of 1993 ("Arbeitsinspektionsgesetz" - ArbIG).³³

The Central Labour Inspectorate is part of the Federal Ministry of Economy and Labour. There are 19 regional Labour Inspectorates and 1 Labour Inspectorate for building works directly subordinated to the Central Labour Inspectorate. It employs about 550 persons in total of which about 300 are workplace labour inspectors. They look after about 210,000 work places and monitor compliance with safety regulations for about 2.4 million employees. Most of the Labour Inspectorates have a technical department and a safety department to protect various groups (pregnant women, young people etc.). Every Labour Inspectorate has a special medical service.

The labour inspectors have the right and the duty to:

- support and advise employers and employees in questions of safety
- enter and control enterprises, workplaces and building-sites at any time
- question employers and employees and demand written information
- view material concerning the safety regulations and the working conditions
- take photos and measurements
- take samples of working materials and have them examined
- collect information about working materials and machines from the producers and dealers
- apply to the relevant authority for regulations concerning the employees security
- treat each source of complaint confidentially.

An announcement of a visit is explicitly forbidden.

²⁹ *ArbeitnehmerInnenschutzgesetz; Bundesgesetzblatt für die Republik Österreich*, 17 June 1994, updated the last time in 1998

³⁰ <http://www.google.com/search?q=cache:U5BerJHYHjQC:at.OHSa.eu.int/systems/arbaufsicht.stm+arbeitnehmerschutzbeirat&hl=en>

³¹ <http://www.bmags.gv.at/bmags/OHSa/at/information/organisaNA.htm#5>

³² <http://at.OHSa.eu.int/publications/pdf/aiinfo.pdf>

³³ *Bundesgesetzblatt für die Republik Österreich*, Nr. 27

Enforcement activity³⁴ — There is little published information available that makes it possible to relate enforcement activity directly to OELs in any detailed way. However, the following provides some indirect indicators:

- In 2000, out of a total of 56,376 investigations that took place the Labour Inspectorate performed 945 in the field of chemical agents
- The medical service performed 1,548 investigations, of which 202 took place in the field of chemical agents
- Out of 119,139 work accidents, 2,924 were related to chemical agents of which 3 were fatal
- Out of 1,136 recognised occupational diseases; at least 692 were related to chemical substances
- Out of 39,258 workers who were examined, 29,179 were examined for being exposed to chemical agents, of which about 60 were considered not to be suitable for working with such agents
- Out of 11,672 infringements with respect to general procedures, 6,284 infringements were registered with respect to risk assessment and risk documentation.
- *1,297 infringements with respect to dangerous substances in general were registered, of which 198 were related to OELs.*

The Central Labour Inspectorate does not perform measurements on its own, but depending on results of the visits of the local labour inspectors, it asks the Central Office for Accidents and Occupational Diseases³⁵ (of the Federal Accident Insurance Institution) to perform measurements.³⁶ The results of these measurements are kept at the local offices of the Labour Inspectorate but are not publicly available because they are the result of an official legal procedure. In some cases (e.g. for wood dust, solvents or isocyanates), the Central Office performs - within the framework of research projects - systematic measurements in order to get an overview of a specific type of exposure. The results of these research projects are published as technical reports and are publicly available.

3.2 BELGIUM

Regulatory system and responsible bodies³⁷ — The Ministry responsible for H&S is the *Ministère Fédéral de l'Emploi et du Travail*.

The basic legislation dealing with H&S issues in Belgium is (still) the *Règlement Général pour la Protection du Travail* (RGPT) which dates from 1947.³⁸ Most of the European legislation dealing with chemicals in general or with certain substances or groups of substances has been transposed into Belgian legislation by modifying this basic law.³⁹ The following deal in general with OELs:

³⁴ All data taken from the following website <http://www.bmwa.gv.at>

³⁵ *Hauptstelle für Unfall- und Berufskrankheitenbekämpfung - HUB*

³⁶ *Allgemeine Unfallversicherungsanstalt*

³⁷ http://www.meta.fgov.be/pa/fra_index.htm

³⁸ *Les Codes Larcier, tome III (Droit social), Maison F. Larcier s.a., 39 Rue des Minimes, 1000 Bruxelles, Belgique, éd. 1990, p.686-789*

³⁹ <http://europa.eu.int/celex/>

- Royal Order/Decree on the insertion of measures concerning the protection of workers against hazards of exposure to chemical, physical and biological agents into the General Regulations on Labour Protection (transposition of Directive 80/1107/EEC).⁴⁰
- Royal Order/Decree of 11 April 1995 modifying the General Regulation for Labour Protection, concerning the establishment of exposure limits to chemical substances (transposition of Directive 91/322/EEC – 1st list of indicative limit values).⁴¹
- Royal Order/Decree of 10 August 1998, modifying Annex II, Title II, Chapter I, of the General Regulation for Labour Protection, concerning the establishment of exposure limits to chemical substances (transposition of Directive 96/94/EC – 2nd list of indicative limit values).⁴²

Other directives (e.g. those on carcinogens or on asbestos) are also integrated in the Belgian legislation.⁴³

The current list of OELs (dating from 1998) has about 640 main entries and is principally based on the US ACGIH TLV list of 1993.⁴⁴

There is a new Royal Decree in preparation on chemical agents, adapting the Belgian situation to the Chemical Agents Directive. In this proposal a limited number of modifications are put forward, following European regulations (on benzene, vinyl chloride and wood dust.)⁴⁵ (see also *Problems discussed at national level* on current discussion in Belgium on this issue).

Belgium does not have its own system for establishing OELs and there is no clear structure for their systematic revision. Members of the Federal Labour administration prepare modifications to adapt the Belgian list, mostly following changes in the EU. There is no official Commission as in other European Countries, and no direct input either from scientific experts, or the social partners.⁴⁶ Nevertheless there are certain consultative bodies in which employers and workers are amongst those represented. These are described below. The Labour Inspectorate (l'Inspection du Travail) is responsible for monitoring and enforcing the H&S legislation including that on OELs.

Occupational Exposure Limits⁴⁷ — The Belgian system has only one type of OEL. They are published in the above-mentioned list that dates from 1998. According to the definition,

⁴⁰ *Arrêté royal du 20 novembre 1987 insérant dans le Règlement général pour la protection du travail des dispositions relatives à la protection des travailleurs contre les risques liés à l'exposition à des agents chimiques, physiques et biologiques, Moniteur belge /Belgisch Staatsblad, 27 November 1987, p. 17640ff*

⁴¹ *Arrêté royal du 11 avril 1995 modifiant le règlement général pour la protection du travailleur en ce qui concerne la fixation des valeurs limites d'exposition à des agents chimiques, Moniteur belge / Belgisch Staatsblad, 14 June 1995, p. 17055ff*

⁴² *Arrêté royal du 10 août 1998 modifiant l'annexe II au titre II, chapitre IIbis du Règlement général pour la protection du travail en ce qui concerne la fixation des valeurs limites d'exposition à des agents chimiques, Moniteur belge / Belgisch Staatsblad, 12 September 1998, n° 176, p. 29318ff*

⁴³ *Belgisch Staatsblad, 29 December 1993, n° 260, p. 28911ff, Belgisch Staatsblad, 8 October 1999, n! 199, p. 38043*

⁴⁴ *Information given by the Belgian member of the SCOEL and the representative of the Belgian Government in the AHG Limit Values*

⁴⁵ *This information was given by the Belgian member of SCOEL*

⁴⁶ *This information was also given by the Belgian member of SCOEL*

⁴⁷ *Arrêté royal modifiant l'annexe II au titre II, chapitre IIbis du Règlement général pour la protection du travail en ce qui concerne la fixation des valeurs limites d'exposition à des agents chimiques, Moniteur belge, 12.09.1998, p. 29318 ff*

ACGIH TLVs “are health-based recommendations derived from assessment of the available published scientific information from studies in exposed humans and from studies in experimental animals”.⁴⁸ This is not necessarily the case for limit values adopted from European Directives, in particular not from those Directives dealing with carcinogens. The latter take socio-economic and technical feasibility factors into account. Some of the OELs adopted from the two European Directives on Indicative Limit Values have also been discussed further at European level in the light of new evidence but this will only be reflected in the Belgian legislation once these changes are adopted at European level and thereafter are transposed into Belgian legislation.

Definitions against which exposure is assessed — Because the limit values are taken from the US ACGIH TLV list, the definition against which the exposure is assessed is the same as the US definition.^{49 50} In general, TLVs are defined as airborne concentrations “to which nearly all workers may be exposed for 8 hours per day, 40 hours per week for a working lifetime without adverse effect.” They are measured or calculated in relation to a reference period of either 8-hour Time Weighted Averages (TWA) or a 15-minute exposure (STEL). They are expressed in either mg/m³ of air or ppm (ml/m³). A Short Term Exposure Limit (STEL) is defined by ACGIH as the concentration to which workers can be exposed continuously for a short period of time without suffering from:

- irritation
- chronic or irreversible tissue damage
- narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency.

Ceiling values established in the ACGIH TLV list are not mentioned in the Belgian OEL list.

In the Belgian list, notations are given for the following effects⁵¹:

- “M” indicates that for exposures for longer than the time for which the OEL is established, a risk of irritation or acute intoxication exists
- “D” means that the absorption of the substance via other routes than inhalation (via skin, the eyes or by swallowing) constitutes a significant part of total exposure
- “A” means that these substances release gases or vapour, which do not have physiological effects themselves but can decrease the amount of oxygen in the air leading to suffocation when the amount of oxygen goes below 17-18 % (vol/vol)

Limit values taken from the EU lists of Indicative Limit Values are based on similar definitions.

⁴⁸ Source: <http://www.acgih.org/> This is not the appropriate place to question the validity of this definition. However, it is noted that there is a body of both scientific and policy analysis in which such a critique is developed.

⁴⁹ <http://www.acgih.org/>

⁵⁰ Arrêté royal modifiant l'annexe II au titre II, chapitre IIbis du Règlement général pour la protection du travail en ce qui concerne la fixation des valeurs limites d'exposition à des agents chimiques, *Moniteur belge*, 12.09.1998, p. 29318 ff

⁵¹ Arrêté royal modifiant l'annexe II au titre II, chapitre IIbis du Règlement général pour la protection du travail en ce qui concerne la fixation des valeurs limites d'exposition à des agents chimiques, *Moniteur belge*, 12.09.1998, p. 29318 ff

Procedures for setting OELs — The latest revision of the list of Belgian OELs took place with the transposition of the 2nd list of European occupational exposure limit values in 1998.

The social partners and other interest groups are consulted during the general procedure of proposing and adopting legislation in Belgium. Currently, the most important body for this type of consultation is the Supreme/Higher Council for Prevention and Protection at Work (which succeeded the former Supreme/Higher Council for Security, Hygiene and Improvement of Workplaces).^{52 53} The Council's role is to deliver opinions, either on its own initiative or on request, in connection with measurements related to H&S at work. These may include psychosocial aspects, aspects of ergonomics or occupational hygiene, or the improvement of the working environment in general. The Council has a president, a vice president and an equal number of representatives from employers' and workers' organisation, as well several specialised experts (some are permanent, others may be involved only for certain specific issues).

Legal status of Occupational Exposure Limits^{54 55} — As these values are published as an Annex to the Belgian Royal Decree on chemical agents, they form part of the law and must be considered as binding. Exposure to concentrations above the limit values are a violation of the legislation regarding health and safety at work. The consequences of such a violation may vary from warnings and demands for additional measurements to penal sanctions. The latter case is rather exceptional. There have been some cases following an action from the medical Labour Inspectorate on the subject of risk evaluations in enterprises working with organic solvents. Both the lack of properly done risk evaluation (workplace and biological monitoring) and the excess exposure to the organic solvents were punished in some cases (after a series of warnings).

According to the Belgian Member of the AHG on Limit Values, “infringements can be heard in criminal court suits. The social inspectors [i.e. labour inspectors] are empowered as officers of so called “special police”. This allows them to make reports of offences in the same way as police officers do. These reports are addressed to the Labour Judge Advocate, who acts in these cases as the General Prosecutor. After having examined the report of offence, drafted by the social inspector, the Labour Judge Advocate himself (not the social inspector) takes the decision whether to introduce a law suit before the Criminal Court or not. He can also impose a fine. In case of non-payment a criminal law suit will be started automatically. Fines are imposed according to tariffs based on the numbers of workers involved. In Criminal Law, only natural persons can be put on trial. All punishments foreseen in Criminal Law can be imposed (e.g., fines, imprisonment etc.). There is no general line of conduct since every judge pronounces his judgements in plain independence.”

What is meant by compliance?^{56 57} — Belgian legislation requires that each employer sets up an evaluation and control system in order to calculate and/or measure the airborne concentration of chemicals used within the company. They also must create an internal

⁵² <http://meta.fgov.be/pc/pcc/frcc09.htm>

⁵³ *Arrêté royal du 3 mai 1999, relatif au Conseil supérieur pour la Prévention et la Protection au travail, Moniteur Belge, 10.7.1999*

⁵⁴ *Règlement général pour la protection du travail - RGPT, see above /*

⁵⁵ *Information given by the Belgian SCOEL member and the Belgian representative in the AHG Limit Values*

⁵⁶ *Arrêté royal du 20 novembre 1987 / Arrêté royal du 14/09/1992*

⁵⁷ http://mineco.fgov.be/enterprises/vademecum/Vade16_fr-01.htm.

prevention and protection service, to assist in fulfilling their obligations in the field of H&S. If they cannot create the service on internal resources, an external, recognised company must be contracted to comply with this duty. Each internal protection and prevention service (or the external service doing the job on behalf of the employer) has to produce and transmit once a year a report to both the Administration of Safety at Work and the Administration of Hygiene and Medicine at Work (which are both part of the Federal Ministry of Employment and Labour). For carcinogenic substances, exposure has not only to be reduced but less hazardous alternatives (production process and/or substitutes for substances) have to be used in order to reduce the risk.

Who enforces the exposure limits? — The Labour Inspectorate of the Federal Ministry of Employment and Labour controls the execution of these laws.⁵⁸ Its major task is the surveillance of the application of all legislation in the field of H&S and well-being at the work place. The technical inspection section of the Labour Inspectorate is responsible for safety surveillance whilst the medical section monitors health. Visits should be performed (in general) once a year in each enterprise although special visits are made if there is a request, a complaint or a particular incident which causes concern. Inspectors have a number of rights to facilitate inspection, including:⁵⁹

- He/she can enter all work places which fall under their authority at any time (day and night) without announcement and, if necessary, with the support of the local police
- He/she is not obliged to inform the employer of his/her visit if such information would put the result of the control at risk
- He/she has the right to employ all the necessary control measures and investigation (including collecting all the necessary documents) he/she thinks are necessary to make a proper assessment of the situation
- Based on his/her judgement, all possible penalties (or intermediate steps towards a final penalty) can be issued.

Enforcement activity — According to the director of the LIT⁶⁰ “no specific statistics on visits specifically orientated to respect of limit values exist. Most visits of the labour inspection deal with all aspects of health at work, among them respect of limit values”. This is in agreement with the statement of the Belgian SCOEL member. According to the Belgian member of the AHG on Limit Values (see above), “The administration has lists of the general outcome of the actions started by the social inspectors (in the sense of: classified, prosecuted, and found guilty). All other details are kept secret because they deal with criminal law files of existing natural persons.”

Problems discussed at national level - According to the Director of the LIT and the Belgian member of the SCOEL, the public authorities and the scientists involved in the topic of OELs are trying to introduce more OELs at national level on the basis of the EU and/or the OEL

⁵⁸ http://meta.fgov.be/pa/fra_index.htm

⁵⁹ *loi du 16 novembre 1972 concernant l'inspection du travail au plan national et la Convention O.I.T. n° 81 au niveau international*

⁶⁰ *The Lit (Laboratory For Industrial Toxicology) — "Laboratoire De Toxicologie Industrielle" does measurements in workplaces of chemical agents and some physical agents. Analyses of industrial products and materials in the context of occupational hygiene. Both activities at the demand of the Labour Inspectorate. Consultation and some policy responsibilities regarding exposure to chemical agents in the workplace. Surveillance of performance of laboratories operating in the field of workplace measurements.*

lists of other European Countries. This is supported by an article published last year in the monthly newsletter of the FGTVB⁶¹, the Belgian Socialist Trade Union, according to which: “le Conseil Supérieur pour la Prévention et la Protection au travail” is working on an opinion for the Minister on a proposed Royal Order/Decree, which deals with the following topics:

- exposure of workers to carcinogens
- obligations of producers/manufacturers towards the employers whose workers are exposed to (dangerous) chemicals
- protection of workers against chemical agents at the workplace (this is the subject of the transposition of the EU Chemical Agents Directive)
- fixing of OELs for chemical agents.

The FGTVB has high expectations with regard to the transposition of the Chemical Agents Directive into Belgian law and its effect on the protection of workers against the risks related to the exposure to dangerous substances at work. In particular, it is expecting a simplification of a number of regulations currently in force under the 1947 law (the RGPT⁶²). With respect to OELs, it at least expects a corresponding entry to be included in the national list of all European OELs in force. It believes that existing lists (MAK, ACGIH etc.) should be taken as a starting point, although it is not yet sure which of the lists should be used.

It insists that other problems have to be tackled as well, including :

- the existence of OELs for only a very limited number of substances present in the working environment and the absence of guidance on how to handle these substances in a safe way
- the failure of the current system to take into account the cumulative effects of substances
- the question as to whether generic OELs should be proposed
- the necessity of revising the list of OELs in force in Belgium which has not been seriously up-dated for more than ten years.

The trade union argues that a much more dynamic system should be set up which ensures that limit values are in line with the latest scientific knowledge/literature and which takes new products/substances used at the workplaces into account as well as developments in sampling and measurement techniques. It suggests that producers/manufacturers of chemicals should be obliged to pass all available and up-dated information on to companies which use their products, whether it is requested or not. Furthermore, it believes that protection measures in force for carcinogens should be also compulsory for mutagens in the future and wood dust should be added to the existing list of OELs.

3.3 DENMARK

Regulatory system and responsible bodies - The Danish OHS regulatory system is based on the Danish Working Environment Act 1975 (WEA), which is a framework act. The concept of ‘safe and sound working conditions’ is defined in general terms as the purpose for all activities concerning the work environment. The primary activities to ensure a safe and sound working environment are listed as concerned with:

⁶¹ ECHO N° 2, Februar 2001

⁶² Règlement général pour la protection du travail

- chemical substances
- technical aids
- design of the workplace
- excursion of work
- scheduling of working time
- employment of children and young people.

The responsibility for ensuring safe and sound working conditions rests with enterprise management but the law also states that this responsibility must be undertaken in co-operation with employees. An important development in the 1975 legislation was the introduction of occupational health services. According to a departmental order the aim of these services is to prevent accidents and occupational diseases through measures to prevent work-related exposures and to promote workers' physical and mental safety and health. Originally, there was no general requirement on all firms to establish a formal relation with an occupational health service however, it is currently intended that all firms will be obliged to contract with such a service by 2005. The Danish system for protecting workers against the harmful effects of working with chemical substances, including its procedures for setting and securing compliance with OELs, involves all these elements of the wider system for the regulation of health and safety.

OELs are assessed and published under the responsibility of the Director of the Danish Working Environment Service which is an administrative department of the Ministry of Labour and consists of a central Directorate, an Occupational Health Institute and 14 district inspection units.

The legal basis of the activities of the Work Environment Service in relation to OELs is found in Article 22 of the Order on Substances and Materials which states: “ *The Director of the Danish Working Environment Service determines and lays down threshold limit values for substances and materials and rules on the carrying out of industrial hygiene measurements of air pollution*”.

In Instruction No 3.1.0.2 I, the Inspectorate has set administrative norms by means of exposure limit values (Graensevaerdier - GV) for a number of substances and materials that have been documented to be hazardous to health. Although the instruction itself does not have the force of law, the exposure limit values are enforced under the WEA.

Occupational Exposure Limits⁶³ — The Limit Values for Substances and Materials is a list of exposure limit values for workplace air pollutants. It also lists the substances considered human carcinogens by the International Agency for Research on Cancer (IARC) or by the EU Commission. These substances are regulated by specific Orders of the Ministry of Labour. They are also annotated by the symbol “K”, denoting that they are carcinogenic. In addition, organic solvents are given a specific list of limit values as they have to be given particular consideration at workplaces. For lead there is a biological exposure limit set for concentration in blood. Separate exposure limits are also established for dusts and for certain processes such as welding.

Definitions against which exposure is assessed — Most OEL values are time weighted average concentrations of substances for an 8 hour working day. Substances whose acute

⁶³ *The WES publishes the Danish OEL list at:*
<http://www.arbejdstilsynet.dk/services/exec/mask.exe?mask=linker.msk&FILEPATH=REAP>

effects appear so quickly they cannot at any time be permitted to exceed the exposure limit value are given a ceiling value with the notation “L” (*loftvaerdi*) in the table of limit values.

Procedures for setting OELs — The Labour Inspectorate (WES) decides the OELs after consulting with the social partners on the technical and economic feasibility of the proposed level. In outline, the procedure is as follows:

- The Work Environment Service publishes a Proposal for changes to limit values. Anyone is eligible to comment on this.
- Based on documented health effects and any other comments, the Proposal is debated in a Limit Value Committee, set up by the Work Environment Council in accordance with Part XII of the WEA. Membership of the Council and its Committee includes representatives of the social partners.
- Additionally, the Work Environment Council Committee on Substances and Materials (set up in accordance with Part ~XII of the WEA and also including representation from the social partners) is engaged in decision making on setting OELs. This Committee performs the technical/economic evaluation of the level of exposure limit values.
- The scientific documentation of health aspects and control techniques is derived from, *inter alia*, US, German, Dutch and Nordic sources⁶⁴ as well as experiences from Danish workplaces. It is compiled by the Danish Institute for Occupational Health for the Danish Work Environment Service which presents it for use by the Limit Value Committee. The Institute conducts scientific research and investigation on air pollution at the workplace, including toxicologic investigations on neurotoxicity, reproduction capabilities, mutagenic and irritability effects.
- If the Council is able to reach an agreement on all aspects it will recommend an OEL to be set. This is done by the Director of the Work Environment Service. If it is unable to agree the Director may set the OEL on the basis of limits already in place in those countries to which Denmark is normally compared, especially other Nordic countries.⁶⁵
- Limit values are up-dated every two years (although in practice the gap between up-dates may be longer).

What is meant by compliance — Under the WEA employers are obliged to keep exposure as low as reasonably possible and the limit values that are set should never be exceeded.

Who enforces the Exposure Limits? — As stated above, Limit Values are enforced by the Ministry of Labour which has overall authority for occupational health and safety legislation and its enforcement. The inspectors of the local units of the Work Environment Service are responsible for carrying out inspection. In practice, the Work Environment Service is more concerned with inspecting the whole production process to ensure health and safety than it is with checking individual exposure levels. The Danish system places considerable emphasis on the role of the integrated occupational health services in aiding employers to fulfil their responsibilities in providing a safe and healthy working environment. The experts employed by these services will be the ones who are most likely to monitor the levels of hazardous substances in workplace air and to advise on how risks may be reduced. They are required to

⁶⁴ One important source is the Nordic Group of Experts on Limit Value Documentation, set up by the Nordic Council (the Nordic Council was set up in 1952 to promote governmental co-operation between Denmark, Iceland, Norway and Sweden and included Finland from 1955). The Group of Experts produces criteria documents for the five Nordic countries as scientific background for the establishment of limit values.

⁶⁵ See American Industrial Hygiene Association & Chemical Manufacturers' Association (1996) *An international review of procedures for establishing occupational exposure limits*, American Industrial Hygiene Association, Fairfax, VA.

undertake these services in dialogue with representatives of workers and their employers under the WEA system for participative workplace health and safety management that is mandatory in all but very small Danish workplaces.

Enforcement activity — Although it is known that there are records kept of enforcement activities, insufficient access to this data was achieved to make a meaningful analysis. It is not clear whether the available data is sufficiently focused or detailed to enable a commentary on the role of enforcement in relation to OELs. Further investigation is required.

Problems discussed at national level — Traditionally, discussion at this level has been particularly concerned with ensuring the maintenance of Danish standards.

3.4 FINLAND

Regulatory system and responsible bodies⁶⁶ — In Finland, H&S is under the direction of the Ministry of Social Affairs and Health and its six departments, of which the Department for Occupational Safety and Health is concerned with all aspects of OHS including monitoring, research and legislation.⁶⁷

The protection of workers against the risks arising from the exposure to chemicals is regulated in the following laws⁶⁸:

- Valtioneuvoston päätös työntekijöiden suojelemisesta kemiallisille tekijöille altistumiseen liittyviltä vaaroilta (920/92) 08/10/1992, muutos (727/93) 29/07/1993 – transposition of Directive 80/1107/EEC.
- Työministeriön päätös työpaikan ilman haitallisiksi tunnetuista pitoisuuksista (860/93) 06/10/1993 and Turvallisuustiedote Nro 25 “HTP-arvot 1993”, Työministeriö, Tampere 1993 – transposition of Directive 91/322/EEC.
- Sosiaali- ja terveysministeriön päätös haitallisiksi tunnetuista pitoisuuksista/Social- och hälsovårdsministeriets beslut om koncentrationer som befunnits skadliga (365/98) 20/05/1998 and Sosiaali- ja terveysministeriön turvallisuustiedote numero 25 (1998)/Social- och hälsovårdsministeriets säkerhetsmeddelande nummer 25 (1998) – transposition of Directive 96/94/EC.
- Valtioneuvoston asetus kemiallisista tekijöistä työssä ref: Suomen Säädoskokoelma N° 715/2001 page 2209; 09/08/2001 and 2. - Valtioneuvoston päätös lyijytyöstä ref : Säädökset vuosi N° 1154/1993, 09/12/1993 – transposition of Directive 98/24/EC.
- Valtioneuvoston päätös työhön liittyvän syöpävaaran torjunnasta (1182/92) .26/11/1992 and Työministeriön päätös syöpäsairauden vaaraa aiheuttavista tekijöistä (838/93) 16/09/1993 – transposition of Directive 90/394/EEC.
- A further 30 or so pieces of primary or secondary legislation that have been introduced or modified to transpose the EU Framework Directive 89/391.

The Occupational Safety and Health Inspectorates of Finland, supervised by the Ministry of Social Affairs and Health, are the enforcing authorities for occupational safety and health.

⁶⁶ *Occupational Safety and Health in Finland, Ministry of Social Affairs and Health, Brochure 1999:7; ISSN 1236-2123, ISBN 952-00-0634-6*

⁶⁷ <http://www.vn.fi/stm/english/index.htm>

⁶⁸ http://europa.eu.int/celex/htm/celex_en.htm

Occupational Exposure Limits — Finland has its own system of OELs:

- Binding Limit Values (MAC or Sitovat raja) are published as ordinances of the Council of the State under the Occupational Safety and Health Act⁶⁹;
- Concentrations known to be harmful (Haitalliseksi tunnetut pitoisuudet - HTP) are published as ordinances of the Ministry of Social Affairs and Health under the Council of State decree on chemical agents at workplace⁷⁰.

The lists are regularly updated (last time in 2000). They currently contain

- 18 MAC entries including 2 additional entries for lead in blood⁷¹
- about 500 main HTP entries⁷²

The propositions for HTP and MAC values are prepared in a working group of the Advisory Committee on Chemicals, which is an Advisory Committee to the Ministry of Social Affairs and Health. Amongst several other interest groups and public authorities, social partners are represented within the Committee.

Of the two types of OELs concentrations known to be harmful (HTPs) are officially health-based, and defined as the highest concentration of a substance in the air a worker is breathing which has no adverse health effect.

Maximal allowed concentration are maximums of allowed concentrations, which Finland is obliged to have because of the European Union. These values are not health-based but have been established at European level by taking socio-economic and technical feasibility aspects into account.⁷³ In general, Finland does not allow limit values or acceptable risk levels for genotoxic carcinogens.

Definitions against which exposure is assessed — A HTP is defined as a time-weighted average over a reference period of 8 hours.

Short-term values are defined for a period of 15 minutes.

The values are expressed either in ml/m³ (ppm) or in mg/m³ at 20°C and 101.3 kPa. A skin notation is given for substances, which can be also absorbed via the skin and/or which can have additional effects like being irritating or corrosive.

For substances with a MAC value or a bio-monitoring action level⁷⁴, reference to the relevant lists is given.

For ceiling values, no reference period is given.

⁶⁹ Työturvallisuuslaki (299/1958)

⁷⁰ VNp työntekijöiden suojelemisesta kemiallisille tekijöille altistumiseen liittyviltä vaaroilta (920/1992)

⁷¹ <http://www.occuphealth.fi/ttl/projekti/htp/english/appe3.htm>

⁷² http://www.occuphealth.fi/ttl/projekti/htp/english/oel_eng.htm

⁷³ information given by the toxicologist responsible for publishing the OELs on the Internet and the senior civil servant of the Ministry of Social Affairs and Health

⁷⁴ There are only four Biological Limit values established – for Ethyl benzene, Phenol, Carbon disulphide and Toluene

Asbestos has in addition to its MAC value an Action Limit; if this value is exceeded, the employer has to take certain additional measures, including notifying the Labour Inspectorate of the work.

Procedures for setting OELs^{75 76} —The first list of Finnish occupational exposure limits was published in 1960 and, like the other early lists of Nordic Countries, it was heavily influenced by the US ACGIH list.

Propositions for HTP and MAC values are prepared by the Advisory Committee on Chemicals, which is a multipartite Advisory Committee to the Ministry of Social Affairs and Health.⁷⁷ It is a co-operative body appointed by the Council of State (Government) upon the submission of the Ministry of Social Affairs and Health for a term of three years. Its members represent the relevant authorities responsible for chemical control and the most representative organisations of trade, industry, and employees. It is composed of representatives of the following agencies:

- the Ministries of Social Affairs and Health, of the Environment, of Trade and Industry and of the Interior
- National Product Control Agency for Welfare and Health
- Finnish Environment Institute
- Safety Technology Authority
- Federation of Finnish Commerce and Trade
- Chemical Industry Federation
- Chemical Workers' Union
- The Advisory Committee has called in permanent experts from the Finnish Institute of Occupational Health (see below), the National Public Health Institute, the Environment Centre of the City of Helsinki and the Finnish Association of Nature Conservation

The Advisory Committee contributes to:

- reforming the legislation on chemicals
- preparation of EU affairs concerning chemicals
- implementation of the Chemicals Programme of the OECD
- monitoring and informing about the actions of the Chemicals Group of the Nordic Council of Ministers
- issuing guidelines for the handling and storage of dangerous chemicals.

The Committee selects a Sub-Committee of Exposure Limits, which does the actual preparation work for setting OELs. The four Sub-Committee members are from the Ministry, chemical industry, employers' organisations and the trade union movement. The Sub-Committee secretaries prepare drafts for recommendations.

The process is started by the preparation of a short documentation on the use and chemical-physical properties of the agents and the observed health effects with a specific emphasis on

⁷⁵ *Parts of this and the previous section are based on less official information on the process for setting OELs given by a senior civil servant of the Ministry of Social Affairs and Health and a toxicologist, who is (amongst other tasks) responsible for publishing the limit value lists on the internet. The other information is taken from the website of the Ministry.*

⁷⁶ *Other information is taken from the website of the Ministry <http://www.vn.fi/stm/english/index.htm>*

⁷⁷ *http://www.vn.fi/stm/english/organ/organisation_fset.htm*

the dose-response relationships. The critical effect is selected and the exposure limit recommended. The documentation is not publicly available, it is delivered only to the Advisory Committee together with the proposed list.

Problems that arise are seldom of real scientific nature. “Uncertainties in the risk evaluations are not properly taken into account or are treated in peculiar ways, which originate from political compromises from 1970s and 80s”. When drafting MAC values not only adverse health effects but also socio-economic and technical feasibility factors are taken into consideration. The discussion on HTP values is restricted to adverse health effects and measurement techniques for the substance.

During the preparation of the recommendations, standards of other countries including OELs set at European level⁷⁸ and the reasoning given for these standards are taken into consideration.

In addition to the Advisory Committee the work of the Finnish Institute of Occupational Health (FIOH)⁷⁹ is also relevant. FIOH is a public corporation supervised by the Ministry of Social Affairs and Health. It is a research and advisory institute whose main tasks are research, training of occupational health and safety professionals, provision of advisory services, and dissemination of information. The Institute covers altogether 10 disciplines related to occupational health and safety.

The research is concentrated on workers’ health (including the working environment/physical and mental pressure of work/risks arising from chemical substances, noise, heat and radiation/safe working methods/occupational accidents and illnesses). Experts of FIOH give instructions on the planning of the working environment. The services include measuring harmful radiation doses at workplaces, testing people applying for demanding professions, psychological studies concerning work, development of workplaces and directions on the establishment of action programmes concerning occupational safety and health. FIOH organises about 300 training courses for OHS professionals on various topics related to occupational safety and health. FIOH also acts as an information centre on OHS.

Legal status of Occupational Exposure Limits⁸⁰ — In principle both the MAC values and HTP values are mandatory. The difference lies in the follow-up responsibilities linked to them:

- The concentration of a substance in the breathing air of worker must not exceed the MAK value
- HTP values must be used as a design parameter in planning work environment and in the risk assessment.

The enforcement of the occupational health and safety legislation including OELs is generally backed by threat of punishment. The general penalties for labour offences are based on the criminal code. The penal scale is from day-fine (according to a so-called day-fine system) to imprisonment for not more than 1 year. In addition the Labour Protection Act advances a separate possibility to use pecuniary penalties for safety offences.

⁷⁸ SCOEL, Nordic Expert Group, ACGIH, MAK-Kommission, DECOS, IPCS Health Criteria, HSE and Swedish limit value documents

⁷⁹ <http://www.occuphealth.fi/e/fioh/index.html>

⁸⁰ Again, this information was supplied by the Senior Civil Servant of the Ministry of Social Affairs and Health

What is meant by compliance? — Because Finland has transposed the Chemical Agents Directive, all provisions foreseen in it have to be fulfilled by employers when chemicals in general and dangerous chemicals in particular are used at the workplace. This includes the requirement of a detailed risk assessment and protection and prevention measures based on the result of this risk assessment as well as exposure measurements on a regular basis.⁸¹

The employer has to take HTPs into account when evaluating the purity of the workplace air, the exposure of workers and the significance of the results of air impurity measurements. It has been stated that slight harmful effects and also such serious effects whose probabilities of prevalence are low, are not taken as criteria to lower the limits.⁸²

MAC values must not be exceeded. If they are, the employer is obliged to undertake various measures.⁸³ Exposure to substances assigned a MAC value should be avoided anyway and substitution with less harmful substances/processes is also an obligation (if available).

With respect to carcinogenic substances in general, employers are obliged to notify on an annual basis the number of workers exposed to carcinogens. On the basis of these notifications, the national register of workers exposed to carcinogens (ASA Register) has been kept by FIOH since 1979. The ASA notifications are obligatory and they cover all salaried workers in Finland. However, the coverage of ASA is incomplete for many carcinogenic exposures, because occasional low level exposures are often not reported, and there are also employers who are not aware of exposures or who neglect the notification duty.

No detailed manual exists for the use of OELs in the enforcement of occupational safety and health laws. Authorities may differ in their interpretations.

Who enforces the Exposure Limits?^{84 85} — The district authorities for occupational safety and health carry out the practical supervision and other activities in the field of OHS. The country is divided into eleven OHS districts. Each District has one central office and several local offices. The Occupational Safety and Health Inspectorates employ approximately 460 people; about 360 of these do field surveys at workplaces. There are experts in different professional areas (engineering, chemistry, law, construction engineering, nursing). The OHS Districts are organised in different structures. Normally they have a group structure, i.e. each group has responsibility for one or more sectors of industry and services. Inspectors are specialised in those industries they have been assigned. The most important target of OHS inspection visits in the past was to observe any defects in working conditions, to eliminate hazards in the working environment, and by that means to reduce accidents and work-related diseases. Nowadays the inspection methods are more sophisticated. The central task of the OHS District is to monitor that the provisions of OHS legislation are observed, and to support and encourage the development of OHS management systems at working places. Guidance is given to both employers and employees. The powers given to the OHS inspectors and OHS Districts are defined in the Labour Inspection Act (1973)⁸⁶ and include the following:

⁸¹ <http://www.finlex.fi/linkit/sd/20010715>

⁸² Information given by the above mentioned toxicologist

⁸³ <http://www.finlex.fi/linkit/sd/19921182>; <http://www.finlex.fi/linkit/sd/19930838>

⁸⁴ *Occupational Safety and Health in Finland, Ministry of Social Affairs and Health, Brochure 1999:7; ISSN 1236-2123, ISBN 952-00-0634-6*

⁸⁵ <http://www.dOHSnet.fi/hallinto/english/piirit/default.htm>

⁸⁶ *Laki työsuojelun valvonnasta ja muutoksenhausta työsuojeluasiaoissa, Act of 16.2.1973/171*

Rights

- of entry into any place of work at any reasonable time, day or night, to carry out an inspection and make enquiries,
- to question the employer and employees concerning matters of OHS and other matters dealing with working conditions. This power does not, however, extend to requiring them to make a written statement.
- to call for and examine all registers and other documents required to be kept by the legislation,
- to take samples of raw materials and products used at work for analysis,
- to take photographs and measure

Powers

- to issue an inspection protocol or improvement notice. The notice identifies the law that is broken, describes the nature of the deficiency, may suggest how the deficiency can be rectified (although this is not necessary), and stipulates the time limit within which the employer must respond to the OHS District indicating the action he or she has taken
- to issue a legally binding enforcement notice under the authority of the Head of the District, if the inspection protocol has not had the desired effect. The notice stipulates a time limit within which the required work must be completed and may, although this is not obligatory, set a fine, which must be paid if the deadline is not met. The employer has the right of appeal to the regional Administrative Court.
- to issue a prohibition notice in cases where an inspector believes there is an imminent risk to life or health (about 30-40/year). The notice comes into force immediately. The initiating inspector submits a copy of the notice to the Head of the District, who decides whether to support the notice or rescind it. The employer again has the right to appeal to the Administrative Court. Should the employer not comply with the notice, the matter is put in the hands of the police, who have the powers necessary to ensure that compliance is achieved. It is only rarely that this procedure has to be used.

In cases of wilful intent or negligence, and normally following an accident, the inspector may draw up a report for the public prosecutor who will initiate an investigation by the police (about 300 are initiated per year). Any prosecution, which follows, may lead to the offender being fined or sent to prison. The prosecution will be taken against an individual or individuals within the enterprise since there is no possibility in the law for proceedings to be taken against the company itself.

According to the senior civil servant of the Ministry of Social Affairs and health interviewed, “The district offices of the labour protection inspection are responsible for enforcing the limit values. Very seldom the inspectors study the compliance with the OELs as a separate issue from other issues. I do not remember a case here [in which] the sole excess of an OEL would have been the[exclusive] reason for enforcement measures by the authority. The air concentration values in excess of the OELs are usually used as evidence of failure of the safety program of the employer”.

Enforcement activity — Approximately 30,000 safety inspections are undertaken annually. Finland has about 240,000 workplaces subject to regular inspections.⁸⁷

⁸⁷ *Occupational Safety and Health in Finland, Ministry of Social Affairs and Health, Brochure 1999:7; ISSN 1236-2123, ISBN 952-00-0634-6*

The Finnish Institute of Occupational Health (FIOH) monitors the development of health, working conditions and work organisations in Finland.⁸⁸ The Institute maintains several databases and registers used for surveillance:

The Register of Occupational Diseases (TPSR) contains information on occupational diseases reported by physicians and publishes annually a statistical report. The TPSR register includes information on occupational diseases from the year 1964 onwards.

The ASA Register contains data on workers occupationally exposed to carcinogens since 1979. An official list of carcinogens is the basis of registration. A statistical report on numbers of exposed workers is published annually. The ASA Register does not contain information on level of exposure.

The FINJEM exposure information system covers all occupations and the most important physical, chemical, microbiological, ergonomic and psychosocial factors. An assessment of the probability and level of exposure for each occupation and agent is presented. FINJEM also contains principles for the assessment, background information on occupations and exposures, and bibliographic references. A database on industrial hygienic measurements carried out by FIOH is maintained for the internal use of the Institute. Every third year FIOH produces a national report on the state of occupational health and its trends in Finland. The first report was published in 1997 and the second one in November 2000.

Therefore it would appear that there is considerable data on exposure which may be available, although enforcement data may be more difficult to interpret.

Discussions at national level — Discussions with respect to OELs deal with the scientific basis for establishing in particular health-based values. The following points were raised in personal communications with the toxicologist who is responsible for the Finnish OEL website:

“For historical reasons and for the needs to give an unanimous consensus proposals, the philosophical background of the limit value concept is peculiar in Finland:

- *Some parties argue that the values known to be harmful must be such that they literally are known to be harmful*
- *NOELs cannot be used to argue for a recommended limit – the concept of known to be harmful implies the use of LOAELs*
- *Uncertainty factors cannot be used in the extrapolation of the limits – uncertainties are not known*
- *In the case of irritant agents, if the RD50 value is known, the recommendation is usually 3 % of this*
- *For compounds, which have showed carcinogenic activity in animal experiments, the extrapolation can be done from the lowest carcinogenic dose taking into account the weight and inhalation volume differences between man and the animals. In the calculation, the 70-year exposure of humans is assumed.”*

⁸⁸ <http://www.occuphealth.fi/ttl/osasto/eb/datab.html>

3.5 FRANCE

Regulatory system and responsible bodies — Provisions for workers' health and safety are integrated within two fundamental laws: the Labour Code and the Social Security Code. Measures on hygiene, safety and working conditions and on the functioning of workers' representation on health and safety are part of the Labour Code which is the main instrument upon which the Labour Inspectorate relies to perform its tasks. The Social Security Code provides for the compensation-based requirements necessitated by work-related accidents and occupational illness. The scope of the Labour Code does not cover many employees in the public sector and separate provisions extend a broadly similar protection to employees in this area.

H&S in general is under the responsibility of the Ministry of Employment and Solidarity ("Ministère de l'Emploi et de la Solidarité"). Its Sector in Charge of Work ("Secteur chargé du Travail") publishes new or up-dated Limit Values ("Valeurs limites") as amendments to the Annex of the "Circulaires du 19 juillet 1982". The consolidated list is published by INRS⁸⁹, and can be found on the Internet.⁹⁰

There are other pieces of legislation dealing with health and safety in general (e.g. transposition of the Framework Directive by the Prevention of Occupational Risks Act of 31/12/1991 and the adoption of Decree 95-680 of 9 May 1995⁹¹) and chemicals (in general⁹² or with respect to individual substances - like asbestos⁹³ - or groups of substances - like carcinogens⁹⁴).

Recommendations for Limit Values ("Valeurs limites") are developed and up-dated by an expert group under the direction of the Ministry in Charge of Work ("Groupe scientifique pour la surveillance des atmosphères de travail" – Scientific Group for the Surveillance of the Working Atmosphere/Environment). This expert group is attached to the Higher Council for the Prevention of Occupational Risks ("Conseil supérieur de la prévention des risques professionnelles"), a quadripartite Advisory Committee of the Ministry, representing, amongst others, the Social Partners and various affected administrations.

After having being published by the Ministry, the National Institute of Research and Safety ("Institut National de Recherche et de Sécurité" – INRS), publishes regularly consolidated lists of admissible limit values including their definitions and other additional information on

⁸⁹ *L'Institut National de Recherche et de Sécurité – National Research and Safety Institute*

⁹⁰ *Valeurs limites d'exposition professionnelle aux agents chimiques en France - Cahiers de Notes Documentaires – Hygiène et Sécurité du Travail, 1999, 174, ND 2098, pp. 59-77 / <http://www.inrs.fr/dossiers/nd2098.pdf>*

⁹¹ *Loi Numéro 91-1414 du 31/12/1991; Journal Officiel du 07/01/1992 / Décret Numéro 92-158 du 20/02/1992; Journal Officiel du 22/02/1992 / Décret Numéro 92-333 du 31/03/1992; Journal Officiel du 01/04/1992 / Loi numéro 97-1051 du 18/11/1997; Journal Officiel du 19/11/1997 / Decret 98-588 ref: JORF 11-07-1998 - SG(2000)A/7467 / Ordonnance n° 2001-175 du 22/02/2001; Journal Officiel du 24/02/2001*

⁹² *Code du travail, titre 4, livre 2 / Décret Numéro 84-1093 du 07/12/1984; Journal Officiel du 08/12/1984 / Circulaire, Journal Officiel du 06/06/1985*

⁹³ *Décret Numéro 77-949 du 17/08/1977; Journal Officiel du 20/09/1977 / Décret Numéro 92-634 du 06/07/1992; Journal Officiel du 10/07/1992*

⁹⁴ *Arrêté ministériel du 05/01/1993; Journal Officiel du 19/02/1993 / Décret n° 2001-97 du 1er février 2001; JORF du 03/02/2001 / Arrêté du 18 septembre 2000; JORF du 28/09/2000*

standards for measurement techniques, procedures for mixtures etc.⁹⁵ The same scientific expert group (“Groupe scientifique”) also elaborates the document dealing with the scientific basis and the principles for the application of Biological Exposure Indicators (“Indicateurs biologiques d’exposition” – IBE). The Labour Inspectorate (“l’Inspection du Travail”) of the Ministry is responsible for the surveillance and enforcement of the legislation. In addition, the organisations for social security exert, within the framework of their function as insurance companies, a system of specific control and incentives to ensure the application of the legislation at enterprise level.

Occupational Exposure Limits — A limit value (“valeur limite”) of a chemical compound is defined as its concentration in the air which a person can breathe during a determined time period (see below), without the risk of deteriorating his/her health. Reversible physiological modifications might be tolerated, whereas irreversible or chronic effects should not occur when respecting the limit value. Limit values are considered to be minimum targets.

There are two types:

- Limit values for short-term exposure (VLE), whose respect allows to avoid risk of immediate or short-term toxic effects.
- Limit values for average exposure (VME), intended to protect the workers from long term effects.

In addition, Biological Exposure Indicators (“l’Indicateur biologique d’exposition”) are established for certain substances, in particular for those which can be absorbed by other routes than inhalation. They are measured as concentrations of the substance and/or its metabolite(s) in blood or urine.

The recommendations delivered by the “Groupe scientifique pour la surveillance des atmosphères de travail” are health-based, but socio-economic and technical feasibility factors are taken into account by the “Conseil supérieur de la prévention des risques professionnelles” before being finally adopted.

The limit values are published as amendments of the “Circulaire du 19 juillet 1982”, some in the French Official Journal (“Journal Officiel”), and some not, and by the INRS as consolidated lists. The first list contained 37 substances chosen because of their irritant effects. The current list contains about 650 main entries of substances or group of substances.

The list of IBE is mainly based on values published by the ACGIH (American Conference of Governmental Industrial Hygienists) or the DFG (Deutsche Forschungsgemeinschaft). The last time it was updated was in 1997. It is published as a guidance document by the scientific expert group (“Groupe scientifique pour la surveillance des atmosphères de travail”). It contains about 40 main entries for substances or group of substances.

Definitions against which exposure is assessed — All limit values are defined as time-weighted averages over a specific period. The VLE (short-term value) is a ceiling value, measured over a maximum duration of 15 minutes, according to the nature of the risk, the working conditions and the technical possibilities of measuring.

⁹⁵ *Valeurs limites d’exposition professionnelle aux agents chimiques en France - Cahiers de Notes Documentaires – Hygiène et Sécurité du Travail, 1999, 174, ND 2098, pp. 59-77*

- The VME (long-term value) is measured or estimated over the duration of an 8 hour working period per day, 40 hours a week. The VME can be exceeded for short periods, subject to not exceeding the VLE, if a VLE exists.
- The IBE correspond to an average exposure measured over a period of 8 hours, 40-hours per week.

Limit values have to reflect the real concentration of the substance in the breathing zone of the worker and are expressed in either in ppm or in mg/m³. Additional information is given on allergic or sensitising effects, absorption via the skin, and whether the substance is a carcinogen or a mutagen. If substances are assigned a skin notation, additional preventive and protection measures have to be taken. The same is true for substances classified as carcinogens and/or mutagens category 1 according to the European Directive 67/548/EEC on the classification and labelling of dangerous substances.

There are also certain rules established for substances in the form of dusts, aerosols or vapours and for the calculation of limit values in the case of a mixed exposure based on the individual concentration of the substances present.

Procedure for setting OELs —Recommendations for limit values are developed and up-dated by the Groupe scientifique pour la surveillance des atmosphères de travail, under the direction of the Ministère chargé du travail. This group includes prevention experts and experts on chemical risks, representatives of the regional health insurance companies, occupational physicians, toxicologists, people from industry, and INRS. Its recommendations for limit values are based on toxicological and epidemiological data either from animal studies or industrial exposure. The expert group is attached to the Conseil supérieur de la prévention des risques professionnelles. The Council was established in 1976 and is the main consultancy body for the Ministry with respect to H&S issues. The Council is consulted on all questions and for all legislative projects in relation to health and safety at work or with respect to the quality of the working environment. It formulates proposals for improving the working conditions, conducts investigations and establishes priorities for action programmes at national level.

The Council is a quadripartite body with representatives of:

- a) The organisations of the Social Partners⁹⁶
- b) Other ministries affected by H&S issues (agriculture, health, industry, environment etc.)
- c) Specialised institutes and organisations like INRS, CNAM, ANACT⁹⁷, OPPBTP
- d) Qualified experts (scientists, occupational hygienists and technicians, occupational physicians)

The work of the Council is undertaken within the framework of either specialised committees or technical working groups. It meets once a year in a plenary session, chaired by the Minister, during which it reviews action in progress and adopts the priority orientations for the forthcoming year(s).

⁹⁶ *The Social Partners are not only involved in the committees and working groups of the Council, they are also part of the administration of the branch of the Commission on occupational accidents / occupational diseases, and they are part of the administrative council of INRS.*

⁹⁷ *Agence Nationale pour l'Amélioration des Conditions de Travail – National Agency for the Improvement of Working Conditions*

Socio-economic and technical feasibility aspects are taken into consideration before the limit value recommendations from the ‘Groupe Scientifique’ are adopted.

INRS - Institut National de Recherche et de Sécurité — The INRS is a non-profit organisation, subject to State financial supervision, and created in 1947 under the auspices of the CNAMTS. It operates on behalf of the employees and companies coming under the general Social Security scheme. It is supported by the regional health insurance funds (CRAM) in metropolitan France and general Social Security funds (CGSS) in French overseas administrative departments, and provides its competence to other prevention partners such as occupational physicians and Labour Inspectorate services. Its activities are programmed in accordance with directives from the National salaried workers’ health insurance fund (CNAMTS) and policies defined by the Ministry of Employment and Solidarity. It is managed by a joint board of directors representing employers (Medef⁹⁸) and employee trade unions (CFDT⁹⁹, CFTC¹⁰⁰, CGC¹⁰¹, CGT¹⁰², CGT-FO¹⁰³). Its budget - about 400 million French francs - comes almost entirely from the National occupational accident and disease prevention fund. This fund is provisioned by a share of the occupational accident and disease contributions paid by firms, and managed by the CNAMTS. It employs around 600 people.

*ANACT - Agence Nationale pour l’Amélioration des Conditions de Travail*¹⁰⁴ — Founded in 1973, ANACT is a publicly owned body under the surveillance of the Ministry of Employment and Solidarity. It is administered by an Administrative Council, representing all workers’ and Employers’ Confederations, three experts in health and safety, nominated for a period of three years, and representatives of various Ministries affected by its work.

Legal status of Occupational Exposure Limits — The majority of the limit values are indicative of what has to be considered a minimum target (“Valeurs limites admises, à caractère indicatif”). Some of these indicative values are recommendations by the National Health Insurance Fund for Salaried Workers (“Caisse nationale d’assurance maladie des travailleurs salariés” – CNAMTS). Only for some carcinogenic/mutagenic substances such as benzene, asbestos dust, vinyl chloride monomers, lead, silica etc. are binding limit values established (mainly because binding values are set at the European level).

Biological exposure indicators are guidance values for occupational physicians or other people involved in the surveillance of the health and safety of workers at work..

What is meant by compliance? — Employers’ obligations vary according to the legal status of the limit values. In general, they have to follow the obligations laid down in the “Code du Travail”.¹⁰⁵ These broad obligations cover the whole range of risk assessment and risk prevention as laid down in the European Framework Directive. If a substance or a preparation

⁹⁸ *Mouvement des Entreprises de France*

⁹⁹ *Confédération française démocratique du travail*

¹⁰⁰ *Confédération française des travailleurs chrétiens*

¹⁰¹ *Confédération générale des cadres*

¹⁰² *Confédération générale du travail*

¹⁰³ *Confédération générale du travail – Force Ouvrière*

¹⁰⁴ <http://www.anact.fr/index.html>

¹⁰⁵ *Code du Travail; Partie Législativaive, Livre 2 (Réglementation du Travail), Titre 3 (Hygiène, sécurité et conditions de travail) Articles L230 – L236 / Code du Travail, Partie Réglementaire – Décrets en Conseil d’Etat, Livre 2 (Réglementation du Travail), Titre 3 (Hygiène et sécurité), Article R230 – R238*

is assigned an indicative limit value, the employer “must try to respect the VLE or VME”.¹⁰⁶ If a limit value is exceeded, measures have to be taken to reduce the exposure efficiently. This also includes – for a short and limited period – the use of PPE if the exposure cannot be reduced otherwise. In the case of new installations or important modifications of the existing installations/procedures, the employer should consider the technology which allows him to keep the exposure as low as technically possible.

For binding limit values, the situation is different. Here the employer must make sure that he complies with the limit values set by controlling the exposure situation regularly. If a limit value is exceeded, a new exposure measurement has to be performed immediately. If this measurement confirms the results of the former, measures have to be taken to remedy the situation and the work where the exposure was exceeded has to stop immediately.¹⁰⁷

Exposure measurements have to be performed by recognised companies at least once a year (if the limit values have been respected during that period, otherwise the intervals are shorter). If significant changes take place in the production process or the installations used, new control measures have to take place within 15 days. The results of the measurements have to be communicated to the bodies within the company responsible for surveillance of health and safety and have to be available for the labour inspectors, the occupational physician and the inspectors of the social security. There are special laws/regulations for certain substances such as asbestos or benzene, with additional provisions.

Who enforces the Exposure Limits? — With two complementary external intervention systems at enterprise level with respect to surveillance and enforcement of legislation in the field of health and safety and the prevention of occupational risks, the French system – like the German – is a dual one.¹⁰⁸ There is on the one hand the Labour Inspectorate as part of the Ministry in charge of Labour, on the other hand are the institutions of the social security system (regional and national) and their surveillance systems. Both the Labour Inspectorate and the surveillance and enforcement bodies of the social security organisations, not only control the application of the labour law but also advise the companies in areas related to H&S.¹⁰⁹ Labour inspectors have the right to enter the enterprises at any time. They must be given access to documents they need and can perform measurements and take samples.

If they register infringements of regulations, they may:

- remind the employer of his obligations
- issue improvement or enforcement notices
- impose fines
- in urgent cases, apply for a provisional legal order at court to stop the work.

The difference between the two types of limit values, their enforcement, and the possibilities labour inspectors have becomes clear when looking at the power of the Labour Inspectorate

¹⁰⁶ *Circulaire du 19 juillet 1982, including all amendments*

¹⁰⁷ *Code du travail, Article R231-56-4-1*

¹⁰⁸ *There is, of course also an internal system of surveillance, which obliges the employer to establish a regular medical and technical surveillance and a committee with representatives from employers and workers – Le Comité d’hygiène, de sécurité et des conditions de travail – CHSCT (all depends also on the size of the enterprise); <http://www.sante-securite.travail.gouv.fr/systeme/institutions.html>, <http://fr.OHSa.eu.int/publications/acteurs.stm>, <http://www.inrs.fr/actualites/chsct1.htm>*

¹⁰⁹ <http://www.sante-securite.travail.gouv.fr/systeme/inspection.html>

with respect to these two OELs.¹¹⁰ Air quality control measurements by the labour inspectors are only possible for substances for which a binding limit value exists, which are those for dust/fibres of asbestos, lead, benzene, vinyl chloride monomers etc. For substances for which indicative limit values have been adopted and published, the order of 9th October 1987 does not allow the labour inspectors to enforce these OELs directly by issuing improvement or enforcement orders. The nature of these limit values (‘indicative/guidance’) does not permit prescription of exact measures to ‘enforce’ them. The only possibility to ‘enforce’ them is via indirect sanctions on failures of the ventilation system and similar offences.

The Labour Inspectorate monitoring function has been extended to include compliance with provisions deriving from collective agreements. In addition to this, it also performs advisory and information functions, has responsibilities in the settlement of disputes and possesses certain decision-making powers. It may take part in the meetings of the CHSCT.¹¹¹

At enterprise and establishment level, the labour inspector is the official who has direct dealings with enterprise managers, unions and workforce representatives and employees. They are supported by other experts like the occupational physician and the safety engineer(s) who are part of the OHS system the employer has to establish.

The National Health Insurance (Caisse National d'Assurance Maladie – CNAM)^{112 113 114}
Since 1945, CNAM, under the supervision of the Ministry of Health, has been responsible for the compensation of industrial accidents and the administration of occupational risks and occupational diseases. Its mission is also to prevent occupational accidents and occupational diseases by technical and financial means. CNAM administers the national fund for prevention, which is based on the contributions levied from enterprises. The prevention service and its regional offices and services is financed out of this fund, as well as the work of the INRS, the National Institute of Research and Safety.

At regional level¹¹⁵, its inspectors and consulting engineers have the same access and inquiry right as the national labour inspectors have. They perform risk assessments and give advice on prevention and protection measures in consultation and co-operation with the Committee for Hygiene, Security and Working Conditions – CHSCT. They can also refer to specialised laboratories.

If an employer fails to follow the advice given, the inspectors have the right to take all the necessary measures they consider justifiable under the circumstances and, if necessary, they can issue improvement or enforcement notices.

CRAM is able to impose higher contributions on a branch or a certain enterprise based on the annual numbers of occupational accidents etc. in the branch or because of infringements by a certain company. On the other hand, reductions in contributions because of an outstanding OHS performance of a company are also possible. CRAM has the power to change the

¹¹⁰ <http://www.inrs.fr/dossiers/ed773.pdf>

¹¹¹ *Le Comité d'hygiène, de sécurité et des conditions de travail – the OHS advisory committee of management and workers at enterprise level*

¹¹² <http://www.cram-bfc.fr/prevention/page-prevention.htm>

¹¹³ <http://machines-dangereuses.drt.travail.gouv.fr/ct5/minitra.htm>

¹¹⁴ <http://www.sante-securite.travail.gouv.fr/systeme/ministere.html>

¹¹⁵ *CRAM – Caisse régionale d'assurance maladie*

financial contribution for occupational accidents the companies are due to pay in a certain branch of industry.

CRAM organises information and training courses for employers and for employees, campaigns to tackle specific problems, and publishes journals and brochures.

The data about occupational injuries, accidents and diseases as well as all other data gathered and collected during the visits are taken into consideration when designing policy priorities in the field of occupational health and safety at ministerial level.

Enforcement activity — H&S statistics are published annually by the responsible authorities/bodies involved. Some of them can be found on the internet, some detailed ones have to be purchased. The following statistics are available free of charge. However, they do not allow a detailed analysis with respect to violations of the legislation in place for dangerous substances, and do not address violations with respect to occupational exposure limit values. The following data was available for 1999:

- 1,469 000 enterprises fell under the control of the Labour Inspectorate (1.7 % more than in 1998)
- The resources for the Labour Inspectorate increased by 2.4%. In numbers, this means that 1,868 agents have been occupied, of which 408 were labour inspectors, 790 control agents and 670 secretaries, distributed within 440 departments.
- On average, per department, 3,339 plants and 31,886 of employees were covered.
- 90.4 % of the inspections took place in enterprises with less than 50 employees and 64.3 % took place in companies with less than 10 employees.

In the field of H&S:

- 358,267 “observations” were performed
- 6,633 requests for payment were issued (“mises en demeure”), and
- 2,421 notices for stopping the work process were issued (“arrêts de travaux”).

In order to get a better picture about the risks to which workers are exposed, the Ministry of Employment and Solidarity initiated in 1994¹¹⁶ the so-called SUMER surveys (surveillance médicale des risques professionnels/medical surveillance of occupational risks).¹¹⁷ This survey was based on inquiries of around 48,000 workers via a network of industrial physicians who consults these workers every year.

Based on the inquiry, a compendium of the risks to which workers are exposed in the field of organisation and methods, physical constraints and biological and chemical risks could be established. An employment exposure matrix in the form of a CD-ROM is being developed, reflecting the links between the workers activities and the chemical products to which they are likely to be exposed (and *vice versa*). The data have already been widely used to analyse the exposure of workers to carcinogens, other substances of certain interest (like glycol ether) or certain branches of industry (e.g. the construction industry).

¹¹⁶ The first scientific investigation was conducted in 1994/1995, the second in 2001

¹¹⁷ Expositions aux contraintes et nuisances dans le travail " sumer " 1994 n° 5-6/98, Ministère de l'emploi et de la solidarité

3.6 GERMANY

Regulatory System and Responsible Bodies¹¹⁸ — The German national system of occupational H&S protection is based on two main pillars and thus referred to as a ‘Dual System’. The two strands are:

- the legislative and institutional system of the Federal Government and its “Länder”
- The regulatory and institutional system of the institutions for statutory accidents insurance and prevention (“Berufsgenossenschaften”).

H&S legislation is dominated by Federal laws and regulations. The “Länder” are responsible for their execution and their surveillance through the Trade Supervisory Boards (“Gewerbeaufsichtsämter”) or the National Offices for Industrial Safety (“Landesämter für Arbeitsschutz”). However, in addition the Berufsgenossenschaften (BGen) are also prominent in the OHS system. The BGen are autonomous bipartite bodies of the social partners with their own binding regulatory framework (Accident Prevention Regulations – Unfallverhütungsvorschriften) and a Technical Inspection Service (“Technischer Aufsichtsdienst”) for its surveillance and enforcement. Their regulations have to be approved by the responsible Federal Ministry for Labour and Social Affairs (Bundesministerium für Arbeit und Sozialordnung). This Ministry is also responsible for announcing revised and/or new OELs in the Technical Guidance Rules for Hazardous Substances (“Technische Richtlinien für Gefahrstoffe” - TRGS) after they are adopted by the Committee on Hazardous Substances (“Ausschuß für Gefahrstoffe”).

The legislative basis for OELs is the Chemicals Acts (“Chemikaliengesetz”¹¹⁹) with its Dangerous Substances Regulation (“Gefahrstoffverordnung”¹²⁰). The Chemical Act was last amended on December 27th 2000. Annex 1 and 2 were adapted to technical progress on May 8th 2001.

Occupational Exposure Limits — Three limit values are in use in Germany:

- Maximum Workplace Concentrations (“Maximale Arbeitsplatzkonzentrationen” – MAK)
- Technical Guidance Concentrations (“Technische Richtkonzentrationen” – TRK), and
- Biological Tolerance Value for occupational exposures (“Biologische Arbeitsstofftoleranzwerte” – BAT).

The first occupational exposure limit values were published in 1886. In 1938, about 100 OELs were presented during a congress in Frankfurt. In 1958, the first MAK-list was published; the values mainly based on the US TLV list. Since 1969, the MAK list has been published annually and independently from the TLV list.

¹¹⁸ The source for this information is based to a large extent on the experience of one of the authors (Grodzki) as a member of the German Committee on Hazardous Substances

¹¹⁹ Gesetz zum Schutz vor gefährlichen Stoffen (Chemikaliengesetz - ChemG) In der Fassung vom 25. Juli 1994 (BGBl. I 1994 S. 1703; 1994 S. 1963; 1994 S. 2705; 1997 S. 1060; 1998 S. 950; 2000 S. 1045, 2048; 2001 S. 843, 2001 S. 2331)

¹²⁰ Verordnung zum Schutz vor gefährlichen Stoffen (Gefahrstoffverordnung - GefStoffV) Neufassung vom 15. November 1999 (BGBl. I S. 2233), zuletzt geändert am 20. Juli 2000 (BGBl. I S. 1076)

The MAK is the concentration of a substance in the air at the workplace which generally does not impair the health of workers.¹²¹ ¹²²According to this definition, MAK values can only be established for those substances, for which a No Observable Adverse Effect Level (NOAEL) or a Lowest Observable Effect Level (LOAEL) can be determined and they are therefore – in theory – health based. ‘In theory’, because initial health-based recommendations of the MAK Commission (Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area)¹²³ are discussed and eventually changed for socio-economic reasons by the Committee on Hazardous Substances before being finally adopted.

For substances like genotoxic carcinogens or mutagenic substances Category I or II (according to the EU classification for hazardous substances), a NOAEL or LOAEL can not be established. To minimise exposure to these substances, TRK values are established, reflecting the “airborne concentration of hazardous substances which can be achieved with the available techniques”.¹²⁴

BAT values are also health-based and are defined as the “Maximum permissible quantity of a chemical substance or its metabolites or the maximum permissible deviation from the norm of biological parameters induced by these substances in exposed humans, which generally does not impair the health of workers”.¹²⁵ They are established for about 50 substances.

The MAK and TRK values are published in the TRGS 900. BAT values are published in the TRGS 903. All values are legally binding.

TRGS 905 contains carcinogenic and mutagenic substances and substances toxic for reproduction and their German (CMR-) classification for which either a different or no classification has been established so far in Annex I of Directive 67/548/EEC. But they are only published in the TRGS 905 if neither MAK nor TRK value has yet been established.

The TRG 900 (MAK and TRK values) refers to about 700 substances or groups of substances, though the number of substances actually covered is much higher (for example, “Beryllium and its compounds”).

Definitions against which exposure is assessed¹²⁶ — MAK and TRK values are established for single substances (not for mixtures), expressed in ml/m³ (equivalent to ppm - parts per million) for volatile substances and in mg/m³ for non-volatile substances, and defined at 20°C and 101.3hPa. MAK and TRK values are time-weighted shift averages of normally 8 hours daily under the condition of an average weekly working time of 40 hours. For 4-shift-

¹²¹ TRGS 900 Ausgabe Oktober 2000, zuletzt geändert BArbBl. Heft 9/2001

¹²² This definition is less comprehensive than the one from the MAK Commission according to which ‘The MAK value is the maximum allowable concentration in the workplace of a working material in the form of gas, vapour, or air-suspended matter which, according to the present state of knowledge, generally does not impair the health of the workers and does not inconvenience them unduly, not even on repeated and prolonged exposure ...’ And “In establishing MAK values, the main consideration is the characteristic effects of the materials, but as far as possible consideration is also given to the practical conditions of the working processes or of the resultant exposure pattern.” MAK- und BAT-Werte-Liste 2001, Mitteilung 37 der Deutschen Forschungsgemeinschaft (DFG), August 2001

¹²³ “What finally matters is the scientifically based criteria of industrial hygiene, and not the technical and economical possibilities of implementation in industrial practice.” MAK- und BAT-Werte-Liste 2001 *ibid*,

¹²⁴ TRGS 900 Ausgabe Oktober 2000, zuletzt geändert BArbBl. Heft 9/2001

¹²⁵ MAK- und BAT-Werte-Liste 2001, Mitteilung 37 der Deutschen Forschungsgemeinschaft (DFG), August 2001

¹²⁶ TRGS 900 Ausgabe Oktober 2000, zuletzt geändert BArbBl. Heft 9/2001

premises, the basis are 42 hours per week on average for four consecutive weeks. In addition, substance-specific exceeding factors of the time-weighted MAK/TRK value are established (between 1 and 10 times of the MAK/TRK value), as well as their duration, their maximum frequency per shift, and the minimum time between two events where the MAK value is exceeded.

BAT values are expressed as concentrations, formation or clearance (amount per time unit) of a certain substance or a metabolite either in blood or urine. As for the MAK/TRK values, BAT values are calculated on the basis of an exposure of 8 hours daily under the condition of an average weekly working time of 40 hours.

Rules for simplified risk assessments of mixtures of substances are established in the TRGS 403,¹²⁷ based on the concentration of each individual substance, not taking into account possible synergistic or antagonistic effects. Additional specific rules apply for substances or groups of substances occurring as dusts, gases, vapours, mists and fibres. Substances, which can be absorbed in large quantities via the skin are assigned an 'H' in the TRGS 900. In addition to the MAK value, specific protection measures have to be applied.

Possible gender specific sensitivities are not taken into account, though specific restrictions exist for pregnant and breastfeeding women, and women who have recently given birth, with regard to CMR¹²⁸ substances.

Procedures for setting OELs — The Technical Rules for Hazardous Substances (Technische Regeln für Gefahrstoffe - TRGS) and therefore also the TRGS 900 (MAK and TRK values), the TRGS 903 (BAT values) and the TRGS 905 (Inventory of CMR substances) are established by the Committee on Hazardous Substances (Ausschuß für Gefahrstoffe - AGS) and adapted by the Committee to the current status of development.

The Committee is an Advisory Committee to the Federal Ministry of Labour and Social Affairs. After having been adopted by the plenary meeting of the Committee on Hazardous Substances, which meets twice a year, the Ministry announces the Technical Rules in the Federal Labour Gazette (Bundesarbeitsblatt – BArbBl.).

The Committee¹²⁹ is a statutory body (§52 Dangerous Substances Regulation – Gefahrstoffverordnung¹³⁰). It has 40 members, which belong to various interest groups, including representatives of:

- the Social Partners
- the Federal and 'Länder' authorities
- producers and manufacturers of hazardous substances
- the institutions for statutory accident insurance and prevention ("Berufsgenossenschaften") and
- the MAK Commission.

¹²⁷ TRGS 403 - Bewertung von Stoffgemischen in der Luft am Arbeitsplatz Ausgabe Oktober 1989 (BArbBl. 10/1989 S. 71)

¹²⁸ Carcinogenic, mutagenic or toxic for reproduction

¹²⁹ http://www.baua.de/prax/ags/ags_allg.htm

¹³⁰ Verordnung zum Schutz vor gefährlichen Stoffen (Gefahrstoffverordnung - GefStoffV) Neufassung vom 15. November 1999 (BGBl. I S. 2233), zuletzt geändert am 20. Juli 2000 (BGBl. I S. 1076)

It has several sub-committees and working groups (some permanent, some established for specific tasks). The various interest groups are also represented within these sub-committees and working groups.

Within the relevant sub-committee(s), the MAK and BAT recommendations of the MAK Commission are discussed, as well as OELs established by other bodies (e.g. the EU). Based on these discussions, the sub-committee(s) propose(s) MAK and BAT values to the plenary meeting for final approval. TRK values are developed within a specific sub-committee and also forwarded to the plenary meeting for final approval. Both types of recommendations are finally discussed, and may be again changed and approved by the plenary meeting of the Committee for Hazardous Substances.

The MAK Commission¹³¹ is a scientific expert group of the German Science Foundation (“Deutsche Forschungsgemeinschaft” – DFG). The Commission publishes each year its MAK and BAT value list (1st July). These values are based on toxicological, occupational hygiene and analytical considerations; they are therefore health-based but not legally binding (see above).

Legal status of Occupational Exposure Limits — All limit values are legally binding as soon as they are adopted by the Committee on Hazardous Substances and published by the Ministry of Labour and Social Affairs. Non-compliance is an infringement of the law (the Chemical Act) and/or its Hazardous Substance Regulations.

In cases where the life or the health of an employee is at risk, non-compliance can become a criminal offence. As a consequence, fines of between 10,000 and 50,000 DM (about 5,000 to 25,000 EUROS) can be charged for infringements or non-compliance with demands of the surveillance authorities. In cases where demands of the surveillance authorities are ignored repeatedly or where the health and/or life of an employee are endangered, a minimum prison sentence of a year or fines are possible.¹³²

In cases where the Accident Prevention Regulations of the institutions for statutory accidents insurance and prevention are ignored or violated, the institution can impose fines and higher mandatory contributions on the employer.¹³³

What is meant by compliance? — Compliance with a MAK value means that the value is not exceeded (allowing for the exemptions mentioned above for peak exposures etc.). Compliance with TRK values means that they should not only not be exceeded but working conditions should ensure a concentration significantly below the established value.

To ensure this, the employer has an obligation to assess and evaluate the concentration of dangerous substances at the workplace (TRGS 402¹³⁴). This assessment and evaluation is divided into four steps:

¹³¹ <http://www.dfg.de/organisation/gremien/mak.html>

¹³² *Gesetz zum Schutz vor gefährlichen Stoffen (Chemikaliengesetz - ChemG) In der Fassung vom 25. Juli 1994 (BGBl. I 1994 S. 1703; 1994 S. 1963; 1994 S. 2705; 1997 S. 1060; 1998 S. 950; 2000 S. 1045, 2048; 2001 S. 843, 2001 S. 2331)*

¹³³ <http://www.hvbg.de/d/pages/kosten/beitrag/beibe.htm>

¹³⁴ *TRGS 402 - Ermittlung und Beurteilung der Konzentrationen gefährlicher Stoffe in der Luft in Arbeitsbereichen Ausgabe November 1997 (BArbBl. 11/1997 S. 27)*

- An assessment of the hazardous substances and their limit values at the workplace
- Collection of basic information about the type of work, the production process, the machinery and techniques involved, ventilation facilities, amount of substances, temperature etc. for the specific work place;
- Collection of additional information on possible exposure scenarios (including exposure peaks, comparison with similar plants, first measurements etc.);
- Based on the information gathered in steps 1 to 3, an assumption has to be made whether or not a permanent compliance with the limit value can be achieved. If this is not the case, the employer is obliged to perform measurements of the exposure according to a detailed plan, including the measurement technique, the number and frequency of measurements (depending on the exposure scenario calculated on the basis of the assessment in steps 1 to 3).

If the limit value is exceeded, immediate action to reduce the concentration has to be taken.

Results of the exposure measurements have to be kept for 30 years.

Who enforces the Exposure Limits? — Compliance with the established limit values is enforced by the labour inspectors of the National Offices for Industrial Safety of the Bundesländer. The National Offices for Industrial Safety, which the Labour Inspectorate (“Gewerbeaufsicht”) is part of, are normally authorities (“Behörden”) of the responsible Ministry at State level. The following powers are given to the inspectors of the Gewerbeaufsicht¹³⁵:

- to enter, investigate and monitor workplaces at any time
- to require from the employer the information and documents necessary for them to fulfil their task
- to perform technical checks and to receive the technical assistance (manpower, tools etc.) to do so
- to collect material samples and to analyse them
- to consult experts.

For the execution of their tasks, the inspectors have the same powers as the local police. In cases of lack or violation of laws and regulations, inspectors have to ensure their remedy. They can issue orders and make use of the compulsory measures/sanctions they are entitled to use according to the relevant State laws. Normally this covers the remedy of the situation at the expense of the employer or the establishment and/or the fixing of fines. Additionally, they can order the suspension/cessation of parts or the whole of the production process or initiate ongoing penalties.

The institutions for statutory accident insurance and prevention and their Technical Inspection Service are also responsible for the surveillance of the Hazardous Substances Regulation and its Technical Rules. Both surveillance authorities also offer special support for small and medium sized enterprises with respect to training and measurement techniques.

In addition to ‘external’ surveillance, an internal system for ensuring compliance with the health and safety provisions is in place. This is composed of safety engineers and the occupational medical support service (which is mandatory for companies of a certain number of employees), as well as representatives of the workforce. Regular meetings between the

¹³⁵ *Gewerbeordnung (GewO) in der Fassung der Bekanntmachung vom 22. Februar 1999 (BGBl. I S. 202*

management and other people responsible for health and safety within an enterprise are mandatory.

Enforcement activity — Both the National Offices for Industrial Safety as well as the institutions for statutory accident insurance and prevention collect and publish annual reports about their surveillance and enforcement activities. These reports are publicly available (often via the Internet). They include information on the number of inspections, the types of notices issued, fines charged etc., as well as strategic targets and plans for the forthcoming years. These reports cover all health and safety activities and not only those linked with hazardous chemicals and the enforcement and surveillance of occupational exposure limit values. In the 156 pages of the annually published report of the Federal Ministry for Labour and Social Affairs for the year 2000¹³⁶, no direct mention of infringements of the H&S legislation in the field of dangerous chemicals and exposure limit values is made. Emphasis lies on the number of occupational accidents and occupational diseases, their development sorted by branches, occupation, Bundesländer (States), and various other criteria, costs linked to occupational accidents/diseases, developments in the working population etc. No data on chemical exposure or infringements of OELs is available in these reports. However some conclusions about the exposure situation can be drawn from information given about the number of people working with chemicals/dust etc. or from the numbers of occupational diseases related to chemicals.

A much better source for this sort of information are the databases of the Berufsgenossenschaften – (BGen) (“Statutory Accidents Institutions for Insurance and Prevention”) and the publications based on them. Within the framework of the Berufsgenossenschaften’s measuring and supervision tasks, the BG measuring system for hazardous substances (BGMG) records more than 350 substances used at the workplace. Particular emphasis is placed on carcinogenic substances for which some 3,000 readings are taken every year. The operational data obtained within the framework of workplace measurements together with the results themselves are recorded in the MEGA databank of the Berufsgenossenschaftliches Institut für Arbeitssicherheit (BIA).¹³⁷

MEGA is the chemical workplace-exposure-database of the Institute for Occupational Safety, BIA of the German Berufsgenossenschaften. On the legal basis of the social insurance law the inspectorates of the BGs conduct workplace measurements of chemical and biological agents. The BGs have cooperated with BIA within the “Berufsgenossenschaftliches Meßsystem Gefahrstoffe – BGMG” since 1972: measurements are done by the BGs, analysis and data processing are the tasks of BIA. In 1999 31,000 measurements with 68,000 analyses were taken in 4,000 enterprises. All data are stored in the MEGA-database with up to 150 pieces of information (describing type of workplace, working conditions, measured substances, sampling strategy, sampling duration, sampling and analytical method etc.), for each result. MEGA contains currently about 1,000,000 measurements of more than 400 substances beginning from 1972. MEGA is used by BIA and the BGs for the following purposes: prevention (e.g. identification of hazards, efficiency of exposure reducing measures, determination of technical criteria for exposure limit values), epidemiological questions and investigations of occupational diseases. In the framework of the measuring and inspection activities of the BGs the locations for measurements are not randomly selected, but focus on critical exposure situations and testing the efficiency of exposure reducing measures. Nevertheless, a statistical appraisal of the data is possible for different purposes considering

¹³⁶ *Unfallverhütungsbericht Arbeit – 2000 (Accident Prevention Report 2000)*

¹³⁷ *Stamm, R. et al; Workplace exposure to hazardous substances: status quo Source: BIA-Report 2/96. 2nd updated edition, HVBG 1998*

the specific determinants of the results, as for example classification of enterprises (sectors), workplaces (activities, tasks), used materials and products.¹³⁸ It is not clear whether (or how meaningfully) detailed analysis of the data collected here would reveal information on enforcement practice in relation to OELs.

Discussions at national level — The discussion at national level with respect to OELs was and is dominated by two topics:

- The revised classification of the MAK Commission of carcinogens into five categories and
- The White Paper of the European Commission on Chemicals.

In 1998, the MAK Commission proposed a new concept for carcinogens, by introducing two new additional categories to the three existing ones. These were:¹³⁹

- non-genotoxic substances (category 4)
- substances with carcinogenic and genotoxic effect, whose potency is considered to be so low that no significant contribution to human cancer risk is expected, provided that a special MAK value is observed (category 5)

In 2000, the MAK Commission divided its 3rd category (B – substances with suspected carcinogenic potential) in two sub-categories:

- Category 3A – Substances which are foreseen for either category 4 or 5 but for which so far no ‘safe’ MAK values could be established
- Category 3B – Substance which are still seriously suspected to be carcinogens

Criticism of the new concept has to be seen against the background of a broader discussion about the limitation of the existing OEL concept, and in particular against the concern about OELs being based on single substance exposure assessments (see the discussion in the Netherlands to follow).

Through introducing Category 5, the MAK Commission questions the long- recognised principle within the scientific community that for genotoxic carcinogens no safe threshold can be established below which no risk exists. In addition, it neglects the combined effects of different substances and in particular the fact that some substances act as so-called promoters in conjunction with genotoxic carcinogens. This issue was highlighted by the classification proposals of the Commission for the new Category 4, which placed more or less exclusively these promoter substances in this Category.

With respect to OELs, the White Paper of the Commission on Chemicals has provoked criticism within parts of the H&S community in Germany. The foreseen reduced testing requirements for substances produced below 1000 tonnes per year is considered to be a threat to occupational health and safety because data on chronic and subchronic effects would no longer be available for the majority of substances used in Europe (and of course in Germany). Recommendations/proposals for OELs are mainly based on this data, so OELs could only be derived for an even smaller number of substances.

¹³⁸ Stamm, R. Title: *MEGA-Database: One Million Data Since 1972, Applied Occupational and Environmental Hygiene 16 (2001) No. 2, pp. 159-163*

¹³⁹ *proven carcinogens either in humans (category A1) or animals (category A2) and substances with suspected carcinogenic potential (category B)*

Definitions of exposure limits for action as laid down in the 82/605/EEC Dir.(P.D.94/87) and amended in P.D.338/2001(98/24 EC Dir.):

'If the assessment provided for in paragraph 1 reveals the presence of at least one of the following conditions:

- exposure to a concentration of lead in air greater than 75g/m³, calculated as a time-weighted average over 40 hours per week,
- a blood-lead level greater than 40g Pb/100 ml blood in individual workers, the protection provided for in this Directive(82/605 EEC), in particular the lead-in-air monitoring and the medical surveillance set out in Articles 3 and 4, is to be given to the workers concerned.'

3.7 GREECE

Regulatory system and responsible bodies — Act 1568/85 on Health and Safety at Work was a milestone in the history of Greek OHS legislation. It introduced new institutions and spelt out the duties and responsibilities of employers, workers and the manufacturers/importers of machinery and chemicals. Article 26 of Chapter V (echoing Dir.80/1107/EEC) obliges the employer to take measures to avoid or minimize the exposure of workers to chemical agents, wherever this is practically possible. In all events the level of exposure must be lower than the level defined as the “exposure limit value”. The ratification of the 1989 EU Framework Directive through Presidential Decree 17/1996 further improved the protection of health and safety at work.

The Ministry of Labour is the main controlling body for the work environment in all work activities, public and private. In December 2000 a new *corps* of Labour Inspectors (SEPE) was established. SEPE, which is better staffed and equipped than the previous Labour Inspectorate, is organised centrally and regionally.

Occupational Exposure Limits — Under Act 1568/85(Chapter V, Article 24, Definitions) there are two types of exposure limit.

- ‘Exposure limit value’ means the concentration that should not be exceeded for any part of the working exposure
- ‘biological indicator limit value’ - the highest permissible concentration of an agent as measured directly in body tissue, body fluids or in the exhaled air, or indirectly via its specific effect on the organism.

The OELs are the products of a compromise reached after considering, health and administrative, political and economic issues. Negotiations take place within the National Council for Health and Safety at Work (SYAE). SYAE deliberates on all matters pertaining to occupational health and safety and is effectively an institutionalized forum for national consultation: 17 bodies are represented on the Council .

The General Directorate of Working Conditions of the Ministry of Labour through its Directorate of Working Conditions has the task of sending the summary information report of the emerging decision as a Presidential Decree (P.D.) and attaching to it a copy of the state journal containing the relevant list of OELs.

All P.D. are published by the National Publishing House. Copies of the official journal are sent to the social, administrative, economic and scientific bodies participating in and represented in SYAE.¹⁴⁰

Definitions Against which Exposure is Assessed — Acting in accordance with the empowering provisions laid down in Article 29 of the Act 1568/85, P.D. 307/86 “on the protection of the health and safety of workers from the risks related to specific (39 in number) chemical agents at work” was issued. Article 2 contained the following definitions:

- Exposure means the individual worker exposure level to a polluting agent of the working environment, for a temperature 25 C and pressure 760mmHg, given in ppm or mg/m³.
- The exposure limit value (exposure limit value – TWA) is a time weighted average over a period of eight hours. It should not be exceeded over any 8-hour working day and a 40-hour working week..
- The short-term exposure limit (‘exposure limit value – highest’) is defined as a 10-minute time weighted average exposure to a chemical agent which should not be exceeded at any time during a workday even if the 8-hour TWA is within the exposure limit value. It is given in ppm or mg/m³.

The following additions are also given:

- Skin Notation: this covers eight listed chemical agents and refers to the potential contribution to the overall exposure by the cutaneous route
- ‘Action level’ for specific OELs including those for lead and asbestos
- Occupational exposure limit values for particulates i.e .crystalline silica dust, cotton dust, inert dust.

P.D. 77/1993 “on the protection of workers from physical, chemical and biological agents” transcribed the 88/642/EEC Directive and complemented and amended P.D.307/86.

For the purpose of implementing this P.D. the terms used have the following meanings:

- Exposure means the individual worker exposure level to a chemical agent present in the air of the workplace. The exposure level is described in terms of concentration over a reference period and is stated in ppm by volume in air (ml/m³) or mg/m³ or number of fibres/m³
- in case of fibrogenic dusts, OELVs are defined as in P.D.307/8.
- The limit value for gases and vapours is stated in terms independent of temperature and air pressure variables in ml/m³ (ppm) and in terms dependent on those variables in mg/m³ for a temperature of 25 °C and a pressure of 760mmHg
- The limit value for suspended matter is given in mg/m³ for operating conditions at the workplace.

¹⁴⁰ Free copies are also available on line :<http://www.osh.gr/workcond>, <http://www.osh.gr/Kyae>, <http://elinyae.gr> .
ELINYAE is the Hellenic Institute for Occupational Health and Safety at Work. The operation of ELINYAE began in May 1993. It is a product of cooperation between the main employer and employee organisations and has as a long-term objective their contribution to the development of an overarching policy of health, hygiene and safety at work in Greece.

P.D.90/99 transcribed 91/322 EEC and 96/94 EC Directives on establishing a first and a second list of indicative limit values and amended article 3(4) of P.D.307/86 as it was amended by P.D.77/93 and also replaced the list of the 39 agents included in article 3(1). With the addition of indicative values based on other sources such as the ACGIH list Greece has a list of 553 substances with indicative OELs.

P.D.338/2001 transcribed almost verbatim the Directive 98/94/EC “on the protection of the health and safety from the risks related to chemical agents at work (14th individual Directive)”. P.D. 338/2001 redefined and specified all previous exposure values as follows:

- ‘Occupational exposure limit value’ means the limit of the time-weighted average of the concentration of a chemical agent *in the air within the breathing zone of a worker* in relation to a specified reference period’
- “‘Biological limit value’ means the limit of the concentration in the appropriate biological medium of the relevant agent, its metabolite, or an indicator of effect’.

P.D.339/2001 was issued in accordance with the 2000/39 EC Directive. It added 4 new indicative occupational exposure limit values to the previous list of 553 chemical agents (P.D.90/99), which included the remaining 59 on the 2000/39 list. It also ratified the meaning of OELs as amended in P.D.90/99.

In relation to lead, definitions of exposure limits for action as laid down in the 82/605/EEC Dir.(P.D.94/87) and amended in P.D.338/2001(98/24 EC Dir.):

‘If the assessment provided for in paragraph 1 reveals the presence of at least one of the following conditions:

- exposure to a concentration of lead in air greater than 75g/m^3 , calculated as a time-weighted average over 40 hours per week,
- a blood-lead level greater than 40g Pb/100 ml blood in individual workers,

the protection provided for in this Directive (82/605 EEC), in particular the lead-in-air monitoring and the medical surveillance set out in Articles 3 and 4, is to be given to the workers concerned.’

As far as the protection of the health and safety of workers from risks related to carcinogenic agents at work P.D.399/94 and P.D. 127/2000 have adopted 90/394/EEC and 97/42/EC Directives.

Procedures for setting OELs — Since 1986 Greece has developed a two tier system in order to meet its obligation to set Occupational Exposure Limits. The first scientific advisory committee consisting of 8 members made its proposals for 45 chemical agents, proposed the prohibition of an additional 12 as well as the reduction of the exposure limit values of benzene, vinyl chloride, asbestos, epichloridrine, a-chlorotoluene and exachlorobutadiene in the meeting of SYAE on the 2nd June 1986.

SYAE after considering HSE, NIOSH, ACGIH, NSBOSH, DFG standards decided to set limits for 39 chemical agents. Four of the 12 proposed in 1986 (see 98/24 EC Directive) were prohibited with a ministerial decision in 1989 following the 89/677/EEC Dir.

A similar *modus operandi* was followed with regard the OELs endorsed in the above mentioned P.D.90/99. A scientific committee including a member of ELINYAE and a

member of the Union of Greek Chemists, after detailed consideration of the available scientific and medical evidence recommended OELs for 553 agents.

Legal Status of Occupational Exposure Limits — Laws are discussed and voted in Parliament while Presidential Decrees are merely signed by a minister or a group of ministers and approved by the President of the Greek Republic. The lists of limits endorsed in the P.D.s are binding and therefore associated with legal sanctions. For agents not included in the lists, inspectors use the ACGIH values as guidance.

Enforcement Activity²⁰ - The Labour Inspectorate have the normal range of powers. They may use:

- Advice
- Improvement Notices
- Administrative sanctions
- Penal sanctions

Improvement notice — An inspector may serve an improvement notice where s/he is of the opinion that a contravention of a statutory requirement has been or is about to be carried out. It requires the person on whom the notice is served to make the necessary improvements to reach the desired standard. The inspector may specify appropriate remedial action and give a time limit of maximum 30 days in which to comply.

An extension of a maximum 10 days may be given if the time allowed in the first place is judged as insufficient. There is no appeal against the terms of the notice. Safety reps should be given a copy of Improvement Notices.

Administrative sanctions — The labour inspector may impose the following sanctions on any employer, manufacturer, producer, importer or supplier who infringes the provisions of the health and safety laws or the provisions of the presidential decrees or ministerial decisions issued under the terms of these laws, independently of the penal sanctions, on the basis of a fully reasoned decision and after summoning the person to provide explanations.

- a fine for each infringement ranging from 155 Euros. to 9.780 Euros
- provisional cessation of the operations of the particular production process, or section or sections or the entire undertaking or firm for a period of up to 3 days.

The Minister of Labour may impose the following sanctions, after receiving a reasoned report from the labour inspector:

- temporary cessation of the operations of the particular production process or section or of the entire undertaking for a period of more than 3 days.
- complete cessation of the operations of the particular production process or section or the entire undertaking

The employer has 60 days from the receipt of the notice in which to contest the proposed administrative sanctions to the administrative tribunal of the region. If the employer fails to notify the inspectorate of his contest within 10 days, the assessed penalty is deemed final.

In selecting and imposing the above administrative sanctions the following aspects shall be borne in mind:

- The immediacy, severity and extent of danger
- The seriousness of violation, subsequent violations, good -faith efforts, previous convictions.
- The responsible police authorities shall execute the administrative sanctions of the cessations.
- The above fines may be raised by decisions of the Minister of Labour after hearing the opinion of the OHS Council

Penal Sanctions — Any employer, manufacturer, producer, importer or supplier who willfully violates the Act or the rules promulgated by it shall be punished by: imprisonment or a fine of at least 310 Euros or by both imprisonment and a fine of 310Euros. Offences committed due to negligence (on conviction) carry the full sanction of a fine or a prison sentence not exceeding one year.

What is meant by Compliance — The process and the principle of the assessment of exposure are laid down in P.D.77/93(ANNEX) is as follows:

‘If the presence of one or more agents in gaseous, vaporous or suspended form in the air at the workplace cannot for certain be ruled out, an assessment must be made to see whether the limit values are complied with. In this assessment, all points which might be relevant to exposure must be carefully looked into, for example:

- agents used or produced
- operations, technical installations and processes
- temporal and spatial distribution of concentrations of agents.

A limit value is complied with if the assessment shows that exposure does not exceed it.

If the information obtained is insufficient to establish reliably whether the limit value is complied with, it must be supplemented by workplace measurements. If the assessment shows that a limit value is not complied with:

- the reasons for the limit being exceeded must be identified, the workers must be informed and appropriate measures to remedy the situation must be implemented as soon as possible
- the assessment must be repeated.

If the assessment shows that the limit values are complied with, subsequent measurements at appropriate intervals must be taken to ensure that the situation continues to prevail. The nearer the concentration recorded comes to the limit value, the more frequently measurements must be taken.

If the assessment shows that, on a long-term basis, owing to the arrangement of the work process, the limit values are complied with and there is no substantial change in conditions at the workplace likely to lead to a change in workers’ exposure, checks on compliance through measurements may be curtailed, after consulting with the workers. In such cases, however, the quality of the assessment leading to that conclusion must be monitored.

If workers are exposed simultaneously or consecutively to more than one agent, this fact must be taken into consideration in evaluating the health risks to which they are exposed’.

Who enforces the Exposure Limits? — The basic objective of the Greek Labour Inspectorate is to monitor the implementation of the provisions of labour legislation. The SEPE is above

all a monitoring mechanism whose main task is to monitor the implementation of labour legislation in respect of: terms and conditions of employment (such as working time limits and pay); the legality of employment; the investigation of workers' social insurance coverage; and workers' health and safety conditions.

The SEPE's offices are open every day of the month, and it exercises its monitoring responsibilities 24 hours a day, seven days a week. In order to carry out its work, the SEPE has the right and duty to:

- freely enter all workplaces in the private and public sectors
- temporarily suspend operation of the whole or part of an enterprise if it deems that workers' safety and health are directly at risk;
- impose, or take legal action to impose, administrative penalties;
- have access to archives, documents, registers, books and other data concerning an enterprise;
- investigate the causes of occupational diseases and the conditions in which they occur;
- collect samples, conduct analyses, measure natural, chemical and biological factors and take photographs.

Penalties will be incurred by anyone who prevents labour inspectors from entering an enterprise or who provides false data. All administrative, police and harbour authorities, judicial and public services, as well as the services of regional and local authorities, must provide assistance to the SEPE upon request.

Presidential Decree 136/99 establishes that the SEPE is organised on the basis of a central service and regional services, in order to function as a modern monitoring body.

The central service is made up of:

- the office of the special secretary who heads this service;
- the department of Special Inspectors responsible for the internal monitoring of the service;
- the planning and coordination division;
- the administrative and technical support division.

The regional services are organised in line with the division of the country into regions and prefectures, and include:

- regional social inspection divisions, under which fall 76 local social inspection departments (mainly at the prefectural level);
- and seven Occupational Risk Prevention Centres with sections of work environment measurements, on the divisional level, with interregional competency, under which fall 31 local departments of technical and sanitary labour inspection (at the prefectural level).
- For the Attica region in particular, where a large number of workers and enterprises are concentrated, four social inspection divisions have been created; four Occupational Risk Centres also have their headquarters in Attica.

SEPE Occupational Risk Prevention Centers and local departments when in need of extra expert assistance in enforcing the OELs have access to the scientific and technical support of the Center of Health and Safety at Work (KYAE) which is a separate Directorate within the General Directorate of Working Conditions.

Enforcement activity — There are no data available at national level showing numbers of inspections or prosecutions in relation to occupational exposure limits. There are however, a few prohibitions and improvement notices, in relation to the monitoring strategies – health surveillance with regard lead and its ionic compounds, asbestos and asbestos products, the replacement of some dangerous industrial solvents with others less dangerous and the gradual replacement of PCBs electrical transformers. It is believed that the new approach of SEPE that takes advantage of risk assessment in regulating self-regulation in an adequate and effective way could bear on current practice. SEPE does not only pursue the establishment of written risk assessment in firms but also checks the assessment of risk of hazardous chemical agents.

How will the country comply with the IOELV Directive? — P.D.339/2001 was issued in accordance with the 2000/39 EC Directive. It adds 4 new indicative occupational exposure limit values to the previous list of 553 chemical agents (P.D.90/99), which includes the other 59 of the 2000/39 list. It also ratifies the meaning of OELs as amended in P.D.90/99.

3.8 IRELAND

Regulatory system and responsible bodies — Health and Safety is regulated in the Republic of Ireland under a single piece of primary legislation – the *Safety Health and Welfare at Work Act, 1989* which implemented the requirements of the EU Framework Directive. In addition it established a separate agency, the Health and Safety Authority (HSA)¹⁴¹, responsible for implementation and enforcement of the Act. Prior to this the enforcement of health and safety in Ireland fell under the responsibility of the Department of Labour. The HSA is responsible for producing, disseminating and enforcing Occupational Exposure Limits in the Republic of Ireland. The original piece of secondary legislation which supported OELs was the *Safety Health and Welfare at Work (Chemical Agents) Regulations 1994* – a piece of legislation very similar in style and content to the UK Control of Substances Hazardous to Health Regulations. The Chemical Agents Regulations was updated at the end of 2001.¹⁴²

Occupational Exposure Limits — The Irish system of OELs utilises a single status exposure limit, the Occupational Exposure Limit. The list of OELs is published in a Code of Practice for the Chemical Regulations,¹⁴³ this is updated bi-annually. This listing of exposure limits distinguishes between hazards by the use of notations, carcinogens, reproductive hazards, mutagens and sensitising agents.

Definitions against which exposure is assessed — Exposures are defined as being personal time-weighted average values over an eight hour period. Within this daily average limit there is also a requirement to comply with a short term exposure limit (or STEL), where cited, this is measured over a 15 minute reference period. Further limited information is provided in the form of an annotation to notify substances which are deemed to be readily absorbed through the skin.

Procedure for setting of OELs — The Irish system openly borrows exposure limits from the UK, the US and Europe. The majority of the limits applied are taken from the UK though the

¹⁴¹ Health and Safety Authority Website: www.hsa.ie

¹⁴² *Safety, Health and Welfare at Work (Chemical Agents) Regulations, 1994, SI 445 of 1994, Dublin*

¹⁴³ *Code of Practice for Safety, Health and Welfare at Work (Chemical Agents) Regulations, 1994. Dublin.*

ACGIH and SCOEL limits are consulted and may be applied in some cases. For example the UK currently applies an MEL of 0.3 mg/ m³ to crystalline silica for socio-economic reasons whereas Ireland applies the ACGIH limit of 0.1 mg/m³. The Code that disseminates the limits is updated every two years. Changes in exposure limits in the UK and elsewhere are tracked and brought into the Irish system with an intervening period of consultation with those affected. Changes in exposure limits will thus lag behind changes elsewhere.

Legal Status of Occupational Exposure Limits — The OEL is a statutory limit, compliance is mandatory under the Chemical Agents Regulations. Non-compliance is a criminal offence which could theoretically lead to a statutory notice enforcing reduction in exposure, curtailment of the process or, in the case of further non-compliance, legal sanctions (usually fines).

What is Meant By Compliance — Irish employers are required to assess or measure exposures against the exposure standard and ensure that the OEL is not exceeded. Excursions which exceed the OEL for a short period are allowable. Non-compliance is taken as exposure consistently above the OEL.

Who Enforces the Exposure Limits ? — The Chemical Agents Regulations and the related OELs are enforced by the workplace inspectors employed by the HSA. Where general inspectors require verification of exposure to a chemical agent they are able to call upon an occupational hygiene unit to carry out workplace assessments.

Enforcement Activity — Health and Safety Authority inspectors possess enforcement tools which mirror those of the UK inspectors, these include improvement notices, prohibition of the use of substances or the prohibition of operation of particular processes. In practice the Authority tends to require improvement plans to be put in place by the employer where there is non-compliance with an exposure limit. The Authority has not invoked improvement or prohibition notices with respect to non-compliance with an OEL, in fact there have been no prosecutions under the Chemical Agents Regulations (HSA, 2002). However this should be viewed against an overall prosecution total for all safety and health violations of between 35 and 69 for the years 1996 to 2000 (HSA website).

Discussions at National Level — The Irish system has been looking to Europe for some time and taking note of the recommendations arising from SCOEL. Implementation of the IOELV Directive had to some extent already been taken into account in many of the existing exposure standards, values being in line with the indicative values or stricter.¹⁴⁴ The recent introduction of the Chemical Agents Regulations 2001¹⁴⁵ has widened the scope of this legislation and will fully implement the Directive once the Code of Practice is re-issued against these Regulations.

¹⁴⁴ Health and Safety Authority, (2002) Personal Communication.

¹⁴⁵ Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001, SI 619 of 2001, Dublin

3.9 ITALY

Regulatory system and responsible bodies — The Italian OHS system is based on two fundamental aspects: public health and labour policy.¹⁴⁶

Public health — The OHS system is organised around the National Health Service (“Servizio Sanitario Nazionale” - SSN). The Ministry of Health (“Ministero della Sanità”)¹⁴⁷ is the central body of the SSN and its main tasks consist of the national planning and co-ordination of all matters regarding public health.

Public agencies (monitored by the Ministry of Health) act as technical-scientific bodies for the SSN. They include:

- The National Institute of Occupational Safety and Health (“Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro” – ISPESL)¹⁴⁸
- The National Institute of Health (“Istituto Superiore di Sanità” – ISS)¹⁴⁹
- The National Advisory Committee on Toxicology (“Commissione consultiva tossicologica nazionale” - CCTN)

Labour policy - The Ministry of Labour and Social Affairs (“Ministere del Lavoro e delle Politiche Sociali”)¹⁵⁰ plans and co-ordinates national policy and strategies on labour and employment. The Labour Inspectorate is part of the Ministry. The main bodies involved in H&S under the auspices of the Ministry of Labour and Social Affairs are:

- The National Institute of Insurance against Accidents at Work (“Istituto Nazionale per L’Assicurazione contro gli Infortuni sul Lavoro” -INAIL)¹⁵¹
- The Italian Institute of Social Medicine (“Istituto Italiano di Medicina Sociale “ - IIMS)¹⁵²
- The Permanent Advisory Committee for Accidents Prevention and Occupational Hygiene (“Commissione consultiva permanente per la prevenzione degli infortuni e l’igiene del lavoro”).¹⁵³

In Italy, no national system exists for establishing OELs. Legislation limiting exposure to hazardous chemicals generally comes in the form of decrees by the Italian Government or the Ministries of Health and Labour.¹⁵⁴ In addition, TLVs of the ACGIH have sometimes been included in sectoral collective agreements between trade unions and employers’ organisations.¹⁵⁵ In Italian law such agreements have a legal status.

¹⁴⁶ <http://it.osha.eu.int/systems/osh syst.htm>

¹⁴⁷ <http://www.sanita.it/>

¹⁴⁸ <http://www.ispesl.it/>

¹⁴⁹ <http://www.iss.it/>

¹⁵⁰ <http://www.minwelfare.it/defaultgen.asp>

¹⁵¹ <http://www.inail.it/>

¹⁵² <http://www.iims.it/>

¹⁵³ <http://www.area.fi.cnr.it/guests/prevenzione/cap5.pdf>

¹⁵⁴ Information given by the ISPESL

¹⁵⁵ Information given by members of the trade unions, in Italy and the TUTB and an epidemiologist from the University of Turin .

Italian measures to transpose the main European Directives dealing directly or indirectly with the risks arising from dangerous substances at work, include¹⁵⁶:

- Decreto Legislativo n. 626 del 19/09/1994 – transposition of Directive 89/391/EEC¹⁵⁷ and 90/393/EEC¹⁵⁸ (amongst others)
- Decreto Legislativo 25 febbraio 2000, n 66 – transposition of Directive 97/42/EC and 1999/38/EC¹⁵⁹
- Decreto Legislativo n° 277 del 15/8/1991 – transposition of Directive 80/1107/EEC¹⁶⁰, 82/605/EEC¹⁶¹, 83/477/EEC¹⁶² (amongst others)
- Legge 29 dicembre 2000, n. 422 - delegates to the Government the right to issue the decrees for the implementation of 27 EU Directives within one year, amongst others for Directive 98/24/EC¹⁶³
- Legge 2 February 2002, n.25 transposes the Chemical Agents Directive

Occupational Exposure Limits¹⁶⁴ — As mentioned above, Italy does not have its own system of establishing OELs. The only limit values adopted nation-wide are those arising from the transposition and implementation of European Directives on carcinogens or specific substances like asbestos, inorganic lead or vinyl chloride monomers. These are binding limit values which are not health-based because socio-economical and technical feasibility factors were taken into account, when they were established at European level. No official list of OELs exists. In addition, in sectors where agreements between employers' organisations and trade unions refer to the US ACGIH, this list represents OELs that are compulsory in these sectors. The agreements are normally up-dated every three years and will incorporate the most recent version of the ACGIH list.

Definitions against which exposure is assessed — For the definition of TLVs according to the ACGIH list see the section on Belgium. The definition of the OELs based on the European Directives are the same as in the EU Directives. They are expressed in either mg/m³ at 20°C and 101.3 kPa or in ppm (ml/m³).

Benzene has a skin notation, the values for benzene, vinyl chloride monomers and hard wood dust are expressed as time-weighted averages, measured or calculated over a period of 8 hours. The value for wood dust is given for the inhalable fraction.

Procedure for setting OELs — Until recently there was no national committee/advisory board or other regulatory body established dealing exclusively with the establishment of OELs. The only (historical) example of such a body existed in 1975, when the former ENPI ("Ente Nazionale Prevenzione Infortuni" - National Agency for Prevention of Accidents at Work) issued a provisional list of recommended OELs, which was never approved at national level.

¹⁵⁶ <http://europa.eu.int/celex/>

¹⁵⁷ Framework Directive

¹⁵⁸ Carcinogen Directive

¹⁵⁹ 1st and 2nd modification of the Carcinogen Directive

¹⁶⁰ Chemical, Biological and Physical Agents Directive

¹⁶¹ Directive on Lead

¹⁶² Directive on Asbestos

¹⁶³ Chemical Agents Directive

¹⁶⁴ Information given by the ISPESL, contacts within the Italian trade unions and the epidemiologist from Turin

ENPI was shut down in 1979, after the National Health Service was installed in 1978. The ACGIH list of TLVs. has been used as reference in the “Contratto Collettivo Nazionale di Lavoro”, the collective agreement signed by trade unions and employers in Chemistry/Rubber/Plastics sector in the early 1970s. Other sectors, such as metal working have also used it, or are negotiating to use it in their collective agreements.

Although historically there was no specialised body at national level dealing exclusively with OELs, a number of committees and bodies existed that dealt with H&S issues in general or including OELs. Some of them are multi-partite bodies. The most important ones are¹⁶⁵:

The National Institute of Occupational Safety and Health (“Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro” – ISPESL) — The Institute is one of the technical-scientific bodies of the National Health Service under the Ministry of Health and it operates on all occupational safety and health matters. As well as the National Advisory Committee on Toxicology (see below), the task of proposing exposure limits is addressed by ISPESL, which relies on recommendations by the ILO or EC directives that address occupational exposure to carcinogens and other hazardous chemicals in the workplace.¹⁶⁶

The National Institute of Health (“Istituto Superiore di Sanità” - ISS) — The National Institute of Health is another technical-scientific organ of the National Health Service. It enjoys scientific, organisational, administrative and accounting independence and is subject to monitoring by the Ministry of Health. It undertakes research, experimental, control and training functions in relation to public health.

*The National Advisory Committee on Toxicology (“Commissione consultiva tossicologica nazionale”)*¹⁶⁷ — Provides information on chemical compounds and their effects on health. The general aim is to draw up guidelines and perform toxicological evaluations of chemicals, mainly for carcinogenicity, teratogenicity and mutagenicity. It is done through an evaluation of the scientific evidence available in literature, and other sources, including confidential ones. The intended users are the health personnel of the National Health Service and epidemiological researchers. Reports on single chemicals or groups are distributed on request and free of charge.¹⁶⁸

The National Institute of Insurance against Accidents at Work (“Istituto Nazionale per L’Assicurazione contro gli Infortuni sul Lavoro” -INAIL) - Operates under the authority of the Ministry of Labour, managing the mandatory insurance funds against occupational accidents and pathologies. The INAIL has regional and local offices all over the country.

The Italian Institute of Social Medicine (“Istituto Italiano di Medicina Sociale “ – IIMS)
An advisory body, under the Ministry of Labour, devoted to study and research regarding social diseases and prevention tools.

¹⁶⁵ Information on most of the bodies described in the following can be found on the following web pages:
<http://www.ispesl.it/>; <http://www.iss.it/>; <http://www.inail.it/>; <http://www.iims.it/>;

¹⁶⁶ U.S. Congress, Office of Technology Assessment, *Researching Health Risks, OTA-BBS-570* (Washington, DC: U.S. Government Printing Office, November 1993).

¹⁶⁷ U.S. Congress, Office of Technology Assessment, *Researching Health Risks, OTA-BBS-570* (Washington, DC: U.S. Government Printing Office, November 1993).

¹⁶⁸ <http://www.occuphealth.fi/e/eu/haste/i011.htm>

*The Permanent Advisory Committee for Accidents Prevention and Occupational Hygiene (“Commissione consultiva permanente per la prevenzione degli infortuni e l’igiene del lavoro”)*¹⁶⁹ — This committee, chaired by the Minister of Labour, monitors the application of legislation, as well as its updating, and is composed of a great number of members regarding all aspects of OHS. The most represented bodies are the following: Ministry of Labour, Ministry of Health, ISPESL, Regions and Autonomous Provinces, Trade Unions, Employers’ Organisations. In addition, the following institutions are represented by one member: Ministry of Industry and Trade, Ministry of the Interior, Ministry of Defence, Ministry of Transport, Ministry of Agriculture, Ministry of Environment, Office of the Prime Minister, INAIL, IIMS, National Institute of Health (ISS), National Fire Brigade, National Research Council (CNR), National Body of Standardisation (UNI), Italian Electrotechnical Committee (CEI), National Environment Protection Agency (ANPA).

Implementing the EU Chemical Agents Directive and the IOELV Directive — In order to implement the transposition of the EU Chemical Agents Directive and the IOELV Directive made under it, several new committees and working groups have been set up. One is composed on nominees of the various ministries and is responsible for implementation of indicative values in the IOELV Directive. The Ministries of Labour and of Industry have defined the need for a Working Group with membership of about 25 persons representing wide ranging interests in order to assist with guidance on the definition of risk. It is particularly charged with dealing with the needs of small enterprises in this respect. At the same time, there is a committee with regional representation that is working on the same issue (see Chapter 6 for more details)

Legal status of Occupational Exposure Limits¹⁷⁰ — Only the OELs taken over from the European Union are legally binding nation-wide. TLVs agreed between social partners are only valid for the sector for which the collective agreement has been adopted. But both types of values have to be seen in conjunction with the ALATA principle¹⁷¹. According to this principle, the employer is obliged to and the worker is entitled to avoid exposure to chemical agents, which can have an adverse effect on health. The principle is regarded as a general and fundamental right of workers based on articles of the constitution¹⁷², the civil code¹⁷³ and which can also be found in basic H&S legislation like for example the general provisions of the DPR 303 from 1956.¹⁷⁴

If limit values, established either via the EU or via collective agreements, are higher than those technically achievable, then these transposed/agreed values are considered to be against the law. With respect to the European Union this is generally not a problem, because all OELs based on H&S Directives are anyway minimum standards and Member States are free to establish better values. The same seems to be the case for sectoral national agreements. If they are higher than those that can be technically achieved, they are void.

Failure to comply with this and other regulations can lead to prosecution of the employer; in cases of occupational diseases or death of the worker(s) because of infringements of the laws and regulations, prosecution for “severe personal lesions” or, respectively, “third degree

¹⁶⁹ Decreto Legislativo n. 626 del 19/09/1994 Coordinato con Decreto Legislativo n. 242 del 19 marzo 1996

¹⁷⁰ This again is information given by ISPESL, an epidemiologist from Turin and various trade unions

¹⁷¹ As low as technically achievable

¹⁷² Article 32 & 41

¹⁷³ Art. 2087

¹⁷⁴ Decreto del Presidente della Repubblica n° 303 del 19/03/1956 Norme generali per l’igiene del lavoro

murder” are possible. Fines can vary from 1 to 8 million Lira (around 520 to 4,100 Euros), imprisonment is possible for between two and six months.¹⁷⁵

What is meant by compliance? — Based on the transposed European Framework Directive and the obligation arising from the Directive 80/1107/EEC, employers are obliged to assess the risk to workers arising from the exposure to dangerous substances at work.

The employer “is obliged to adopt within the company those measures which – according to the particular features of the job, experience and technology – are necessary to ensure the physical and emotional integrity of workers” (Art. 2087 of the Civil Code). Therefore, once the risk has been identified, the only limitation for the employer when adopting preventive and protective measures (aimed at eliminating or reducing the risk) is technical feasibility.

Who enforces the exposure limits? — Between 1955 and 1978, the Labour Inspectorate (“Ispettorato del Lavoro”)¹⁷⁶ as an office of the Ministry of Labour, decentralised to regional and provincial level, was the main body responsible for monitoring the application of labour legislation and collective agreements and the functioning of social insurance, welfare and health arrangements. In 1978, the Health Services Act (Law 833/78¹⁷⁷) instituted the National Health Service structured in Local Health Agencies (“L'unità sanitaria locale” - USL)¹⁷⁸ at regional level under the Ministry of Health. In each USL, among the traditional health services (“Aziende sanitarie locali” - ASL), a unit for Occupational Health and Safety (“Servizio di Prevenzione e Sicurezza negli Ambienti di Lavoro” - PSAL) was established.

The law gave some of the powers of the Labour Inspectorate to PSAL providing them with regulatory powers in H&S and enabling them to use these powers in addition to their preventive advisory activities (which were mainly oriented to support trade union actions in worksites based on Art. 9 of the L.300/70).¹⁷⁹

The health and safety system was substantially reorganised as a result of efforts to comply with the EU Framework Directive. A somewhat more significant inspection role for the Labour Inspectorate was introduced as a consequence in the late 1990s. The decree DPCM 14.10.1997 n.412¹⁸⁰ identifies a few higher risk sectors where control can be done jointly by Labour Inspectorate and the prevention service of the USL (for example in the construction industry. PSAL activities include:

¹⁷⁵ Decreto Legislativo 19 settembre 1994 n. 626

¹⁷⁶ <http://www.area.fi.cnr.it/guests/prevenzione/cap1.pdf>

¹⁷⁷ Legge 23 dicembre 1978, n. 833 "Istituzione del Servizio Sanitario Nazionale" pubblicata sul Supplemento Ordinario della Gazzetta Ufficiale n. 360 del 28-12-1978

¹⁷⁸ Legge Regionale 17 luglio 1996, n. 26., Riordino del servizio sanitario regionale
<http://www.regione.marche.it/bur/96/53.2507/leggi/2.html>

¹⁷⁹ L. 20 maggio 1970, n. 300; Norme sulla tutela della libertà e dignità dei lavoratori, della libertà sindacale e dell'attività sindacale nei luoghi di lavoro e norme sul collocamento <http://www.di-elle.it/Leggi/70-300.htm>

¹⁸⁰ Decreto del Presidente del Consiglio dei Ministri, Reingresso dell'ispettorato del Lavoro nell'attività di vigilanza;
<http://www.626.cisl.it/doconline/Legislazione/Leggi%20Decreti/Dec%20pres%20consiglio%20ministri.htm>

- sectoral prevention plans
- controls on OHS legislation
- controls on medical surveillance carried out by the “Competent Doctor” of the companies
- examining plans for the removal of asbestos
- preventive assessment of new activities, plants and work-sites
- criminal investigations on work accidents and occupational diseases
- providing information to workers on control activities
- giving information and training on legislation and authority policies to workers, trade unionists, employers and experts.

Enforcement activity — There are a number of statistics available, but none specifically relate enforcement activities to infringements of OELs. According to sources within the Labour Inspectorate Unit of the Ministry: “data are not systematically collected. Perhaps some Region[al] Government (the more efficient ones, such as Toscana or Emilia Romagna) have data-bases on the USL activities, and then also on infringements related to chemicals.” However, such information is not collected systematically.

Discussions at national level (see Chapter 6 for more detail) — At national level, discussions on how to deal with the obligations arising from transposing the Chemical Agents Directive and the lists of Indicative and Binding Occupational Exposure limit based on this Directive, are taking place. There is in particular a fear that binding limit values threaten the highly valued ALATA principle. This is particularly worrying because of the concern that Italy’s capacity to influence developments is not as great as those countries with long established (and internationally recognised) Committees involved in OEL settings (such as the UK, the Netherlands and Germany).

According to the trade unions (CGIL/CISL/UIIL)¹⁸¹ maximum effort should be made to establish at national and European level health-based OELs in a more systematic way. They argue these health-based values should be developed by independent scientists and should extend to more sensitive groups of workers. Their OEL approach therefore covers far more workers than the one generally used by national OEL Committees. The unions would not regard most of the so-called health-based values established in other countries health-based at all, and consider that their own approach (ALATA) guarantees much lower exposure levels at the work places.

However, because the trade unions recognise that the process of establishing health-based Europe-wide recognised OELs is very time consuming, they accept (in order to speed up the process for getting OELs at all) for the time being what they call “*technical OELs*”, or “occupational exposure action levels”.

3. 10 LUXEMBOURG

Regulatory system and responsible bodies — The responsible Ministry in Luxembourg for H&S is the Ministry for Labour and Employment (“Ministère du Travail et de l’Emploi”).¹⁸²

¹⁸¹ This is based on information in ‘I Valorie-limite per l’esposizione professionale a Sostanze concerogete’, CIGL, 2002 Fiere, Modena.

¹⁸² <http://www.mt.etat.lu/>

The protection of workers against dangerous substances at work is regulated in the following legislation.^{183 184}

- *Loi du 20 mai 1988 concernant la protection des travailleurs contre les risques liés à une exposition à des agents chimiques, physiques et biologiques pendant le travail* – this is the Luxembourg equivalent of Directive 80/1107/EEC on the protection of workers from chemical, physical and biological risks (the predecessor of the Chemical Agents Directive 98/24/EC at European level); modified by
- *Loi du 19 juillet 1991 modifiant la loi du 20 mai 1988 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents chimiques, physiques et biologiques pendant le travail* (amendment to Directive 80/1107/EEC by Directive 88/642/EEC).¹⁸⁵

The two lists of limit values adopted within the framework of the Directive are transposed into Luxembourg law by:

- *Règlement grand-ducal du 10/07/1995 relatif à la fixation de valeurs limites concernant la protection des travailleurs contre les risques liés à une exposition à des agents chimiques pendant le travail* (Directive 91/322/EEC)¹⁸⁶
- *Règlement grand-ducal du 28 février 1999 modifiant le règlement grand-ducal du 10 juillet 1995 relatif à la fixation des valeurs limites concernant la protection des travailleurs contre les risques liés à une exposition à des agents chimiques pendant le travail* (Directive 96/94/EEC).¹⁸⁷

The Framework Directive 89/391/EEC is transposed by: *Loi du 17 juin 1994 concernant la sécurité et la santé des travailleurs au travail*^{188 189}

There is other legislation dealing with specific sectors (schools, laboratories) and/or specific substances (like asbestos¹⁹⁰ or lead¹⁹¹) or groups of substances (like carcinogens¹⁹²), therefore the above list covers just the main instruments. There is no system in place to develop OELs within a scientific expert group like those in France, Germany, the Netherlands or the UK.¹⁹³

The Labour Inspectorate (“L’Inspection du Travail et des Mines” - ITM),¹⁹⁴ as part of the Ministry of Labour, enforces and surveys the limit values.

¹⁸³ <http://europa.eu.int/celex/>

¹⁸⁴ http://www.itm.etat.lu/produits_dangereux/gesetzge.htm

¹⁸⁵ http://www.itm.etat.lu/legisnat/cd_91/0719/0719.PDF

¹⁸⁶ http://www.itm.etat.lu/legisnat/cd_94_95/0710a/0710a.pdf

¹⁸⁷ http://www.itm.etat.lu/legisnat/cd_99/0228/0228.pdf

¹⁸⁸ http://www.etat.lu/MS/MED_TRAV/Memorial3.pdf

¹⁸⁹ http://www.etat.lu/MS/MED_TRAV/Memorial12.pdf

¹⁹⁰ http://www.itm.etat.lu/legisnat/cd_88/0520/0520.PDF / http://www.itm.etat.lu/legisnat/cd_91/0719/0719.PDF / http://www.itm.etat.lu/legisnat/cd_93/0421B/0421B.PDF

¹⁹¹ http://www.itm.etat.lu/legisnat/cd_88/0520/0520.PDF / http://www.itm.etat.lu/legisnat/cd_88/0715A/0715A.PDF

¹⁹² http://www.itm.etat.lu/legisnat/cd_94_95/1104f/1104f.pdf

¹⁹³ http://www.itm.etat.lu/produits_dangereux/gesetzge.htm

¹⁹⁴ <http://www.itm.etat.lu/>

Occupational Exposure Limits — The limit values in force in Luxembourg are those of the European Directives transposed into national laws and legislation:

- Indicative limit values according to Directive 91/322/EEC¹⁹⁵ and Directive 96/94/EEC¹⁹⁶
- Binding limit values for e.g. asbestos¹⁹⁷, benzene¹⁹⁸, lead¹⁹⁹, vinyl chloride monomer.²⁰⁰

European Indicative Limit Values are health based, Binding Limit Values take socio-economic factors as well as technical feasibility aspects into account. The limit values are published in the different pieces of Luxembourg legislation mentioned above.

For substances for which no limit values officially exist in Luxembourg, the Labour Inspectorate takes the German MAK list (together with the relevant TRGS) as a reference list.²⁰¹ Mixtures are assessed according to the TRGS 403.²⁰²

Definitions against which exposure is assessed — The limit values are adopted on the basis of Directive 80/1107/EEC as amended by Directive 88/642/EEC, the definition against which the exposure is assessed is therefore the same as the European definition:

- They are measured or calculated in relation to a reference period of either:
- eight-hours time-weighted average or
- 15-minute (STEL)
- Exposure should not occur above the STEL value.

They are expressed in either mg/m³ of air or ppm (ml/m³) and defined at 20°C and 1,013 or 101.3 kPa (760 mm mercury pressure). A skin notation assigned to the OEL denotes the possibility of significant uptake through the skin.

Procedure for setting of OELs — Besides the fact that Social Partners and other interest groups are consulted during the general procedure of proposing and adopting legislation in Luxembourg²⁰³, no specific committee (scientific or other) exists to discuss limit values at the national level.

Legal status of Occupational Exposure Limits²⁰⁴ — Infringements of the Law of May 20th 1988 (Directive 80/1107/EEC) can be punished with fines from 250,000 to 200,000 Francs

¹⁹⁵ http://www.itm.etat.lu/legisnat/cd_94_95/0710a/0710a.pdf

¹⁹⁶ http://www.itm.etat.lu/legisnat/cd_99/0228/0228.pdf

¹⁹⁷ http://www.itm.etat.lu/legisnat/cd_88/0520/0520.PDF / http://www.itm.etat.lu/legisnat/cd_91/0719/0719.PDF
[/http://www.itm.etat.lu/legisnat/cd_93/0421B/0421B.PDF](http://www.itm.etat.lu/legisnat/cd_93/0421B/0421B.PDF)

¹⁹⁸ *Règlement grand-ducal du 28 février 1999 modifiant le règlement grand-ducal du 4 novembre 1994 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents cancérigènes au travail (Mémorial A – N°26, 17.03.99, p.659-660)*

¹⁹⁹ http://www.itm.etat.lu/legisnat/cd_88/0520/0520.PDF /
http://www.itm.etat.lu/legisnat/cd_88/0715A/0715A.PDF

²⁰⁰ http://www.itm.etat.lu/legisnat/cd_1810_1985/1982/0722.PDF

²⁰¹ http://www.itm.etat.lu/produits_dangereux/gesetzge.htm

²⁰² <http://www.itm.etat.lu/condtype/pdf/Cl86-1.pdf>

²⁰³ *You always find a reference in the laws that the social partners have been consulted*

²⁰⁴ http://www.itm.etat.lu/res_juri/tdVers3_a.htm#IV_A_1_c_

Lux (equivalent to 6,200 and around 50,000 EURO respectively) and between 8 days and 1 month of imprisonment.²⁰⁵ In addition, members of the AAA (see above) are liable to a financial penalty if they fail to follow the binding guidance of the AAA.²⁰⁶

What is meant by compliance^{207 208} — The operator of an enterprise/plant has to keep an inventory of all dangerous substances and preparations used. This inventory must contain information about the producer and/or manufacturer, and also data on where, when and in what quantity the substance/preparations/product is used. The inventory has to be up-dated at least once a year.

As well as the inventory, it is a requirement that Safety Data Sheets are available for every dangerous substance/preparation/product in use. The employer has to make sure that the limit values (the established ones and those recognised as guidance values by the Labour Inspectorate) are respected. If the exposure to a dangerous substance can not be excluded, regular exposure measurements according to the TRGS 402 have to be performed by a nationally recognised control body/company (under certain conditions, measurements can be performed by the company itself). In general, measurements have to be performed at least:

- Every six weeks in cases where the exposure value equals or exceeds 50% of the MAK value
- Every 32 weeks in cases where the exposure value is higher than 25 but lower than 50% of the MAK value
- Every 64 weeks in cases where the exposure value is higher than 10 but lower than 25% of the MAK value.

Who enforces the Exposure Limits?²⁰⁹ — With the reorganisation of the Labour and Mines Inspectorate in 1974, it (“L’Inspection du Travail et des Mines” - ITM) was given responsibility for ensuring the implementation of all legislation relating to the working conditions and protection of all employees subject to a contract of employment, except those in the public service. ITM has no responsibility for the self-employed and consequently there is little surveillance of standards of protection in the agricultural industry.

The Inspectorate has close co-operation and collaboration with a number of other organisations and government departments which also have an interest in the subject of health and safety at work. These are:

- Association d'Assurance contre les Accidents (AAA) (description see above)
- The Ministry of Health, particularly with a small group of doctors whose interest lies in occupational medicine and the problems of health and hygiene at work
- The Ministry of Public Affairs which has a small Inspectorate with the responsibility of overseeing the safety of employees in the public sector including those at work in the health service and education
- Approved technical organisations - *organismes agréés* - appointed by the Minister of Labour to carry out inspections and surveys in their designated areas of competence

²⁰⁵ http://www.etat.lu/MS/MED_TRAV/Memorial3.pdf

²⁰⁶ <http://agency.osha.eu.int/publications/reports/impact/en/lu/p3.html>

²⁰⁷ <http://www.cepl.lu/pages/av070.htm>

²⁰⁸ <http://www.itm.etat.lu/condtype/pdf/C186-1.pdf>

²⁰⁹ http://www.itm.etat.lu/#sec_au_travail

- The Customs Service whose officers are increasingly being used to assist the Labour Inspectorate in its work
- The Consultative Committee for Labour Inspection (see above).

ITM has responsibility for many other matters apart from health and safety. The following powers are given to all inspectors and controllers:

- to enter any place of work at any time of day or night without giving prior notice
- to enter during day-time any premises which can reasonably be assumed to be a place of work
- to carry out any examination, inspection or enquiry necessary to establish compliance or alternatively non-compliance with the law
- to question any employer or employee and to require them to make a written statement of the matters on which they are questioned
- to require the production of any book, register, file or document relating to working conditions
- to require notices to be displayed in accordance with the relevant legislation.

Additionally inspectors are empowered:

- to take samples of substances and materials used in the workplace for analysis
- to issue an order requiring rectification within a given time period of faults caused by a failure to comply with the requirements of the relevant legislation
- to issue an order requiring immediate action when there is an imminent threat to the health and safety of an employee
- to issue an order requiring an installation to be inspected within a time limit set by the inspector by a specialist body approved by the Minister of Labour.

The cost of the inspection falls to the employer.

Enforcement activity — ITM is by far the smallest of the Community Inspectorates with a total staff of 38 in the inspector, controller and administrative grades.

Every accident at work together with those that occur on the way to and from work have to be reported both to the Labour Inspectorate and to the AAA. Fatal accidents and those where the injured person is likely to be absent from work for more than thirteen weeks have to be reported immediately. Other accidents must be reported within seven days of their occurrence.

The inspectors in charge of the regions decide which accidents should be investigated. They are generally those which are fatal or result in serious injury. Cases of occupational ill-health are investigated by doctors employed by the Ministry of Health.

ITM gives a high priority to dealing with complaints and attending to requests for advice. About 90% of complaints received are concerned with general working conditions and social matters and only 10% have a health and safety content. Of the total of ITM interventions in 1999 (3,516), the number in the field of “Hygiene and security within enterprises” amounted to only 120 of the total (less than 3.5 %). No other more specific data could be found in relation to OELs from published sources.

3.11 THE NETHERLANDS

Regulatory system and responsible bodies — The responsibility for establishing occupational health standards lies with the Ministry of Social Affairs and Employment (“Ministerie van Sociale Zaken en Werkgelegenheid”).²¹⁰ Within the Ministry, the Directorate-General of Labour (Directoraat-Generaal Arbeidsverhoudingen en Internationale Betrekkingen - DG AVIB) is responsible for H&S including occupational exposure limit values.

In the Netherlands, prescriptions for working conditions in firms are regulated under the Working Environment Act (*Arbeidsomstandighedenwet - Arbowet*²¹¹), which is a framework act on the basis of which further decisions and regulations can be made.²¹² Concrete material regulations under state control can be found in the Occupational Decision (*Arbobesluit 1997*²¹³) and the Occupational Regulation (*Arbeidsomstandighedenregeling 1997 - Arboregeling 1997*²¹⁴).

The legal basis for establishing OELs or MAC values as they are called in Dutch (Maximum Allowable Concentration or “Maximaal Aanvaarde Concentraties”) are:

- Bijlage VI behorend bij artikel 4.19 eerste lid, Lijst van wettelijke grenswaarden op grond van artikel 4.9 van het Arbeidsomstandighedenbesluit²¹⁵
- Bijlage VII behorend bij artikel 4.20, eerste lid, Lijst van wettelijke grenswaarden voor kankerverwekkende stoffen op grond van artikel 4.16 van het Arbeidsomstandighedenbesluit²¹⁶
- Bijlage 6 behorend bij beleidsregel 4.2 -1 Arbobesluit²¹⁷

Occupational Exposure Limit Values are established in a three-step consultation procedure, involving several committees and sub-committees of various bodies (the Dutch Expert Committee on Occupational Standards – DECOS, the Sub-Committee on MAC values of the Social and Economic Council - SER).²¹⁸ They become legally binding when confirmed and published by the Ministry of Social Affairs and Employment.²¹⁹ The Labour Inspectorate, as part of the Ministry, is responsible for surveying and enforcing the OELs.²²⁰

²¹⁰ http://home.szw.nl/index/dsp_index.cfm

²¹¹ *Wet van 18 maart 1999, houdende bepalingen ter verbetering van de arbeidsomstandigheden (Arbeidsomstandighedenwet 1998)*, Staatsblad No.184 / <http://www.xs4all.nl/~wilcodeb/arbo1998.html>

²¹² *This is the Dutch equivalent of the European Framework Directive*

²¹³ *Besluit van 15 januari 1997, houdende regels in het belang van de veiligheid, de gezondheid en het welzijn in verband met de arbeid (Arbeidsomstandighedenbesluit; Staatsblad N° 60 / http://nl.osha.eu.int/content/network/szw/docs/arbobesluit/wijziging_09_mei_2000.pdf*

²¹⁴ *Staatsblad 1997, N° 63 / http://nl.osha.eu.int/content/network/szw/docs/arboregeling/arboreg_1.pdf*

²¹⁵ <http://nl.osha.eu.int/content/network/szw/docs/grenswaarden.pdf>

²¹⁶ <http://www.bbzfmv.nl/arbobvii.htm>

²¹⁷ <http://www.fnv.nl/?02werkgeld/arbo/themas/gevaarlijke-stoffen/?stoffen.html>

²¹⁸ <http://www.gr.nl/OVERIG/PDF/00@15000OSH.PDF>

²¹⁹ <http://www.gr.nl/overig/standing%20committees/DECOS.htm>

²²⁰ <http://www.minszw.nl/Documenten/Informatie/Arbo/arbeidsinspec/arbeidsinspec.htm>

Occupational Exposure Limits^{221 222 223 224 225} — The Netherlands has two types of MACs: legally binding and administrative (legally non-binding) OELs. The latter are health-based (based on dose-response relationships, NOAELs, LOAELs), the former take, in addition, technical and socio-economic feasibility factors into account. Binding limit values are established for both non-carcinogenic and carcinogenic substances. Administrative values are only established for non-carcinogenic substances.

Definitions Against which Exposure is Assessed^{226 227 228 229} — A MAC value is defined as time-weighted average over an eight-hour period. Substances which can easily be absorbed by the skin are assigned an “H”. For these substances, additional protective measures have to be taken. Specific rules apply to respiratory dusts and fibres. Short-term exposure limit values are established for certain substances for a 15 minute period (up to ten times the MAC value for non-carcinogenic substances and up to two times the MAC value for carcinogens). In addition, some substances are assigned a ceiling value (“C”), which should not be exceeded at any time. The MAC values are expressed in mg/m³ and established at a temperature of 20°C and a pressure of 101.3kPa.

Procedure for setting of OELs^{230 231 232} — Until 1977, the US ACGIH TLV list was used in the Netherlands. In 1978, the Directorate-General of Labour of the Ministry of Social Affairs and Employment (MSAE) published the first official list of MACs which was largely similar to the ACGIH TLV list of 1977. Since 1978, new MACs and changes in existing MACs have been established in the Netherlands according to the following three-step procedure:

- In the first step a scientific evaluation of the data on the toxicity of the substance is made by the *Dutch Expert Committee on Occupational Standards (DECOS)*, a committee of the *Health Council*, on request by the State Secretary of Social Affairs and Employment. This evaluation should lead to a draft report for a health-based recommended occupational exposure limit value (HBR-OEL), using the no-observed-adverse-effect level (NOAEL) approach in combination with an ‘uncertainty (or safety) factor’ (UF). Draft recommendations of DECOS are published as soon as the Committee reaches consensus about a certain substance. In this way, third parties are given the opportunity to submit comments on its content. The deadline for comments is approximately three months. The Committee takes the comments into consideration in establishing the definitive advisory

²²¹ <http://www.bbzfnv.nl/arbobvi.htm>

²²² V.J. Feron: *A Critical Appraisal of the Setting and Implementation of Occupational Exposure Limits in the Netherlands; Indoor Environ 1994; 3: 260 - 265*

²²³ V.J. Feron: *A Critical Appraisal of the Setting and Implementation of Occupational Exposure Limits in the Netherlands; Indoor Environ 1994; 3: 260 - 265*

²²⁴ <http://nl.osha.eu.int/content/network/szw/docs/grenswaarden.pdf>

²²⁵ <http://www.bbzfnv.nl/arbobvii.htm>

²²⁶ <http://www.bbzfnv.nl/arbobvi.htm>

²²⁷ V.J. Feron: *A Critical Appraisal of the Setting and Implementation of Occupational Exposure Limits in the Netherlands; Indoor Environ 1994; 3: 260 - 265*

²²⁸ <http://nl.osha.eu.int/content/network/szw/docs/grenswaarden.pdf>

²²⁹ <http://www.bbzfnv.nl/arbobvii.htm>

²³⁰ <http://www.industox.nl/MACcie2000/sld005.htm>

²³¹ V.J. Feron: *A Critical Appraisal of the Setting and Implementation of Occupational Exposure Limits in the Netherlands; Indoor Environ 1994; 3: 260 - 265*

²³² <http://www.minszw.nl/Documenten/Nieuws/nieuwsberichten/pb00/00215.htm>

report. This first step is only performed for legally binding OELs (MACs). For legally non-binding, administrative OELs, the SER (see next paragraph) uses values and data from other countries (e.g. ACGIH) as the base for the second step.²³³

- In the next phase of the three-step procedure, the health-based recommended exposure limit is assessed for technical and economic feasibility by the MAC-Value Subcommittee of the *Social and Economic Affairs Council (SER)*. Based on the results of this study, the Social and Economics Affairs Council either advises the Minister and State Secretary for Social Affairs and Employment to adopt the health-based recommended exposure limit or it recommends a different value.
- In the third phase, the Secretary of State determines and publishes the limit values either as legally binding values or non-binding administrative reference values.

In the case of substances that are classified as carcinogens Category 1 or 2 by the European Union (Directive 67/548/EEC) or by the DECOS-Committee and which, in addition, probably also have a genotoxic effect, a risk evaluation is carried out by the Committee. At the request of the Minister of Social Affairs and Employment, the committee derives so-called health-based calculated – occupational cancer risk values (HBC-OCR_V) for these substances. The HBC-OCR_V enables the calculation of dose levels and air concentrations associated with reference cancer risk levels for the occupational situation.

In its reports on the individual genotoxic carcinogens the Committee presents the concentration levels associated with excess cancer mortality levels of 4 per 1000 and 4 per 100,000 as a result of working life exposure. To estimate the additional lifetime risk of cancer in humans exposed at the workplace, i.e. to calculate the HBC-OCR_V, the committee assumes that workers are exposed 5 days per week, 8 hours per day, 48 weeks per year for 40 years. They are expected to inhale 10m³ of air during 8-hour working day. This advice also results in a legally binding MAC-value.

The Health Council of the Netherlands^{234 235 236 237} — was established in 1902. It is an independent scientific advisory body for all Ministries dealing with public health issues. It is headed by a President and two Vice-presidents and has approximately 170 members, selected from the scientific and health care communities. Members are nominated by the President of the Council on the basis of their personal expertise and are appointed by Royal Decree. The Council publishes either on request or on its own initiative advisory reports, which are in general prepared by multidisciplinary committees of Dutch or, sometimes, foreign experts, appointed in a personal capacity. The reports are available to the public.

*Dutch Expert Committee on Occupational Standards (DECOS)*²³⁸ — The Dutch Expert Committee on Occupational Standards (DECOS) has been part of the Health Council since January 1994. The DECOS-Committee informs the Ministers of Social Affairs and Employment about the harmful consequences of exposure to toxic substances in the air in the workplace. The members of the DECOS are experts from research institutes, universities, ministries and industry, who participate in the Committee on a personal basis.

²³³ Information provided by a member of Health Council

²³⁴ <http://www.gr.nl/engels/health%20council/history/frameset.htm>

²³⁵ <http://www.gr.nl/engels/health%20council/mission/frameset.htm>

²³⁶ <http://www.gr.nl/engels/health%20council/domain/frameset.htm>

²³⁷ <http://www.gr.nl/engels/health%20council/organization/frameset.htm>

²³⁸ <http://www.gr.nl/overig/standing%20committees/DECOS.htm>

*Subcommittee on MAC values of the Social and Economic Council*²³⁹ — is composed as follows: six employers' representatives, six employees' representatives, one independent member (chairman), two advisory members (from DECOS), and six ministerial representatives. In principle, the Sub-committee meets every month.

Social and Economic Council (Sociaal-Economische Raad - SER)^{240 241} — The Social and Economic Council is the Dutch government's main advisory body where social and economic matters are concerned. It is a tripartite body, comprising employers' representatives, workforce representatives and crown-appointed members (economic, financial, legal and social experts appointed as independent members by the Head of State and the Cabinet).

Legal status of Occupational Exposure Limits — Limit values formulated through the three-step procedure are considered to be legally binding.²⁴²

Both general and specific health and safety legislation falls within the domain of public law, and violation of the provisions is a punishable offence. There are two fine categories: the first category amounts to NLG 10,000.00 at the maximum. The second category amounts to NLG 25,000.00 at the maximum. The Labour Inspectorate may impose an administrative fine when, for example, the employer (with the support of the Arbodienst) has not made an inventory of the dangerous substances or does not have a working conditions policy.

If the employer violates one of the obligations of the Working Conditions Act for the second time within a period of 24 months, the Labour Inspectorate may increase the administrative fine up to 50% of the original amount. If the employer still does not observe the obligation, the Labour Inspectorate may close down some or all activities of the company, or the employer in person may be prosecuted. In this respect, the Public Prosecutions Department ("Openbaar Ministerie") may impose imprisonment of 6 months or a fine of NLG 25,000.00 at the maximum.²⁴³

What is meant by compliance²⁴⁴ — By law, every employer is obliged to take care of the health of his employees at the workplace. This includes the *effective* prevention of exposure to chemicals. 'Effective' implies taking measures to reduce the exposure; these ought to result in the absence of health hazards and nuisance. In work environment legislation, the Strategy of Occupational Hygiene aims to reduce exposure to hazardous chemicals. The key aim of this strategy is to reduce exposure by introducing measures as close to the source of exposure as possible (ventilation systems for example). Companies are obliged to give evidence, by means of a risk assessment, that the situation at the workplace does not harm the health of employees. This risk assessment consists of a risk inventory and a risk evaluation. To execute this risk assessment, an OHS service has to be employed. Using this risk assessment, the extent of exposure is mapped out and reduced. It is stated that, when measures already taken seem to be satisfactory, the concentration in air scarcely needs to be monitored. The Labour

²³⁹ http://www.ser.nl/overdeser/default.asp?desc=commissies_10_5

²⁴⁰ http://www.ser.nl/overdeser/default.asp?desc=en_index

²⁴¹ http://www.ser.nl/overdeser/default.asp?desc=overdeser_mac_waarden_inleiding

²⁴² http://www.ser.nl/overdeser/default.asp?desc=overdeser_mac_waarden_inleiding

²⁴³ [http://www.andersenlegal.com/resource2.nsf/vAttachLU/IntroductiontoDutchLabourLawII%20NETHERLANDS/\\$File/Introduction%20to%20Dutch%20Labour%20LawII.pdf](http://www.andersenlegal.com/resource2.nsf/vAttachLU/IntroductiontoDutchLabourLawII%20NETHERLANDS/$File/Introduction%20to%20Dutch%20Labour%20LawII.pdf)

²⁴⁴ Maureen E. Butter (ed.) - *Risks, Health and Environment; NGO background document for the Third Ministerial Conference on Environment and Health and parallel Healthy Planet Forum, London 16-18 June 1999, The Science Shop for Biology Report 52*

Inspectorate monitors the level of exposure only in exceptional cases, if reasonable doubt exists about the situation in a company, and the employer is not willing to take measures. Only a small number of companies, mostly larger chemical industries, monitor levels of exposure in everyday practice. The frequency of monitoring varies from business to business. Monitoring mainly takes place within the framework of obtaining background information, to check if the measures taken are satisfactory. However, according to the MAC commission, especially when data can be obtained from corresponding situations in other companies in the Netherlands or even abroad, the companies and OHS Services do not monitor sufficiently. The reasons given for not monitoring extensively are: monitoring is too expensive and too labour-intensive, and it can be unreliable. When the results of monitoring are checked, threshold limit values such as MACs are not used in all cases.

Who enforces the Exposure Limits?²⁴⁵ ²⁴⁶ — Responsibility for the enforcement of health and safety law lies with the officials of the Labour Inspectorate (Arbeidsinspectie), incorporated into the Ministry of Social Affairs and Employment.

The Labour Inspectorate is responsible for the supervision and enforcement of the Working Conditions Act in general. With respect to specific violations of the obligations as inserted in the Working Conditions Act, the Labour Inspectorate can impose an administrative fine. It is empowered to detect contraventions of the law and to draw up official reports on them. Under the Working Conditions Act, the Inspectorate may stipulate the manner in which general provisions and technical regulations in the Act must be complied with in practice and may order the cessation of dangerous activities (right of summary enforcement). Apart from this, employees themselves are also entitled to discontinue an activity in cases of imminent serious danger where it is not possible for the Inspectorate to act on the matter in time. In such cases the employee concerned must then inform the Inspectorate of what has happened.

In order to monitor compliance with the Working Conditions Act, the Inspectorate visits premises for inspection purposes, with or without prior announcement. Inspectors may also be requested to make such a visit by a trade union, or the workers' representatives within an enterprise. In most cases, the Labour Inspectorate will first summon the employer to comply with the obligations ("eis tot naleving") before imposing an administrative fine. Only in severe violations of the obligations of the Working Conditions Act, will the Labour Inspectorate immediately impose an administrative fine.

Enforcement activity — The Working Conditions Act is part of the criminal law. Every year the Labour Inspectorate issues 2,000 official reports of offences resulting in fines of NLG 3 to 5 million. Official reports of offences are drawn up to penalise relatively serious infringements of the Working Conditions Act. For less serious infringements the Labour Inspectorate may either agree improvements or issue a warning or requirements.²⁴⁷

Discussion at national level: theory versus practice — A major criticism of the current system is that for the majority of the substances dealt with at the workplace, no exposure limit value exists at all or the basis on which they have been established is too old. A large number of current OELs were adopted from the American Conference of Governmental Industrial Hygienists' list of Threshold Limit Values in the 1970s (around 300 substances – these values are currently under review). There are studies indicating that for more than 10% of the

²⁴⁵ <http://www.minszw.nl/Documenten/Informatie/Arbo/arbeidsinspec/arbeidsinspec.htm>

²⁴⁶ http://nl.osha.eu.int/content/network/szw/docs/arbeidsinspectie/enforcement_policy.pdf

²⁴⁷ <http://agency.osha.eu.int/publications/reports/impact/en/nl/p3.html>

substances of the more than 650 entries in 2000 the OEL was too high from a health protection point of view, with deviations ranging from a factor of 2 to 250. For around another 100 substances the toxicological database was judged to be too poor to recommend a health-based OEL.

Another criticism is that the complete procedure starting from the inclusion of a chemical in the working programme of DECOS to the official publication of a new MAC value by the MSAE takes too long (on average 3-4 years).

In addition, the simultaneous exposure of workers to a variety of chemicals is not taken into account. The toxicity of a mixture is not only determined by the toxicity of the individual compounds but also by combination effects. Traditionally, toxicological studies for the assessment of hazards to health, as well as the setting of such standards as TLVs and MACS, have focused on single compounds.

Other factors which are not really considered when establishing OELs in order to keep the whole procedure as simple as possible are:

- longer (or shorter) working days than those on which the standard is based
- differences in reaction, that the human body may display depending on whether the exposure took place during the daytime or in the night (these differences are of relevance to shift work, for example, but would severely complicate the method)
- gender or age aspects (despite certain protective measures for pregnant workers or young people).

Therefore, the safety that MAC values appear to offer is considered to be to some extent illusory. As one consequence of the weakness of the existing system, negotiations between the FNV and Dutch employers resulted in an agreed framework on maximum acceptable occupational risk levels for non-substitutable carcinogens, values which are now applied across the board to materials in the Netherlands. For the trade unions, the agreement meant “getting their hands dirty” as they had to accept a specific risk of fatal disease incidence among the workers involved. However, the agreement had the advantage of replacing the previous, ad hoc substance-by-substance approach to carcinogen control in the Netherlands and produced recommendations for Dutch threshold limit values (TLVs) which are stricter than those promulgated by other agencies. Based on this agreement between the social partners, the government has asked the Dutch Scientific Expert Group, responsible for putting forward health-based recommendations for official TLVs to the government (in the form of criteria documents), to provide their future recommendations with two time-weighted average TLVs for the carcinogenic substances under consideration: one based on a residual risk of 10^{-6} fatalities/year and one based on 10^{-4} fatalities/year.

3.12 PORTUGAL

Regulatory system and responsible bodies²⁴⁸ — In Portugal, occupational health and safety including, the protection of workers against the risks arising from exposure to dangerous chemicals is under the responsibility of the Ministry of Work and Solidarity (“Ministério do Trabalho e da Solidariedade” – MTS).

²⁴⁸ <http://www.mts.gov.pt/mts/index.php>

Within the Ministry, H&S is assigned to the General-Directorate for Working Conditions (“Direcção-General das Condições de Trabalho” – DGCT).

The following relevant EU Directives have been transposed into national law and legislation²⁴⁹:

- Decreto-Lei n° 441/91²⁵⁰ and n° 26/94²⁵¹ - transposition of the Framework Directive 89/391/EEC
- Decreto-Lei n° 273/89²⁵² - transposition of Directive 78/610/EEC on vinyl chloride monomers
- Decreto-lei n° 479/85²⁵³ transposition of Directive 80/1107/EEC
- Decreto-Lei n° 274/89²⁵⁴ - transposition of Directive 82/605/EEC on lead and its compounds
- Decreto-Lei n° 284/89²⁵⁵ and n° 389/93²⁵⁶ - transposition of Directives 83/477/EEC and 91/382/EEC on asbestos
- Decreto-Lei n° 390/93²⁵⁷ - transposition of Directive 90/394/EEC on carcinogens
- Decreto-Lei n° 290/2001²⁵⁸ - transposition of Directives 98/24/EC (Chemical Agents Directive), 91/322/EEC (1st list of Indicative limit values under Dir. 80/1107/EEC) and 2000/39/EC (1st list of Indicative limit values under Dir. 98/24/EC)
- Portugal has a list of OELs based on the US ACGIH TLV list, published as a standard (Norma Portuguesa 1796 from 1988)²⁵⁹ by the Portuguese Institute for Quality (“Instituto Português da Qualidade” – IPQ)²⁶⁰.

The Labour Inspectorate (“Inspeção Geral do Trabalho” - IGT) is part of the Institute of Development and Inspection of Working Conditions (“Instituto de Desenvolvimento e Inspeção das Condições de Trabalho” IDICT²⁶¹). It is responsible for the surveillance and enforcement of H&S regulations.

Occupational Exposure Limits — The national OEL list is based in part on ACGIH TLVs and also on the two European Directives (of which at least Dir. 91/322/EEC has been transposed into national legislation). Based on information found for single substances like quartz, cristobalite, tridymite and silica²⁶², limit values seem to be divided into those that are

²⁴⁹ <http://europa.eu.int/celex/>

²⁵⁰ *Diário da República* 262/91, Série IA de 14/11/1991

²⁵¹ *Diário da República* 26/94, Série I-A de 01/02/1994

²⁵² *Diário da República* 191/89, Série I de 21/08/1989

²⁵³ *Diário da República* 261/85, Série I de 13/11/1985

²⁵⁴ *Diário da República* 191/89, Série I de 21/08/1989

²⁵⁵ *Diário da República* 194/98, Série I de 24/08/1989

²⁵⁶ *Diário da República* 272/93, Série I-A de 20/11/1993

²⁵⁷ *Diário da República* 272/93, Série I-A de 20/11/1993

²⁵⁸ *Diário da República* 266/01, Série I-A de 16/11/2001

²⁵⁹ NP 1796:1988 (2^a Edição) pp.41 C 420 /CT 42 Higiene e segurança no trabalho. Valores limites de exposição para substâncias nocivas existentes no ar dos locais de trabalho del Instituto Português da Qualidade (IPQ)

²⁶⁰ <http://www.ipq.pt/>

²⁶¹ http://www.idict.gov.pt/destaques/igt_doc/igt.htm

²⁶² <http://ibase093.eunet.be/en/siloel.pdf>

binding, which must not be exceeded and a type of indicative limit value for which the rules are less stringent. They are published as a standard (NP 1796 from 1988)²⁶³ by the Portuguese Institute for Quality - IPQ²⁶⁴. According to the IPQ, the standard is currently under revision and the revision will be published in the 2nd half of the year 2002. At the moment it contains 598 entries; the revised version will have 633 entries.

The 1988 standard was exclusively based on the ACGIH TLV list including the STEL values, whereas the new standard will be based on the ACGIH TLV list of 2001, including also the updated values for 2002. In addition, it will contain the indicative and binding limit values published in the various EU directives. From 2002 onwards, the standard will be up-dated annually.

Definitions against which exposure is assessed — Because the limit values are taken from the US ACGIH TLV list, the definition against which the exposure is assessed is the same as the US definition.²⁶⁵ Limit values taken over from the EU lists of Indicative Limit Values use EU definitions.

Based on the values found for quartz etc. (see above), ceiling values seem to be 5 times the binding limit value, and a binding limit value has not to be exceeded more than 3 times within 30 minutes.

Procedure for setting of OELs — There is no special body officially involved in the development of OELs at national level. Consultation of Social Partners and other interest groups takes place in Portugal via the Economic and Social Council (“Conselho Económico e Social” - CES²⁶⁶). This body was created in the 1989 revision of the Portuguese Constitution²⁶⁷. The Council is a consultative body of diversified composition, described by the Constitution as a body for “consultation and concertation in the field of economic and social policies”²⁶⁸. Its members, totalling 63, include representatives of the government, trade union organisations, employers’ associations, the liberal professions, the Autonomous Regions and local authorities, environmental protection organisations, consumers’ associations, family associations, and the universities.

Within the CES, the Permanent Commission of Social Consultation (“Comissão Permanente de Concertação Social”²⁶⁹) deals with topics related to H&S. It is a tripartite body with 6 representatives of the trade unions (3 from each of the 2 confederations), 6 representatives of employers’ organisations (2 from each of the 3 confederations) and representatives of the Ministry.

²⁶³ NP 1796:1988 (2^a Edição) pp.41 C 420 /CT 42 Higiene e segurança no trabalho. Valores limites de exposição para substâncias nocivas existentes no ar dos locais de trabalho del Instituto Português da Qualidade (IPQ)
Note: At this stage because of incomplete responses to requests for information it is unclear whether Portuguese Limit Values Standard only contains the ACGIH substances or also the Binding Limit Values established by various Directives of the European Commission.

²⁶⁴ <http://www.ipq.pt/>

²⁶⁵ <http://www.acgih.org/>

²⁶⁶ <http://www.ces.pt/>

²⁶⁷ Constitutional Law n° 1/97 (4th constitutional amendmend), article 92

²⁶⁸ http://www.ces.pt/html/e_main.htm

²⁶⁹ http://www.ces.pt/html/e_main.htm

A consultation procedure for legislation in the pipeline seems to take place very regularly via a bulletin of the Ministry²⁷⁰, which is published four times a month and which gives all interest groups the possibility to send their comments.

Legal status of Occupational Exposure Limits — Non-compliance with binding limit values is considered as a serious offence against the Law 290/2001²⁷¹ and is punished according to the Law 116/99.²⁷²

Non-compliance with indicative limit values is considered a serious offence against the Law 290/2001 and is punished according to the Law 116/99.

Fines vary according to the size of the company and the scale of the offence. Fines for a serious offence are:

- in the range of 80,000 to 400,000 PTE (corresponds to about 400 to 2,000 EURO) for very small companies (less than 5 employees)
- 100,000 to 600,000 PTE (500 to 3,000 EURO) for small companies (between 5 and 49 employees)
- 130,000 to 930,000 PTE (650 to 4,650 EURO) for medium companies (between 50 and 199 employees)
- 225,000 to 1,450,000 PTE (1,150 to 7,250 EURO) for big companies (200 and more employees).

For very serious offences, the figures are:

- 300,000 to 1,500,000 PTE (1,500 to 7,500 EURO) for very small companies
- 500,000 to 3,000,000 PTE (2,500 to 15,000 EURO) for small companies
- 830,000 to 6000,000 PTE (4,150 to 30,000 EURO) for medium companies
- 1,400,000 to 9,000,000 PTE (7,000 to 45,000 EURO) for big companies

What is meant by compliance? — The employer is obliged to perform all the preventive and protective measures foreseen in Chemical Agents Directives as transposed into national law by Decreto-Lei 290/2001²⁷³. This includes a documented comprehensive risk assessment and regular exposure measurements, in particular when working conditions have changed or exposure limit values (binding and indicative ones) have been exceeded. Neither indicative nor binding OELs should be exceeded at all; however for indicative limit values exemptions are made for short-term exposure. Substances assigned a binding OEL must be replaced if technically possible, otherwise the number of workers exposed and the exposure as such has to be as low as possible.

For substances assigned an indicative OEL, reductions of exposure have to follow the well-known hierarchy of prevention measures, starting with substitution and ending with PPE.

Who enforces the exposure limits²⁷⁴ — The Labour Inspectorate (“Inspecção Geral do Trabalho” - IGT) as part of the Institute of Development and Inspection of Working

²⁷⁰ Boletim do Trabalho e Emprego BTE; http://www.dgct.mts.gov.pt/avisos_1sem_02.htm

²⁷¹ Decreto-Lei n.º 290/2001 – Transposition of the Chemical Agents Directive

²⁷² Lei n.º 116/99, Regime geral das contra-ordenações laborais

²⁷³ Diário da República 266/01, Série I-A de 16/11/2001

²⁷⁴ http://www.idict.gov.pt/destaques/igt_doc/igt.htm

Conditions (“Instituto de Desenvolvimento e Inspecção das Condições de Trabalho” - IDICT) is responsible for enforcing H&S regulations²⁷⁵. The IGT is a department directly under the Ministry of Employment but endowed with administrative autonomy, possessing powers to ensure compliance with legal provisions on working conditions and the system of employee protection at work and during unemployment. Its inspectors have the requisite powers and may call on the intervention of other authorities such as the police where necessary. Structurally, it comprises both central and peripheral offices, including regional services and co-ordinating centres. Its activities include education and guidance, enforcement and inspection. It may also dictate how contraventions should be rectified, as well as any changes necessary to ensure strict application of the legal provisions on health and safety at work and including immediate measures in cases where the life, health or safety of employees is in imminent danger.

Enforcement activity²⁷⁶ — The Inspecção-Geral do Trabalho publishes every year a number of statistics dealing with enforcement. But none of the information available reveals any specific data on enforcement activities in relation to chemicals let alone enforcement activities relating to OELs.

3.13 SPAIN

Regulatory system and responsible bodies — The Ministry responsible for H&S in Spain is the Ministry for Labour and Social Affairs (“Ministerio de Trabajo y Asuntos Sociales”²⁷⁷). The legal framework for protection of workers against risks at work including dangerous substances and preparations encompasses:

- the Prevention of Risks at Work Act (“Ley 31/1995 de Prevención de Riesgos Laborales”)²⁷⁸ - the Spanish equivalent of the European Framework Directive 89/391/EEC, and
- the Royal Decree 374/2001 (“Real Decreto 374/2001, de 6 de abril sobre la protección de la salud y seguridad de los trabajadores contra los riesgos relacionados con los agentes químicos durante el trabajo”)²⁷⁹ – the transposition of the European Chemical Agents Directive 98/24/EC and its first List of Indicative Limit Values (Directive 2000/39/CE) into Spanish law.

Since 1999, limit values have been developed and published by the National Institute of Safety and Hygiene at Work (“Instituto Nacional de Seguridad e Higiene en el Trabajo” – INSHT)²⁸⁰ as reference values. They are approved by the National Commission of Security and Health at Work (“Comisión Nacional de Seguridad y Salud en el Trabajo”)²⁸¹.

²⁷⁵ Decreto-Lei n.º 219/93, de 16 de Junho

²⁷⁶ http://www.idict.gov.pt/default_1.htm

²⁷⁷ <http://www.mtas.es/guia2001/portada.htm>

²⁷⁸ http://noticias.juridicas.com/base_datos/Laboral/l31-1995.html

²⁷⁹ <http://www.garben.com/pg2001/legislacion/leg15.htm>

²⁸⁰ http://www.mtas.es/insht/en/index_en.htm

²⁸¹ <http://www.cgt.es/spcgt/Comision.htm>

Both bodies were established by the Prevention of Risks at Work Act from 1995 (Article 8 and 13)²⁸². The “Comisión” is a joint advisory committee to the Ministry of all Public Administrations in the formulation of prevention policies and of institutional participation in the matter of H&S at work.²⁸³ The “Instituto” is the scientific-technical advisory body of the Ministry the mission of which is to analyse and study the conditions of H&S at work.²⁸⁴ Monitoring and enforcement of the legislation is performed by the Labour Inspectorate (“Inspección de Trabajo”)²⁸⁵.

Occupational Exposure Limits — The following types of OELs are defined:

- Valores Límite Ambientales (VLA)
- Valores Límite Biológicos (VLB)

The first type is sub-divided into values for the daily average exposure (“Valores Límite Ambientales - Exposición Diaria” VLA-ED) and for short-term exposure (“Valores Límite Ambientales - Exposición de Corta Duración” VLA-EC). VLBs are defined as daily reference values for biological indicators (the substance as such or its metabolites) in blood, serum or urine associated with the exposure to a chemical agent. These values are, by definition, health based recommendations.

For some carcinogens and mutagens classified as carcinogens and/or mutagens Category 1 or 2 according to Directive 67/548/EEC, risk-based values are adopted. For those substances (and also for those classified carcinogens and mutagens Category 1 or 2 without an assigned limit value), additional protective measures according to the national equivalent of the European Carcinogen Directive have to be applied.

The values are published annually in the List of Environmental Values for Occupational Exposure (“Lista de Valores Límite Ambientales de Exposición Profesional”). The general List (“Lista General de Valores Límite Ambientales de Exposición Profesional”) is subdivided in two parts:

- Part 1 contains the adopted long term (VLA-ED) and the short term values (VLA-EC) as well as the CAS and EINECS numbers of the substances, plus various complementary information (“Notas” - see next paragraph). The list contains about 800 main entries, divided into several sub-categories.
- Part 2 contains the list of biological limit values including their CAS and EINECS numbers, the biological fluid to determine the substance/the metabolite and additional remarks. This list contains around 50 entries.

Carcinogens and mutagens are listed in two tables of Annex 6 to the general list:

Table 1 (“Lista de cancerígenos y mutágenos”) includes all substances classified as carcinogens and/or mutagens Category 1 or 2 according to Directive 67/548/EEC. This list contains about 250 main entries.

²⁸² http://noticias.juridicas.com/base_datos/Laboral/l31-1995.html

²⁸³ <http://www.cgt.es/specgta/Comision.htm>

²⁸⁴ http://www.mtas.es/insht/en/index_en.htm

²⁸⁵ <http://es.osha.eu.int/>

Table 2 (“Lista de cancerígenos y mutágenos con valor límite adoptado”) contains all substances of Table 1 for which a limit value has been adopted. This list contains about 60 main entries. Limit values given in Table 2 are reference values for the daily exposure.

Definitions against which exposure is assessed — A VLA-ED is defined as the measured or calculated concentration of a substance in the breathing zone of the worker in the time-weighted average over a reference period of 8 hours daily, based on a 5-day week.

Short-term values (VLA-EC) have a 15-minutes basis. Peak exposures of three times the VLA-ED are allowed only for a period of 30 minutes. A ceiling value is established of five times the VLA-ED value. A VLB is, in general, defined for an occupational exposure of 8 hours daily during a 5-day week. For mixtures, a formula is given to calculate the limit value for a mixed exposure. Additional information about the substances are given in notations, such as:

- Possible risk of sensitisation via skin or inhalation (“Sc” / “Si”)
- Existence of a Biological Limit Value
- Classification as a carcinogenic and/or mutagenic substance

Procedure for setting OELs — The Spanish OELs are developed and published by the National Institute of Safety and Hygiene at Work (“Instituto Nacional de Seguridad e Higiene en el Trabajo” – INSHT) as reference values. They are approved by the National Commission of Security and Health at Work (“Comisión Nacional de Seguridad y Salud en el Trabajo”).²⁸⁶
287 288

The National Institute of Safety and Hygiene at Work (INSHT)²⁸⁹ is the specialised scientific/technical body of the state government administration, whose mission is the analysis and study of occupational health and safety conditions, as well as the promotion of, and support for, improvements to them. To this end, it has established the necessary lines of co-operation with the competent bodies of the Regional Governments. To fulfil its mission, INSHT carries out various functions, including:

- Technical assistance
- Study/Research
- Training
- Promotion/Information/Dissemination
- Development of guidelines/Standardisation
- Testing/Certification of protective equipment and machinery
- Technical co-operation
- Secretariat of the National Commission for Health and Safety at Work

The National Commission for Safety and Health at Work²⁹⁰ (CNSST) is a professional body that advises the Public Administrations on the formulation of preventive policies and acts as

²⁸⁶ http://www.prevencion.com/descargas/toxicos/limites_exposicion.doc

²⁸⁷ <http://www.cgt.es/legislacion/textos/Limites-Exposicion-Profesional-Agentes-Quimicos.pdf>

²⁸⁸ http://www.mtas.es/insht/en/index_en.htm

²⁸⁹ http://www.mtas.es/insht/en/index_en.htm

²⁹⁰ <http://www.cgt.es/spcgt/Comision.htm>

an institutional participatory body on issues relating to health and safety at work (its legal basis is Article 13 of the Prevention of Risks at Work Act 31). It is made up of the state government administration, the Autonomous Region government administrations and the most representative trade union and business organisations, which constitute its four representative groups. In order to carry out its duties, it meets in Plenary, Permanent Committee and Workgroup sessions, in accordance with the stipulations of its Internal Operating Rules. Agreements are adopted by majority, with each representative of the public administrations (from the central and the regional governments) having one vote and those from the business and trade union organisations having two. Thus, it can be seen that the National Commission for Health and Safety at Work is a quadripartite body in its composition, but functions in a tripartite manner.

Legal status of Occupational Exposure Limits^{291 292} — The majority of the Valores Límite Ambientales (VLAs) are only recommendations which serve as technical references for the obligations employers have with respect to risk assessment and prevention. Only for a limited number of substances (asbestos, lead, vinyl chloride monomers) do binding limit values exist.

What is meant by compliance^{293 294} — According to the Prevention of Risk at Work Act (Spanish Equivalent to the European Framework Directive on Health and Safety Protection) and the Royal Decree 374/2001 (Spanish equivalent to the European Chemical Agents Directive), employers are obliged to assess working conditions in general and with respect to chemical substances in particular. Exposure measurements have to be performed regularly (if the employer can not prove with other methods that the exposure limit values are not exceeded); the time interval between two measurements depends on the result of the first one.

With respect to carcinogens and mutagens Category 1 and 2, employers not only have to respect the existing limit values but also minimise the use of the substance even if the necessary substitute and/or technology is more expensive than the one used in the current process.²⁹⁵

Because the majority of the VLAs are only recommendations, the employer can, in theory, exceed a VLA if after the risk assessment he comes to the conclusion that exceeding the limit value would not constitute a risk for the employees. In practice, binding limit values and indicative limit values are treated the same. No employer, no labour inspector, and no technician of a public or private surveillance institute would publicly admit or promote the idea that exceeding a limit value is not a risk to health, even if in practice they are not always respected.²⁹⁶

²⁹¹ INSHT: http://www.canalsalud.com/mejorprevenir/salud_laboral/vlas.htm

²⁹² Information received from ISTAS

²⁹³ http://noticias.juridicas.com/base_datos/Laboral/l31-1995.html

²⁹⁴ <http://www.garben.com/pg2001/legislacion/leg15.htm>

²⁹⁵ Real Decreto número 665/97 de 12/05/1997, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo, Boletín Oficial del Estado número 124 de 24/05/1997 / Real Decreto 1124/2000, de 16 de junio, por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo; Boletín Oficial del Estado número 145 de 17/06/2000

²⁹⁶ Information received by ISTAS

If a binding limit value is exceeded, the labour inspector can stop the work immediately. If an indicative limit value is exceeded, sanctions can only be imposed if the risk assessment hasn't been performed properly.²⁹⁷

Who enforces the exposure limits?²⁹⁸ — The central government body responsible for monitoring and supervising compliance with labour and social legislation is the Labour Inspectorate or “Inspección de trabajo”. It was set up in 1906 and is part of the labour administration. Labour Inspectors have rights of access to workplaces, and to certain information kept by the enterprise and can issue official notifications (of infringement, settlement, etc.) and propose administrative or penal sanctions for violations of social legislation.

Administrative offences, which are subject to sanctions imposed at the proposal of the labour inspectorate are covered by the Labour Offences and Sanctions Act²⁹⁹, by the Workers' Statute and by the prevention of Occupational Hazards Act³⁰⁰

The 1988 Act describes various violations of labour legislation (particularly as regards work, health and safety, employment and social security) and categorises them as minor, serious or very serious offences. The same Act states that administrative sanctions may include the imposition of fines of varying magnitude, and even temporary or permanent closure of the workplace. Offences which have greater social impact are categorised as criminal labour offences in the Penal Code and are subject to penal sanctions.

The labour inspectors perform their functions essentially by visiting enterprises or workplaces; they are also officially empowered to institute legal proceedings and to act as mediators or conciliators in industrial and legal disputes and are in charge of the investigation of accidents at work.

There are some specific events where the activity of the Inspectorate must be connected with the competencies of different authorities (e.g. accidents in mines, accidents associated with radioactive installations or nuclear plants etc). However, the coming into effect of the Law on Prevention of Labour Risks, permits that, as a final step in every procedure derived from working accidents in these special areas, the labour inspector may act in defence of the affected worker or his relatives.

Enforcement activity — There are a large amount of official statistics relating to occupational accidents and diseases available on the internet.³⁰¹ ³⁰² However, according to ISTAS, no statistical data is available which relates labour inspection, enforcement and OELs.

Discussion at national level³⁰³ — Until 1998, Spain only had a very limited number of binding limit values and the legal basis for these was very out-dated being more than 60 years old.. The only reference which was then used in practice was the ACGIH list, but without any legal basis for endorsement or sanctions. This is the reason why the current situation is

²⁹⁷ Information received by ISTAS

²⁹⁸ <http://www.cgt.es/legislacion/textos/Inspeccion-Trabajo-Seguridad-Social.pdf>

²⁹⁹ Ley 8/1988 de 7 de abril (B.O.E. 15-04-1988), sobre infracciones y sanciones en el Orden Social; Boletín Oficial del Estado de 15/04/1988 / <http://www.ccoo.es/legislacion/leyorden.htm>

³⁰⁰ http://noticias.juridicas.com/base_datos/Laboral/l31-1995.html

³⁰¹ <http://www.mtas.es/Estadisticas/anuario00/Welcome.html>

³⁰² <http://www.mtas.es/Estadisticas/anuario00/Index.html>

³⁰³ All these points were raise by ISTAS

regarded as representing a step forward compared with the past. As a result there is little critical discussion about the system now in place beyond that which is common in many countries. For example, there is concern with the application of limit values for substances or preparations classified as carcinogens, mutagens or toxic for reproduction.

Other issues under discussion include:

- The need for more extensive coverage: at present limit values exist only for around 10% of the substances which are in use at the work place.
- The limit values do not take individual susceptibility into account, nor do they consider all routes of exposure (only the respiratory route - despite the fact that some notations are foreseen for substances which can be adsorbed via the skin etc.), and in most cases they do not consider all possible effects.
- For carcinogenic or mutagenic substances, no limit values exist below which no adverse effect to health can be observed; therefore their use should be avoided and the exposure should be reduced to zero.
- Limit values are established for single substance exposure situations, but in reality, workers are exposed to a mixture of substances and preparations which often have synergistic effects - even if the exposure for every single substance is below the official limit value.
- The concentrations of the polluting agents can vary and oscillate during the reference period. The concentration is affected by the production rate, the temperature/season, ventilation, humidity, state of hygiene etc. Measurements only represent the day and the moment in which they are made and therefore do not reflect these different circumstances.

From a trade union point of view, it is thought to be better to have limit values than to have no limit values at all. However, it should be clear that these limit values only represent a type of guidance with respect to possible health effects. Respecting limit values does not mean that there is no risk for the safety and health of the workers.

Despite all of this, they are considered to be a very useful tool to document the exposure situation of workers to chemicals during their working life and the Spanish trade unions insist on the right of individual workers to have access to his/her exposure data. Results of collective and personal exposure measurement have to be kept to enable retrospective analysis.

3.14 SWEDEN³⁰⁴

Regulatory system and responsible bodies — The Swedish Work Environment Authority (SWEA) is given the task by society to ensure that the working environment meets the requirements formulated in the Work Environment Act and concretised in the provisions issued by the SWEA.

The power to issue provisions without having to consult the government is a cornerstone in the Swedish policy of risk management in the working environment.

³⁰⁴ This section is based mostly on information supplied by Dr Kerstin Wahlberg of the Swedish Work Environment Authority

The Authority works in close co-operation with the Social Partners. This brings a stability to the process of issuing and implementing new rules. There is a general basis of understanding and acceptance of the production and use of different rules as a result.

Occupational Exposure Limits — The Swedish OELs are legally binding. An OEL gives the maximum acceptable concentration of an air contaminant in respiratory air. Scientific data is the basic ground to an OEL. The limit value is however considered an administrative limit since social, technical as well as economical aspects have to be considered. The employer has the responsibility to know of and to comply with the limit values and the rules linked to them.

There are three values used in Sweden:

- Level Limit Value (LLV)
- Short Term Limit Value (STV)
- Ceiling Limit Value

Definitions Against which Exposure is Assessed — A level limit value (LLV) is a time weighted average for exposure during a working day. The reference period is normally eight hours.

A ceiling limit value (CLV) is a time weighted average with a reference period of 15 min. A couple of substances (isocyanates and ammonia) have reference periods of 5 min. The swift-acting effects of substances with a CLV are well documented/supported with scientific data.

Short-Term Values (STV) are given for certain substances that do not have ceiling limit values. STVs are not as well documented as the CLVs. They do not have the status of limit values, they serve as guidelines for safety action.

The following designations are used in the list:

- A The substance can easily be absorbed cutaneously (H in Swedish)
- C The substance is carcinogenic
- S The substance is sensitising
- R The substance causes reproduction disturbances

Procedures for setting OELs — The Swedish Work Environment Authority issues a revised Ordinance on Limit Values roughly every third year. The system of setting OELs is based on a tripartite system. The social partners have the opportunity to give views from the start with prioritisation to the final public hearing.

The Swedish Criteria Group at the National Institute of Working Life (NIWL) provides the authority with the scientific data. The expected outcome from the Criteria Group is a consensus document containing the scientific data about the substance and if possible targeting a critical effect and a dose-response/dose-effect relationship. The Criteria group does not propose any OEL.

The staff of SWEA has to propose a limit value based on the scientific data but also taking into account all kind of technical-socio-economic aspects for a substance. In exceptional cases, if there is a lack of scientific data, limit values of other countries form a basis for the Swedish limit level.

Legal status of Occupational Exposure Limits — All limit values in the Ordinance of Limit Values are binding. Some substances are more strictly regulated than others since there is a demand for mandatory exposure measurement. Those are styrene, crystalline silica, asbestos, cadmium and lead.

What is meant by compliance — The Level Limit Value (LLV) may be exceeded for part of the day if the time weighted value for the whole day is not. It is however not acceptable to use work rotation to avoid reducing the exposure level. CLVs are normally defined with a reference period of 15 min. The value can be exceeded within the reference period if the time-weighted average value is not.

The employer is in general obliged to reduce exposure as far as possible. According to this provision, theoretically, the Labour Inspectorate can enforce measures against an employer even if the limit is not exceeded³⁰⁵.

Who enforces the Exposure Limits? — The Work Environment Inspectorate within SWEA is responsible for enforcement of the exposure limits. It is an integrated part of the Authority and has access to all scientific and technical support that can be provided through SWEA.

Enforcement activity — No specific data on compliance with limit values is available. There are some statistics on claims by the Inspectorate in the occupational hygiene field that have been collected during the last five years.

How will the country comply with the IOELV Directive? — The substances with IOELVs are considered within the general Swedish process for limit values. The chemicals that do not have Swedish values are prioritised. A scientific report is ordered from the Criteria group. The authority proposes and establishes a value as usual, taking into consideration scientific as well as technical/socio/economic aspects. The value may be higher, lower or the same as the IOELV. IOELV substances that are not used in Sweden, are listed with their IOELV values separately in the Ordinance on Limit Values. If the substance comes into use it is recommended that the IOELV is used as a guideline.

3.15 SOME BROAD CONCLUSIONS FROM THE FOURTEEN COUNTRIES SURVEYED

There are strong similarities between the various systems for setting and achieving compliance with OELs in the EU. This is hardly surprising since these practices mostly derive from the same small number of historical sources. The ACGIH list of TLVs has clearly been of major influence as, to a lesser extent, have been practices in Nordic countries and in Germany. Latterly, the influence of the EU has been responsible for further convergence. These similarities however, do not entirely override national differences apparent in the setting, status and use of OELs as well as in their legal context.

Regulatory system and responsible bodies — There is legislation on health and safety in the use of chemical substances in all countries. In most cases it is in the form of some kind of framework provision supplemented by more specific requirements relating to chemical substances. The influence of both the EU Framework Directive and EU Directives on chemical agents is evident in both the structure and content of these provisions and in their

³⁰⁵ However, see Chapter 8 for a further discussion of this point

increased emphasis on process based approaches to the management of risk. There is further similarity in the broad nature of the responsible bodies involved. National organisations for monitoring compliance with legal requirements on health and safety are present in all countries. They are variously titled — Labour Inspectorates, Work Environment Authorities etc. They usually operate under the authority of a central Government Department or Ministry and mostly have some form of overall responsibility in both the setting and enforcement of OELs. There are differences between countries in the extent to which such national authorities:

- are regionalised in their operation,
- deal exclusively with health and safety or with labour inspection of other aspects of working conditions more generally,
- have specialised field inspectors and support services in relation to chemical safety
- are sole enforcing authorities or share this function with other agencies.

Similarities are also evident in the role of national research institutes for health and safety, which appear to play a strong, independent, advisory role in the setting and adoption of OELs in most countries.

One significant difference between countries is found in the role of social insurance associations. Their engagement in regulation is most marked in the German model (also evident in Austria), where they have both rule making and enforcement authority in addition to that of the state inspectorate. The French approach and the role of the CNAM/CRAM shares some of these features in its emphasis of the powers of the social insurance bodies. Another departure from the predominant pattern of organisation of regulatory structures is found in Italy where in practice the responsibilities for seeking compliance with health and safety provisions lies with regional and local structures of the public health system (although the Labour Inspectorate has some national responsibilities as well as some residual shared role in especially hazardous sectors).

A further difference is seen in the role of external prevention services in matters concerning OELs. It seems clear that in countries where there is a legislative requirement or strong tradition for integrated occupational health services as part of the national health and safety system, it is anticipated that they will play a significant role in helping firms achieve compliance with requirements that involve OELs. This would appear to be the case in Nordic countries and in the Netherlands. It also appears to be the aspiration in some southern European countries such as Spain and in Greece (although it is questionable whether there is sufficient infrastructure in place to allow this).

What impact if any, these differences have on regulatory practices in relation to OELs will be explored in the following chapters in which regulation of OELs will be explored in examples of countries exhibiting most of the range of these features³⁰⁶.

Procedures for setting OELs — Another strong similarity is seen between countries in the way in which they have set up their structures for setting or adopting OELs to allow for considerable stakeholder participation. These structures are mostly based on tripartite models, with the addition of “independent” expertise. Other agencies such as insurance associations also may play a greater or lesser role depending on the broader national health and safety system. In countries in which OELs are set there are also broad similarities in the procedures

³⁰⁶ Unfortunately it has not been possible to include France in the examples of countries chosen for more detailed study and therefore it is not possible to comment on the significance of the involvement of the CNAM/CRAM

involved. Mostly there is a two stage processes in which the scientific/health based issues are dealt with, usually by “experts” (sometimes representing economic interests sometimes not, and sometimes a mixture of both) and a further second process in which economic/technical issues of feasibility are considered. Here economic interests are always represented and the social partners are much in evidence.

There are two broad patterns evident in the 14 countries studied. There are a group of countries in which there is quite detailed discussion and procedures in place for both setting and complying with OELs. These are essentially the larger northern European countries, the Nordic countries and the Netherlands. These too are the major players when it comes to the setting of limits at the level of the EU. There are several other countries for which this seems to be far less the case. Their systems vary in detail, but generally they consist of structures and procedures in which expert and stakeholder representation is in place although the nature of the decisions they take may be different to those in the countries with more developed systems. There was clearly some concern in countries with less developed systems about adequate scrutiny of the meaning of values adopted from the EU. There was also concern about the continuation in force of values that could be traced to older lists of the ACGIH and for which there was now new scientific evidence available concerning the effects of exposure. Indeed, such has been the widespread historic use of TLVs that the speed with which these can be reviewed and if necessary, replaced is of concern in most countries regardless of whether or not they currently set their own new standards. At the same time, in countries such as Italy there seems to be another level of concern about the meaning and use of OELs as legal standards. This derives from a fear that adoption at national level of EU ‘pragmatic’ standards that take economic considerations into account will undermine the Italian workers’ constitutional right to healthy and safe workplaces. According to this argument the assumption of a level risk that is implicit in such standards is fundamentally at odds with workers’ rights to health that are enshrined in the constitution.

Occupational Exposure Limits — As far as the limits themselves are concerned there are differences of detail in the values adopted. We have not explored the reasons or practical significance of these. Terminology used to define them is international such as time weighted averages, short-term exposure limits, ceiling values and annotations for special risks such as carcinogenicity, skin absorption, allergenic substances etc. but there are differences in the detail of its application to different substances in different countries. Further comparative study would be required to explore the significance of such detail.

Legal status of Occupational Exposure Limits —In most countries there are a number of OELs that are legally binding limits. Sometimes they are restricted to those that are in force as a result of compliance with EU Directives but in many cases the list is considerably larger. In the guidance that accompanies OELs in all countries in which it was available, it is made clear that they are not regarded as *safe* limits and they are frequently accompanied by recommendations to reduce exposures to as low as is possible below the limit.

In some countries there are more than one kind of limit that has some kind of legal meaning as in the UK (although not necessarily with the same definition applying), in others there is only one limit that has a legal definition but there may be others that have the status of guidance. It is not clear from information available whether this has a significant or measurable impact on the use and enforcement of limits. Nor is it clear whether it affects the understanding of the meaning of limits by users. These are issues to which we shall return in the more detailed country studies that follow. Further variation occurs which reflects broader variation in the regulatory systems of the countries. Thus in Italy, older OELs derived from the ACGIH list may be legally binding in some sectors because they are referred to in

collective agreements which themselves have a legal status within the Italian labour relations system. In the Nordic countries, the long tradition of Nordic corporatism also means that the detail of OELs that apply may be found in collective agreements. In the Netherlands the social partners have achieved an agreement on the controversial use of OELs in relation to non-substitutable carcinogens in which a certain level of risk is accepted in exchange for the likelihood of increased safe working environments overall. The social partners agreed to strive for TLVs corresponding to risks not larger than 10^{-6} per year (or 4×10^{-5} for the working-life as a whole). However, as such low risks are not achievable for many carcinogens for the time being, TLVs that correspond to risks up to 10^{-4} per year (or 4×10^{-3} for the working-life as a whole) are tolerated at present. (A risk of 10^{-4} per year roughly equates to the average risk for a fatal work accident in the Netherlands.) Since 1996, about 15 TLVs have been derived under this scheme. (Wriedt 2003 and Wilders 2002.) In Germany so-called TRK values have been derived for more than 70 carcinogens. However, only recently has the decision for a systematic review of these limit values been taken. It is likely that more than 10 years will be needed to revise all of them and therefore such review will tend to become a permanent feature of the German system (Wriedt 2003)

Who enforces the exposure limits, enforcement activity and what is meant by compliance?

— As already pointed out it is the national labour inspectorates (or their equivalent) that have enforcement authority in all countries although this may be supplemented in various ways by other agencies. Breach of requirements relating to binding values is either a criminal or administrative offence (or both) depending on the national regulatory system and the seriousness of the breach. Penalties are most commonly fines, the levels of which are defined usually in the relevant legislation. However the extent of the use of such penalties is much more difficult to determine. Enforcement activity in general has proven difficult to document from the sources available to us at this stage in the study. We have been unable to obtain a detailed picture of enforcement practice from any of the countries studied and it forms part of the next stage of the study in relation to selected substances in a smaller number of countries. What is clear from the overview in this chapter is that while OELs are part of the enforcement scenario in most countries the way in which such enforcement is undertaken varies. In some cases the emphasis of inspectorates is on firms achieving compliance with requirements concerning the management of the overall processes of production. Compliance with OELs as such, is therefore evidence of health and safety management working effectively, as lack of compliance would indicate the opposite. They are also enforced (at least in theory) in their own right, where there is evidence that they may be exceeded. Again, it has not been possible to determine from records, with what frequency such action takes place. There are situations in which measurement of airborne pollution will be required to assess and manage risks. While this is the responsibility of employers, in practice it is often undertaken by external expertise and the role of prevention services to which we have already referred is important in several countries. Generally, regulatory inspectorates rarely engage in proactive acts of monitoring compliance with specific OELs themselves. However, where there is concern over workplace airborne pollution which may be approaching or exceeding limits, there are requirements in some countries to inform and involve the regulatory agencies in monitoring, but it is not clear what happens in practice. Nor is it clear the extent to which technical aspects of monitoring actually occur either with the involvement of the regulators or the prevention services (or their equivalents).

PART 2

USING OELS IN REGULATING THE MANAGEMENT OF CHEMICAL RISKS IN 5 EU COUNTRIES

Part 2 contains an detailed examination of the role and use of OELs in regulatory approaches to achieving risk assessment and control of hazardous substances at work in the systematic management of occupational health and safety in 5 EU member states. The countries covered are:

Germany
Greece
Italy
The Netherlands
Sweden

CHAPTER 4

GERMANY

4.1 INTRODUCTORY REMARKS

In Germany, OELs represent one of many elements within a complex structure of external and internal tools, measures and considerations³⁰⁷ for managing health and safety at enterprise level. Moreover, the regulatory system for OHS has undergone considerable change in the recent past. Much of this change (particularly the development of a more holistic approach) has its origin in the transposition of the EU Framework Directive on Health and Safety (89/391/EEC) (see Schaapman 2002).

In order to understand the role of OELs within the German OSH system and compliance (or non-compliance) with them, it is important to remember that there is a dual system comprising both the State and its federal sub-structure and the institutions for statutory accident insurance and prevention (Berufsgenossenschaften or BGen). The statutory social insurance role of the BGen and the engagement of both employers and trade unions in their organisation is also important since it means that while the BGen do not themselves establish OELs, their role in the process makes the establishment of OELs, proof of compliance with them and possible adverse health effects for workers resulting from exceeding them, the subject of intensive and often controversial discussions at all levels. Opinions are often dominated by the nature of the role their source plays within the system.

These features help in practice to make the mode of operation of the German system quite different from that of the UK and the other countries in the present study. Importantly the degree of operational decentralisation of the inspection system both federally and in terms of the role of the BGen is greater than in other countries. Furthermore the technical orientation of the system means that the considerable attention that is paid to issues of measurement and surveillance in some sectors of industry are interspersed with issues of inspection and control in a manner that does not seem entirely comparable with patterns in other countries. Thus for example, we find a comparative wealth of information on exposure levels for wood-dust and toluene that have been generated by actions commissioned and in some cases undertaken by inspection agents of the dual system – from within the BGen but also from within the labour inspectorate of some Lander. Moreover, the information generated from these activities form impressive data sets on exposure levels and trends that perhaps tell us as much about compliance with the regulation of chemical risk management as the (much less apparent) records of enforcement actions might.

Using the examples of toluene and wood-dust, this chapter aims to show the extent to which exposure to dangerous substances is monitored, the role of inspection and control agencies in this process and how well companies follow their obligations to respect certain limit values. The limitation of this study to three branches and two substances was in practice somewhat restrictive. This was particularly so when trying to analyse the role OELs for wood dust and toluene play in OHS management systems. The reality of the situation at enterprise level is

³⁰⁷ *Legislation, OSH authorities and their surveillance and monitoring system etc., financial aspects, interaction with environmental and other legislation, trade unions and workers involvement and participation, economic situation in general and in certain branches etc. etc.*

that workers are exposed to several hazards at the same time (not only dangerous substances and certainly not single dangerous substances). The approach towards prevention at enterprise and OHS authority level is therefore more holistic. In the two of the three sectors (printing and furniture industry) where toluene and wood dust play an important role, other health hazards like ergonomic issues and exposure to noise are, at least in bigger companies, considered to be more dominant. In particular in the printing industry, exposure to toluene is much reduced as a result of the development in technology (replacement of workers by robots, closed technologies etc. and the recycling and reprocessing of toluene as an expensive working 'tool'). This technological development is even more advanced in the metal sector where, it has played a role in reducing the use of toluene as a single substance to the extent that it is now very limited indeed. Where it is still present it is more often found in mixtures with other substances and its percentage content in these mixtures is often quite low. The primary driver of this reduction the metal industry has legal requirements (like labelling or the obligation to follow quite restrictive health and safety protection measures at the work place when using pure toluene or toluene in mixtures above a certain concentration), in combination with the availability of suitable substitutes.

Because of the differences between the operation of the German regulatory system and those other countries in the study we begin this chapter with a brief outline of some of the key features of the German system. This is followed by a section on experiences in relation to wood-dust. It includes an outline of the hazards of wood-dust and the position of OELs in legislative arrangements. It describes the essential features of the wood-working and furniture sectors, before considering the evidence of surveillance of wood-dust within these sectors, in which exposure limits have featured significantly. Using the same structure we move on to consider the situation in relation to monitoring exposure to toluene in three of the principle sectors where the substance is in use. This is followed by a discussion of the salient issues that emerge from our review, that place the role of OELs in regulating chemical risk management in German workplaces in context.

4.2 THE BACKGROUND TO REGULATING CHEMICAL RISKS — THE GERMAN HEALTH AND SAFETY SYSTEM IN OUTLINE³⁰⁸

The regulatory system for occupational health and safety in Germany has for many years been characterised by its complexity, its technical orientation and its resistance to change. Its dual system of regulation has created different regulatory regimes with strong orientation towards the enforcement of a mass of technical rules. Transposition of the Framework Directive enabled a fundamental modernisation of German occupational health and safety law resulting in a new unifying Act, (the Occupational Safety and Health Act 1996) which incorporated employers' responsibility, the principles of prevention and the obligation to make a risk assessment.

The regulatory system for health and safety is based on the Industrial Code 1869 (*Gewerbeordnung*). A general obligation for employers to organise and maintain workplaces, installations, machines and tools and to run businesses in such a way as to protect workers against life and health threatening hazards insofar as permitted by the nature of the business was included in its revision in 1891. Paragraph 120 (e) allows the possibility of regulations (*Verordnungen*) from the Minister of Labour and Social Affairs, or, where such action is not taken, from the authorities of the federal states. Its use resulted in a large body of detailed

³⁰⁸ This section is based on Schaapman (2002)

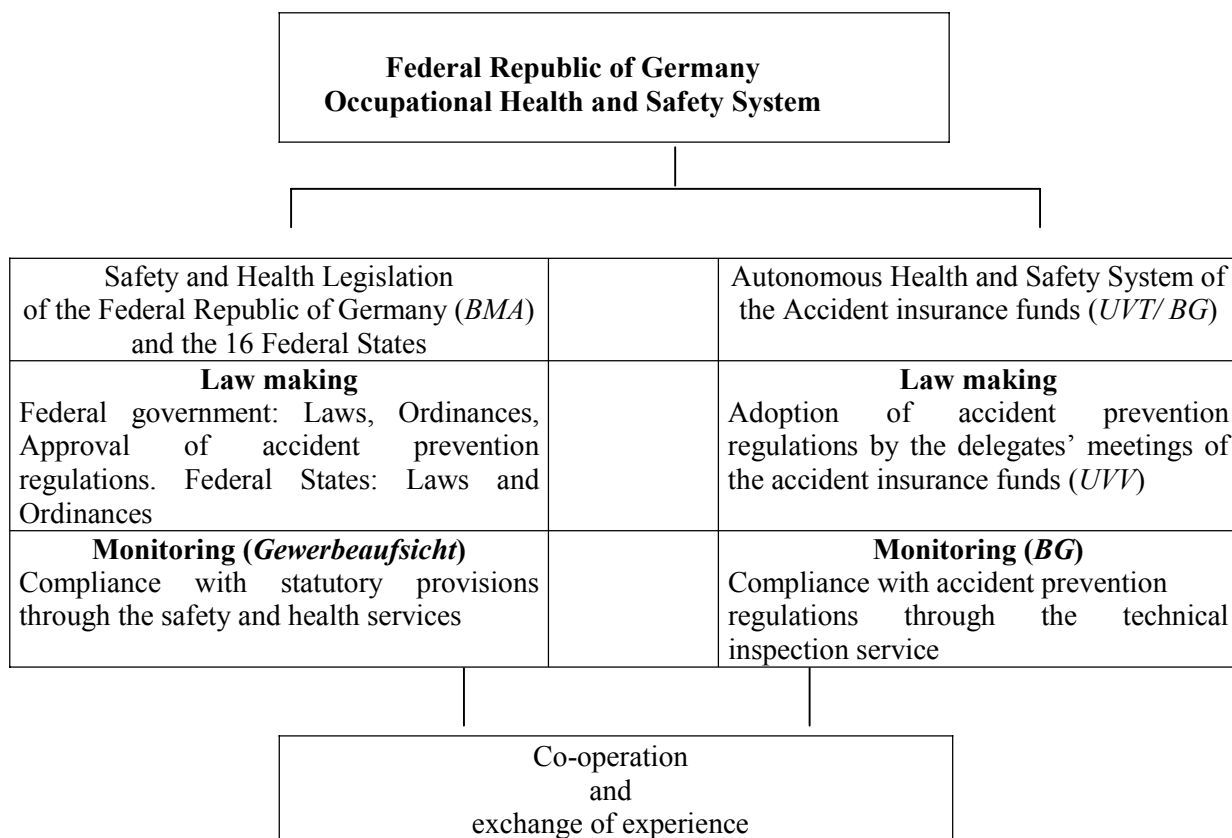
regulations supplemented by so-called ‘generally recognised technical rules’, representing a pattern of regulation that is typical for German technical law in general.

The Labour Inspectorate (created in 1853) is responsible for monitoring and enforcement. Because of the general character of paragraph 120 (a) of the Industrial Code, the role of the Labour Inspectorate includes specifying orders for particular situations. This gives rise to a third form of decentralised regulation, in addition to the regulations and the generally recognised technical rules.

A second track of regulation and enforcement is that of the so-called Accident Insurance Law (*Unfallversicherungsrecht*), which dates back to the Industrial Accidents Insurance Act 1884 (*Gewerbe-Unfallversicherungsgesetz*), later included in the National Insurance Code 1911 (*Reichsversicherungsordnung*). This created the legislative base for accident insurance funds (*Unfallversicherungsträger*) of which the so-called *gewerblichen Berufsgenossenschaften* (industrial employers’ liability insurance funds) are the most important. Beside them, there are separate insurance funds for agriculture and for the civil service. The *Unfallversicherungsträger* are public corporations and both their delegates’ meetings as well as their board are organised according to the principle of parity, with employers and insured equally represented. They are funded by employers’ contributions and membership is compulsory. Beside their compensation function, the statutory accident insurance funds are responsible for the prevention of accidents. This combination of duties dates from the Industrial Accidents Insurance Act 1884 and was motivated by the idea that those responsible for the damage should investigate the causes of the accidents and initiate preventive measures.

In the current version of the National Insurance Code, prevention of accidents is the first priority of the insurance funds. In order to undertake this task, the statutory accident insurance funds have the power to issue and enforce autonomous rules, the so-called Accident Prevention Orders (*Unfallverhütungsvorschriften*) and a Technical Inspection Service (“Technischer Aufsichtsdienst”) for surveillance and enforcement.

Schematically, the German OHS regulatory system can be represented as shown in Figure 1 (after Schaapman 2002):



- BG = *Berufsgenossenschaften*
 UVV = *Unfallsverhütungsvorschriften*
 UVT = *Unfallsversicherungsträger*
 BMA = *Bundesministerium für Arbeit und Sozialordnung*

Figure 1 Schematic representation of the German OHS system

The rules of the federal state are general in character, both with respect to sectors and regions, whereas the rules of the *Länder* are regionally specific and those of the *Berufsgenossenschaften* apply to specific sectors and sometimes also specific regions. As co-ordination between both tracks of regulation is often insufficient, this can lead to overlapping and even contradictory rules (Gerlinger 2000).

Although we have used the conventional term and referred to it as a 'dual' system, the complexity of the German system is such that in reality it is 'multiple' rather than 'dual'. Every statutory insurance fund is authorised to issue and enforce rules for its own sector or region. Regulation is further fragmented because of its decentralised character, and because of the limited coverage of the Industrial Code in the first place, which has resulted in different

regulatory regimes and different levels of protection accordingly, for different sectors³⁰⁹. Moreover OHS law (as well as any other part of German technical law) is characterised by manifold references to private norms by way of the concept of ‘generally recognised technical rules’.

As we saw in Part 1, the legislative basis for OELs is the Chemicals Acts (“Chemikaliengesetz”) with its Ordinance on Hazardous Substances (“Gefahrstoffverordnung”). In addition the BG’s own regulatory framework (Accident Prevention Regulations – Unfallverhütungsvorschriften) is approved by the Federal Ministry for Labour and Social Affairs (Bundesministerium für Arbeit und Sozialordnung), which is also responsible for announcing the legally binding revised and/or new OELs in the Technical Guidance Rules for Hazardous Substances (“Technische Richtlinien für Gefahrstoffe” - TRGS) after they are adopted by the Committee on Hazardous Substances (“Ausschuß für Gefahrstoffe”). Compliance is enforced by the labour inspectors of the National Offices for Industrial Safety of the Bundesländer.

Both the Labour Inspectorate and the BGen can impose fines/penalties. Labour Inspectors may issue orders and make use of compulsory measures/sanctions under the relevant State laws. Normally this covers remedy of the situation at the expense of the employer or the establishment and/or the fixing of fines. Additionally, they can order the suspension/cessation of production or initiate ongoing penalties. The institutions for statutory accident insurance and prevention and their Technical Inspection Service are also responsible for the surveillance of the Hazardous Substances Regulation and its Technical Rules. As well as this, the BG may also require higher mandatory contributions on the employer.

There is little information that is easily available on the extent to which OELs feature in the enforcement activities of either the state or insurance authorities. As we mentioned in Part 1 both the National Offices for Industrial Safety as well as the institutions for statutory accident insurance and prevention collect and publish annual reports on their surveillance and enforcement activities, but they do not contain direct reference to infringements involving OELs. The extensive databases of the BGen, such as the chemical workplace-exposure-database (MEGA) of the Institute for Occupational Safety contain exposure data for more than 400 substances used at the workplace. But these data are normally only available for the BGen and their members. As we shall see subsequently, information from these sources provides an indication of the role of exposure limits in workplace chemical risk management, more readily than enforcement statistics from other sources.

Both surveillance authorities (The BGen and the State labour inspectors) visit companies for different reasons:

- a) because certain types of companies / a certain sector etc. is part of a pinpoint action or something similar,
- b) the surveillance authorities have a suspicion requiring investigation (based for example on the information they received from a work council in a certain company) or
- c) there is an accident.

Based on their experience and on the model work place conditions established by former pinpoint actions or studies performed by the BGen or the public authorities, inspectors know or can be fairly certain if working conditions are according to the law or not. They might

³⁰⁹ *The regulatory basis for commercial personnel, for example, is to be found in paragraph 62 of the Business Code (Handelsgesetzbuch), whereas for civil servants there is no similar OHS regulatory basis.*

either measure themselves or urge the company to present the relevant data if they think there is something wrong, but this would be only an *additional* information, either supporting or not supporting the already existing suspicion. Generally, it is felt that there is no need to measure, if all the other surrounding circumstances (compared with standards established by the BGen or the State Authorities themselves) indicate that the OELs are respected (if the employer is for example using the recommended machinery and exhaust or ventilation system). Because measuring is so expensive, everybody tries to avoid it by having other tools (comparable working condition, machinery according to standards etc.) from which the relevant conclusions can be drawn. Pinpoint actions are the main source of OEL measurements. But because they are performed in order to improve working conditions according to the state of the art in technology and knowledge about health hazards, they are not considered as being enforcement activities but guidance and help for companies. As a member of a BG, a company is entitled to receive help. If a State Authority finds working conditions they consider unacceptable or improvable, guidance is also given in the first place because nobody is interested in undertaking the kind of 'enforcement action' that risks destroying companies and workplaces.

4.3 WOOD DUST

Hazards — According to the Technical Rule for Hazardous Substances N° 901, Wood dust is recognised as being associated with the following hazards:

- Fire and explosion (it can form explosive mixtures with atmospheric oxygen).
- Sensitising effects on the respiratory tract and the skin is documented for domestic and tropical timber.
- Oak and beech wood dust have been classified as carcinogens, category 1 (known human carcinogens) since 1986. Unspecified wood dust as such is classified as a carcinogen, category 3 (known or suspected carcinogens with limited evidence). (Technical Rule for Hazardous Substances N° 905).

In 1987, the atmospheric limit value for wood dust (the TRK³¹⁰ value) was established at 2 mg/m³ for new plants and 5 mg/m³ for old / existing plants. Since 1996, the 2 mg/m³ value³¹¹, measured as inhalable ("E")³¹² dust (Technical Rule for Hazardous Substances N° 900), applies to all workplaces where wood dust is generated. At European level, the limit value for hardwood dust is 5 mg/m (Council Directive 1999/38/EC).

Relevant legislation at national level — In 1986, the so-called ZH 1/139 was published for the first time, a regulation of the BG, which deals with the extraction and separation of dust and chippings. This regulation was updated in 1990 but withdrawn completely in 1993, after the TRGS 553 (see below) was published. In 1992, all rules concerning the use of wood dust were summarised and consolidated in the so-called Technical Rule for Hazardous Substances N° 553 (TRGS 553), including requirements for technical tools and equipment as well as organisational measures when working with wood.

Workplaces and machinery for which the OEL is currently unachievable due to the (less developed) state of the art in the available technology, constitute a so-called "negative list",

³¹⁰ *Technische Richtkonzentration / technical guidance concentration*

³¹¹ *with a ceiling value for peak exposures of 4 times this TRK value*

³¹² *former "total" dust*

which was published for the first time in 1994. For those workplaces / machinery a limit value of 5 mg/ m³ is allowed together with the obligation to minimise the exposure. It is published as Annex 2 of the TRGS 553. The list has to be up-dated regularly by the German Committee for Hazardous Substances (AGS³¹³), normally based on data collected by both the institution for statutory accident insurance and prevention in the woodworking industry³¹⁴ and the State Offices for Labour Protection in the Länder. The aim of each revision is to shorten the list until no workplace / installation is exempted any longer from the lower limit value of 2 mg/m³. Based on the results of the last measurement series, the "negative list" was revised in March 2002.

The TRGS 553 also determines when the more stringent provisions of the Ordinance on Hazardous Substances foreseen for carcinogens have to be applied when working with wood that contains either oak or beech wood or both³¹⁵.

The Ordinance on Hazardous Substances in conjunction with the Technical Rule for Hazardous Substances (TRGS 402) also lays down how to determine and to assess the airborne concentration of dangerous substances in work areas and whether or not work areas can be exempted from exposure measurements³¹⁶. This is the case "when the limit value can be guaranteed securely and permanently". This means that no exposure measurements have to be performed if a work area under scrutiny fulfils certain requirements with respect to ventilation, machinery etc. This is important as many activities from all stakeholders aim at establishing this type of criteria in order to avoid expensive measurements and also to facilitate the task of the labour inspectors.

4.4 THE INDUSTRY³¹⁷

The two sectors of the industry that are of interest are woodworking and furniture manufacture.

Woodworking — The industry has a turnover of about 16 billion EURO³¹⁸, which corresponds to less than 2 per cent within the processing industry as a whole. In 1999, about 114,000 people were working in 2000 companies³¹⁹ in the sector. The majority employed less than 60 workers each and are therefore SMEs. During the past five years, the employment rate reduced by 3.2 per cent annually. The amount of female workers is 18 per cent on average, (below the average of other processing industries, probably due to the high

³¹³ Ausschuß für Gefahrstoffe

³¹⁴ Berufsgenossenschaft Holz / in the following: BG Holz

³¹⁵ the percentage of oak and / or beech wood has to be higher than 10 per cent of the total annual amount of wood use in the company

³¹⁶ Notwithstanding the fact on whether or not a work area is exempted from exposure measurements, other obligations of the employer according to the Ordinance of Hazardous Substances remain in force such as its obligation to use less hazardous substitutes if available, to respect the hierarchy of protective measures, to equip every workplace with operating instructions and to perform regular training for the workforce

³¹⁷ if not mentioned otherwise, the data given are taken from the following publications:

- IG Metall (Hrsg) (2000)
- IG Metall (Hrsg) (2002)

³¹⁸ Data for 2001 according to the Federal Ministry of Economy and Technology (2001): 16,66 billion EURO

³¹⁹ Data for 2001 from the Federal Ministry of Economy and Technology (2001): 111.986 employees in 1.905 companies)

percentage of heavy physical work). About 75 per cent of workers are manual, a higher percentage than in other parts of the processing industry. An average production increase of 4.5 per cent was realised in the sector, whereas the income of the employees only increased by 1.3 per cent on average over the same period. As a result, the salary-costs-per-unit have been reduced by 12.3 per cent since 1996.

Furniture industry— The furniture industry annual turnover is about 22 billion EURO³²⁰, which is around 2 per cent within the processing industry. In 1999, just under 166,000 people were working in 1470 companies³²¹; the average size of these companies is about 113 employees per company and about 40 per cent of the turnover is produced in companies with less than 200 employees. The percentage of family enterprises is quite high, particularly in the sub-sector of living and bedroom furniture production. Most of these family businesses face economic pressure caused by a changing competitive environment³²². During the past five years, the employment rate was reduced between 4.4 and 1.9 per cent per annum with the strong tendency to shift labour intensive activities to countries where labour costs are cheaper such as the Eastern European countries (e.g. Poland). About 72 per cent are manual workers. During the past five years, an average production increase of 2.3 per cent was realised, while the salary-costs-per-unit hasn't changed since 1996.

Surveillance Compliance with OELs for wood dust over recent years — There are several reasons why workplaces where wood dust is generated have been monitored quite intensively since the end of the 1980s. Probably most important reason is the "negative list" of the TRGS 553. This implies a threat that the Committee of Hazardous Substances will withdraw workplaces and / or machinery mentioned in this list if no data is supplied when the list is revised. It is therefore in the interest of the industry to have data available which proves that certain workplaces and / or machinery is still not able to achieve the lower limit value, otherwise they may be withdrawn and the lower limit value of 2 mg/m³ will then apply to them. As a result, there are a number of organisations that have been involved in undertaking a variety of different studies in the sector that have involved monitoring wood-dust exposures. They include:

- Studies undertaken in different enterprises and sectors of the wood working industry by BG Holz to support its members in fulfilling legal requirements and to improve the technology within the sector.
- Several pinpoint / targeted actions performed by the State Offices for Labour Protection because they had evidence that the working conditions in certain branches / sub-branches of the wood working industry were not in accordance with the legislation in force.
- Research institutes like the Research Institute for Hazardous Substances which offers professional help for enterprises by performing risk assessments according to the Ordinance on Hazardous Substances, have performed workplace atmosphere analyses and control measurements in different sectors of the wood working and wood processing industry. This type of professional help normally also includes advice for possible technical measures to reduce exposure.
- Many exposure measurements of different types of work areas have been performed in order to establish criteria and requirements under which the limit value can be guaranteed

³²⁰ Data for 2001 from the Federal Ministry of Economy and Technology (2001): 22,32 billion EURO

³²¹ Data for 2001 from the Federal Ministry of Economy and Technology (2001): 157.441 employees in 1.393 companies)

³²² One exception is the Hülsta company which took part in the study

permanently and securely, to exempt companies meriting these criteria from performing exposure measurements

- Numerous measurements have been carried out in projects in which BG Holz is involved that are funded by the European Union, which aim at preparing exposure registers of hazardous substances in the woodworking industry.

Further examination of these activities gives an indication of the extent, diversity and role of monitoring. It shows developments related to the establishment of an OEL (in this case a TRK) value for a certain substance (wood dust), its significance / meaning for improvement of health and safety at enterprise level, and the complexity of the whole framework. The overwhelming majority of the data collected has its origin in studies performed by either the BG Holz or by the State authorities. Studies based on exposure measurements performed by employers as part of their duty to assess the exposure situation when dealing with dangerous substances are not accessible. There are two main reasons for this:

- The data are not publicly available. Labour inspectors have the right to examine them, but can only use them within the framework of the control and surveillance of the enterprise.
- According to our interviews, another more fundamental reason for the lack of this kind of data is that only a minority of employers perform exposure measurements (subjectively estimated at about 5 per cent or less, based on the experience of labour inspection in one of the Länder).

Pinpoint actions — In 1987 the Gewerbeaufsicht Hessen³²³ performed one of the first ‘pinpoint actions’ on wood dust. The background was the then adopted legal requirements and obligations for wood working and wood processing companies (as outlined above) and the resulting tasks for the State authorities, to supervise and control the new legislation. At that time, around 4500 wood working and wood processing companies with more than 40,000 employees were registered in Hessen, most of them belonging to SMEs. The aim of the pinpoint action was to evaluate:

- How many companies complied with the TRK value?
- What was the exposure situation of the employees (which was considered to be too high already)?
- What were the reasons for this exposure situation?
- What was the state of the art in dust abatement technology and in how many companies was this technology level achieved?
- What type of measures and strategies were necessary to improve the situation?

The pinpoint action ran over a period of two years. Out of the 4500 companies, a random sample of 400 enterprises were registered, of which 390 were visited and analysed with respect to the type of timber and dust abatement technologies used. The results showed severe shortcoming in occupational safety in the companies under investigation³²⁴:

- Wood dust exposure measurements had been performed in only 3 per cent of the companies

³²³ *State Industrial Inspection of the Bundesland Hesse*

³²⁴ *This is a selection of the results. The whole report is published by: Hessisches Sozialministerium und Hessische Landesanstalt für Umwelt, Abt. Arbeitsschutz (1989)*

- 32.7 per cent out of the 7257 wood working and wood processing machinery didn't have any dust abatement facilities at all³²⁵;
- 10.6 per cent were only connected to a dust bag and
- 56.2 per cent were connected to the central ventilation.
- With respect to the exposure situation of the employees, the following results were found:
- 20 per cent of all measured exposure values³²⁶ were above the TRK value of 5 mg/m³ (the limit value for existing plants)
- At every 10th workplace, the exposure measured was twice as high as the TRK value;
- Maximum values measured were 63.7 and 33.9 mg/m³ which corresponds to an excursion factor of 12.7 and 6.8 respectively;
- Serious exceeding of the TRK value was found at workplaces with hand sanding machines without any abatement technology, but other machines (sanding machines or saws) caused concern as well.

Other findings included that a work area analysis according to the TRGS 402 had not been performed in any of the companies. Operating instructions did not exist and annual training of the workforce didn't take place. Suitable respirators were not available in any of the companies. In nearly half of them, the exhaust air was re-directed to the workplaces, leading to an (avoidable) increase of the basic exposure burden. Another (avoidable) contribution to the basic exposure burden connected with extreme exposure ceilings was 'achieved' by cleaning the work clothes, the tools, the machinery and the whole workplace with compressed air.

There was only limited awareness amongst duty holders and workers of the cancer risk of wood dust. The state authorities concluded that better engineering controls for wood-dust (e.g. dust extraction/abatement systems with personal protection only as a last resort where compliance with TRK values could not be guaranteed) and an obligation on employers to follow a hierarchy of preventive controls including instruction and training was needed. They also required a higher awareness from employer of their duties, particularly their responsibility to monitor the working conditions through work place analyses (which includes an initial and subsequent control measurements) and optimum facilities to monitor dust emissions. In addition they recommended that when designing workplaces / buying machinery etc, the dust reducing potential of a tool / machine should be considered as important as its other technical specifications. Furthermore, it was concluded that state authorities need to ensure an efficient control of the (new) OHS legislation and they must — if necessary — enforce it with the legal instruments available.

These findings probably reflected a position in wood-working and wood processing workplaces in Germany at the beginning of a process where everyone involved was confronted with a new situation:

- public authorities with new surveillance and enforcement tasks,
- employers with new legal obligations, and
- workers with new (or at least now officially confirmed) evidence about health hazards.

³²⁵ *But these 32.7 per cent included machines which could not always connect to any kind of dust abatement system like veneer machinery or power drills*

³²⁶ *The results are based on 600 samples, taken over a total period of 1200 hours out of which 111 representative average shift values could be derived*

Campaign of the Office for Labour Protection, Hamburg — Following the pinpoint action in Hessen, in 1990, Hamburg's Office for Labour Protection decided to initiate a comprehensive action program on wood dust covering all wood-working and wood processing activities in the area of Hamburg. A basic premise, also shared by many studies that followed, was the aim to achieve working conditions which — because of the dust extraction systems and other related technologies put in place — would guarantee the compliance with the current TRK value without having to perform regular measurements. The campaign was intended to run the campaign until the end of 1995.

However, it was confronted with criticism and opposition from its targets and many of their support organisations from its outset. Trade organisations like the Association for Wood and Plastics³²⁷ recommended its members did not co-operate. In addition, the Holz BG advised its members not to take part in such a study but to wait until the Holz BG had performed its own long term study on how best to transpose the requirements of the TRGS 553³²⁸.

All of which meant that the uptake of the campaign was not as extensive as it could have been and by 1996, the Office for Labour Protection managed to examine about half of the 500 wood working and wood processing companies in Hamburg and its environs. Nevertheless, the publicity the campaign produced and received inspired other Länder to initiate similar studies. The campaign was also a starting point for other activities at regional and national level (some of them are described further below), in most of which Hamburg's Office for Labour Protection³²⁹ was involved in a leading position as a result of experience gained in its own campaign.

Model Guidance Document of the Committee of the Länder for Occupational Safety and Security Techniques — In 1996, the Committee of the Länder for Occupational Safety and Security Techniques published a guidance document³³⁰ which aimed at helping entrepreneurs to fulfil their obligations resulting from the Ordinance on Hazardous Substances and the TRGS 553 "Wood dust", but also securing a common approach for the State authorities when executing the TRGS 553 in the Länder of the federal republic. The brochure is a detailed description of all aspects of preventive health and safety for wood dust. It is concerned to promote best practice and thereby to reduce regular surveillance by exposure measurements to a minimum. It includes advice on how to calculate the amount of oak / beech wood used (because of the threshold of 10 per cent for more stringent health and safety provisions), how to design an operating instruction and how to organise a regular check of the abatement devices.

Project of the BG Holz "Transposition of the TRGS 553"³³¹ — This was one example of several projects undertaken to help establish criteria under which the limit value could be guaranteed permanently and securely (thus making the necessity of monitoring superfluous).

³²⁷ *A few days after the start of the campaign, the Office receive a copy of a special circular, which the Branch Association for Wood and Plastics had sent to their members as a response to the action taken by the Office. In this circular, it was recommended, that the member companies should not fill out the questionnaire etc. for the time being, because they would risk legal persecution if doing so. The Trade organisations finally agreed to support the project, but this was more a lip-service than anything else.*

³²⁸ *In between, the classification of beech and oak wood dust as carcinogens was adopted, and the TRGS 553 was published - causing in its first edition - at least for some aspects - more problems than solutions.*

³²⁹ *represented by its Laboratory for Occupational Safety and Health, and in particular its head Prof. Dr. Wüstefeld*

³³⁰ *Landerausschuß für Arbeitsschutz und Sicherheitstechnik (1996)*

³³¹ *Holz-Berufsgenossenschaft (Hrsg) (1998)*

It was also the project that the BG Holz advised its members to engage with rather than the one being carried out by the Hamburg Office for Labour Protection (see above). It was undertaken between May 1994 and September 1996 and aimed to establish:

- Which workplaces and / or machines needed to be equipped with a dust extractor?
- When exposure measurements according to the TRGS 553 could be dropped, because so-called dust-deficient areas could be shown to exist or because machinery could be put in the same category as certified machinery (i.e. those producing acceptably low dust levels)?
- What type of dust collecting / dust extracting devices installed on existing machinery are proven to be successful in practice (thus allowing further control measures to be dropped if machines were thus equipped)?
- What level of quality of extraction and separation of wood dust is needed to guarantee the TRK value at the workplace?

48 companies - chosen randomly - took part in the project of which 17 participated until the end. Initially it was found that the TRK value of 2 mg/m³ was exceeded in more than one third of all cases. For personal measurements, the excess was even higher with 72 per cent of the measurement values exceeding the TRK value. The main reason for these high values was non-existent, inefficient or out-dated dust abatement devices, in particular in areas where hand machines were used. By equipping machinery either with new or improved abatement devices and ventilation systems, it was shown that the average wood dust concentration could be reduced from 3.5 mg/m³ to around 1.0 mg/m³. Of the 39 per cent of the companies, exceeding the TRK value during the stocktaking exercise at the start of the project, only 9 per cent did so following intervention with recommended controls, (although personal measurements remained high — with 41 per cent still above the TRK value of 2 mg/m³ and 11 per cent laid above the 5 mg/m³ value). The general conclusion was that if state of the art dust controls were used, the overwhelming majority of companies could achieve the established TRK value.

Studies on wood dust exposure performed within European projects — The Holz BG has also been involved in projects of the European Union, aiming at developing exposure registers for hazardous substances in industrial enterprises of the woodworking industry. One of the recent studies was performed to assess wood dust exposure in selected companies with good abatement technologies³³². The TRK value of 2 mg/m³ was exceeded in 27 per cent of the personal measurements, the European OEL of 5 mg/m³ was exceeded in 6 per cent of the personal measurements in companies involved in manufacture of box-type furniture, frame construction, manufacture of solid wood furniture, manufacture of wooden articles, and saw mills. Another observation was that wood dust exposure in industrial companies is less than in handcrafting work working and wood processing companies, even if these are equipped with model wood dust reducing technologies.

Several other studies were performed in order to evaluate and to document the state of the art either for specific workplaces and / or specific machinery. A range of situations are described in these studies, from joiners' workshops³³³ where it was shown to be possible to achieve the TRK value of 2 mg/m³ in a cost-effective way by using the recommendations given in Model Guidance Document of the Länder, to surface treatment of parquet flooring where the use of

³³² Poppe, M., Detering, B., Neuschaefer-Rube, J., Woeste, W., Wüstefeld, B., Wolf, J. (2002)

³³³ Adolph, A., Lehnert, M., Zoglauer, H. (1997)

personal protective equipment is recommended because of the difficulty in controlling dust levels in the process.³³⁴

³³⁵ . Criteria developed in these studies help to determine under which working conditions the OEL might or might not be respected or eventually even 'guaranteed permanently and securely'. Other studies led to recommendations on integrated de-dusting facilities for hand-held electric tools.³³⁶

Studies performed to up-date the so-called 'negative list' —Two studies have been undertaken explicitly to deliver data for the German Committee for Hazardous Substances to have a sound basis for revising the 'negative list' of the TRGS 553³³⁷. This is the list, that includes those work areas and installation where the TRK value of 2 mg/m³ cannot be realised. Its revision was postponed several times³³⁸ but the final deadline for revision was set for 31 December 1999. After that date, only those work areas / installations, for which supporting data³³⁹ had been delivered would remain on the list.

The results presented in a first (1999) study were based on measurements performed by:

- The BG Holz, most of them within the former mentioned project on the transposition of the TRGS 553³⁴⁰,
- Measuring facilities of the German Länder³⁴¹,
- The Laboratory for Occupational Safety and Health in Hamburg, and
- The Research Institute on Hazardous Substances of the Mining Berufsgenossenschaft.

The study concluded that the TRK value of 2 mg/m³ could be achieved at various installations mentioned in the 'negative list', if they were equipped to the state of the art. But this would only be true for the short operating times normally found in handcrafting work activities. In industrially run companies, operating times are normally longer, resulting in higher exposures during a shift. As a consequence, the study proposed a shortened 'negative list'³⁴², but one that included the obligation to evaluate whether or not work at a certain machine is performed only seldom and for very short periods or permanently.

When revising the 'negative list', the AGS followed the results of the 1999 study in most cases, except for some specific workplaces with manual wood working activities. This was mainly because of unavailability and / or quality of supporting data.

In order to deliver the missing data, the Holz-BG together with the Laboratory for Occupational Safety and Health in Hamburg undertook a second project, (Detring *et. al.* 2000). One of its main conclusions was that in some of these wood-working companies, the TRK value of 2 mg/m³ and sometimes even the 5 mg/m³ could not be achieved

³³⁴ *Technical Rule for Hazardous Substances N° 420, Annex II*

³³⁵ *Stoff- und verfahrensspezifische Kriterien - VSK*

³³⁶ *Georg, H., Heimann, M., Leßnich, W., Post, G. (1998)*

³³⁷ *Detering, B., Heimann, M., Möcklinghoff, K., Müller, L., Poppe, M., Wüstefeld, B., Wolf, J. (1999):*

Detring, B., Neuschaefer-Rube, J., Poppe, M., Woeste, W., Wüstefeld, B., Wolf, J. (2000)

³³⁸ *Meaning the deleting of some of the work areas and / or installation from this list and as a result of that the application of the lower TRK value of 2 mg/m³ instead of 5 mg/m³ for these deleted work areas / installations*

³³⁹ *Data supporting the allegation that the TRK value of 2 mg/m³ can not be realised*

³⁴⁰ *Holz-Berufsgenossenschaft (Hrsg) (1998)*

³⁴¹ *Baden-Württemberg, Hamburg, Hessen, Niedersachsen*

³⁴² *In particular all machines used in joineries were proposed to be eliminated from the list*

4.5 TOLUENE

In this section we consider the second substance that is the focus of our detailed attention concerning the role of OELs in regulating chemical risks. We start with some general information concerning the nature of the hazards of toluene that have led to the setting of an OEL. This is followed by an outline of its use in the industries on which we have focussed and a presentation of some of the main sources of information on surveillance of compliance with exposure limits. Finally, we present some case-studies of policy and practice in selected companies whose personnel we interviewed in the course of our fieldwork.

Hazards — In Germany³⁴³ toluene is regarded as a highly flammable substance with acute toxic effects that include disturbances of the central nervous system (CNS), minor irritation to the eyes and the airways and lung damage following aspiration. Chronic toxic effects are skin damage due to contact with the liquid and functional disturbances or damage to the CNS. A risk of reproductive-toxic action (impairment of reproductive capability and / or damage to the developing embryo or foetus) is suspected³⁴⁴. There are also some indications of a fertility decrease in animal experiments, which have not been proven in epidemiological studies. It is therefore classified as toxic to reproduction, category 3. Despite some positive results in certain mutagenicity studies on persons occupationally exposed, no final assessment of this effect has yet been completed³⁴⁵.

Relevant legislation and OEL — It received its first MAK value in 1958 (750 mg/m³ or 200 ppm). This value was reduced to 375 mg/m³ or 100 ppm in 1985 and to 190 mg/m³ or 50 ppm in 1994, which is still the current MAK value for the substance. The ceiling value is four times the MAK value.³⁴⁶ In 1991, a BAT value of 3.4 mg/l toluene in blood was established, which was continuously reduced over the years to its current value of 1.0 mg/l toluene in blood, which was established in 1997³⁴⁷. Because a significant amount of toluene can be absorbed via the skin, the contribution by skin absorption has to be taken into consideration when analysing the exposure situation at work places. Not exceeding the MAK value as such is therefore not a sufficient criterion to apply to exposure.

Toluene is subject to classification and labelling requirements according to Directive 67/548/EEC³⁴⁸ (F³⁴⁹, Xn³⁵⁰, R 11³⁵¹-20³⁵², S (2-)³⁵³-16³⁵⁴-25³⁵⁵-29³⁵⁶-33³⁵⁷).

³⁴³ *Gefahrstoffinformationssystem der Gewerblichen Berufsgenossenschaften (2002)*

³⁴⁴ *Infertility is covered by the definition of the German MAK value (because the adverse health effects are directly linked to the worker) whereas teratogenic effects / developmental effects are not covered by the MAK definition (because these effects might occur in the possible offspring):*
Rüdiger, H.W. (1999)

³⁴⁵ *Mutagenic effects are in principle not covered by the definition of the German MAK value:*
Rüdiger, H.W. (1999)

³⁴⁶ *Technical Rule for Hazardous Substances N° 900*

³⁴⁷ *Technical Rule for Hazardous Substances N° 903*

³⁴⁸ *Council Directive 67/548/EC*

³⁴⁹ *flammable*

³⁵⁰ *harmful*

³⁵¹ *highly flammable*

³⁵² *harmful by inhalation*

³⁵³ *Keep out of the reach of children*

³⁵⁴ *Keep away from sources of ignition -- No smoking*

³⁵⁵ *Avoid contact with eyes*

Next to the legislation on OELs and BATs, the requirements of the Ordinance on Hazardous Substances apply as well as various regulations at national level, including:

- Regulation on flammable liquids³⁵⁸
- Classification of substances dangerous to water³⁵⁹
- Technical rule to keep the air clean³⁶⁰
- German equivalent of the EU 'Seveso' Directive³⁶¹
- Various technical rules for hazardous agents³⁶²
- Detailed safety and security rules for storage and transport
- Numerous rules and regulations on personal protective equipment (breathing, skin, eyes), or workplace requirements (e.g. ventilation).

As was the case for wood dust, the Ordinance on Hazardous Substances in conjunction with the TRGS 402³⁶³ lays down how to determine and to assess the airborne concentration of dangerous substances in work areas and whether or not work areas can be exempted from exposure measurements³⁶⁴. This is the case "when the limit value can be guaranteed securely and permanently" (see description in the previous section on wood dust).

Occurrence and use^{365 366} — Toluene is used in general:

- as solvent for various natural and artificial resins
- a solvent for illustration retrogravure printing paints
- in the production of trinitrotoluene, benzene, cresole, phenole and various other products
- in spays for various surface treatments (producing varnish and other surface covers).

In the construction industry it is used:

- as a solvent component of epoxy resins,
- in sealings of wooden surfaces (parquets etc.),
- in wood glues and adhesives etc., PVC and other glues
- as a de-stainer and solvent for special purposes.

In the metal industry it is used as a:

- constituent / component of varnish, dilutant of varnish, pre-paintings and glues, blend component for varnishes and artificial resins

³⁵⁶ Do not empty into drains

³⁵⁷ Take precautionary measures against static discharges

³⁵⁸ Verordnung über brennbare Flüssigkeiten (VbF): Danger Class A1

³⁵⁹ Einstufung wassergefährdender Stoffe: WGK 2

³⁶⁰ Technische Anleitung zur Reinhaltung der Luft (TA Luft): Section 3.1.7m Substance Class II, OEL 0,1 g/m³

³⁶¹ Council Directive 82/501/EEC

³⁶² 200, 201, 400, 402, 403, 420, 440, 500, 555

³⁶³ Technical Rule for Hazardous Substances N° 402

³⁶⁴ Notwithstanding the fact on whether or not a work area is exempted from exposure measurements, other obligations of the employer according to the Ordinance of Hazardous Substances remain in force like its obligation to use less hazardous substitutes if available, to respect the hierarchy of protective measures, to equip every workplace with an operating instruction and to perform regular trainings for the workforce

³⁶⁵ Gefahrstoffinformationssystem der Gewerblichen Berufsgenossenschaften (2002)

³⁶⁶ Hauptverband der gewerblichen Berufsgenossenschaften (Hrsg.) (1999)

- component of various mixtures of carbon hydrates for cleaning and de-greasing of surfaces etc.
- component of cold cleaners
- component of petrol
- component of certain oils used in industry when punching holes etc. and oils for corrosion protection
- component of epoxy resins

4.6 THE INDUSTRIES IN OUR STUDY: METAL, PRINTING AND FURNITURE MAKING

In our investigation of the role of OELs is the regulation of managing the risks associated with toluene we considered experiences in three industrial sectors: the metal industry, printing and furniture making³⁶⁷. We have included several industries within our definition of the metal industry, the most important of which are:

- **Machinery** — The plant and machinery industry, which is dominated by small to medium-sized companies (around 90 per cent of companies employ fewer than 500 people), is Germany's largest industrial sector. More than 5,700 companies employ 893,000 people.³⁶⁸
- **Mechanical engineering** — Just under 6,500 production facilities are engaged in mechanical engineering. Only about 5.5 percent of the factories have more than 500 employees. Roughly 82 percent of companies are highly specialised small or medium-sized firms with fewer than 200 employees. In 1997 this branch of industry with a total work force of 881,000 produced goods valued at about DM 210 billion.
- **Electrical engineering and electronics industry** — The electrical engineering and electronics industry, with a turnover of DM 242 billion in 1997 and roughly 848,000 employees, is likewise one of the main branches of industry in Germany.
- **Automobile Industry**³⁶⁹ — With 672,000 employees (1997 average) and an annual turnover of DM 268 billion, the automobile industry is another important branch of the German economy.

The printing and media industries³⁷⁰ constitute a much smaller sector of industry. 95 per cent of companies have less than 100 employees. Mostly the owners manage their companies; there are few large companies with employed management. Printing earns only 2.3 per cent of gross production value and employs 2.8 per cent of the labour force of the manufacturing industry. The communication sector as a whole is subject to the effects of rapidly changing technologies such as electronic publishing, multi media, digital data transfer all create new rules in the media markets.

³⁶⁷ See the previous section for a description of the furniture industry

³⁶⁸ *German Data - German Business Worldwide (2002):*

³⁶⁹ *Germany Info Home: Business & Technology: Economic Trends: Economic Basics (2002)*

³⁷⁰ *All data taken from the web sites of the Bundesverband Druck und Medien (the employer and trade federation of the German printing and media industries)*

4.7 SURVEILLANCE OF OCCUPATIONAL EXPOSURE TO TOLUENE

Toluene has been a well-known hazardous substance since the 1950s. Adverse effects that are of most concern are the ones on the central nervous system and fertility, which in turn deliver the basis for calculating the MAK and BAT values. Two major studies have produced extensive data on exposure of workers to toluene at the workplace in the last ten years:

1. Data collection within the framework of EU regulation 793/93 on existing substances³⁷¹
2. A sector study performed in the rotogravure printing industry.

Data collection within the framework of EU Regulation 793/93 — Regulation 793/93 obliges industry to submit all readily available data on 'High Production Volume Chemicals' (HPVCs)³⁷². The basic principle of the Regulation is that the evaluation and control of hazardous chemicals must be based on an assessment of their actual risk to human health and the environment³⁷³ rather than solely on their intrinsic hazardous properties³⁷⁴. This includes explicitly the obligation for the rapporteur to carry out an exposure assessment "for whichever human population-group (i.e. workers, consumers or man exposed indirectly via the environment) is exposed or likely to be exposed to the substance"³⁷⁵. Manufacturers and importers of chemicals, that are directly addressed by Regulation 793/93, normally don't have exposure data available for all intended use of a substance. This was the reason why in 1994 the BGen offered to supply data and information on branch specific uses of hazardous substances within the framework of Regulation 793/93 for the Minister of Labour and Social Order.

A special working group "Existing Substances", chaired by the BG of the chemical industry was established³⁷⁶, using the data of the BIA³⁷⁷ database MEGA³⁷⁸ for describing the exposure situation at shop floor level. It developed uniform criteria for assessing the exposure situation at the work place. Until 1999, exposure data on 44 substances including toluene were supplied. The following graph represents the highly aggregated data for toluene (shift average values, 95 per cent values³⁷⁹) published by the umbrella organisation of the BGen³⁸⁰.

³⁷¹ Council Regulation (EEC) No 793/93

³⁷² 'Existing Chemicals' - 'Existing Chemicals' are those substances which were deemed to be on the European Market before September 18, 1981 and are listed in the EINECS inventory (European Inventory of Existing Commercial Chemical Substances) which were expected to be produced in or imported to the European Union with a tonnage exceeding 1,000 tonnes/year per producer or importer

³⁷³ The risk assessment principles for Existing Substances are laid down in Commission Regulation (EC) No. 1488/94

³⁷⁴ risk assessment is based on hazard and exposure information; and a comparison between a predicted no effect level (concentration) with a predicted exposure level (concentration)

³⁷⁵ Article 4 of Regulation 1488/94

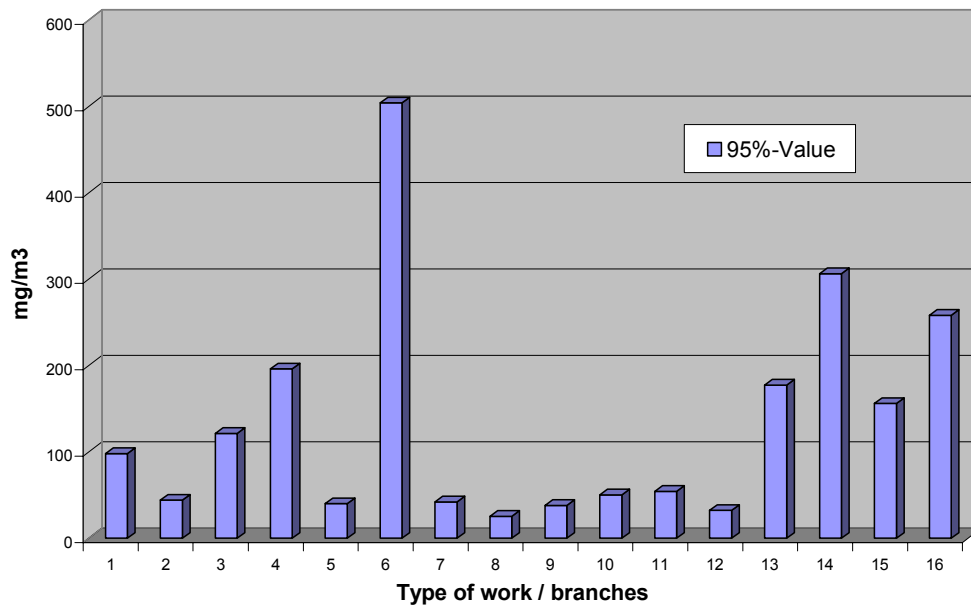
³⁷⁶ Berufsgenossenschaftlicher Arbeitskreis Altstoffe - BGAA

³⁷⁷ BG-Institute for Occupational Safety

³⁷⁸ Meßdaten zur Exposition von Gefahrstoffen am Arbeitsplatz - Measuring Data on Exposure to Hazardous Substances at the Workplace / the BG perform about 60.000 measurements of hazardous substances each year in around 4.000 enterprises. The results, the framework conditions under which they were received and data about the enterprise as such are stored in the database MEGA / MEGA contains data of nearly 30 years of measurements

³⁷⁹ the 95 per cent value represents the mg/m³ value which is achieved by 95 per cent of all measurements (95 per cent of all measurements lay below, 5 per cent are equal or above the 95 per cent value)

³⁸⁰ Bock, W., Brock, T.H., Stamm, R., Wittneben, V (1999)



- | | | | |
|---|--|----|--|
| 1 | Manufacturing of preparations | 9 | Paint spraying (metal processing, electronic techniques) |
| 2 | Cleaning, de-greasing (mechanically) | 10 | Paint spraying (construction branch) |
| 3 | Cleaning, de-greasing (by hand) | 11 | Paint spraying (wood processing) |
| 4 | Gluing (Wood working and wood processing) | 12 | mechanical surface treatment (metal processing, electronic techniques) |
| 5 | Gluing (upholstered furniture manufacturing) | 13 | mechanical surface treatment (wood processing) |
| 6 | Gluing (surface covering work) | 14 | Siebdruck, by hand (construction industry) |
| 7 | Painting, rolling (metal processing) | 15 | Siebdruck, by hand (ceramic and glass industry, printing industry) |
| 8 | Painting, rolling (construction industry) | 16 | Printing (Illustration rotogravure printing) |

Figure 4.1 Exposure measurements of Toluene

(based on 7013 measurements from about 2050 enterprises between 1991 and 1995)

Branch study performed in the rotogravure printing industry — This is probably the most comprehensive study ever performed for a single substance and a special branch. It was undertaken because of new evidence concerning:

- potential changes of cognitive functions and the sense of hearing at a level of exposure below the MAK value of 50 ppm; and
- changes of memory functions for a large sample of German rotogravure workers at the current level of exposure below 50 ppm³⁸¹

The rotogravure printing industry is unique with respect to the use of pure toluene³⁸², therefore offering research conditions not found anywhere else at workplaces. In January 2002, after almost ten years of research, the Institution for statutory accident insurance and

³⁸¹ Seeber, A., Blaszkewicz, M., Demes, P., Kiesswetter, E., Schäper, M., Sietmann, B., Thriel, C.v., Zupanec, M. (2002)

³⁸² as specified by DIN Standard 16513

prevention in the printing and paper processing industry presented the final report of their field study on "Toluene in the rotogravure industry". This report completes the most comprehensive study ever performed³⁸³ to assess possible adverse health effects of toluene exposure.³⁸⁴

Altogether, complete data sets, i.e. on both ambient air as well as blood toluene levels, were obtained from 1244 male and 124 female participants of the rotogravure industry with different degrees of toluene exposure.³⁸⁵ Actual toluene exposure was measured since 1993 on nearly 5,000 references in 15 rotogravure plants. Exposure data for the period since 1960 could be determined from the records available in the various printing plants. While the toluene concentration amounted to 140 ppm (parts per million) in 1970, it came down to an average of only 25 ppm at the time of the long-term study (1996-2001)³⁸⁶. Besides providing some information on the exposure at various work-areas under occupational conditions, the correlation between a time-weighted average of the ambient air concentration with the corresponding blood toluene levels were analysed.³⁸⁷

Based on these results, the Institution concluded that there was no evidence for health hazards from toluene exposure for workers in the rotogravure industry and that the limit values applicable today were appropriate. This view was also shared by the employers' representatives interviewed during our study.

Other studies in the metal industry — Compared with the situation in the printing industry, toluene exposure in the metal industry is normally not a single-substance exposure situation but characterised by a mixed exposure. Toluene, is normally an ingredient of a more complex solvent, mainly used for treating surfaces (either by cleaning them or by adding varnish or other coats) and often users are not aware that toluene is part of the product they are using. Data on toluene exposure is normally only available in the broader context of that for organic solvents generally.

One quite detailed study has been performed by the machinery and metal BG and the Norddeutsche Metall BG within the scope of their general surveillance tasks. The MASCH-BG³⁸⁸ is one of five Berufsgenossenschaften in which employees and companies of the German metal industry are insured. In 2002, it represented around 1,200,000 employees in just over 40,000 enterprises in the machinery construction and metal industry. It has had a special unit dealing with dangerous substances, (something that doesn't exist in any other BG) since 1979, which performs measurements within the companies insured by the BG. It also deals with occupational diseases linked to dangerous substances, therefore covering the whole area of exposure to and compensation of occupational diseases linked to dangerous substances.

Since 1986, it has carried out about 2,500 measurements for all uses of toluene. The number appears to be quite low, but according to the BG, this reflects the limited importance of toluene in the companies it insured. As a pure substance it is hardly used at all. If it is used, it is in mixtures and then only present in very low proportions. It has been replaced by non-aromatic substances in many of the applications in which it was used previously, for example

³⁸³ at least in Germany

³⁸⁴ Press release, 21 January 2002, BG Druck und Papier

³⁸⁵ Neubert, D., Borchert, G., Gericke, C., Hanke, B., Beckmann, G. (2001)

³⁸⁶ Since 1994 an occupational exposure limit of 50 ppm is valid.

³⁸⁷ Neubert, D., Borchert, G., Gericke, C., Hanke, B., Beckmann, G. (2001)

³⁸⁸ Maschinenbau und Metall Berufsgenossenschaft - Machinery construction and metal Berufsgenossenschaft

as a solvent or for cleaning purposes. If such products still contain toluene, it is in such a low concentration, that the risk of exceeding the limit value is minute. One example where it is still used is in glue, another is in varnishing / painting surfaces of cars and other products. A combination of external pressure (legislation, image etc.), developments in technology, higher perception of risks in general for certain substances, availability of alternatives have all led to the reduction of its use. Thus, according to the data the BG has collected, between 3.4 and 0.2 per cent of all measurements obtained results above the limit value of 190 mg/m³, while between 64.5 and 92.3 per cent were below 0.1 of the limit value

The reason why measurements are performed by the BG vary. The technical surveillance officer may suspect that the limit value is being exceeded in a certain company. But in general measurement is made more in the framework of targeted campaigns or awareness raising programmes or if data is needed, such as in the European programme for existing substances described above. Measurement for toluene are of course only then performed when an indication exists that toluene is present at the workplace, meaning surveillance authorities (as well as employers) depend on the information given in safety data sheets, for example.

It is not the task of the BGen to act on behalf of the owner of a company with respect to its general obligation to secure working conditions below the limit value. But data collected and published as a result of a targeted campaign can be used by every employer to prove that they are respecting the limit value by establishing comparable working conditions. The establishment of comparable working conditions is also used by the surveillance authorities to assume that limit values are respected. An example: Authorised repairers of Volkswagen have to fulfil very strict requirements with respect to machinery and tools used to repair the cars because they would otherwise eventually damage the image of Volkswagen. So if the standards foreseen by Volkswagen are judged by the surveillance authorities to be sufficient to secure the limit value, every appointed dealer "benefits" to a certain degree from this assumption. Finally, surveillance results also depend on the technical capacity of the inspector in charge. The inspectors of the BGen receive a broad range of training, but people differ in their attitude and workplace experience.

4.8 COMPANY CASE STUDIES ON TOLUENE IN THE METAL SECTOR

All in all, toluene is not a 'hot topic' in the metal sector. This was reflected in the interviews with representatives of three companies in the sector:

- the head of the chemical safety department of the Volkswagen AG plant in Kassel-Baunatal,
- a work council member of the Bosch-Siemens Haushaltsgeräte Werk in Berlin
- the head of the environment and safety department of the Drehgestellwerk (bogies production) of Bombardier Transportation in Vetschau

The viewpoints collected during these interviews reflect the way toluene exposure is monitored and also how changes in legislation have affected its use in the industry. In the example of Volkswagen AG in Box 1, the impact of health and environmental awareness at corporate level is strongly evident in the substitution policies developed and applied throughout the company. It is also a powerful example of the way in which major economic players can affect the behaviour of their dependents in the supply chain, as is illustrated by its requirements on its suppliers for health and safety information. The second example is a further illustration of how substitution has dominated the management strategies for

chemicals such as toluene and also provides a good example of the engagement of workers' representatives in decision making on chemical risks, including their relations with the surveillance authorities and their engagement with the activities of the latter. The third example suggests that the reduction in the use of toluene is not restricted to successful West German plants but is also the case in at least some plants in the former FDR.

Box 1

Volkswagen AG, Kassel-Baunatal

The VW plant in Kassel is the second largest VW plant, employing over 16,000 people and the biggest employer in Northern Hesse. It is a manufacturing plant mainly for individual component parts of engines and gearboxes and body panels, as well as being the largest engine and gearbox reconditioning plant in the world. It also comprises the entire parts sales and distribution division for Volkswagen AG worldwide.

For the Volkswagen AG, the management of dangerous substances is part of its corporate identity and integrated in its environmental policy. Being a global player with respect to its plants and products, VW is also actively involved in events and groups at global level. As a consequence of this overall policy, the substitution of dangerous substances by less dangerous ones does not only follow the legal requirements but is considered to be one of the main tools to achieve very high standards in health and safety working conditions as well as in environmental performance.

Uniform OSH and environmental minimum standards and procedures are laid down for all plants across the group. About 80 per cent of all the dangerous substances used in the enterprise are found in the group of so-called process chemicals (for example adhesives, varnishing materials, cleaning agents). A special procedural instruction for the introduction of these process agents foresees a release obligation. This means that before it comes to a final serial application of these materials within the production, they go through several stages of a prescribed examination program. If, at the end of the process, the substance has been proven to be suitable for the process as such, it has also been assessed with regard to its labelling requirements and its safety-chemical check. A very important part of this procedure is the evaluation for possible less hazardous substitutes and their documentation in a computer-based database.

Each external supplier of dangerous materials has to reveal the composition of its product, otherwise it is not even considered for the use in any VW plant. Volkswagen actually uses toluene in very few preparations (beside the sector for surface treatment with varnish)

VW is also recognised as a measuring point according to the Ordinance on Hazardous Substances, which means it is entitled to perform its OEL surveillance by its own personnel and equipment etc. This does not mean that VW can for example only pretend to follow the legal obligations based on the measurements performed by its own body. The measurement point is checked regularly by the state authorities and has to fulfil high standards in order to be considered as such.

Box 2

Bosch Siemens Hausgeräte GmbH (BSHG), Berlin

The company produces a wide range of electrical household appliances like freezers, washing machines, and cookers. It is an internationally operating group, encompassing 42 factories in 15 countries in Europe, the USA, Latin America and Asia. In 2001 the BSHG Group made a turnover of more than 6 billion ECU and employed about 35,000 worldwide.

The representative of the works council we interviewed had tried hard to find some evidence for toluene use within its company. Like VW, the BSHG has a whole section dealing exclusively with environmental and health and safety standards. Even together with the help of one representative of this OSH and ENV section, we only could find one product used in the company which contained toluene. Here, as in so many other companies of the metal sector, toluene has been successfully substituted, on the one hand in order to avoid extensive and expensive legal obligations, on the other hand because of the availability of suitable alternatives.

What was important in BSHG was the experience of the work council of being involved in the management of dangerous substances within its plant. They are consulted in the production of official reports from surveillance authorities on dangerous substances; they are also always informed in advance if somebody from a surveillance authority is going to visit the company and a member of the work council is part of the group which joins the inspector during his visit.

For the work council, exposure to dangerous substances was of minor importance compared with other health and safety problems, which is in line with the results of the other interviews performed.

Box 3

Bombardier Transportation, Vetschau

Bombardier Inc. is a Canadian corporation engaged in design, development, manufacturing and marketing activities in the field of rail transportation equipment, aerospace and recreation products. The Montreal-based corporation employs 47,000 people world-wide. Bombardier Transportation is specialised in the design, manufacture and distribution of products for the passenger rail market and offers, amongst others, a wide-range of urban, suburban and intercity vehicles. The plant in Vetschau (former GDR) has 110 employees, produces bogies for various coaches and driving trailers and illustrates well the transitional economical ups and downs, companies in former Eastern Germany went through after re-unification. Before, during and after the interview in July 2002, the plant (which has a more than 140 year history) was more in the news because of the threat of its closure than for its products.

Health and safety is part of the environmental policy of the company. Here, as in the other two companies described, toluene is no longer used. Besides the factors mentioned during the interviews with VW and BSHG, for the OSH representative in Vetschau the storage requirements for toluene or toluene containing products were an important factor in the decision not to use the substance or related products any longer.

4.9 DISCUSSION: THE ROLE OF OELS IN MONITORING COMPLIANCE WITH REQUIREMENTS TO MANAGE THE USE OF CHEMICALS SAFELY

OELs have a significant niche in the overall system for regulating OHS in Germany. There are several possible reasons for this. To begin with there is a substantial history of independent national activity in setting OELs (at least in the former West Germany). As a result the structures and processes by which this is achieved are a well established part of the fabric of the regulatory system. They and the OELs they generate are clearly valued by the social, professional and political actors at this level. Additionally it is no coincidence that several of the sectors of industry with which the development and use of OELs are perhaps best associated, such as the chemical and manufacturing industries for example, are prominent elements of the industrial profile of the country. Moreover, while small enterprises are an important part of the economy, large enterprises have also been much in evidence in sectors in which substances with OELs are in use. It is such enterprises that support the employment of the OHS specialists who can contribute to the development of an infrastructure and culture that would help to support the role of OELs in technical risk assessment in these sectors. More influential than all of this however, is perhaps the tradition of the wider regulation of health and safety, which, as we have pointed out, has been dominated by a technical approach to the subject, and a plethora of technical rules. It is this tradition that has supported a strong role in monitoring and surveillance for the institutions of the regulatory system whether they are part of the social insurance infrastructure or that of the Bundesländer.

However, despite the relatively developed profile of OELs and their surveillance within professional approaches to OHS and arguably in the regulatory tradition, their use and the understanding of their role is not ubiquitous in workplaces throughout industry. Nor is it clear that the published or available number of measurements undertaken is necessarily a good indicator whether or not the system of OELs in Germany ‘works’ in terms of improving the systematic management of health and safety or its outcomes. Indeed, respondents in the present study have argued that monitoring airborne exposure to chemical substances with OELs is not even particularly significant in ‘normal’ approaches to managing the risks of hazardous chemicals in more than a (albeit substantial) minority of workplaces where such chemicals are used. Indeed, the quality of surveillance /enforcement is not necessarily linked to the number of measurements performed (even though there is a huge amount of measurement data). Quite the contrary, arguably, if there were numerous reports about measurements, then it would be a serious indicator that the whole system was failing.

In this final section, we review our findings and consider some of the issues surrounding the measurement of compliance with OELs for wood-dust and toluene and its role in promoting systematic approaches to managing occupational health and safety within the German regulatory system.

Monitoring the degree of compliance with OELs for wood-dust and toluene — In the case of both toluene and wood-dust there is considerable experience of monitoring airborne exposures by or on behalf of the authorities for inspection and control. However, the two substances are illustrative of rather different kinds of OHS management problems. Toluene, which was once in widespread use in a large range of industrial sectors is now less used than in the past and (at least as a pure substance) not subject to the same degree of concern about possible workplace air contamination, because as discussed below, a combination of considerations derived from occupational health and safety concerns, cost factors and social/regulatory/political pressures mean that it has been largely replaced by alternative

products or it is used under conditions in which possible environmental exposures are much reduced by the technology employed as is illustrated by the case of rotogravure printing, where it is still commonly used as a production aid for the printing of mass media products such as magazines and catalogues. As illustrated in Box 4, this example of continued use provides a clear illustration of how technology in conjunction with economic considerations has given rise to improvements in control that, in turn, reduce the need for widespread airborne monitoring. Toluene in the printing industry is a good example on how diverging interests have considerably improved the health and safety situation of workers. Together with the facts, that, toluene is the only solvent used in the rotogravure printing process and epidemiological data on its health effects was widely available and not really disputed, a situation has developed in which:

- legal requirements have been tightened continuously over the years, resulting for example in an OEL of 50 ppm, at which scientific research is struggling to prove any adverse effects to health,
- tightening legal requirements, and in particular, economic considerations, created pressure to improve technology, thus allowing closed systems and recovery of the non-substitutable and expensive solvent,
- environmental considerations, not just ones influencing recovering toluene as a raw material, but also attempts for energy savings or reduction of solvent emission in the final product added further pressure to reduce toluene concentration in the ambient air³⁸⁹.

A further (largely cost related) reason for discontinuing the use of toluene are legal requirements concerning its storage³⁹⁰ and the requirements to keep it apart from other materials used in a company³⁹¹. In addition, special requirements have to be met when handling and using the pure substance or products containing toluene at a certain percentage³⁹². These are all cost-intensive factors and if a company can reduce these cost, it will do so.

In all these cases of strategic decision-making concerning the use of a hazardous substance monitoring compliance with the OEL it has been of relatively limited significance in determining outcomes.

³⁸⁹ *Environmental protection standards - like reducing solvent emission and diminishing the residual proportion of solvent in print products – are a pre-condition for a company wishing to be recognised as environmentally friendly. This is true for all industries using toluene*

³⁹⁰ *Toluene belongs to the storage class A3 - flammable, liquid substances. Only substances belonging to the same class should be stored together*

³⁹¹ *Because of its chemical-physical properties, toluene is not allowed to be stored together with substances with which dangerous chemical reactions are possible*

³⁹² *In particular sufficient ventilation, explosion-proof electrical equipment and lighting; build-up of electrostatic charges (e.g., by grounding) has to be prevented etc. etc.*

Box 4

Toluene in rotogravure printing

'Toluene can not be substituted in the rotogravure printing industry' – was a statement heard from all interviewees in the sector. So if it cannot be substituted, and if epidemiological data indicates adverse health effects, then industry has only one possibility: to reduce the exposure situation by using closed systems and / or reducing the number of people exposed:

'Automated work processes are the striking feature present in all areas of this printing plant for fast, cost-saving production of printed products with a minimum use of labour.'

Another aspect in times of growing economic pressure is the price of the raw material, a material that must fulfil strict standards, since toluene used in rotogravure printing is the only solvent used in the process and is required to be pure as specified by DIN standard 16513. Therefore considerable efforts have been made in the industry to recover toluene by using enclosed systems with solvent recovery facilities. As a result, the machines used in rotogravure printing are often designed to work fully automatically. The entire press installation is monitored and controlled from a central master control console using integrated process control systems. Only a limited number of people are necessary to watch the monitors, sitting in sealed chambers in the middle of huge production halls in which every day bigger, more complex and more efficient machinery is installed³⁹⁸. Only in cases where something goes wrong, might workers be exposed to then high concentrations of toluene.

The full range of the potential health effects of wood-dust have been recognised for a shorter time than for toluene. Exposure to wood-dust is a problem that is confined to fewer industries, than was the historical case for toluene, however, unlike toluene, there is no obvious declining trend in such exposure and cost considerations far from aiding the reduction of airborne contamination are probably a powerful factor in maintaining it. Thus, exposure in wood-processing and furniture manufacture is often a problem of small enterprises that cannot afford the technology that would help to reduce it to levels within the OEL. As is common amongst such companies, the structures of vulnerability with which they are associated also mean that owner/managers often have neither the will or capacity to perceive the need for, or advantages of such controls.³⁹³ The problems of the sector are recognised by the regulatory authorities and a system is in place to encourage gradual improvements (for example, the so-called negative list, pin-point actions etc.). As a result, there have been numerous activities that have involved monitoring wood-dust exposure in relation to its OEL (either by the BGen or by the State authorities at different levels) since 1987. Despite this, it is evident that the TRK value for wood dust is still often exceeded and many of the requirements of the basic legislation (the THRG 553 and the Ordinance of Hazardous Substances) are not transposed at company level. There is evidence that projects performed by either the BGen or the State authorities to design and establish model work places have achieved their intended trigger-down effect. But some companies continue to ignore legal requirements.

While it is probably the case that overall there has been an improved consciousness and awareness amongst employers and employees of both the legal requirements and the health hazards of wood-dust (and that both the processes of setting and applying OELs may have played some role here), this doesn't necessarily lead to widespread application of initiatives started at enterprise level to improve the situation. This is in particular true for very small and

small companies, where surveillance by labour inspectors is low and independent worker organisation is seldom present. Bigger companies normally face a higher frequency of labour inspections as well as a greater presence of works councils — both helpful pre-conditions to 'convince' entrepreneurs to follow their legal obligations.

The means of achieving compliance with OELs—The starting point in the German system seems to be the parallel assumptions that:

- measuring OELs is not necessary as long as surveillance authorities come to the conclusion that, according to the state of the art in technology foreseen for a certain sector / workplace, OELs are supposed to be respected.
- OELs are not respected in many (in particular small and medium sized) enterprises, but this is not because the surveillance / monitoring system as such has failed but rather that within the more general policy system of allocating resources for this type of work it is not regarded as a priority

The major tool for achieving compliance is the use of improved technology, in the case of toluene this has meant substitution and closed/recovery systems and in the case of wood-dust, the advocacy of the use of abatement systems and other dust reduction facilities. Here in particular big improvements have taken place, at least with respect to the availability of the technology needed. But once again the connection between monitoring compliance with the OEL in influencing these improvements is rather tenuous. Because everybody is more or less aware of the fact that wood dust exposure measurements are very seldom performed by employers — even if it is their duty — the main emphasise of the regulatory authorities and other professional agents of the OHS system³⁹⁴ is on other strategies, like designing model work places which guarantee the compliance with the TRK value by using recognised abatement and dust reduction facilities with well established technical requirements for flow velocity etc. This is a big advantage for both employers and labour inspectors, because employers don't need to measure any longer and labour inspectors only have to look if certain machines are present and are working in the way they should. Measurement therefore becomes an exceptional requirement rather than a normal expectation. This is not only true for wood dust (and for toluene) but is a general approach in the German system of managing risks related to hazardous substances. As such, OELs have an important value in determining the specification standards for machines, but a reduced importance as reference points for routine airborne monitoring — because the need for such monitoring is itself much reduced in such circumstances.

The role of OELs in systematic approaches to occupational health and safety management

— The logic of the above paragraph may be widely accepted but not necessarily implemented, since the availability of a certain technology is not necessarily a reason for a company, to buy it. In the case of wood-dust generating industries the alleged major obstacle is cost, even if — according to the data published by the authorities — low-priced solutions seem to be available at least for certain applications. This is somewhat in contrast with toluene in the metal and printing industries where as we have seen, the cost argument seems to have combined with other pressures to create reasons for using the technology rather than rejecting it.

³⁹⁴ *The German OHS system has a highly developed and statutory role for occupational health physicians and safety engineers (see Schaapman 2002, also Vogel 1993 and Walters 1996). While they are not in strong evidence in the wood-dust generating industries (because their presence is related to workplace size), the professional ethos overall will make a powerful contribution to defining the principles and priorities of prevention in relation to risks of wood-dust control.*

While the overall direction of the system seems to be positive, the levels of surveillance of airborne exposures to hazardous substances in relation to their OELs is also a consequence of the dual system of State and BG inspection and control. It is especially evident from the various approaches to monitoring compliance with OELs for wood-dust described earlier, that this has often led to rivalry and competition instead of a concerted action between agencies, and to legal requirements which were not free of contradictions and creating loopholes for those who were looking for them. Transitional periods for old and existing machinery and unclear requirements for workplaces where old and new machinery were used together³⁹⁵ probably contributed to a perception at least in some companies that there was no hurry and in particular no unified system to improve the situation. Taking into account the fact that many surveillance authorities assess workplaces based on their experience but also - and that is even more important point - on evidence of working conditions, work places, the use of approved standard machinery, ventilation systems, reported cases of occupational diseases within a company etc., measurements of airborne hazardous substances in relation to OELs might in many cases not be necessary. That doesn't mean that the surveillance authorities believe there are no OEL related problems at German workplaces, but that there may be many other factors that are likely to influence the frequency of measurements.

With respect to the establishment of health and safety management systems in general and OELs as one part of the surveillance tools, there was widespread acknowledgement in the interviews we conducted that, the importance of advances in technology and substitution notwithstanding, these systems are well developed and in place in large companies but less so in small ones. However, it would seem clear that in Germany, OELs are not the driving force in promoting and improving health and safety at work. They play a relevant role in a complex system, but probably more as a measurable indicator in cases where something is going wrong than a tool as such to actively enforce a higher OSH standard at the workplaces. They are nevertheless very useful, if only because there is no other comparable good indicator with which to audit this aspect of risk management. In big companies, they are part of OSH and / or environmental management systems mainly for a variety of reasons (including their public image, public awareness, corporate identity, reduced costs of sickness absence, reduced costs in general etc.), of which improving the health and safety situation for the workforce is only one. One might also risk the thesis that large scale devotion of regulatory authority resources to focussing on their surveillance may be counter-productive (with respect to health and safety) because in those small and medium sized companies, which employ most of the people in Germany (as in the rest of Europe), OELs are least known, understood or respected and it is these companies (which are arguably most in need of guidance and regulation) that are largely beyond the reach of the surveillance authorities. Clearly, it is a political decision not to allocate resources to undertake such widespread surveillance of monitoring that would be required to embrace small enterprises anything like fully either by the state authorities or the BGen. Allowing for this constraint the German surveillance and monitoring authorities have nevertheless managed to establish a sophisticated system that improves the existing situation without performing extensive expensive OEL measurements.

It would seem therefore that they are going in a useful direction — perhaps not as fast as would be ideal and certainly not without struggles. Despite the problems, the system does seem to offer an important example of the means with which OHS authorities with limited resources for surveillance can usefully construct a complex of regulatory, economic and technological push-pull levers to improve chemical risk management in many workplaces.

³⁹⁵ *at least at the beginning of the wood dust legislation*

CHAPTER 5

GREECE³⁹⁶

5.1 INTRODUCTION

Survey results suggest that working with hazardous chemicals and in the presence of dust and fumes are perceived as significant problems amongst Greek workers. In a survey of 2,809 workers in Athens (Athens Labour Centre 1998):

- one in two workers reported a noise or heat problem;
- one in three workers reported a dust problem;
- one in four workers reported a problem of fumes or damp;
- one in seven workers reported a problem of toxic substances;

For the population interviewed in the study and working in industry, noise was the most common occupational hazard (71 per cent of workers exposed), while 45 per cent claimed to be exposed to fumes, 50 per cent to dust and 29 per cent to toxic substances. However, with the exception of a few large enterprises in the oil and oil refining business and the shipbuilding sector, Greek Industry's perception of OELs as a risk management tool is minimal.

Sectors in which toluene and wood dust are most commonly used are:

- printing, publishing and allied industries
- wood furniture and fixtures industries
- fabricated metal products industry

In keeping with the observation about industry in general, we found that risk management in relation to wood dust and toluene was not perceived as an issue in the sectors and the role of monitoring compliance with OELs was minimal. In the case of wood dust, part of the reason for this can be found in the fact that the wood furniture industry itself was until quite recently not regarded as particularly hazardous. Wood dust itself has never been identified a public issue of indoor air quality or toxicological research in the way that for example, as formaldehyde, cement dust or cotton dust have been (Kogevinas 1995). Indeed historically, it was most noticeable as a subject brought up solely by the Greek Federation of Building and Allied Trades workers in connection with their argument for a financial bonus for unhealthy work for wood working machine operators and varnishing workers³⁹⁷. The labour inspectorate did not begin disseminating written information on hazards and precautions for wood dust in relation to health (especially cancer) risks until the 1990s.

³⁹⁶ *The authors would like to acknowledge the contribution to this chapter from Mr Alex Karagiorgiou upon whose report it is largely based.*

³⁹⁷ *In 1981 they managed to gain an extra 2 per cent over their basic wage which was raised to 5 per cent in 1982 and 7 per cent in 1992 after negotiating with the employers' confederation (SEV) and the Panellenic Federation of Wood Processing Craft Unions.*

In the case of toluene, it has only a limited ‘separate’ existence as an organic solvent. It is a constituent of ‘Nitro solvents’ a trade name for a mixture of solvents very popular in the sectors under discussion. Therefore, despite its widespread use, it has not been signified as a dangerous substance (such as benzene for example) and thus its risks have low recognition.

The chapter begins with an outline of regulatory strategies on managing chemical risks and their background. It then considers practices in relation to toluene and wood-dust in the three sectors in which their occurrence is common. It concludes with a discussion of the role of OELs at present and in the future, the challenges that face the furtherance of this role and their implications for inspection and control.

5.2 REGULATING THE MANAGEMENT OF CHEMICAL RISKS IN GREECE

The background —Greece is an example of a smaller and economically weaker southern European country with relatively underdeveloped infrastructure for the wider regulation of OHS as well as for setting and using OELs. Nevertheless, despite the relatively short history of a ‘European’ approach to health and safety in Greece, many of the issues that regulators and users of hazardous chemicals face in chemical risk management and their responses to them in relation to the role of OELs in practice have similarities to those experienced in the other countries in the study.

Since joining the European Community in 1981 successive Greek governments have striven to adopt ‘European’ approaches to economic and social regulation, including on health and safety. However, the country’s long history of economic weakness, limited provision for public services for health and social welfare, poor infrastructural support for regulation, political instability and confrontational industrial relations have presented many challenges to ‘Europeanisation’. The first attempt at modern health and safety legislation was the Health and Safety at Work Act 1568/85, which contained the general health and safety duties of employers, provisions for worker representation and requirements for employers in larger enterprises to appoint occupational health and safety professionals to advise them on carrying out their responsibilities³⁹⁸. Article 26 of Chapter V (echoing Dir.80/1107/EEC) obliges the employer to take measures to avoid or minimize the exposure of workers to agents, wherever this is practically possible. In all events the level of exposure must be lower than the level defined as the ‘exposure limit value’. Despite these provisions there is little evidence to show that any significant change took place in arrangements for the health and safety of the vast majority of Greek workers. However, adoption of the Framework Directive 89/391, which was transposed by a Presidential Decree³⁹⁹ 17/96 in 1996 gave further stimulus to creating a structure in which the regulation of systematic health and safety management has become a more feasible objective and in which many of the features of modern process regulation for health and safety can be seen to be emerging. In particular, the introduction of Presidential Decree 95/99 on External (EXYPP) and Internal (ESYPP) Preventive Services helped to make the provisions of the Law 1568 on occupational physicians and safety engineers a more workable reality. Under the PD95/99 before any EXYPP can operate it must be licensed to ensure it has the technical and personnel capacity to undertake prevention services, including

³⁹⁸ Prior to this the main legislation on health and safety was contained in the 1934 Presidential Decree which was prescriptive legislation in a similar tradition similar to the UK Factories Acts. Curiously, it had quite strong requirements on safety in relation to chemical substances including measures on classification and packaging of dangerous substances as well as special provisions on the removal of dusts and fumes.

³⁹⁹ While a law is discussed and voted in parliament, a presidential decree is simply signed by a minister and approved by the president of the republic

a safety engineer and occupational physician as well as equipment for monitoring the working environment. The licensed EXYPP/ESYPP may undertake various tasks on behalf of employers including risk assessment (in accordance with PD17/96) and monitoring physical, chemical and biological agents at the workplace. The provisions have stimulated an emerging market for EXYPP organisations. Currently there are 17 that have been established, nearly all of which have been set up within the last two years.

However, the present reality of provisions on chemical substances neither takes the form of a regulatory package like the UK Control of Substances Hazardous to Health regulations or a coherent national framework of regulations. Nor has it been enriched by guidance such as COSHH Essentials or a National Code of Practice for the control of workplace hazardous substances. It is an amalgam of prescriptive, sector specific (e.g. Shipbuilding), process specific (e.g. Welding), substance specific (e.g. Lead) Presidential Decrees of some age; and of the more comprehensive legal framework consisting principally of Act 1568/86 Chapter V which provides a goal setting legislative framework requiring employers to assess and manage risks arising from the use of chemicals in the workplace. To this has been added P.D.17/96 and every relevant EEC Directive that has been transcribed in conformity with European Legislation.

The General Chemical State Laboratory of Greece — In the field of chemical risk control a role is also played by the General Chemical State Laboratory of Greece (G.C.L.S). While its authority on chemical safety is much wider than the workplace and more concerned with regulation of the market than with occupational use, its role is important in relation to regulating the provision of safety information on the use of chemicals. Its activities cover the whole of the country and its mission comprises the protection of public health and the environment, consumer protection and the provision of scientific support to State Authorities. It is the Greek competent authority for the control of chemical substances and it provides services to enterprises or individuals who wish to check the quality of their products.

Its representative interviewed for the present study pointed out the dualism characterising Greek firms. At one extreme there are the subsidiaries of multinational corporations operating in Greece, those firms which have established long-term strategic alliances with companies from abroad, firms which are parts of large holding groups, and individual companies whose CEOs and other executives are professional career managers. They appear to be well-informed about the regulations concerning chemical risk and properly organised.

At the other extreme are the far more numerous family-owned businesses, most often managed by their founder and major owner or his/her descendants. With rare exceptions, the CEOs and executives of these family-owned firms have no other managerial experience than that in their own firms and no exposure to management practices in firms outside Greece. These firms lag behind both in terms of information and response to regulatory provisions.

A common characteristic of both groups however, is the lack of competent staff experienced in the legal, technical, implementation aspects of the provisions related to hazardous substances. In family-owned firms especially, there is an absence of scientific support and coverage, not even an external one. This lack is considered by the G.C.L.S as the main cause of a variety of breaches of the law noticed during enforcement action related to substances hazardous to health. These include:

- ignorance of the nature and hazards of products in production and circulation and especially of those imported from third countries.
- dangerous products without labels or labelled incorrectly

- no text in Greek language in the packaging labels
- identical products that are labelled differently
- absence of product safety data sheets, or if present then not available in a Greek translation.

These problems are particularly significant if, as is outlined below, safety information data is regarded as an important aspect of overall occupational risk management strategies for hazardous substances.

Inspection strategies — It has been long recognised that the enforcement of labour law — and in particular occupational safety and health (OSH) legislation — has been rather weak in Greece⁴⁰⁰. Although penal and administrative sanctions are severe enough in the legal texts, past experience is that the Labour Inspectorate has in practice rarely presented a significant threat to the employers, even those repeatedly violating the labour law. The situation deteriorated especially during the period 1995 – 1998, when the Labour Inspectorate was administratively devolved to Local Prefecture Authorities. Ironically, this weakening occurred at a time when a large number of European Union OSH Directives were under transposition into Greece’s laws and institutions.

A further challenge to an empirical investigation of the role of OELs in enforcement is that the present structure of Labour Inspectorate databases means that a comprehensive analysis of enforcement activity, in as far as it addresses efforts to regulate chemical risk management and the inspectorate’s use of OELs in this respect is not possible. Therefore some indicative results of local investigations undertaken expressly for this study are presented to supplement the rather meagre evidence that can be gained from examination of national data.

Following the relocation of the Labour Inspectorate under the central authority of the Ministry of Labour, its new organisational structure absorbed the existing inspectorate (both administrative and technical) and started operating in July 1999 led by a Special Secretary nominated by the Prime Minister. It created a discrete Labour Inspectorate, (Soma Epitehorisis Ergasiss — SEPE) with two branches, one for safety inspection and the other for the enforcement of more general labour law requirements. In order to implement this major “administrative re-engineering” the Government:

- quadrupled the manpower of SEPE by recruiting new staff (over 360 new inspectors)
- provided a substantial budget for upgrading its material resources (measurement equipment, vehicles, computers, etc.).

Morale of labour inspectors has improved, resulting in their being able to send a strong signal to recalcitrant employers that they must take their obligations seriously.

Presidential Decree 136/99 establishes that the SEPE is organised on the basis of a central service and regional services, in order to function as a modern monitoring body. The central service is made up of the:

- office of the Special Secretary who heads the service;
- department of Special Inspectors responsible for the internal monitoring of the service;
- planning and coordination division;

⁴⁰⁰ See for example, Spyropoulos G (ed) 2000 for a detailed account. Also Walters 2001: 197-202, for a brief summary of some of the difficulties facing OHS regulation in relation to small firms in Greece.

- administrative and technical support division.

The regional services are organised in line with existing regions and prefectures, and include:

- 16 regional social inspection divisions, under which fall 76 local social inspection departments (mainly at the prefectural level);
- seven Occupational Risk Prevention Centres (KEPEK) with sections dealing with work environment measurements, on the divisional level, with interregional competency, under which fall 31 local departments of technical and sanitary labour inspection (at the prefectural level).

The year 2001 was the first complete year of SEPE activity. The total number of inspection visits during 2001 increased by 71 per cent over previous figures. The total number of sanctions increased by nearly 75 per cent. As is shown in Table 1 below:

Table.1 Number of sanctions

	Sanctions Years 2000-2001		
	2000	2001	per cent increase
Total	899	1577	75,4
Law suits	299	892	198,3
Cessations	393	611	55,5
Fines	207	744	259,4
Amount of Fines	146.823	552.457	276,3
	Euros	Euros	Euros

Source: SEPE statistics.

According to its statistics it undertook 1863 inspection visits in 1424 enterprises having more than 50 employees. Of these, 80 per cent used the services of a safety engineer while 70 per cent had an occupational physician. 142 enterprises had contracted with an EXYPP. Only 13 per cent of the 1863 inspection visits revealed the availability of a written risk assessment. In 49 per cent of cases no assessment had been undertaken while in the remaining 38 per cent, a risk assessment was under completion⁴⁰¹.

Unfortunately, statistics on contraventions are classified according to various Presidential Decrees. It is not possible to ascertain from these aggregate figures the extent to which OELs feature in enforcement. However, information on inspection strategies (below) would seem to suggest that it is unlikely that OELs play more than a minor role in enforcement. Inspectorate emphasis on OHSM is borne out by the observation that 32 per cent of notices related to PD 17/96, indicating the importance SEPE attached to risk assessment/systematic OHSM.

The increased rate of inspection visits in combination with the increased number and activity of occupational health services provided by EXYPP has contributed to some increase in risk assessment that includes monitoring physical, chemical and biological exposures at the workplace (an example of the extent to which such monitoring might be undertaken by an EXYPP is shown in Box 1 which documents monitoring activities of one EXYPP during the

⁴⁰¹ This situation should have improved somewhat during 2002 since it was decided that no enterprise with more than 50 employees shall be without a Safety Engineer or an Occupational Physician and a written risk assessment.

period 2000-2002). Notwithstanding this increase, the strategy of the inspectorate (as well as that of the EXYPPs) is orientated towards improving employers' awareness of the need for documented risk assessments overall. Actual measurement of exposure is estimated to feature only in around 10 per cent of written risk assessments. Policy documents and comments from health and safety practitioners shed light on this approach. For example, a circular to inspectors from the Ministry of Labour makes it clear that the immediate objective of the Labour Inspectorate should be to:

“ . . . increase inspections so that no small or medium sized company be left without being visited and registering its Safety Engineer and Occupational Physician with the Labour Inspectorate ” (Polychroniou 2001).

From EXYPP personnel, statements such as⁴⁰²:

“We proceed carefully even in large enterprises to win them over in their duty to have a risk assessment performed in their workplaces leaving aside the inclusion of measuring occupational exposure (an expensive exercise) as a separate issue to be examined in due course

are indicative of an approach in which awareness building concerning systematic health and safety management requirements is seen to be the objective to be achieved first, with the assumption that more detailed technical involvement will be more easily and more usefully attempted as a later follow-up once employers are committed to action on OHSM.

Box 1

Monitoring Activities of one EXYPP 2000-2002

Measurements were carried out in 29 enterprises (having more than 50 employees). They consisted of:

- 21 for noise,
- 14 for “inert” dust,
- 8 for concentration of solvents (xylene, toluene, ammonia, white spirit, isophorene, acetone, MEK, trichloroethane, trichloroethylene, alcohols),
- 7 for thermal distress (WBGT index),
- 6 for illumination,
- 4 for concentration of chemical agents (formaldehyde, CO, CO₂),
- 3 for air velocity,
- 1 for concentration of filter tow
- 1 for electromagnetic radiation.

In 22 of the 70 measurements the respective limits were exceeded.

Official guidance — Complementing the activities of the EXYPP and the enforcement practices of SEPE is the publication of guidance from the technical support unit of the Ministry of Labour, for health and safety (KYAE) and from the National Health and Safety

⁴⁰² Dr M. Velonakis, interview

Institute (ELINYAE). KYAE (1989) published guidance on the main methods of sampling and determination of chemical agents (airborne substances) in the working environment. ELINYAE (1997) translated and published the 1996 ACGIH Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs). The edition established the beginning of a scientific co-operation between ELINYAE and the ACGIH. In 1999 it published and distributed an advisory document on industrial organic solvents in the interest of providing useful information and basic knowledge on their safe handling in industry for employers workers and others. The leaflet contained advice on control measures and emphasized the role of substitution/process modification, but made no direct reference to sampling methods, or to the role of OELs in determining what control measures should be used in OHSM (ELINYAE 1999).

Risk ratings and employers' reactions — The increased inspection rates and emphasis on ensuring all enterprises made appropriate efforts to register with Inspectorates (Law 2874/2000) also gave the Technical Labour Inspectorates an opportunity to register thousands of SMEs in the Inspectorates' computerised archives and categorise them according to whether they were High (A), Medium (B), Low (C) risk workplaces under P.D.294/88.

Classification of sectors such as metal manufacture, printing and wood furniture production in the B (medium risk) category created controversy among the small employers in these sectors and amongst their representatives in their association, the General Confederation of Professionals and Handicraft Traders of Greece (GSVEE). This was because such a classification in the B (medium risk) category meant they were required to use the services of a qualified engineer (their own or external, EXYPP) or a full time employee with 8 years experience, technical education and training in OHS) for the post of Safety Engineer and to contract with an Occupational Physician if they employ more than 50 employees. Not surprisingly this was perceived primarily as an additional cost by the industries that saw themselves in a period of economic difficulties⁴⁰³. The employers' association therefore tried to negotiate their relegation and classification into class C (low risk) where owner/managers may themselves act as Safety Engineers with the only obligation to pass through a 10 hours training course in OHS. Following strong pressure on the Ministry of Labour a tacit verbal arrangement was achieved which 'relaxed' the urgency of their immediate compliance. An additional circumstance that conspired to favour their claim was a decision taken within SEPE at that time, to focus on class A enterprises and on enterprises of any class employing more than 50 employees.

5.3 SECTOR SPECIFIC EXPERIENCES OF WOOD DUST AND TOLUENE

Legal requirements for the control of wood dust — The control of wood dust is required by law. The Royal Decree 1937(10/9/37) 'On the protection of safety of workers and technicians employed in the woodworking factories' Article 42 states: '*exhaust appliances shall be provided at every sanding or producing wood dust machine as close to its production so that the dust is sucked at its source*'.

By virtue of Article 4 of P.D.307/86 the employer is obliged to take all the necessary measures of Article 26 of Chapter V Health and Safety at Work Act 1568/85 to avoid or minimize the exposure of workers to agents referred to in Article 3 of P.D.307/86 (on

⁴⁰³ Such costs are estimated to be in the order of 74 euros per month for a typical small firm with less than 20 employees. They can be contracted with the cost of measurement involved in monitoring airborne exposure, which are said to be 440 Euros per hour.

the protection of the health and safety of workers from the risks related to specific chemical agents at work) wherever this is practically possible. In all events the level of exposure must be lower than the level defined as ‘the exposure limit value’. Article 3 as amended by Article 3 of P.D. 77/1993 does not mention wood dust precisely or make any distinction between softwood or hardwood dust, but it does mention ‘inert dust’ and ‘nuisance dust’ giving an exposure limit value of 5mg/m³ for respirable dust and of 10mg/m³ for total dust. These limits are used as guidance for the assessment and control of exposure to wood dust under P.D.77/93 and P.D.159/99 on risk assessment.

Legal requirements for the control of toluene — The control of exposure to toluene is required by Chapter 5 of the Health and Safety at Work Act 1568/85, P.D.338/2001 transcribed almost verbatim the Directive 98/94/EC “ on the protection of the health and safety from the risks related to chemical agents at work. It redefines and specifies all previous exposure values as follows:

“Occupational exposure limit value” means the limit of the time-weighted average of the concentration of a chemical agent *in the air within the breathing zone of a worker* in relation to a specified reference period”

P.D.90/99 which transcribed EC Directives 91/322 and 96/94 EC Directives on establishing a first and a second list of 553 indicative limit values. For toluene it set new OEL values as 100 ppm or 375mg/m³. It redefined the highest limit value (Short-Term-Exposure Limit) as: ‘a 15-minute time weighted average exposure to a chemical agent which should not be exceeded at any time during a workday even if the 8-hour TWA is within the exposure limit value and set it at 150ppm or 560mg/m³

Compliance with risk assessment and OELs in the wood furniture manufacturing sector— Since the large majority of these workplaces are very small or micro-enterprises that are rarely inspected and also rarely use any form of EXYPP, the likelihood of a risk assessment being undertaken is quite remote, let alone measurements being taken to monitor dust levels. In an interview with the CEO of an EXYPP with some experience of the sector it was stated that currently only 5 enterprises with more than 50 workers in the sector have a written risk assessment. Of these, according to the director of the EXYPP concerned, one carried out its own assessment while the rest were carried out by an external organization (EXYPP)⁴⁰⁴. The assessments included measuring exposure to dust. Air samples were below 5mg/m³, a great proportion were around 1mg/m³.

Although there were substantial increases in inspections and subsequent enforcement actions in the sector between 2000 and 2002, (516 inspections leading to 3 prosecutions in 2000, increased to 726 inspections and 28 prosecutions in 2001), it is not possible to determine how many of these made reference to wood-dust exposure or involved OELs in any way. Given the existence of the general inspection strategy described so far, and the known reluctance of many inspectors to engage with technical aspects of the risk evaluation of the use of hazardous substances, it seems likely that very few inspection and enforcement actions will have done this. However, exposure is likely to be quite high in many cases. Similarly, exposure to solvents including toluene, in the finishing processes of furniture making in the sector is also probably quite significant, although it may be marginally lessened by the introduction of water based surface coating materials. If the enforcement actions on the part of the inspectorate reflect an increased demand for evidence of risk assessment and systematic OHSM, it is quite likely that they reflect the absence or incompleteness of evidence of risk

⁴⁰⁴ Dr M. Velonakis interview

evaluation through monitoring exposures to both wood-dust and organic solvents such as toluene. However, the future availability of a written risk assessment in this sector will also depend on the outcome of the sector's negotiations on the issue of their non-compliance with P.D.17/96 and P.D. 159/99.

Experiences in printing — Printing, publishing and allied industries, include firms whose business is dominated by printing operations, firms performing operations commonly associated with printing, such as plate making or bookbinding, and publishers of books, newspapers, magazines etc. whether or not they actually print their own material. The industry is organized by the type of printing process used: lithography, (roto)gravure, flexography, screen, and letterpress, with different union and employer associations traditionally representing its different parts. It has a high ratio of small operations, with nearly 95 per cent of printing facilities employing fewer than 10 employees. Flexographic and gravure printers, however, tend to be larger operations and to have more employees. According to 1998 Census data, in printing and publishing industry there were only 232 firms with more than 10 workers, employing a total of 11,042 workers. This figure does not capture a number of “in-plant” printing operations located throughout the manufacturing sectors or services.

The diversity of technologies and products in the printing industry makes it difficult to characterise the processes and the workplace environmental issues facing the industry as a whole. Their differences can lead to distinct concerns and are critical when developing compliance assistance programs. However, it is estimated that 97 per cent of all printing activities can be categorized within five different printing processes: lithography, gravure, flexography, letterpress, and screen printing.

The National Collective agreement that is negotiated and signed every year by the Panellenic Union of Lithographers, Graphic Arts, Press and Allied Trades specifically mentions the Employer's duty to comply with the provisions of:

- R.D.464/68 “On regulating the Health & Safety of those working in typography, and generally in Graphic arts and paper processing factories⁴⁰⁵”
- Act. 1568/86
- P.D.398/94 (EEC Dir.90/394 VDU)

At the same time, a 10 per cent bonus for unhealthy and dangerous jobs has been agreed since 1994⁴⁰⁶. It is given to those working in:

- rotogravure, flexography that use solvents, in systems UV, magnesium and bronze powder coating, metal printing ovens
- high speed web-fed offset when they are not enclosed so that exposure to noise, heat, and emissions is reduced⁴⁰⁷

The bonus clause, amongst other things, reflects the perception that the use of solvents is an activity dangerous to health (while hardly contributing to its prevention!).

⁴⁰⁵ R.D. 464/68 was the product of a transitional phase in the industry from typography with its typesetting, and typesetting, to lithography with its plate development and the production of images photographically. P.D. 464/68 still comprises provisions relevant for the present heterogeneous situation in lithography etc in Greece

⁴⁰⁶ Previously it had been 4 per cent since 1964

⁴⁰⁷ 500g of milk (which still perceived to have antidotal qualities against poisoning from exposure to metal fumes, in addition to nutrition properties it has) is also given to the above workers.

There is very limited officially published guidance on working with chemicals in printing and publishing⁴⁰⁸. In a page reserved for chemical substances in such guidance that exists for owners and workers in small enterprises, there is a reference to the legislation on the handling of chemicals and a check-list of questions including:

- “Do you know that every packaging of chemical substances should be clearly labelled to show its hazards content?”
- “Do you know that it is the duty of the suppliers of hazardous substances to provide the users with information on the safe use of their substances?”
- “Do you know that for some substances used in our country there are OELVs?”

In addition, to assist SMEs to perform risk assessment in their premises there is a translation of the UK HSE’s “*Five simple steps to risk assessment*” that is also available. Such guidance is distributed by Labour Inspectors but, no data exists on the extent of its distribution to employers or to workers, or if and how frequently they use it.

It is recognized that the worst area of control of hazards in the printing industry is in the management of hazardous substances. The great majority of improvement notices issued are in this area. No specific data is available on the extent to which inspections or enforcement actions have referred to OELs. However, the pattern of increased inspection activity is evident in printing as was previously noted for wood furniture manufacture. Thus, in 2000 there were 99 inspection visits recorded but no prosecutions, while in 2001 there were 223 inspection visits leading to 11 prosecutions.

Employers and workers in small enterprises in the sector are in the hands of their suppliers for information on chemical hazards. Risk perception has been influenced by this relationship. Since there is almost complete absence of Manufacturers’ Safety Data Sheets (MSDS) and the warning labels on containers are problematic, precautions are based on accumulated experience, smelling substances and using gloves where signs of dermatitis have appeared. Verbal information from suppliers, fellow employers and workers filtered by the criteria of daily praxis and the suitability of the substance for the purpose for which it was bought, play major roles in decisions concerning risks⁴⁰⁹.

Emissions to air arise primarily from the organic solvents used in inks and in dilution. This is especially true for rotogravure, flexography and screen-printing. Solvents used in cleaning, the storage and handling of solvents and the use of organic solvents as dampeners are also important sources of emissions of organic compounds. The use of glues and adhesives is a further source of emissions. Toluene is used quite extensively especially as a constituent of the ‘Nitro’ mixture of solvents, but as mentioned previously its separate identity is not really acknowledged. Risk assessment has not yet reached small workplaces in printing and safety engineers wherever they have a role to play rarely deal with the problem of hazardous substances. However, studies carried out on exposures to mixed solvents in a small sample of printing works around Athens show exposure to mixed solvents to be a significant problem (ELINYAE 2002).

In recent years in some printing processes such as flexography, screen printing, and offset printing, water based inks have been increasingly used instead of organic solvent based inks.

⁴⁰⁸ See for example, *IMPEI Network (2002)*

⁴⁰⁹ *During the last decade annual sector exhibitions in Athens and Thessalonika have also become a source of information on risks.*

According to the editor of one trade magazine interviewed for the project⁴¹⁰, there is an industry-wide move to the use of water-based inks. They are used currently by at least 60 per cent of offset printing firms whether small or medium sized. This development has also possibly led to a degree of complacency amongst opinion makers in the industry that it will reduce the future need for monitoring OELs in risk assessment.

Experiences in metal fabrication— The fabricated metal products industry comprises enterprises that form metal shapes and/or perform metal finishing operations. They include establishments that fabricate ferrous and nonferrous metal products and those that perform electroplating, plating polishing, anodizing, colouring and coating operations on metals. The main processes associated with the industry can therefore be divided into three types of operations (i.e. metal fabrication, metal preparation and metal finishing), Again it is a sector of predominantly small enterprises. There are only about 348 companies (5 per cent of all companies) with more than 10 employees.

Toluene exposure is present in many parts of the industry including:

- Manufacturing of metal frames and their parts
- Manufacturing of window and doors metal frames
- Forging, moulding, various-gauges printing and metal formation by milling, powder metallurgy
- Metal processing and overlaying (plating)
- General mechanical works
- Manufacturing of light package ware

Once again, there is little specific information available on the role of OELs in risk assessment or the extent to which the Labour Inspectorate has included any reference to using them in its inspection and enforcement of the law. As in other sectors, inspection and enforcement increased between 2000 and 2002. Inspection visits rose from 1,077 to 1,551 and prosecutions from 29 to 82 but it is not possible to ascertain from these figures whether such increases have any significance for inspectorate monitoring of the role of OELs in risk assessment.

Two case studies on labour inspectorate activities in metal fabrication give a sense of the way in which regulating hazardous substances is approached in the sector. They are summarised in Boxes 2 and 3. They demonstrate that labour inspectors are clearly involved in the regulation of hazardous substances and they show that in some cases this can involve making requirements for monitoring of exposure levels in relation to OELs. However, they confirm that inspectors are confronted with an enormous range of health and safety issues of which dangerous substances are but one aspect. They also demonstrate that achieving basic notions of good preventive health and safety practice are clearly fundamental starting points for regulatory activity (as well as addressing substantial infraction of regulatory provisions). The relatively low starting point in terms of awareness and good OHS practices for many enterprises means that there is clearly much to be done that is likely to take precedent over the relatively sophisticated question of the extent of monitoring of compliance with OELs. There are indications that inspectors are indeed following the strategy outlined previously in which OHSM provisions are being applied through an initial insistence on the engagement of OHS competent persons and subsequently requiring evidence of risk assessments. Again, monitoring chemical exposures to ensure compliance with OELs, while part of this process,

⁴¹⁰Mr Despotopoulos editor of "Imressions-printing" (*ediposeis-ektiposeis*) a trade magazine for printing.

can be seen to be relatively far down the line of actions required (it is however, demanded on occasion, as is shown in Box 3). Inventories of adequate suppliers' information on the risks of substances in use on the premises is a much more frequent starting point for chemical risk assessment. Generally, the kind of control measures that are required by inspectors, while they may apply the accepted hierarchy of preventive principles, reflect fairly basic hygiene strategies whether in terms of information, engineering or personal protection, such as can be achieved and maintained without the need for sophisticated instrumentation or techniques.

Box 2

A painting workshop in a metal fabrication industry

The enterprise employed 105 workers in a new plant. Since June 2001 it had used the services of a safety engineer who was a qualified mechanical engineer and full time employee. Since September 2002 the company had also used the services of an external occupational physician (who was a Urologist). Its painting activities take place in the open at the end of the production plant. 2 painters and 2 assistant painters wearing simple overalls and shoes are engaged in mixing process and spray painting . No local ventilation exists. The whole plant has a general ventilation system with unsatisfactory results.

Although the company has used an EXYPP for its written risk assessment there were no measurements concerning the exposure of workers to organic solvents. MSDS in English were provided by the supplying company (protective materials for construction) after the intervention of the Labour Inspectorate who had issued improvement notices on this matter. Its interesting to note that in these sheets the company (having an ISO 9001) provided information in accordance with requirements of Directive 93/112/EC and made reference to COSHH regulations but not to any Greek legislation. Nor were OELs mentioned. Toluene was present in concentrations of greater than 40 per cent in one of the solvent used as well as in some of the paints. The safety engineer had no knowledge of the occupational exposure limits of toluene or the other substances. And the workers were not aware of the hazards involved.

SEPE issued improvement notices concerning among others things, the inadequacy of the risk assessment.

Box 3

Steel products manufacturer

A leading manufacturer of steel products in Greece, for the construction of metal buildings including an extensive range of metal sheet profiles and sections in addition to polyurethane panels which find application in industrial facilities, warehouses, airport facilities, sheds, etc. All products are manufactured according to international quality standards and ISO 9002 and are sold both in Greece and abroad. It has 250 Employees and employs a safety engineer as well as an occupational physician and now has a joint health and safety committee. It has undertaken a risk assessment and uses Material Safety Data Sheets. The SEPE diary between March 2001 and September 2002 reveals 10 inspections and 7 re-inspections with one prosecution resulting in a fine of 8,800 Euros in relation to this firm.

Through the diary it is possible to follow how the SEPE labour inspectors served improvement notices concerning local exhaust ventilation in the coating line, bath, rotating parts, personal protective equipment, paint storage, the inventory of chemical substances, MSDS, monitoring capacity, instruments for measurements of chemical agents and the appointment of a chemical engineer as a safety engineer. It also shows how the notices were followed up in a series of re-inspection, each noting partial compliance and the need for an adequate risk assessment to be performed.

Following a serious accident, critical examination of designing, ordering, introducing, testing and certifying, new equipment was required. Inspectors suggested a meeting with the new general manager, the management team and worker representatives to discuss risk management in the company. One outcome of the meeting was the election of a joint health and safety committee. At the same time a prosecution was initiated concerning the company's failure to comply with its duty to make a risk assessment in accordance with P.D. 17/96 and P.D. 159/99. Further inspections resulted in a letter to yet another new general manager (there were three during the period of the diary) concerning strict application of legislation regarding the control of hazardous substances P.D. 94/87, 77/93, 395/94, 399/94, 16/96, 90/99, 127/2000. and their obligation to undertake measurements. The inspectorate requested help from KYAE to perform its own risk assessment to see whether the limit values are complied with and establish reliability. Some months later the company reported completion of a risk assessment undertaken by a EXYPP. Further inspections and accident investigations followed with a range of non-compliance items identified and remedial actions demanded. Some concerned hazardous substance such as requirements for monitoring lead levels. Overall actions were deemed inadequate and a fine of 8800 euros imposed for infringements related to P.D.395/94, 397/94, 16/96.

5.4 DISCUSSION: THE LIMITED ROLE OF OELS IN CONTROLLING RISKS OF HAZARDOUS CHEMICALS IN THE WORKPLACE

Until very recently in Greece the issue of hazardous chemicals has not really featured in public debates on health and safety at work, despite information suggesting that one in seven workers reported a problem of toxic substances. Even now, the over-riding consideration is the need to operationalise the requirements of the Framework Directive on the regulation of occupational health and safety management. The approach has been a cautious one. The promotion of safe handling of hazardous substances — to the degree that one can isolate it both in practice and in its conceptual context within the national strategy to achieve systematic OHSM therefore seems to be based on the following assumptions:

- Vigorous and rigorous enforcement activity by SEPE will change the status of control and the employers' perception of carrying out their duty of risk management in their workplaces. It is believed that in the long term the new approach of SEPE that takes advantage of risk assessment in regulating self-regulation in an adequate and effective way could have positive effects on current practice. This is predicated on the condition that SEPE does not only pursue the establishment of written risk assessment in firms but at some stage also checks the assessment of risk of hazardous chemical agents.
- The bipolar system of trained safety engineers and occupational physicians (that constitute the specialist personnel of the EXYPP and ESYPP, will serve to reduce the great deficit in knowledge in relation to securing improved management of chemical risks within the systematic management of health and safety generally .
- By applying systematic health and safety management according to the principles of the EU Framework Directive, as transposed by PD 17/96, using risk assessment, evaluation and control, the extent of exposure will be mapped out and reduced. If the wider systematic OHSM measures already taken are adequate, the concentration of workplace pollutants in air should be reduced, thus minimizing situations requiring monitoring. The Labour Inspectorate will therefore only need to require monitoring by exception, if reasonable doubt exists about the situation in a company.
- The EXYPP may provide the technical support to employers to enable them to understand the role of OELs as well as undertake monitoring for them
- Increasing demand for OHS services will increase the need for other disciplines to enter the field of health and safety and especially people trained in monitoring .
- ELINYAE will fulfil its objectives in the domain of OHS most of all in the area of training and in producing practical guidance complementary to the Ministry of Labour.
- The General Chemical State Laboratory of Greece will make its enforcing presence felt on suppliers, importers and manufacturers in order to deliver chemical information to SMEs in the Greek language.

It also assumes that the following difficulties will be overcome:

- The 'general and multifaceted lack of resources' (Nichols 1997), the rigidities and the enduringness of certain mentalities among employers and workers in small enterprises.⁴¹¹

⁴¹¹ For instance, the majority of SMEs in the metal fabricating sector have grown out of larger enterprises (such as steel and aluminium plants, shipbuilding, metal construction) In them, heavy, unhealthy and dangerous work is the norm. Handling solvents is a small and insignificant aspect. This helps create a small enterprise owner manager with a self-image as a survivor who 'escaped' from the crowd of factory workers and climbed socially first by becoming a sub-contractor and then a boss. There is little room for practices and sensitivities on prevention and employee health protection in such an experience based self-image. In the furniture and

- The absence of general knowledge required for protection from hazardous substances, evident in the vast majority of small and medium-sized companies.
- A culture in which owner managers of small and medium-sized companies receive information and support from those who they already trust. This means that when deciding what steps to take to protect employees, chemical users rely mainly on information from suppliers, rather than the carefully crafted regulatory system of legislation and guidance from other sources such as ELINYAE or Labour Inspectors⁴¹².
- The use of process controls (ventilation systems, enclosed systems or modification of the process) that technology offers and market competition imposes develops asymmetrically in the three sectors. Little thought is given to priorities such as eliminating the hazardous substance or using it in a safer form. Even personal protective equipment is rarely used.
- The OELs system is poorly understood by almost everybody in the field including many labour inspectors who are therefore reluctant to see it as an integral part of the regulatory approach to control measures for health protection
- Trade unions that continue to negotiate and support financial bonuses for unsafe work contributes to an ideology hardly conducive to prevention and deliver mixed messages for workers' participation in risk assessment and risk management.
- Occupational risk awareness and militancy among workers is unevenly distributed across the different sectors of economic activity; the construction sector being the most militant followed by the metal sector while the furniture and printing sector lag a long way behind.
- While many trade union activists who developed during the 1980s believed that the promotion of health and safety behind the factory gates was part and parcel of their political struggle for industrial democracy,¹⁰ they have become demoralised by unemployment, which has reversed the relation of forces in factory politics and reduced the significance of OHS as an organising issue.

It is very recently indeed (only the last year or so) that the idea of risk assessment has started to be understood by large industries. Small enterprises are still far from reaching this point, the majority regarding the services of a Safety Engineer as a new burden on their budget or as another trick of the government to create jobs for unemployed engineers. In the words of a spokesperson for the printing trades on the requirement to use Safety Engineers⁴¹³:

“I can't hide the fact that there is some mumbling about it which reflects our mentality more or less. It is however an EEC law that concerns the health and safety at workplaces. As a union we are for it despite the problems that may be created. The Safety Engineer is indispensable for the reduction of labour accidents of which there are quite a few. However I think that the law should be changed and relegate us to the low risk C class so that the employers could be able to assume for themselves the role of the Safety Engineer — after some training of course — instead of having an employee or an external engineer who would visit us twice a month to pocket our money”

printing sectors employers and workers alike are characterised by their 'craft-guild microcosm' and its 'habitus' where exposure to dust and solvents is viewed a 'normal' occurrence almost in every phase of production process.

⁴¹² For example, safety data sheets, the major source of information on chemical hazards are generally not available, even if they are, they are often not translated into Greek and, are inadequate both in qualitative and in quantitative terms.

⁴¹³ Mr Palas, President of Printing Owners' Union of Piraeus and Vice president of Craftsmen Chamber of Piraeus

It was anticipated in planning the interviews for the present study that the number of key informants would be limited, however even those that were expected to be well informed and well placed to comment on the realities of workplace practices in relation to the subject matter of the study often had little to say about the role of OELs in managing workplace chemical risks. Apart from the clear infrastructural weaknesses and resource limitations in the Greek system for regulating OHS overall, a possible explanation for the reluctance to engage with OELs may also lie in the perception of OELs as part of a medically dominated schema in which they are especially associated with measurements. Measurements are themselves associated with instruments and with professional/outsider/authority figures, signifying interference with the employer's freedom in the production process and probably the loss of worker's job. Thus the following statements reflect the tenor of some of our interviews. An occupational physician who works for an EXYPP suggests employers' attitudes to professional occupational health and safety practice in their firms were not dissimilar to some lay attitudes to relations with physicians in general⁴¹⁴:

"I don't go to have a check up because I am afraid that Doctors will find something , which I don't want to know at the moment...these Doctors they always find something"

While a senior regional trade union organiser says of exposure levels⁴¹⁵:

"Don't make a fuss about it, other things have priority, it's a luxury to ask for monitoring when unemployment runs high".

A typical employer and owner manager in a small printing works said⁴¹⁶:

"I've been breathing the same air as my workers for 20 years now, nothing has happened to me so far."

and:

"If you go along with your insisting on monitoring we will end up wearing a mask. Why bother wear a mask? Masks are for the carnival!".

Furthermore it is apparent that as long as the employer seeks cheaper solutions such as providing personal protective equipment as the norm because other solutions are perceived as costly (and apparently they don't even do this very often), the role of OELs cannot be clarified because it is not sufficiently tested. Overall this means that the whole system and culture of prevention in Greece does not yet enable the use of OELs to be evaluated beyond the simple impressionistic level, and even this is problematic. There is not a critical mass of data and experience sufficient enough to cautiously conclude more than the following:

- The application of monitoring of chemical exposures in the workplace needs professional input and is labour intensive.
- Experts see monitoring as a difficult exercise that can probably only be undertaken properly by a very small number (some 10 to 15) hard-to-find persons in the whole of the country. They continue to emphasise the complexity and sophistication of expertise necessary to understand for example, problems of individual susceptibility , synergistic effects, non consideration of skin absorption, oscillation of concentration. Thus, making

⁴¹⁴ Dr Stelios Papadopoulos

⁴¹⁵ Mr A. Tiligadas, President of the Labour Centre of Volos

⁴¹⁶ Mr A. Xourafas, owner manager of a small offset printing firm with a family history in the printing trades

the whole idea of monitoring an adventure that is unlikely to be embarked upon voluntarily by the average employer.

- EXYPP personnel regard monitoring as the end phase of a game of diplomacy that is expensive and scares employers. Nevertheless they press SEPE to increase its demands for monitoring so that they can have a return on their capital investment in monitoring instruments.
- KYAE does not have the resources to engage extensively in monitoring to undertake tasks such as cross checking when results are disputed by workers' representatives. Organisational changes in the structure of the labour inspectorate also make it more difficult for SEPE to use KYAE to satisfy its need for expertise
- At the same time, SEPE's own resources and training of inspectors in monitoring is insufficient to make them confident in using it when dealing with OHS issues for hazardous substances.
- Safety engineers are rarely well trained, confident or equipped to deal with technical aspects of chemical handling and use (unless they are already chemical engineers by training).
- Occupational Physicians, with the exception of the few that have seen a market opportunity and set up EXYPPs, scarcely bother to take initiatives on workplace chemical exposures
- Internal chemical control is minimum even in large enterprises, and even in enterprises in the chemical industry itself. There is no product stewardship. As one EXYPP physician⁴¹⁷ stated: *"They do as much as to avoid being in trouble, and most of the times they do it under pressure from the inspectorate or the daring few workers who speak out"*
- From a trade union point of view, those with any knowledge of OELs argue that it is politically better to have limit values than not. However, they insist that respecting limit values does not mean that there is no risk for the safety and health of the workers. They are also considered to be a very useful tool to document the exposure situation of workers to chemicals during their working life and to still have uses as levers to ask for more money as well as to demand better conditions of work

This rather challenging scenario for the role of OELs in regulating the management of chemical risks is perhaps a more extreme situation than is found in other countries in the study. However, it is not altogether different from what can be observed elsewhere. As we shall continue to see in subsequent chapters, in other countries, with more highly developed regulatory infrastructures for health and safety and greater application of the regulation of OHSM, there is also considerable ignorance of the role of monitoring workplace exposure to hazardous substances, especially in the majority of small enterprises. Monitoring does not take place in many situations in which it is technically and legally a clear option. Organisations representing small firms in other countries have also sought low risk classifications for the economic activities of their members (based largely on size), exempting them from the necessity of technical evaluation of workplace chemical exposures. There are limitations both in terms of the required resources, and the technical skills of prevention services and regulatory agencies that restrict the amount of monitoring that takes place. The limited willingness and capacity of employers to engage in the activity remains a major factor ensuring that the role of OELs in risk assessment is relatively under-developed. And as we shall see, in all these countries OELs are also valued and used as much for their political and symbolic meanings as they are in the practice of monitoring compliance with risk management requirements for chemical risks. Moreover, the regulatory strategy in Greece is not really that different in principle from current approaches found in most other countries. As

⁴¹⁷ Dr Stelios Papadopoulos

in other countries, better OHS management is the overall target. OELs, if they feature at all, do so way down the sequence of events that operationalise the OHSM requirements of the national provisions that implement the Framework Directive 89/391. OELs are not the drivers of improvement in chemical risk management. In Greece, as in other countries, technological development and other factors that influence it such as cost, are viewed as the most significant influences determining improvements in exposures to hazardous chemicals. In this sense in Greece, the adaptations of technology would seem to move faster than 'Europeanisation' in OHSM.

The real differences between Greece and the other countries in the study would appear to be less ones of policy and more to do with the degree to which the Greek regulatory and economic system has the capacity to change itself, to influence awareness and practice, and deliver modern OHSM outcomes for chemical risks. Also, the extent to which it can achieve results comparable with other EU countries by means and processes that are less established and which have had a far shorter gestation period in Greece than elsewhere in the EU.

CHAPTER 6

ITALY

6.1 INTRODUCTION

In order to understand the practical realities of the role of OELs in Italy it is first necessary to place them within the context of the Italian system for regulating occupational health and safety. As we showed in Part 1, of this report one of the distinctive features of the Italian system is that traditionally it did not provide a legal status for OELs within OHS regulation. The only limit values adopted nation-wide were those arising from the transposition and implementation of European Directives on carcinogens or specific substances like asbestos, inorganic lead or vinyl chloride monomers. These are binding values that are not health-based because socio-economical and technical feasibility factors were taken into account, when they were established at European level. Transposition of these and the IOELVs under the Chemical Agents Directive challenges some of the basic principles of the traditional Italian approach to safeguarding workers' health. Moreover the requirements of EU Directives on health and safety are essentially centralist in orientation and largely constructed around models of administration, inspection and control typical of the majority of member states. There were therefore also likely to be administrative problems surrounding their implementation in the highly regionalised systems of the Italian state.

Therefore, in order to maintain the standards intended by the national legal system, while at the same time embracing the requirements of EU Directives considerable legislative ingenuity has been required. To understand the reluctance of the Italians to set OELs it is therefore necessary to first revisit the principles on which the traditional system is based and the way they are intended to function. This is not only a matter of legal principle. Securing compliance with the regulatory system is an issue for agencies charged with this task. The means and strategies they adopt are to a large extent derived from the legal principles set out in the Constitution and in the basic legislation on workers' protection that has been in place for many decades. Change in legislative requirements on OELs therefore implies considerable challenges for techniques of inspection and control.

Further complicating factors for both the development of new legislation and the practice of securing compliance with it include:

- the extent of regional devolution of authority
- the major involvement of the public health system in regulating health and safety and the relatively minor role of the Ministry of Labour in this practice; and
- the legal status and role of collective agreements in the practice of workers' protection

Another, perhaps less foreseen use of legally defined OELs in Italy has been (especially in the case of asbestos and silica) in compensation cases and in redundancy settlements

In the following chapter we shall explore these issues and consider their implications for managing chemical risks and especially for the practice of securing compliance with OELs. We begin with some general points about the Italian regulatory system for occupational health and safety. This is followed by an outline of the approach currently taken to reforming the system to meet the requirements of the Chemical Agents Directive. Finally we consider the

role of OELs in the strategies and practices of inspection and control. As with the other national chapters, the material in the following sections has been derived from published sources and from interviews with key participants.

6.2 THE ITALIAN MODEL FOR REGULATING HEALTH AND SAFETY AT WORK

The economic and political context of occupational health and safety involves both a complexity of institutions and of instruments in Italian society. State provisions and collective agreements interconnect and policy related to work must normally be acceptable both to the unions and employers' organisations. Institutional checks and balances in the parliamentary system mean that political exchange and negotiation between executive and legislative branches of government pose serious obstacles to radical policy initiatives. Although Parliament may adopt broad policy in primary legislation, it does not necessarily mean that the executive will draw up the detailed statutory instruments it requires to be implemented. This is vividly illustrated by the fate of the legislative reforms to the national health system that were initially introduced in 1978 (see below). According to Vogel, Act 833 that instigated the reform:

‘incorporated major achievements made by social movements and, in particular, the active struggle of the labour movement, but left it to Government to draw up the statutory instruments needed to implement the broad principles. Far from accepting its instrumental task of giving effect to the legislation passed, the executive branch in fact arrogated a power of permanent re-negotiation which allowed it to neutralise or attenuate the scope of principles of which it did not approve’

(Vogel 1993: 331).

The system is further complicated by the ‘tacit regionalism’ that exists in the country, which allowed for considerable leeway between regions in what they chose to adopt as the means for delivering national policy and legislative objectives. The difficulty of controlling the application of the law in a labour market characterised by the highest proportion of craft and small enterprises in Europe and a buoyant hidden economy is a further significant factor.

Health and safety was an important issue in the labour struggles of the 1970s. As a consequence, it has been included in collective bargaining at national and enterprise level for many years. At the same time, the character of the Italian system for regulating health and safety at work before the transposition of the Framework Directive 89/391 was profoundly different to that of other EU member states in the way it conceptualised workers' occupational health, the responsibility for it and the structures and processes set up to protect and promote it. There was a notion of the rights of workers to have a collective control over their own health, which was, arguably, fundamental to the Italian approach and which was more explicit than in other EU countries. It gave a rationale for the role of public health structures with both advisory and inspection functions in supporting workers and their organisations to achieve better health and safety at work. The involvement of the national health system – in which occupational health and safety is included — was another result of the unrest of the 1970s, but it has been in a continual state of reform since its inception in 1978 until well into the 1990s. This fact gave rise to an increasing regionalisation of its organisational model during the 1980s. This was still underway in the early 1990s when Italy was required to transpose the raft of EU health and safety Directives led by the Framework Directive 89/391. Transposition was undertaken with extensive debate and considerable difficulty despite a consensus on the importance of transposing the European model of OHS

into the Italian context. The need to reform OHS services and to achieve better performance in health and safety at work was widely recognised and indeed, became part of the political agenda⁴¹⁸.

6.3 LEGISLATIVE BACKGROUND

Workers' health and safety, a basic constitutional right: There is a long-standing interest in protecting the health and safety of workers in the Italian legislative tradition. The 1948 Constitution specifically recognised health as a fundamental right that should be achieved by taking the preventive measures that are technically feasible regardless of the economic costs involved (Article 32) and laid down a general duty of work protection. Article 35 established that protection at work was a public constitutional responsibility. Article 41 recognised private entrepreneurial activity. However, it must neither be against public interest nor prejudice safety, liberty or human dignity. This principle considered in conjunction with article 2087 of the Civil Code has led to the interpretation that the employer's duty of safety should be juxtaposed, not to a simple legitimate interest but to a corresponding workers' right to safety.

A key law on prevention of accidents was adopted in 1955 laying down general principles addressing a wide range of issues. It defined employer's liability and required they inform workers about risks and ways to prevent them. The Presidential Decree 303/56 'General provisions for industrial health' was approved in 1956 reaffirming the obligations of employers. It formed the core of the health and safety at work legislative framework. The general principle was that employers should do everything technically possible to reduce risks. It also provided for workers to have health checks by competent doctors at varying frequency depending on the nature of their work.

Health and safety as an issue for workers' rights and national health service reform: In the 1970s and 1980s the health and safety system underwent fundamental changes influenced by campaigns on the control of working conditions and the refusal to put a price on workers' health. At the basis of the reforms concerning health and safety at work were two pieces of legislation: the Workers Statute (Act 300 of 1970) and the National Health Service Act 1978 (Act 833). The impact of these two statutes was far-reaching and set up a unique system of representation and health and safety at work in which public health authorities and trade union organisations were central actors. According to Vogel:

'one of the most important characteristics of the 1978 reform was to assign the public health services far more onerous responsibilities in the area of occupational risk prevention than in other European countries. Also workers' rights to act of their own in this area implied more than simple participation. Overall, the general nature of the provisions of the Workers Statute and Act 833 makes collective agreements decisive to the framing of prevention policy'

(Vogel 1993: 309-10).

Article 9 of the Workers Statute (the Terms and Conditions of Employment Act 300, 20 May 1970) implied that workers, not as individuals but as a community, were to be active in the implementation process of prevention and safety. Hence the framing of preventive policy is defined within collective agreements. Health and safety issues are addressed in both national

⁴¹⁸ See Rivest (2002): 145-175 for a more detailed description of this situation

industry agreements and in enterprise agreements. In general, national industry agreements provide for the role of trade unions in controlling the application of legal provisions and defining preventive measures. The organisation of prevention in small and medium-sized firms is also dealt with, notably through the organisation of regional industry structures.

The adoption and implementation of the Framework Directive — Measures to implement the Framework Directive provide a regulatory structure within which all aspects of risks to health at work are to be managed. Specific measures addressing chemical risks and the role of OELs are made within this framework, so it is important to be clear about its content before we examine the nature and application of these measures more specifically.

Adoption of EU directives on OHS began in 1991, with DL 277/91 that implemented five Directives including measures on workers' protection against noise, asbestos and lead; and anticipated some contents of the Framework Directive (Walters 1996: 124). This decree was important, not only for introducing European directives into the Italian legislation, but also because it was a first endeavour to integrate 'European' concepts into the Italian system, for example, in requiring risk assessments to be carried out by companies. Previously, only the public preventive service assessed workers exposure. Introducing this concept in the specific areas covered by the Directives, paved the way for the later introduction of risk assessment more generally, as required by the Framework Directive (Frigeri 1994: 10-11).

The Framework Directive was transposed into Italian law by legislative decree 626/94⁴¹⁹. Transposition required extensive overhaul of the previous system. The application of the Decree 626/94 was characterised by delays, pressures from the employers associations on the government to modify its content and the adoption of numerous amendments and further legislative measures specifying principles established by the Decree or postponing its application. While the Decree was adopted in September 1994, it was the end of 1997 before implementation was mostly realised and it is still not entirely complete. The new structure of employers' obligations introduced by the Decree has not changed the general principle according to which the employer must avoid work-related damages. Within this principle, however, Decree 626 has introduced a new legal notion of prevention and has added manufacturers' and wholesalers' obligations, as well as those of project and installation managers. It has given an official recognition to competent medical practitioners by increasing their involvement through requirements for employers to have the competencies to undertake workplace risk assessment and surveillance. The resulting provisions require that prevention service be organised internally or externally⁴²⁰. Its tasks are the identification of risks and their assessment, elaboration and implementation of a safety plan, information and training. Workers' participation in health and safety is profoundly changed by the requirements of the Decree with the introduction of specific workers' representatives in health and safety for all enterprises whatever their size⁴²¹. Outside the enterprise, the Decree

⁴¹⁹ *The Decree 626 transposed the FD and seven other Health at Work Directives – on the workplace, the use of work equipment, the use of personal protective equipment, the manual handling of loads, work with display screen equipment, protection against biological agents and protection against carcinogens.*

⁴²⁰ *It has to be managed internally in sectors using dangerous materials or in enterprises with more than 200 employees. However the legislation does not make enlisting external prevention services compulsory where skills available internally are sufficient. Also it does not define the competencies of workers appointed to form company (or external) services. The European Commission recently complained to the European Court of Justice (ECJ) on both these issues and its complaints have been upheld in the ECJ's ruling in case C-49/00 on 15.11.01*

⁴²¹ *According to the Decree in all enterprises whatever their size a safety representative (RLS) must be elected or nominated. In enterprises employing 15 or less workers the safety representative is elected directly from employees. To help these small enterprises coping with the obligation of having a safety representative, the*

provides that at territorial level joint bodies between trade unions and employer associations are set up with the objectives of supporting and promoting initiatives for the employees. They are especially intended to be active in providing support to SMEs in matters of health and safety and they are to collaborate with employers, workers safety representatives and Local Health Authorities (USLs).

6.4 MEASURES REGULATING CHEMICAL RISKS

In Part 1 we outlined the measures adopted on risks of specific substances like inorganic lead and carcinogens such as asbestos and vinyl chloride monomer. In addition, in 2001 the Italian state introduced its measures to transpose the Chemical Agents Directive and the IOELV directive made under it. In essence, the new legislation is a translation of the requirements of the Directives. It therefore requires that the limit values of the IOELV Directive are adopted as Italian measures. This is itself controversial, as setting such values is a departure from Italian practice, but as we discuss in the following sections, the issue that has been even more a focus of debate concerns the degree of risk present in an enterprise that requires a duty holder to monitor the application of the values. The controversy is largely centred around the terminology used to describe the level of risk at which duty-holders are required to take action. This has given rise to much criticism and confusion concerning when exactly action is required by the legislation. As a result national and regional level technical committees have been established with the task of defining more precise guidelines (see below)

6.5 APPLICATION IN PRACTICE

The introduction of OELs into the Italian regulatory system is a departure from traditional approaches. It is also a new development that is largely untested in practice. There are major concerns about the implications of transposition for the practice of risk assessment and its monitoring through the inspection activities of the regulatory authorities. Additionally the regulatory system itself is complicated by the role of the Ministry of Labour and Ministry of Health and the agencies under their separate control as well as by the regional variations in practice. In this section we consider some of the implications of this general picture for the practice of inspecting and controlling measures on chemical risks at the workplace level. We start with the structure of the system for inspection and control, followed by an outline of strategies for securing compliance and end with some observations of participants on OELs and the efficacy of the system. The section is based mainly on interviews with regulatory officials, employer and trade union representatives as well as with representatives of structures created to support employers and workers in health and safety following the implementation of Decree 626.

The structure of the regulatory system — The National Health Service instituted in 1978 replaced previous employment-based health insurance schemes with a single national system. Reforms brought about by Law 833/1978 divided the management of occupational health into three levels of intervention. At national level, the Central State was responsible for national health planning, laying down uniform health and safety rules and approval of machines and

Decree opens the possibility of having territorial safety representatives (RLST). Therefore in such enterprises the safety representative may be nominated for enterprises operating within the same industrial district. S/he can be nominated or elected in the context of trade union representation as determined by the collective agreement. In enterprise with more than 15 employees the safety representative is elected or nominated by employees in the context of the trade union representation of the enterprise. If such representation is not in place, he will be elected by the employees

equipment for accident prevention purposes. The Ministry of Health was invested with the powers previously vested in the Ministry of Labour and inspection functions of the Labour Inspectorate were transferred to the USL⁴²². This was a crucial point of the reform. From 1978 until the adoption of Decree 626, the Labour Inspectorate was virtually absent from the health and safety field. Inspection and control functions normally performed by the Labour Inspectorates in other countries were undertaken by inspectors from local health units (USLs).

In addition the Higher Institute for Accident Prevention and Safety at Work (ISPeSL) was set up by Presidential Decree 619 of 31 July 1980. ISPeSL is managed on a tripartite basis. Its functions are to undertake research and to define criteria for the approval of industrial machinery and equipment. There are 36 ISPeSL local departments working with the USLs.

There are 19 Regions and two Autonomous Provinces. They are all entitled to adopt health legislation including provisions on health and safety at the workplace. Following the reforms introduced by Act 833 the health system was managed in highly diversified ways across regions. There are many factors that explain this variation at regional level. Among the most important are the varying degree of industrialisation, difference in the labour market, varying strength of the trade union organisations, as well as the political orientation of the regional authorities and the resources available. Obviously the fact that detailed national provisions were never adopted to operate Law 833 fostered even more regional variation.

Observers have argued that the implementation of the National Health System gave rise to a double and contradictory effect. For example, according to Pelissero and Carreri:

‘on the one hand, to place . . . under the USL, all the services of prevention, care and rehabilitation induced a global and unitary vision of medicine. On the other hand, the fact that national programme and planning were never completed and that the Act 833 suffered from some technical shortcomings have given rise to an ever increasing ‘regionalisation’ of the organisational model. This led to the development of some 21 models of USL based on the regional laws adopted between 1978-1981’

(Pelissero and Carreri 1997: 314).

The duties and functions of these services varied. Public hygiene, food hygiene and environmental hygiene could be found in all regions. Fifteen regions however, included developing the function of health protection in the workplace as part of the hygiene service (See Pelissero and Carreri 1997: 314 –316). It has been estimated that between 60 to 67 per cent of USLs provided a specific workplace preventive service. There were also 85 district preventive centres or services set up under the aegis of USLs in some regions. Staffed by a workforce of a little over 5,000 people, they had specialised laboratories for analysing physical and chemical factors and toxicological examinations. Their duties extended both to prevention at workplace and protection of the environment, and their activity was multidisciplinary to a high degree (See Vogel 1993: 308 and 313 *et seq.*).

In the late 1980s there were approximately 670 USLs operating at the local level, each covering a population ranging from 50,000 to 200,000 persons. At the beginning of the 1990s the National Health Service including the USLs was restructured. One aspect of this process was the requirement of Decree 502 of the 30 December 1992 for regions to reorganise and reduce the number of USLs until broadly, they corresponded to the number of provinces in

⁴²² USL: *Unità Sanitarie Locali, Local Health Unit.*

each region⁴²³. (Pelissero and Carreri 1997). The implementation of this article reduced the number of USL to 228 in 1995. Article 7 of the Decree aimed to bring more uniformity to the regional systems as regard to prevention, monitoring, inspection, and health and safety at work. It specified that within the boundary of their competence, the Regions must establish within each USL a prevention department to carry out workplace prevention activities in accordance with Articles 16, 20 and 21 of the Act 833/1978⁴²⁴. The setting up of prevention departments within USLs as well as the reorganisation of the USLs at provincial level constituted a major change. However, the preventive principles as well as the attributions and functions of these services remained the same. The public health system was still the main structure responsible for prevention activity in the workplace and once again, it was left to the Regions to implement the detailed operation of health reform and therefore capacity for wide variation also remained.

The transposition of the Framework Directive has modified but not entirely changed the involvement of public health structures in OHS. USLs are still provided with the power of the Labour Inspectorate in health and safety. Thus they have the regulatory powers in health and safety and are able to use these powers in the workplace in addition to their preventive advisory activities. The Decree 626 provides that the monitoring of the application of the legislation on health and safety may also be exercised by the Labour Inspectorate, which will need to inform the prevention and safety unit of the USL at a territorial level beforehand. It also provides for the Ministry of Labour to ensure adequate co-ordination of all the levels of administration (national, regional and local) involved in the management of health and safety at work and the creation of a regional committee for co-ordination (Art.27) of all the OHS structures. However, in practice in most regions it appears that while the Labour Inspectorate has undertaken responsibilities for enforcing some aspects of the law on the terms and conditions of work and on issues of non-legal work,⁴²⁵ it has not engaged substantially in monitoring or enforcing compliance with occupational health and safety provisions. Nor has it made any substantial commitment to the training or employment of specialist inspectors for occupational health and safety. As we see below, the co-ordinating role of the Ministry of Labour at national, regional and local levels is problematic in practice because of its lack of engagement in operational aspects of the substantive issues involved

The implications of the structure of the regulatory system — The somewhat labyrinthine structure of the regulatory system and the complicated distribution of responsibilities for policy and practice between the agencies of the Ministry of Labour and the Ministry of Health at national and regional level are regarded by many as less than helpful for the promotion of a clear strategy on chemical risk. Moreover the dissociation between Ministries and agencies largely responsible for policy from those largely responsible for practice is another obstacle for the operation of strategic aims. The powerful role of the regions in implementation of the law is a further important complication, for although theoretically, the Ministry of Labour has authority to implement the law, in practice this authority actually lies with the regions. At the same time, the Ministry of Labour retains a responsibility for much of the liaison between the Italian state and the European Commission on the creation, transposition and application of Directives on health and safety. It also is the architect of the national transposing measures (sometimes with other Ministries). The details of transposition are however the subject of negotiation between the regions and the national level. Constitutionally, the current system reflects an approach in which it is accepted that minimum requirements will be defined by EU

⁴²³ Each Region is subdivided into a number of Provinces.

⁴²⁴ These are the main articles concerning prevention activities in the workplace and preventive services.

⁴²⁵ It plays a substantial role in policing the illegal employment of immigrants for example

measures which may be taken further by national requirements and further still by requirements at regional level. This means that in some cases, such as with OELs, there are parallel developments in which national committees at Ministry level define technical policies while at the same time there are committees for consultation between regional and national level engaged in a similar task. Because of the importance of the regions in the application and use of the law, these regional committees and their recommendations play a significant role both technically and politically. In addition, because regions may introduce more rigorous measures than those required either at EU level or nationally, and because there is enormous discrepancy between them, in terms of their prevention resources and policies, there is good reason to suppose that widely different standards may result. In practice, given the strong lobbying at national level by interest groups concerned with the costs of compliance, the likely practical and political result of the possibility of greater stringency at the regional level is greater pressure towards minimal standards at national level.

In the case of OELs it is too soon to observe such outcomes as the process of their definition is still underway. Nevertheless, the text of the national provisions transposing the Chemical Agents Directive has been the subject of some controversy. There has been discussion concerning the retention of the substance of previous Italian requirements to reduce risks as low as is technically possible.⁴²⁶ But the main issue of debate seems to have concerned the definition of the level of risk at which employers are required to demonstrate that they have taken action. Clearly action is required at levels of high risk. The problem occurs in the terminology used to define the level at which employers are expected to assess risks taking into account the existence of OELs. This implies a requirement for monitoring and measurement that employers' organisations, especially those representing small enterprises, argue will place unacceptable economic burdens upon their membership. At the same time, trade unions and prevention specialists fear that if the level of risk at which action needs to be taken is set too high, then many workers will face unacceptable risks to their health. They are concerned that workers will experience a lower level of legal protection from their employers than that to which they are entitled as a constitutional right — and which was provided to them under previous legislation in which all employers were required to reduce risks to levels that were as low as technically possible. This has therefore become a political issue that has been fuelled by an issue of translation in which the Italian transposition of the Directive's requirements implies that action is not required if risks are “moderate”.

As we have noted, there are both Ministerial committees and those at regional level that are attempting to develop guidance on these issues. There is for example a technical committee with representation from the Ministries of Labour and Health and their agencies that is responsible for the implementation of EU indicative values. At the same time there are several technical working groups established by the Ministry of Industry and the Ministry of Labour, one of which is charged with defining risk. Parallel to these committees there are regional ones. Indeed, by the time the technical working group on defining risk had held its first meeting the regions had already produced their guidelines.

To avoid the issue of creating arbitrary distinctions between situations of “low” or “moderate” risks in terms of levels of protection required, the agreed aim of the guidelines from all these committees is to achieve a high protection of workers without the need to measure levels of chemical pollution of the workplace. This means producing methods which allow effective risk assessment to be undertaken to certain levels that does not preclude measurement but

⁴²⁶ *During a preparatory phase in transposition the principles of these articles were apparently inadvertently dropped. They have however subsequently been effectively reinstated with requirements on duty holders to maintain previous levels of prevention practice in relation to chemical risks.*

does not make it an essential requirement of the process. This is why the retention of former legislative principles of reducing risks to as ‘as low as technically possible’ is regarded as important since such principles avoid imposing demarcation lines between situations in which risk is legally defined as requiring certain types of action and those where no action is required.

Strategies for securing compliance —The different government ministries involved and the devolution of authority to the regions makes for a complicated system that results in more than a degree of obfuscation of strategy, confusion for its intended targets and many opportunities for debate and disagreement concerning both the aims and application of strategies on chemical risks.

Interviews with officials with responsibilities for securing compliance from different USLs in regions in the north of Italy⁴²⁷ conveyed a general picture of practice in which the traditional requirement to reduce risks as much as was technically possible was preferred to a system in which OELs played a more pivotal role in determining the nature of compliance strategies. As the transposition of the relevant EU Directives on chemical risks is a very recent development and their operation still largely under discussion, this is perhaps not surprising. However, it also reveals that inspectors share some of the concerns about the new system expressed in previous sections (see above). That is, they are worried that the existence of an OEL will act negatively on the will of some employers to reduce exposure to as low as technically possible, even when they have the capacity to do so. In this respect they are concerned that the existence of an OEL for particular substances will reduce the discretion of the inspector and especially his/her authority to require employers to reduce exposures to levels the inspector feels to be technically feasible. Moreover, there is a strongly held view that a ‘one value’ OEL regardless, of the documentation that might accompany it, will be interpreted as a ‘safe level’, and that this will be exacerbated by the definition of risk in the legislation. It is felt that the use of terminology such as ‘moderate’ risks as levels below which monitoring activities may not be required, will be interpreted in ways which will effectively mean that employers will believe there is no requirement for any preventive action to be taken in such circumstances. Again this is perceived to make the inspectors’ tasks of advising and persuading employers to adopt best practice approaches to prevention more difficult. All these concerns were shared by workers’ representatives and trade union officials, as well as by the representatives of unilateral and bilateral OHS information and advisory agencies interviewed. While these individuals all had different perspectives resulting from their particular roles in occupational health and safety, they were nevertheless broadly of the same view regarding a perception of the legislation as requiring an ‘all or nothing’ response that was based around a rather arbitrary definition of risk, and which in practice would do little to encourage many employers to reduce risks to levels they would be technically and economically capable of achieving. This of course is the obverse of the concerns also expressed by organisations representing the interests of the owners of small enterprises, who fear that those enterprises that fall into the higher risk category will by definition be required to invest in monitoring procedures regardless of the realities of the risks actually experienced at their workplaces.

⁴²⁷ *Although there are great differences in the role of the prevention departments in USLs in the south of Italy and those of the north, it is unlikely that officials from USLs in the regions of the south of Italy would have adhered to a more rigorous or technical use of OELs in their inspection strategies. It is widely accepted that the structure, resourcing and practice of inspection and control in OHS in southern Italy is generally much weaker and more erratic than that found in the industrialised regions of central and northern Italy. The interviewees all came from USLs in the northern regions and therefore probably represent ‘best case’ practices.*

Inspectors' approaches to seeking compliance in enterprises in which chemical substances with OELs are in use are based around first checking the extent to which risks had been assessed through the examination of documentation. They then may consider the features of the workplace such as for example, its design, the use to which it is put, work practices, the quantities of substances used or released, and the engineering controls that are in place to reduce exposure. If the inspector is not satisfied with the existing arrangements s/he may require the employer to present a prevention plan in which information on what practices, procedures or designs are to be introduced to assess and control risk. The requirement for a prevention plan/risk assessment could include providing information on exposure levels to substances with OELs, that would mean employers would need to measure (or contract someone to measure) chemicals in workplace air. Inspectors have the power to require such measures and/or to supervise their collection or undertake the measurement themselves.

However, generally measurements are not required. Priority is given to inspection activity in workplaces where actions are most likely to be needed. Here it is normally not necessary to measure airborne contaminants in relation to their OELs since it will be obvious that OELs are being exceeded or there are other obvious problems that imply they will be exceeded.

Recent strategies in some regions have resulted in more targeted inspection in which particular sectors and processes are studied in greater depth. This has been made possible by the recognition that the basis of the Italian economy is the structured network for production amongst small enterprises engaged in similar tasks and using similar processes that characterise many industrial sectors and which is evident at local levels.

OELs and measurement of chemical contamination of workplace air are relevant to these strategies. Generally however, because there is an association between the notion of OELs as legal requirements and the formal enforcement role of inspectors, they are not much used in targeted strategies. The emphasis of the USL inspectors is to develop strong working relationships between employers, workers and their representatives, the regulatory authorities and other participants in OHS at local levels. In these relationships, which are predicated on developing trust between participants, USL inspectors are at pains to project their advisory role rather than that of formal enforcement. Examples of this approach at local sectoral levels include the involvement of inspectors in projects on wood-dust and on lead and other toxic substances in ceramics, in work in the meat industry, and in asbestos removal. Here a more holistic approach to control is sought in which for example, engineering control, control at source or (as in the case of wood-dust) controls built into the manufacture of machinery before it enters the workplace (and thus, specification standards), are the focus of discussion, rather than compliance with OELs. In some of these examples an agreed protocol for good practice at local (district) level, to which employers and other participants adhere in workplace practice, is the desired outcome. Here again, the perception of the OEL as a measure that implied a fixed environmental standard to be achieved regardless of variations in workplace realities is seen as too rigid to allow the flexibility of practical control solutions to the exposure of individuals that could be achieved through agreeing a general protocol for good practice in relation to specific processes. In this approach, inspectors recognised that there are always likely to be some employers who fail to participate or comply with such a protocol. However, they believe that if a critical mass of enterprises in a local area have agreed to implement a protocol concerning a particular issue such as the use of wood-working machines for example, the peer and economic pressure that this has on all the relevant firms in the area is such that it is more likely to achieve overall improved OHS performance than would otherwise be possible. It also allows the bad performers to be more readily identified and for more formal enforcement techniques to be used against them. Moreover, in the case of

subsequent legal proceedings such protocols may be helpful in informing legal decisions about practicable prevention practices for the sector.

Amongst the USL inspectors as well as among other participants interviewed there was a perception that exposure limits were more of a prominent issue in the debates of the 1970s than they have been in more recent times. For example, pressure for the adoption of the ACGIH list into the collective agreements in certain sectors such as the chemical industry dates from this period. Some inspectors also expressed an impression that less rather than more measurement of workplace air pollution in relation to OELs was currently conducted than had been previously. It was further suggested that the increased role of OHS consultants resulting from the requirements on prevention services that were introduced by Act 626 had not really contributed to greater facilities for measurement since many such consultants had neither instruments nor skills to undertake proper occupational hygiene practice. Therefore, although it was felt that one of the effects of the measures to transpose the Chemical Agents Directive may be to increase the pressure to require some employers to undertake monitoring, the extent to which commercial prevention services had the capacity to do so was doubtful. It was feared that this effect of this would be to create a double standard — one for those employers who could afford to take appropriate monitoring actions either themselves or with the aid of qualified and competent prevention services — and another for the rest.

Interviews with workers' representatives and their trade union officials tended to bear out the impressions given by the USL inspectors concerning the use of OELs. For example, workers' representatives believed that national level OELs were a necessary means of alerting participants to the existence of a problem that required attention. Thus, it was suggested for example by workers' representatives from the metal and chemical manufacturing sectors, that in their experience the main value in the adoption of the ACGIH list in collective agreements, was that it drew their attention to substances that may be in use in their workplaces and for which they needed to obtain appropriate information. The worker representatives from these sectors who were interviewed were unaware of any widespread use of OELs in enforcement, despite their inclusion in collective agreements. In contrast, they were able to point to numerous examples of their own experiences in which the existence of the list had prompted them to seek information on particular substances in use in their workplace or about to be introduced there. They were able to give further details of the results of the follow-up to these actions in which, by negotiation, employers had agreed to modify processes or substitute 'safer' constituents. They spoke of USL inspectors being involved in separate discussions with the employer on the same issues in some cases but did not perceive measurement and monitoring of the relevant OELs to have been of central interest.

The strong impression from these interviews was that the role of OELs was somewhat peripheral in the daily realities of the worker representatives' experience. Subjective perception of risk was far more significant. It was this subjective perception that instigated bargaining for better working environment or changes in work organisation, not the technical measurement of risk. They also pointed out that since inspection only reaches a minority of workplaces, the trade union role extended beyond the confines of the large workplaces in which there was strong worker organisation on health and safety to smaller, less well-organised workplaces in the same sector in which trade unions could bring pressure to bear through the adherence to the principles enshrined in the collective agreement. In this sense they provided another side to strategies described above in which the USL inspectors sought to achieve agreed protocols on OHS matters which would have more widespread effect in the sectors in which they were established than could be achieved through inspection alone. Thus the worker representatives confirmed from their own perspective the USL inspection approach. It is noteworthy that from either perspective, OELs do not play a prominent role.

They are not a main focus for compliance strategies even when such strategies deal with subjects such as reducing risk from exposure to substances such as wood-dust which have featured prominently in international debates on setting and using OELs.

6.6 CONCLUSIONS

The implementation of the Chemical Agents Directive poses some major challenges to the Italian system. It is not yet clear how these will be resolved. Transposition at the national level has engendered considerable debate. At the local level there is little sign of compliance strategies that place OELs in a central position, either from duty holders, workers and their organisations or the authorities for inspection and control. While representatives of all these players have quite strong views on the national debate, it is not obvious how these relate to local level experience, beyond concerns on the part of smaller enterprise owners over financial implications of measurement and the concerns of trade union representatives and inspectors that setting both single limit OELs and action levels according to the proposed definitions of risk will, in practice, have a negative effect on the willingness of many employers to follow best practice and reduce exposures to as low as technically possible.

There seem to be some major questions over what is actually being achieved by the introduction of the EU measures on OELs into the Italian system. Trade unions argue that such limits are not the truly health based values they seek. Employers' organisations fear that their adoption will require their members to invest heavily in the use of expertise to monitor workroom air, which, in the main, will be well within the relevant OEL. Inspectors, trade unions, and OHS professionals are all concerned that the national definitions of risk that are set to determine the extent to which duty holders are required take action will have the negative effect of allowing many employers to believe they need do nothing, which, in turn will make it harder for inspectors to require that they reduce risks to as low as technically possible.

OELs probably have some value at national or sectoral level as indicators of risk associated with exposures to some substances. As such they are useful in raising awareness of the possible need for action at local level. But at the local level, practical realities are such that improvements in OHSM are normally effected by means that neither require nor overtly involve the use of OELs. Therefore it is arguable that the confusion and obfuscation introduced by the current state of the transposition of EU measures on chemical risks, could well be greater than the benefits such measures seek to achieve.

However, this also needs to be seen in the context of the general features of the Italian system. One of its characteristics for example, is the great variation between regions. Since practices described by interviewees in the present study were all drawn from the industrialised northern regions — which are widely acknowledged as being comparatively well developed in terms of OHS provision and practice — they are not typical of Italy as a whole. Indeed the absence of input into the present study from representatives from regions in the South is largely a reflection of the lack of resources for health and safety in these regions. It further reflects their lack of engagement in issues at national level such as the development of guidance on transposition of the Chemical Agents directive. It may be that national measures therefore do serve as a useful guide. They may not have a great deal to offer regions in which good practice in OHS prevails, supported by relatively well resourced prevention departments of USLs, and bilateral information and advice structures, as well as by informed trade union representatives. But they are perhaps a useful baseline for the country as a whole since the law allows regions to develop better practices but, theoretically at least, it does not condone the implementation of lesser ones.

CHAPTER 7

THE NETHERLANDS

7.1 INTRODUCTION

Why the Netherlands?— The Netherlands was chosen as one of the countries for more detailed study because its policy on regulating the management of chemical risks at the workplace is widely held to be highly developed and at the same time to contain innovative approaches to the subject. As with other chapters focusing on specific countries, the original intention was to concentrate on the use of OELs in regulatory practices relating specifically to toluene and wood dust. However, we found that in the case of the Netherlands, a better understanding of the issues confronting the regulation of chemical risks was achieved by enlarging the scope of the study to take account of a wider range of substances, practices and participants.

The special features evident in the approach to both setting and using OELs in the Netherlands include, as we saw in Part 1, the involvement of trade unions and employers' organisations as well as representatives of the state in a relatively long history of engagement in standard setting and quite extensive arrangements to distinguish between health based criteria and the use of economic and technical considerations to agree limits. At sectoral level the Dutch approach to chemical hazards is distinguished by the particular prominence of the debate on substitution and the subsequent strategies to achieve this in certain sectors as well as by the recent emphasis on the use of '*convenanten*' to set agreed sector specific targets for improvement of the work environment which in some cases include agreement to improve on OELs. At workplace level several features have a bearing on the approach to dealing with chemical hazards. They include:

- statutory requirement on employers to contract with occupational health services to provide them with expertise in risk evaluation and control;
- role of workers' participation through works councils in arrangements for health and safety,
- strategies of the labour inspectorate to promote and support a systematic approach to occupational health and safety management.

To understand the significance of all these developments for the role of use of OELs in strategies to achieve compliance and their relationship to features of the wider regulatory system, it is first necessary to consider a little of the context in which they occur. This means outlining the regulatory framework within which OELs are established and used and presenting some of the political and socio-economic background to its recent development. We therefore begin this chapter with a brief overview of the background and relevant elements of the Dutch approach to regulating the work environment before turning our attention to the more specific issue of the role of OELs in the process of managing chemical risks.

7.2 THE POLITICAL AND LEGISLATIVE CONTEXT⁴²⁸

Political/economic contexts — The organisation of Dutch society and its economy has for many years been considered to be strongly corporatist in character with little inclination to formalities and bureaucracy. Its present day version, the so-called '*poldermodel*' or *overlegeconomie* ('Consultation Economy')⁴²⁹ is based on ongoing processes of consultation and negotiation between the social partners at different levels and between the government and the social partners at central level. This form of corporatism has in the past recognised the primacy of collective bargaining at the sectoral level. In theoretical terms, the Dutch corporatist system has been represented as 'bargained corporatism' characterised by 'positive-sum strategies' (Crouch 1994). These strategies have resulted in a large measure of consensus and a trade off between economic and social policy objectives. Thus, the role of bipartite and/or tripartite agreements (involving the government) to elaborate or complement legislation by the social partners or to *avoid* statutory regulation is prominent in the field of industrial relations and labour law. Implicitly, collective bargaining agreements are framework agreements, creating room and latitude for interpretations, adjustments and elaboration at the company level. This concept of tailor-made policy has pervaded OHS legislation and the means by which it is enacted.

The national Socio-Economic Council is a central level important structure within which the corporatist approach to health and safety matters is undertaken, with membership including representatives of the larger confederations of employers and workers and a special committee on OHS⁴³⁰.

Parallel to this corporatist approach, there was a highly developed system of social welfare in which, from 1967, the principle of *risque social* has been used in preference to *risque professionnel* in disability and absenteeism benefits. Alarmed by the escalating economic cost of benefits, in the mid 1980s the Dutch government embarked on a reform of the social security system. The reforms included cut backs on social security expenditure, with the dual purpose of both contributing to the government's efforts to reduce state expenditure and to serve as an incentive to increase labour participation rates. Further and more fundamental reforms followed with stricter criteria for access to benefits under the Disablement Insurance Act as well as shortening their duration. Also, attempts were made to introduce financial incentives in which under the Law on Sickness Absenteeism Benefits (*Ziektewet*) employers were required to pay for the first six weeks of sick leave of their employees. Further reforms with similar aims were announced in 2001 and 2002. These attempts to reform social security, mainly by putting up barriers to entitlements in order to reduce the volume of the newly disabled are important, because the policies behind them have also driven parallel reform in the regulation of preventive OHS management, such as the introduction of risk assessment and the role of occupational health services in undertaking assessment and in advising employers on preventive options. Employers are thus expected to have an incentive to improve the work environment in order to avoid higher premiums or to reduce financial risks related to high rates of absenteeism and disability.

⁴²⁸ This section is largely based on Popma et al in Walters (ed) (2002)

⁴²⁹ On the Dutch *poldermodel* cf. Visser and Hemerijck (1997). The question remains however if the Dutch system is really a distinct 'model'. Other countries, e.g. Denmark, share many of the Dutch characteristics.

⁴³⁰ As already pointed out in Section 1 (and discussed later in this chapter) there is a subcommittee of the Council dealing with setting OELs.

Legislation — Change in the discourse on the regulation of the work environment initiated in the late 1960s eventually resulted, in a new Act — The *Arbeidsomstandighedenwet* (Work Environment Act, *WEA* 1980) — of an altogether different character to its predecessor (Safety Act 1934). Two elements can be traced in the philosophy that underlay the *WEA*, related to successive macro socio-economic and political developments in the 1960s and 1970s within the Netherlands. First, the concept of ‘humanisation of labour’ was a *leitmotiv* of the philosophy underlying the Act (Wilthagen 1994). The Act, more concretely, consisted of:

- a broad concept of what was to be understood as ‘safe and sound working conditions’: decent working conditions were not only supposed to include occupational safety and health, but also workers’ well-being
- a high standard of protection, that is, the highest possible standard in the light of technical and organisational developments (so humanisation also means ‘optimisation’)
- co-determination rights for employees.

Second, the view of the state’s role in society and economy underwent a change which, with respect to health and safety policy, led to greater emphasis on *self-reliance* from employers and employees. Here the Dutch approach was influenced by the example of the UK, HSW Act 1974 and the Robens’ philosophy that underpinned it. The principle of self-regulation meant:

- The 1980 Working Environment Act was a Framework Act, stating general principles and duties rather than precise rulings. However, the manifold, detailed Safety Regulations that formed part of the 1934 Safety Act were preserved in this stage of the regulatory development (somewhat at odds with the general character of the new Act and the underlying principle of self-reliance)
- A tripartite structure was created at the national level, the so-called *Arboraad* (Work Environment Council), within the Social and Economic Council in which the co-operation between the social partners and the government had to be worked out
- The powers of works councils were expanded in the area of OHS.

Since 1989 the *WEA* has been adjusted twice. The first and most significant reform in 1994 transposed the requirements of the Framework Directive. Many provisions of the Framework Directive were already in line with the content or purpose of the existing provisions of the *WEA*, especially those on the general duties of care, co-determination, consultation and training. However, the Directive’s provisions on risk assessment implied a more significant adjustment of Dutch law. The main idea of the 1994 version of the *WEA* was to put greater emphasis on a systematic approach to OHS. The employer’s responsibility to develop and pursue an OHS policy was extended by a requirement that such a policy be based on a thorough risk assessment and be moulded into a plan of action. In the case of risk assessment, amendments were made to Article 4 of the 1980 *WEA*. As of January 1 1994 Article 4, Section 1, stipulated:

“In pursuing his general business policy the employer must aim this policy at a maximum possible safety, a maximum possible protection of health and the promotion of the well-being of the employee within the enterprise or the institution; this policy comprises the means and the way to reach this goal, it lays down the distinct powers and responsibilities which in this respect rest with the persons who are employed by the employer, *and should be based on a sound written-down assessment and evaluation of all hazards which the work involves on the safety, the health and the well-being of employees. These hazards include, among other things, the hazards of tools, machines, devices and other aids regarding the work, substances*

or preparations that are being used and the arrangement of the workplace. The assessment and evaluation should also include the hazards that can not be avoided, as well as the hazards for groups of employees that can be considered extraordinary. Besides, it should be laid down which measure will be taken in relationship to the hazards referred to and the relationship between these, in accordance with that stipulated in Article 3.” (authors’ italics).

Article 18 of the *WEA* makes it mandatory for employers to call in the support of the (external or internal) occupational health services (*Arbodienst*) in drafting a risk assessment and evaluation. It requires firms to contract certified multidisciplinary OHS services to support or provide risk assessments, monitor company OHS and absenteeism policies and monitor shop floor conditions. This was one of the major innovations in the 1994 legislation. A limited number of the functions provided by OHS services are mandatory. As well as risk assessment they include for example, requirements to provide care for sick employees, to perform medical examinations and to be available for consultation by employees. However, poor quality of OHS services and their lack of independence have been a controversial issue ever since the system was introduced in 1994. This is to a large extent attributed to the commercial setting in which the OHS services operate.⁴³¹

The Ministry of Social Affairs and Employment further promoted the systematic approach to OHS by a publication on OHS and absenteeism policy,⁴³² which introduced the 5-W planning circle.⁴³³ Also, the ministry promoted the development of guidelines on OHS-management, the so-called NPR 5001.⁴³⁴ In inspection policy, it was expected that companies complying with the NPR 5001 could look forward to a more relaxed attitude of the Labour Inspectorate.

The second reform was the revised *WEA* 1998 (*Arbeidsomstandighedenwet 1998*), which came into force on 1st November 1999. Administrative fines were introduced in the revised Act as a new enforcement tool for the Labour Inspectorate. These fines can amount to a maximum of 4,537 Euros or 11,345 Euros depending on the category of the infringement. They can be imposed for negligence of administrative obligations, such as the absence of a risk assessment or a plan of action (failure to produce adequate evidence of monitoring in relation to OELs falls into this category), failure to report severe accidents, shortcomings in supplying information to employees or the absence of a contract with an OHS service to undertake the mandatory tasks of these services. The higher fines result from violations of safety regulations, such as lacking protective measures *or exposure of workers to dangerous substances*. Employees can also be fined, for example, if they refuse to use safety precautions. More than 2200 administrative fines were imposed in the first year following their introduction, with an average level of 2100 Euros.

OHS ‘convenanten’ — A further relevant development in OHS regulation in the Netherlands was the announcement in early 1999 of the Secretary of State’s intention to conclude so-called OHS ‘convenanten’ (*arboconvenanten*) with a number of sectors of industry and public

⁴³¹ *Trade unions and labour inspectors, frequently claim that employers do not assume the responsibilities required of them by this system. They also criticize the lack of independence of the OHS services, pointing out that in reality, the position of these services within firms is precarious, since employers can easily switch to another service once their contract has expired. The pressure on them to do what employers require of them is therefore considerable and their independence reduced as a result (Popma et al 2002).*

⁴³² *Arbeidsinspectie, Arbo- en verzuimbeleid, publikatieblad P-190, later reedited into Arbo-informatieblad 1*

⁴³³ *Willen, weten, wegen, werken, waken (to want, to know/assess, to weigh/plan, to work, to monitor)*

⁴³⁴ *NNI (Standardization Institute of the Netherlands), Technical Report NPR 5001: Guide to an Occupational Health and Safety Management System, 1996.*

services. They aim to reduce populations at risk; that is, those exposed to prioritised occupational hazards

The government has selected 29 high risk sectors, but additionally, other sectors have applied spontaneously for a covenant probably stimulated by the subsidies the government has made available for the drafting and implementation of OHS '*convenanten*'.

By November 2002 there were 19 declarations of intention and 33 *convenanten*. The strategy can be considered an application of the idea of self-regulation and self-reliance. However government involvement, by being a party to the covenant (particularly because of its provision of financial support), makes it more appropriate to characterise the '*convenanten*' as another manifestation of the Dutch '*poldermodel*'. Still more interesting is that the government intends to incorporate some elements of the various '*convenanten*', such as weight limits or noise thresholds, into public regulations and thereby adopt these standards in its inspection policy. An example here is the recent incorporation of limits on heavy lifting for employees on construction sites, which will become law from January 2003. Hence an interesting mix of public private regulation is emerging (see 7.3 below).

Enforcement policies and practices — According to the official policy of the Dutch Labour Inspectorate, the obligation for companies and establishments to produce a risk assessment should eventually lead to a reduced role for the Labour Inspectorate in routine inspection. That is, inspections should change in character, as OHS management becomes increasingly the company's responsibility. Rather than the inspectorate, it should be "internal checks and balances" in a company that come to play a key role in correcting employers' unwillingness or 'bad behaviour' with regard to OHS matters.

To achieve this change in strategy, Labour Inspectorate inspections are focused more on the management systems of the firms they visit. Inspecting (and if necessary correcting) shop floor situations is no longer an end in itself. Rather, shop floor inspections should be used as a way in which to control the company's OHS management system. By seeking the reason for shop floor irregularities in deficits in the company's OHS management system, enforcement can primarily take place at a 'system level'. An exception is made for serious offences, which will still be enforced in a direct way. However, this does not mean that the Labour Inspectorate charges itself with telling the companies *how* to establish their OHS management systems. Its intention is to exercise its system control in a more *remote* way. Far from telling companies what to do, the Inspectorate should check *whether* specific shop floor irregularities are accounted for in the risk assessment and only marginally check *the way in which* shop floor risks are accounted for.

Most prominent in the Inspectorate's official policy is the movement away from its former advisory role, whether at a shop floor level or system level⁴³⁵. The new actors in the field of OHS-regulation - the OHS services - are supposed to take over this role. With the introduction of an administrative fine as an instrument of enforcement, the Inspectorate is considered to have confined itself even further to the role of 'OHS police'.

⁴³⁵ *Formally, this policy was introduced as a consequence of the infringement of certain articles of the WEA being defined legally as economic offences, however, in practice it revealed a new notion of government withdrawal. It was also strongly associated with the government's preoccupation with enforcing basic norms and achieving short-time results. As a result, the meaning of self-reliance changed and while the responsibility of employers and workers remained the cornerstone of the concept, the supportive attitude of the Labour Inspectorate no longer formed a contributing aspect. Instead, the policy-makers took a distant, formal and strict approach in which employers and employees were expected to regulate working conditions in order that the Inspectorate kept its distance. If they did not, then the Inspectorate would strictly enforce the prescribed norms.*

The inspectorate suggests that from 1994 onwards it has put great emphasis on the relation between occupational health problems on the shop-floor and their management, and not only by looking into the “paper world” of the Risk Assessment documentation. Its policy has been to define for each economic (sub-) sector the most severe occupational health problems. They are the main topics of its inspections in the sector concerned and inspectors start their inspection on the shop-floor to discover whether or not these problems are properly handled. If they are not satisfied they may give a warning or a fine on the subject and look into the risk assessment to establish whether the risk has been properly managed at the policy level of the company. Similarly, in cases of complaints or accidents, the inspector will primarily focus on the causes, give a fine in the case of a breach of law and successively look into the risk assessment and the plan of action. However, researchers that have observed the strategy of the Inspectorate in practice do not entirely agree with this assessment and suggest that the Inspectorates practice could more easily be described as ‘business as usual’, in as far as it contains few elements system control and when it does, inspections do not usually have a bottom-up character, but are executed from the top down. That is, according to these researchers, shop floor irregularities are not the entrance to system control.^{436 437}

7.3 THE DUTCH APPROACH TO OELS

The policy and regulatory background described in the previous section gives us the clues we need to understand the significant features of the Dutch approach to setting and using OELs. As we saw in Part 1, Dutch OELs are assessed for technical-economic feasibility by the MAC-Value Sub-committee of the Social and Economic Council. They are legally binding and monitoring exposure levels should form part of risk assessment. This is a function undertaken or approved by the *Arbodiensten*, that it is mandatory for employers to call in to support risk assessment and evaluation.

The extent to which this occurs in practice however is somewhat debatable. Surveys of compliance with risk assessment requirements have showed it to be incomplete.⁴³⁸ A similar pattern occurs in the Netherlands as is experienced in other countries. Large enterprises show a much higher degree of compliance than is experienced in small companies despite almost all enterprises having access to the services of the *Arbodiensten*.

Monitoring in practice may be complicated by the fact that it would appear to be not only the *Arbodiensten* that are involved. Interviewees in the present study, suggested varying degrees of involvement of other technical consultants independent of the *Arbodiensten*, such as freelance occupational hygienists or members of university departments etc., although no precise figures were available. A corollary of this, also suggested by some participants is the notion that the *Arbodiensten* may not always be optimally skilled or equipped to carry out monitoring⁴³⁹. Although such services are required to be multidisciplinary in order to be

⁴³⁶ Schaapman, M. unpublished PhD thesis, University of Amsterdam.

⁴³⁷ An indication is that, in 2000, less than 3 per cent of the companies inspected were fined for not having conducted a risk assessment, whereas at that time less than 50 per cent of the companies had in fact complied to the WEA in this respect (Popma et al 2002). Recent surveys put this figure higher – at 75 per cent (ARBO-balans 2001).

⁴³⁸ See footnote in previous section (Popma 2002) also Karageorgiou et al (2000: 272-274) and Popma: (2002: 204-205)

⁴³⁹ According to Popma et al, (2002: 202) over 90 per cent of contracts concluded with OHS services consist almost exclusively of medical care, with little investment in preventive activities.

certified, the dominance of market determinants of their usage by employers may mean that occupational hygiene skills and instruments are less widely available in practice within the *Arbodiensten* than might be theoretically anticipated. It is difficult to determine whether this in fact amounts to a problem. It is also likely that there will be considerable variation between sectors, with those sectors in which there are large enterprises using chemicals for which OELs exist, being more likely to be serviced by *Arbodiensten* with occupational hygiene monitoring skills and experience, because of the market demand, than other sectors where there is less demand. However, since such demand is also a function of employers/employees knowledge and awareness of chemical risks to begin with, being less well served does not necessarily mean being less at risk. Under such circumstances, in the absence of detailed survey evidence, it is difficult to know how much the needs of workers exposed to risks from airborne chemicals are actually being addressed. It would seem probable that within the market driven Dutch system, given its overt focus on sickness absence and medical surveillance, there are likely to be many situations, especially in smaller enterprises where chemical risks exist, but where monitoring requirements remain unmet.

It is also arguable that the resources needed to meet such demands anything like completely would be enormous. Moreover, as we have seen in other countries there is a further argument suggesting that such an approach would, anyway, be unnecessary for the majority of situations in which chemicals with OELs are in use. It is partly in cognisance of these kinds of issues that in the Netherlands during the past decade there has been a conscious effort to explore alternative approaches to addressing prevention of chemical risks.

In the strategic approach to the practicalities of controlling chemical risks in the Netherlands, the point of departure is the requirement in Dutch law to reduce exposures to substances hazardous to health. The so called ‘Strategy of Industrial Hygiene’, guidance made under the *WEA* provides the guiding principles that aim to reduce exposure by using recognized good industrial hygiene principles such as appropriate engineering controls as close as possible to the source of exposure. Generally speaking, this involves for example:

- tackling the problem at source by replacing or removing the hazardous substance
- physically separating people from the source of danger
- installing ventilation, extraction systems etc.
- as a last resort, providing means of personal protection.

Employers are required to produce a risk inventory and to draw up an action plan indicating how they will make improvements. The determination of the extent and duration of exposure of workers to substances hazardous to health is an essential aspect of the risk inventory. Theoretically, therefore there should be quite extensive measurement of exposure undertaken by or on behalf of the employer (such as that by the *Arbodiensten* mentioned previously) as well as some data from monitoring by the Labour Inspectorate itself (which occurs when there is reasonable doubt about the situation in the company and the employer is unwilling or unable to undertake measurement). However, trade unions believe that only 25 to 40 per cent of companies actually undertake such risk evaluations and even fewer (15-20 percent) are really measuring levels in workplace air. These estimates are based in part on the sources of information on extent of risk assessment in general (see previous section) and in part on reports from the labour inspectorate concerning approaches to chemical risks in specific sectors.

Given the limited number of enforcement actions taken in relation to risk assessment generally (see Popma 2002), it seems unlikely that there will be significant enforcement actions following the failure of companies to measure OELs as part of their obligations to

document risk assessment. This seems to be borne out by the limited data in available Labour Inspectorate reports concerning inspection projects in various sectors. They identify the violations and enforcement actions, sometimes with reference to hazardous chemicals but generally did not indicate that monitoring of OELs featured significantly as an aspect of either the violations or the enforcement actions. For example, in the inspection report for the year 2000 on the metal working sector, there were a total of 962 violations of which over 300 were to do with not evaluating chemical risks in relation to carcinogens but only three specifically referred to exceeding exposure limits. In other violations in the sector concerning chemicals such as for example in handling of solvents (42 violations), there was no mention of OELs (Min. van Soc. Zaken en Werkgelegenheid 2001⁴⁴⁰). In inspection reports for 2000 in the chemicals sector, practices concerning dangerous substances were amongst the most frequent violations of the law but OELs are not mentioned. Similarly in reports for the same year for sectors dealing with paints, agrochemicals, rubber and plastics there was mention of work with dangerous substances, but no mention of violations or enforcement actions in relation to exposure limits.

Trade unions point to several ways in which the Labour Inspectorate operates in relation to monitoring compliance with standards on managing chemical risks (including compliance with OELs). It issues warning instruments, it follows these with enforcement actions if it believes the duty holder has not heeded the warning. It can serve spot fines, including in relation to failure to comply with requirements on OELs (as previously noted). It can stop work altogether if the inspector believes there are imminent and direct dangers to employees. However, these actions are more common in relation to faulty machinery than with regard to the use of chemical substances. The inspectorate is also obliged to investigate employee complaints. Trade unions are able to put pressure on the inspectorate to be more reactive in this respect by themselves recording and supporting employee complaints. Given that concerns about chemical safety form a large proportion of the inquiries that trade unions receive from workers (see below), this in theory should mean that there are a substantial number of inspections that deal with the management of chemical risks.

In certain sectors such a metalworking and ship repairing there is more information available on the number of companies with risk evaluation reports and about the level of measurement of OELs. These are amongst the sectors in which the Labour Inspectorate has adopted strategies in which it is trying to work in a more systematic way and to inform and engage employers in its effort to make risk evaluation a more meaningful activity for them (see previous section — **7.2 Enforcement policies and practices**). It has reported some success with these approaches. Officials from trade unions organising in these sectors that were interviewed in the present study suggested that such approaches were instigated following union demands and that they are undertaken in conjunction with the trade unions and employers. The systematic approach that has been adopted also results in more attention being paid to measurement of OELs as indicators of risk evaluation.

Substitution, the Dutch approach — The generally unsatisfactory nature of this position coupled with concerns in relation to exposures to particular classes of substances (such as those to organic solvents for example) has led to the development of further strategies aimed at reducing chemical risks. The best known of these is the Dutch approach to substitution, which was primarily conceived as a means of addressing the problem of exposure to organic solvents, but certain aspects of which have been adopted more widely. The origins and

⁴⁴⁰ Unpublished Labour Inspectorate reports on inspection statistics for the year 2000 were obtained for a number of industrial sectors, including Chemicals, paint, agrochemicals, metal-working, plastics and the rubber industry.

development of the substitution approach can be found in concerns on the part of trade unions and sympathetic experts that the system for setting OELs and their translation into effective strategies for chemical risk management was not producing adequate results in practice. Generally, although the industrial hygiene principles of the law imply that quantitative measurement of workplace air is required where hazardous substances for which an OEL is specified are in use, as we have seen, evidence suggests that such practices are not widespread. Also employers were reluctant to commit themselves to such a practice and preferred the notion of a qualitative assessment. The Labour Inspectorate often supported employers in this preference. Furthermore the weaknesses inherent in the meaning of the exposure limits (i.e., the health/economic and technically feasible debates) often meant that even where substantial and measurable adherence to the OELs were observed, the safety of employees could not be assumed.

During the 1990s, following the asbestos crisis, trade union health and safety departments became more aware of members' concerns over chemical safety. Nowadays for example FNV Bondgenoten⁴⁴¹ records inquiries about health and safety from workers. Those on chemical safety are amongst the top three matters on which it receives questions. A particular focus of concern was the incidence of organo-psycho syndrome (chronic toxic encephalopathy). Exposure to organic solvents (widespread in industries producing and using paints, printing inks, varnishes, glues and adhesives, degreasers and cleansers) is common amongst decorators, paint sprayers, automotive sprayers, industrial sprayers, printers and production workers in paint factories, chemical industries, metal industries and polyester processing industries. Roughly half a million workers in the Netherlands were estimated to have daily contact with organic solvents. Growing awareness of problems associated with exposures to organic solvents during the 1990s led to recognition that applying the principles of the industrial hygiene strategies that were the basis of the guidance to achieving compliance with the *WEA* previously described, would at best, only contribute to reducing the number of workers affected by organic psycho syndrome (OPS) in the long term⁴⁴². Also trade unions argued that companies and the *Arbodiensten* were failing to invest sufficient effort in these principles, and the Labour Inspectorate's efforts to ensure they complied were not producing adequate results. In short, they argued there was a considerable gap between the legislative principles and the workplace reality. Moreover, a further issue highlighted by concerns about OPS was the limitation of using OELs to manage the kind of chemical risks involved in causing the condition. People were identified as suffering from the condition while at the same time employers claimed that exposure limits were being observed. One reason for this was that the OELs in question were based on time-weighted average exposures. They therefore took little account of possible peak exposure. It was argued that the work methods involved in using organic solvents often resulted in peak exposures to individuals that were greatly in excess of the OEL but which were not measured⁴⁴³.

A long and difficult political struggle followed, in which trade unions argued that the substitution principle needed to be put more prominently in the strategies of compliance and

⁴⁴¹ *FNV Bongenoten is the largest trade union in the Netherlands with over one and a half million members. It was formed in 1998 as the result of a merger between four smaller unions, representing workers from a variety of sectors including transport, metal manufacture and chemicals, private services, and agriculture.*

⁴⁴² *In the late 1990s it was estimated that there were 2,500 workers seriously affected by OPS with about 200 new cases each year (FNV Bondgenoten 2000)*

⁴⁴³ *While the health effects of short term exposures are not understood, the Health Council has now issued an opinion suggesting that it is likely that short-term exposures contribute to OPS. As a result it has introduced a Short term Exposure limit (STEL) of twice the OEL for organic solvents and a ceiling value of ten times the OEL. However, this does not entirely solve the problem since there are difficulties with measuring such exposures in many workplaces with the instant readout instruments required to do so.*

that it needed better reinforcement by the regulatory agencies. The condition of OPS was eventually recognized as a work-related disorder, and in 1997 the government decided it was necessary to address this issue specifically by tightening the requirements of the *WEA* to reduce health risks from organic solvents by tackling the issue in a different way. A principle of substitution became part of the guidance adopted by the Ministry for Social Affairs. It began to come into effect in January 2000. In a number of sectors where it was considered that there was inevitable and unavoidable exposure to high-risk substances a substitution regime was set out, sector by sector. Trade union and employers' organisations were directly involved in the development of the regime. Tripartite discussion took place on the way in which this principle of substitution could be put into practice in sectors such as car repair, interior decorating, floor covering and printing⁴⁴⁴. Agreements were reached in these sectors to replace certain organic solvents with less toxic products. In other sectors such as metal-working, shipbuilding, furniture manufacture and cleaning, tripartite discussions are continuing.

As well as the political debate surrounding the principle of substitution there is also the question of defining what can be substituted. In every case there is a debate between the trade unions, the Ministry and the employers. Manufacturers also obviously have a major economic interest and are heavily involved. Generally the approach to substitution is product based. For example, it is forbidden to use indoor wall paints with greater than 75 grams of organic solvent per litre of paint. Another approach that is used in printing is to base substitution on flash-point classification and definitions of volatility, thus forbidding the use of substances with low flashpoints/high volatility. The major difficulty with these approaches is that while they work reasonably well for specified processes there are problems with their wider application and this often results in the need to formulate a specific substitution obligation for each process. This is clearly time consuming and resource intensive. In attempting to address this issue the chemical industry has tried to introduce generic standards that are based on a coding system that is a combination of physical properties of the product such as its organic solvent content and vapour pressure with the OEL for the solvents it contains. Using this approach allows simple calculation of the amount of air needed to ventilate a room in which the product is used and can thus be an means of determining both choice of materials and work methods to maximize safety when using products containing organic solvents.⁴⁴⁵

Despite the many problems encountered with the practical application of the substitution principle, Dutch trade unionists and their supporters believe that it is nevertheless an effective way of thinking about how to manage chemical risks in which many of the problems associated with OELs can be avoided. For example, it makes debate about the extent to which OELs represent safe levels redundant. It is relatively simple conceptually and does not necessitate the detailed (and often technical/scientific) understanding required to appreciate the limits of the use of OELs in managing chemical risks. Nor is it necessary to provide sophisticated skills and instruments in order to monitor risk, as is often the case with OELs. Moreover it shifts the onus of providing for safety away from users and on to suppliers to provide safe products. When this is supported by market orientated regulatory strategies that provide positive incentives to manufacturers and suppliers to adapt their production to meet demand it has the potential to encourage research and development strategies aimed at safer products. While presently, most of the experience of substitution is in decisions around the

⁴⁴⁴ *Interior decoration and carpet laying was the first sector to be regulated in this way.*

⁴⁴⁵ *For example, a similar approach is used in Denmark where, paints have a coding classification on their labels. The higher the value the greater the risk, thus for example, a painter knows s/he can only use paints indoors that have a coding below 001.*

use of organic solvents, the principle itself has a considerably greater range of potential applications in managing chemical risks.

Of course this is very much a best case scenario — it is highly unlikely that the principle of substitution would result in the practical substitution of safer products in anything like every situation in which a hazardous substance is used. It is nevertheless a powerful point of principle and a useful orientation towards thinking about strategic approaches to using hazardous substances. This is especially so when it is linked, not only to using substances in work situations but in an holistic way to their production and to the environmental consequences of their use⁴⁴⁶. The significance of the approach becomes even more apparent when it is placed in the context of the broader governmental strategies outlined previously. Successive Dutch governments since the early 1990s have placed greater emphasis on the role of private self-regulation, privatised services, market based approaches and state retreatism in regulating occupational health and safety. Involving suppliers in this process is a logical extension. Coupled with the Dutch '*poldermodel*' tradition, this means that social actors in the employment relationship and the increasingly market driven advisers of employers as well as the manufacturers of hazardous substances are all encouraged to work together to achieve private solutions to risk management that are perceived as beneficial to all parties.

'Convenanten', a further extension of self-regulation — As we saw previously, recent quasi-regulatory strategies of the state have attempted to build further on these approaches through the development of '*convenanten*' at sectoral level. The role of '*convenanten*' in regulating chemical risks is therefore quite important. Although the coverage of sectoral '*convenanten*' is normally broader than chemical risks alone, such risks and OELs may form part of the '*convenanten*' that are agreed or under discussion in some sectors. Trade unions have engaged willingly in the negotiations that lead to '*convenanten*' in some sectors. They perceive advantages in being involved in the development of the prevention strategies they contain. At the same time they are wary about the notion of responsibility that is implied by the '*convenanten*' and in particular, the way in which the existence of the covenant is perceived to allow withdrawal of the Labour Inspectorate from engagement in active enforcement in the sector.

The development of the use of '*convenanten*' is quite well illustrated by the experience of dealing with the problem of wood dust. In 1994 the trade unions and employers' organisations in the parts of the wood industry (wood trades, furniture industry and timber) agreed there was a need to revise the OEL, because of its hazards generally and in view of the debate on the carcinogenic properties of some wood dusts. Up to this time the *Arbodiensten* used in the industry were themselves not always aware of the significance of the risks associated with wood dust and frequently did not measure exposure levels when carrying out risk assessment on behalf of employers. In 1996 the trade unions and employers agreed to a voluntary lowering of the OEL from 5mg/m³ to 2 mg/m³ in the timber and furniture industry. This was incorporated in legal requirements in 1999. As the industry is composed mainly of small enterprises in which there are real problems of health and safety awareness, during these three years, employers and trade unions in the sector collaborated on many activities to publicise the new level and to advise companies on how it could be achieved. The unions also mounted their own campaign that was well received in the industry. The social partners both together and independently, extended information provision, including that to the personnel of the *Arbodiensten*. Despite the resulting raised awareness, not surprisingly, employers had

⁴⁴⁶ This is what has happened in the graphical industry where Ministry for Social Affairs has adopted an environmental agreement that has achieved a ban on ammonia chlorinated hydrocarbons (including, toluene) in the industry.

concerns about the increased cost of measurement to monitor compliance with the new OEL. Partly for these reasons, the trade unions and the industry launched a project with the aid of a professional occupational hygienist, to develop a measurement protocol on simplified means to assess wood dust levels in workplaces that would be uncomplicated and inexpensive and which included subjective estimates of the levels of contamination.⁴⁴⁷ The measurement protocol was agreed by the Labour Inspectorate and the *Arbodiensten* also informed.

In each Labour Inspectorate region of the Netherlands, there is an inspector with overall responsibility for seeking compliance in the wood industry. There is therefore a small group of inspectors who have become highly specialised in the means to evaluate and control risks in the sector. Trade union health and safety officials believe that there has been considerably more measuring of exposure levels in the industry as a result of all these activities and they perceive labour inspectorate demands for measurement to be more insistent as a result. For example, during the past two years the Labour Inspectorate has made a special effort to inspect woodworking companies. If companies are unable to present inspectors with a measurement report showing the extent of compliance with the OEL, in the majority of cases the Labour Inspectorate has demanded measurements be taken and reported. Indeed, the employers' organisation in the timber industry has complained that too many measurements have been demanded of its members by the inspectorate.

At the same time as these developments based on social partnership in the sector were taking place in the late 1990s, the Dutch government was promoting the notion of sector based '*convenanten*' in which employers and trade unions would take on greater responsibilities for self-regulation of the risks. The experience of the trade union FNV BOUW that organises building workers and wood workers is fairly typical. Three of the five sectors that are covered by FNV BOUW were amongst the 29 high-risk sectors selected by the government as areas in which '*convenanten*' might be developed. The trade union was initially approached by the state to explore whether it would be interested in developing voluntary tripartite arrangements in relation to certain hazards in the sectors in which it was active. There were considerable resource incentives provided by government to facilitate these developments. Trade unions and employers organisations in the various sectors met to create 'intention documents' which, following a period of further discussion between the tripartite partners are elaborated into '*convenanten*'. One of the key aspects of the '*convenanten*' is the requirement that they must have measurable objectives, to ensure that they did not simply become another paper exercise that was ignored in workplace practice.

Therefore, baselines are established in the '*convenanten*'. Progress can be measured in terms of objective indicators of achievement in comparison with these baselines over time. In theory OELs provide such useful objective indicators. Where they are used in '*convenanten*' it is normally with the proviso that the partners to the agreement will strive to reach levels of performance that improve on that set by the OEL. However, there is a pragmatism evident in the choice of what is achievable and it is interesting to observe that there is variation in the risks that the partners have agreed to include in the covenant. For example in the timber industry the areas under discussion include physical strain, wood dust, noise and psychological strain. The same ones and additionally, return to work strategies, are included in the wood trade. However, in the furniture industry the subjects include organic solvents, physical strain and return to work strategies but wood dust has been excluded. Clearly the differences in subject matter reflect awareness in the sectors about the risks encountered in different sectors. But they also reflect a sense of what is achievable. Thus, while wood dust is

⁴⁴⁷ "...if you can't see the other side of the room — you know you have a problem. If you can eat of the floor you know you don't. It is the grey area between these two where you need to measure"

a major problem in the furniture industry it is not amongst the issues that are agreed to be part of the covenant. Because it perceived it to be a significant problem the trade union wished it included. However, the employers' organisations refused because, while it did not dispute the nature of the risk, it was not confident that the industry could meet the improved exposure limits that would have been required in the covenant. Eventually the union reluctantly agreed. The spokesperson for the union interviewed in the present study argued that while they are still unhappy about the exclusion of a significant risk from the covenant it is easy to see in hindsight the problems that would have been caused by including unrealistic standards. She pointed to the struggle currently experienced in sectors with less of a wood dust problem, such as the timber and wood trades, to even reach the minimum standard of $2\text{mg}/\text{m}^3$, let alone go beyond it as is required in the '*convenanten*' they have agreed.

The covenant is not intended as a static instrument. It is therefore quite feasible that inclusion of improved targets for reducing wood dust exposures will take place in the future as social dialogue on the issue continues, market pressure is brought to bear on manufacturers to improve machinery emissions/extraction and the industry becomes more confident of their achievement as a result.

An approach that is not only self-regulatory but also a systematic strategy for occupational health and safety management (OHSM) is an important feature of the tripartite dialogue behind the covenant. It is also fundamental to the state policy that informed their introduction. It relates to the systematic approach in the legislative strategy of the WEA 1994 and 1998 and the resulting inspection and control strategy of the Labour Inspectorate mentioned previously. In this respect OELs are not the central issue for preventive strategies. They may on occasion be useful indicators with which to help measure performance against the agreed targets for systematic OHSM, but in many cases there may be other equally helpful indicators. In addition, application of the substitution principle (an important principle that the trade unions have sought to retain in the negotiation of '*convenanten*') can often mean that measurement of OELs for hazardous substances will become increasingly unnecessary as the hazardous substances themselves are replaced.

The self-regulatory element of the '*convenanten*' is one that has caused the most disquiet amongst critics who argue that they imply a reduced role for the labour inspectorate and are in keeping with strategies of withdrawal of the state from regulatory activity. The negative effects of this at the level of the workplace, is a cause for concern about reduced protection for vulnerable workers. The idea of shared responsibility for health and safety between workers' organisations and the employer implies that there should be a shared distribution of power within enterprises, which is far from always (if ever) the case. In practice this means in effect that where there is well-developed worker organisation for health and safety within a workplace the covenant may have a positive role in further enhancing and supporting its engagement in OHS issues. This seems to be taking place in sectors such as metal manufacturing, chemicals, construction and woodworking, where trade union officials report progress with access to information and positive discussions with employers on OHS strategies including those relating to managing chemical risks. In these sectors trade unions also report positively about the opportunities '*convenanten*' provide for the workers' organisations to be more proactive on work environment issues and to be directly involved in building up knowledge on solutions to problems. They also suggest it presents a new way of working more positively within the trade unions themselves.

However, while it may enhance workers' rights to such things as information and participation in managing chemical risks the covenant itself cannot create workers' organisation. Therefore in sectors where such organisation is weak, it is feared that the

existence of '*convenanten*' may be counterproductive. Not only will unorganised workers be unable to take advantage of the potential for increased participation that '*convenanten*' offer, they may even become more vulnerable because Labour Inspectorate inspection strategies result in less inspection in such sectors. It is also pointed out that unlike labour inspectors, workers and trade union representatives have no legal instruments to ensure compliance. The withdrawal of the inspectorate as a result of the covenant therefore implies an increased responsibility without an increased authority for workers' representation.

7.4 CONCLUSIONS

In this chapter we have drawn attention to the long and continuing history of corporatist approaches to regulating occupational health and safety in the Netherlands. The well developed structures for setting OELs that address both health and economically based issues reflect this history. The sectorally based social dialogue resulting in emphasis on the principle of substitution as well as the development of agreed performance targets and their indicators in sectorally specific '*convenanten*' is a further manifestation of the corporatist approach. At the same time, aspects of these developments also reflect the large degree of pragmatism evident in the Dutch approach evident at both central and sectoral level.

Recent regulatory approaches to occupational health and safety in general have increased the emphasis on self-regulation and self-reliance at sectoral and enterprise level. Partly as a consequence of this, the involvement of the social partners in setting work environment strategies that aim to deliver defined performance objectives is evident especially at sectoral level. At the same time national regulatory strategy has emphasised a systematic approach to OHSM. However, systematic approaches to inspecting occupational health and safety management may be less well developed in practice than might be assumed from regulatory policy and some scepticism has been expressed concerning this issue.

These developments have a number of consequences for the role of OELs in inspection and control. For example, OELs sometimes feature in the definition of performance based targets in the self-regulatory strategies agreed at sector level. They can also be performance indicators at the workplace level for systematic OHSM. However, they are not the central feature of either and as such they are not perceived as ends in themselves but mainly as tools with a role in measuring the extent to which the more fundamental self-regulatory and systematic strategies to achieve OHSM in relation to chemical risks are working.

How has this all affected the daily business of managing risks associated with the chemical substances? Theoretically, those with OELs require evidence that exposure levels are acceptable. This is normally obtained on behalf of employers by the occupational health services (*Arbodiensten*) with which they are obliged to contract to ensure that the risks of their enterprises are evaluated appropriately. However, the degree to which this is actually carried out appears to be less than optimal. Although risk evaluation is a statutory requirement for the services that the *Arbodiensten* supply to support employers, they are commercial organisations and the main market demand for their engagement is directed towards sickness absence and medical surveillance. Therefore it is likely that unless employers demand it, they will not undertake such monitoring. For the same reasons it is also likely that despite requirements on competence many of the *Arbodiensten* may not possess the expertise required for sophisticated monitoring of OELs. Moreover the extent of enforcement of the demand for this level of monitoring is also in general, limited. This is one of the reasons why trade unions have adopted a strong line on substitution strategies which, if undertaken successfully render the need for this kind of monitoring largely redundant.

There is no doubt that OELs have played an important part in the development of awareness concerning chemical risks in Dutch workplaces. In this respect their role is regarded as important. At the same time, the limitations of over-reliance on exposure standards is also perceived. As a result a recent, strong emphasis on the principle of substitution as a strategic choice for managing chemical risks has emerged as a major strategy in controlling chemical exposures at the workplace. Emphasis on the substitution of organic solvent has been a prominent feature of national and sectoral approaches to substitution.

These developments are evident in relation to toluene and wood dust, which were the two substances that were intended to be the primary focus of this part of our study: The primary strategic approaches to dealing with risk management in the case of toluene often involve discussion of the issue of substitution. Inspection strategies in cases in which there is no obvious substitute for toluene (such as for example in gravure printing processes) appear to require evidence of OEL monitoring. In the case of gravure printing, there is fairly extensive monitoring of toluene by occupational health services, although employers tend to interpret the OEL literally as a safe level⁴⁴⁸. Although the existence of the OEL can stimulate the awareness of chemical risk in relation to a specific substance such as toluene to spread quickly in an industry, generally, once it is established that that exposure does not exceed the OEL, further measurement is seen as unnecessary.

The value of the OEL both in substitution and in control at source appears to be linked to awareness of chemical risks. At the sectoral level therefore, where OELs exist they are a factor influencing the development and acceptance of strategies to deal with chemical risks. In the case of employers and suppliers, subsequent outcomes at the level of the workplace are dependant on the extent to which their organisations at sectoral level, in turn, have influence over individual members⁴⁴⁹. In other cases, where an OEL is incorporated as part of a system for managing chemical risks at workplace level it doesn't much matter about awareness of the OEL, the fact that it is part of the risk management system means that efforts will be made to achieve compliance with it. Thus if a system exists, then the OEL is important. Conversely, if there is no OEL for a substance, then there is no data and therefore no system for its risk management.

Wood dust has been the focus of attention because of relatively recent renewed interest in risks of exposure — especially because of potential cancer risks. As with organic solvents, debates around the question of the most appropriate level to set the OEL have been important in raising awareness at sector level, but probably less significant in this respect at the level of the enterprise (which in the wood industry are mainly small enterprises). As a result, it was the subject of a number of campaigns and projects run jointly by trade unions employers in the industry and the Labour Inspectorate, as well as by these organisations separately during recent years. As a consequence of this attention, compliance with the OEL is quite extensively monitored by the Labour Inspectorate and a group of its inspectors have become particularly knowledgeable and experienced in the problems of achieving compliance in the sector. They have tended to work closely with trade unions, employers and suppliers of machinery at sectoral level and monitoring exposure levels have become a prominent part of strategies to reduce them at workplace level.

⁴⁴⁸ *Since monitoring is often of time weighted average exposures peak exposures and therefore possible risks of OPS may be missed.*

⁴⁴⁹ *Even where there are responsible care programmes initiated by suppliers, because distributors intervene to break the direct link between suppliers and users, there may be little awareness of risks at the level of the user.*

At the same time, controlling wood dust exposure is one of the targets set in tripartite '*convenanten*' in some (but not all) sectors of the industry. This is quite a good illustration of the pragmatic approach that is evident in Dutch strategies. Controlling wood-dust levels in workroom air to acceptable measurable standards (such as to levels below the proposed new OEL) is regarded as extremely challenging by employers in the furniture industry, for example. Therefore, despite the fact that exposure to wood dust is a serious problem and employers organisations would like to reduce exposures in the long term in the many small enterprises that constitute this sector, it is not included in the current '*conventan*' applying to the sector. Instead, it is part of '*convenanten*' in other parts of the industry where achieving such controls is regarded as more realistic. The trade unions and the inspectorate are not entirely happy with this situation. They nevertheless recognise the difficulties presented by the employers as genuine and are party to the agreement.

More generally, the extent to which workplace structures and practices match the social dialogue at sector level on both substitution and agreed '*convenanten*' and are in practice able to achieve the performance objectives set sectorally is not entirely clear. However, this does not necessarily imply underperformance — the approaches at sectoral level are themselves new and in many cases themselves not yet finalised therefore it may be too early to see clear operational results.

CHAPTER 8

SWEDEN

8.1 INTRODUCTION

The Swedish system for regulating OHS is traditionally perceived as amongst the most conceptually advanced and well resourced in Europe, and a prime example of the Scandinavian approach to the subject. It has a relatively long history of setting and using OELs and from the 1970s until the present time it has had a system for setting exposure limits and using them in the determination of good OHSM practice in workplaces. For these reasons it seemed appropriate to examine its operation, to consider how OELs are used and how they relate to the wider system for regulating the work environment in Sweden.

The features of the Scandinavian approach to work environment regulation include an emphasis on consensus and on corporatist decision-making at national and sectoral level, support from a highly developed provision of external prevention services and strong representative participation in activating health and safety at the local level. Since the early 1990s such approaches at the level of the workplace have been embraced by the term 'internal control' in which a systematic approach to participative OHSM is envisaged.

However, such a system is unlikely to exist independently from, or be unaffected by political and economic cycles, or wider concerns about the economic costs of work-related ill-health, its prevention and the task of the state in regulating the consequences of work in changing economic and political climates. The impact of these wider issues on the role of OELs in Sweden is a further concern of the present chapter. It begins with a brief outline of the economic and legislative background to the Swedish approach to regulating chemical risks. It focuses in particular on policy and practice in relation to achieving compliance with systematic health and safety management requirements (internal control). This is followed by some observations concerning the function of OELs in the process of regulating health and safety management. Beginning with an outline of the theoretical position concerning the use of OELs, the section goes on to consider the extent to which OELs and monitoring compliance with them actually form part of systematic health and safety management of chemical risks in practice. As with some of the other countries in the study such as Italy and Greece it was not found particularly helpful to limit enquiries to wood-dust and toluene and therefore although they are covered, the material in this section mostly refers to hazardous chemicals in general. Finally the chapter ends with some brief conclusions concerning the main issues for the role of OELs in achieving compliance with measures to regulate the management of chemical risks.

8.2 ECONOMIC AND LEGISLATIVE BACKGROUND⁴⁵⁰

Swedish regulation of occupational health and safety management (OHSM) follows a Nordic approach that has largely paralleled regulatory developments in the EU, but which was initiated prior to Swedish membership of the Community. The term characterising this approach during the 1990s was 'internal control'. In July 2001 it was slightly revised and

⁴⁵⁰ For a more detailed description of the main points contained in this summary see Frick (2002)

renamed 'systematic work environment management' (AFS, 2001). As in other countries, the evolution and implementation of regulating OHSM is embedded in national politics, economy, labour market and industrial relations (Frick 2002).

A strong Social Democrat tradition dominated Swedish governments from 1932 to 1976, Welfare policies and their implementation have been much influenced by strong interest organisations, including the trade unions (which have an unusually high membership rate of 80 per cent). There is a long history of participation in labour and social policies. Such corporatism increased after the main trade union confederation (LO) and the employers' organisation (SAF) reached an agreement in 1938 at Saltsjöbaden, (Johansson, 1989, Sund, 1994).

However, since the 1970s both politics and the economy have become more volatile. Although modern Swedish politics has been dominated by Social Democrat governments, between 1976-82 and again between 1991-94 coalitions of centre-right parties held office. At present, the Social Democrats form a minority government, reliant on support from both the Left Party and the Greens. During recent decades the mode of governance has shifted towards decentralisation and market solutions with movement away from Keynesianism (Ryner, 1993). Much of the formal corporatist structure was dismantled when the main employers' organisation (SAF) withdrew from most of the boards of government authorities in 1993. Yet, like the rest of the so-called 'Swedish Model', labour market corporatism has not disappeared entirely. Unions and employers still control some formal structures and an extensive bipartite co-operation still exists on several issues, especially on OHS. Many working conditions are still regulated in collective agreements, which in other countries are, by law, individual rights (Bruun, 1994).

8.3 THE SWEDISH APPROACH TO REGULATING THE WORK ENVIRONMENT

The legislation — The Work Environment Act of 1977 initiated modern approaches to OHS legislation (like the UK HSW Act 1974). It covered practically all employees, made employers responsible for their health and safety at work, and emphasised preventive local OHS activity in which workers were to participate, through dialogue with their supervisors and through their union appointed safety representatives (see Hydén, 1992 and Vogel, 1998). It also broadened the definition of OHS to include organisational aspects and it confirmed the gradual shift in preventive principles from behaviour control to technical prevention. OHS requirements were further specified by mandatory ordinances including standards on new hazards and stricter requirements on old ones. The National Board and the regional Labour Inspectorate received greater resourcing and the number of inspectors grew from 175 in 1967, to around 450 in the mid 1980s who visited nearly 60,000 workplaces per year (AV, 1989).

Internal control — Concerns about the efficacy of the system led to further changes in the Work Environment Act with the introduction of 'internal control' in an ordinance (AFS, 1992) originating from 1991. Internal control (IC) duties of employers included, among other things, requirements to:

- integrate IC of the whole work environment into management
- implement IC in co-operation with the employees (though the forms and rights of participation are specified in older regulations)
- establish objectives for the IC

- list necessary OHS improvements in yearly action-plans
- allocate tasks, responsibilities and resources to prevent ill health at work
- ensure that managers and workers have the necessary OHS competence
- continuously assess the risks of the operations and abate them
- annually audit the effectiveness of the IC and make necessary revisions.

Though the EU Framework Directive was hardly mentioned in the reform process, by introducing internal control, Swedish OHS regulation complied with nearly all of the Directive's articles and exceeded them with its requirement of an annual audit of the adequacy of the IC.

Implementation in an unfavourable political and economic climate — Integration of OHS prevention at all levels requires a considerable development of management capacity. Although internal control was conceived in an economic boom it was launched in the seriously declining economy of the early 1990s at a time when a right wing government held office (from 1991—1994). This weakened both the will and capacity required for the complex local development process needed to organise effective OHSM. At the same time during this period SAF withdrew their representatives from boards of the state authorities, including the National Board on OHS, prompting the dismissal of the union representatives by the government (Rothstein and Bergström, 1998). In 1992, it terminated the central agreement on co-operation on OHS issues, including on prevention services. During the 1990s budgets were also considerably reduced. The staff of the National Board of OHS and the Labour Inspectorate were cut by more than 20 per cent between 1989 and 1999. Yearly workplace inspections decreased by 30 per cent to 35,000, or 10-15 per cent of all establishments with employees (AV, 1989 and 2000)⁴⁵¹.

The ability of the prevention services to support the development of internal control was severely curtailed. Until the early 1990s, they had been a prime example of the results of corporatism in OHS politics. While unions and employers jointly specified their content and promoted their coverage, the government subsidised them, (with some 25-30 per cent of their costs), but did not impose regulatory requirements on their use (SOU, 1992). However, following SAF's withdrawal, from July 1992, the services were no longer guided by a central OHS agreement. When, from 1993, the government discontinued its subsidy, prevention services became completely market driven. As there was no regulatory requirement on their use by firms, their coverage dropped from around 80 per cent of all employees in 1988 to "upwards of 50 per cent" in 2000. The reduction of coverage was mainly experienced by small enterprises (Remaeus and Westerholm, 2001).

The largely medical orientation of the present so-called prevention services⁴⁵² and the probable reduction of their preventive role in favour of health checks and other curative tasks, illustrates that the lack of support of the OHS infrastructure for the new OHSM strategy is a qualitative as well as quantitative problem.

Yet, the central and local OHS actors did not completely stop promoting improved methods of detecting and abating work hazards, even when the economic crisis was the dominant issue and it is arguable that in some ways their work improved. For the Labour Inspectorate and the

⁴⁵¹ However, this also reflected an intentional shift towards more selective and thorough inspections of the worst workplaces (AV, 1989). It included a growth in the number of 'system inspections' (of internal control) from 1,000 in 1993 (ASS, 1994) to 6,000 in 2000

⁴⁵² For the sake of consistency we refer to them as prevention services throughout. However, in Sweden and in other Scandinavian countries they are more commonly known as Occupational Health Services

National Board of OHS for example, the implementation of internal control has been a strategic goal since the 1990s (ASS, 1995). When employers and unions – and especially the OHS services – were weakened as OHS actors, the role of the authorities became even more important. To further a general reorientation towards the broader work environment problems and internal control, the Inspectorate tried to improve the training, instructions and methods of its inspectors (Larsson and Gonzales, 1993, ASS, 1995, ASS, 1998). This resulted in many more inspections of internal control.

Results — Assessment by the Labour Inspectorate gives an indication of how far internal control has been implemented. From 1994 'ratings' have been noted in the Inspectorate's workplace register, and recorded for 10 to 25 per cent of workplace visits. A rating of 1 stands for no internal control, 2 that its implementation has begun, 3 that it is organised into management, while the maximum of 4 means that the internal control results in OHS improvements (ASS, 1995). In the 3,000 assessments undertaken in 1995 there was a compliance rate (a rating of at least 3) of 20 to 25 per cent of workplaces visited (ASS, 1997). Divided by size and main economic sector (public services include schools etc, even if they are privately operated), the following percentages of workplaces with at least a rating of 3 were found in the nearly 6,000 assessments done in 2000 (Holmlund, 2001):

Table 2 Workplaces with a rating \geq 3

Workplace size	Manufact.	Services	Public service	All
1-9 employees	16 per cent	17 per cent	28 per cent	17 per cent
10-49 employees	26 per cent	26 per cent	37 per cent	29 per cent
50-499 employees	53 per cent	32 per cent	34 per cent	42 per cent
500 < employees	79 per cent	25 per cent	57 per cent	59 per cent
All	29 per cent	22 per cent	35 per cent	27 per cent

Because the assessed workplaces are selected through the Labour Inspectorates' inspection programme they are not a representative sample of the total 300,000 workplaces with employees in Sweden and probably over-represent worst cases. The average compliance rate could therefore be higher than indicated by these figures. Indeed, more recent labour inspectorate estimates of compliance with systematic health and safety management requirements indicate it believes 50 per cent of firms are in fact meeting their statutory obligations in this respect (WEA 2002). However, other studies, which have compared the Labour Inspectorates' assessments with 'expert' evaluations, indicate that the inspectors are too lenient in their own assessment of the extent of compliance with internal control. In an analysis in 2000 for example, these studies suggest that according to their more stringent criteria of what constitutes a fully functioning OHSM system, only 2 per cent of the assessed workplaces actually had one in place.

The 'true' compliance rate is likely to be between these figures, but still indicates that eight years after the mandating of internal control at least three out of four workplaces (and probably many more) do not comply, despite its role as a strategic instrument in the Swedish OHS system. The National Board and Labour Inspections have therefore, at best, achieved only around half of their stated objective which was that all workplaces with at least 500 employees and 80 per cent of those with 50-499 employees should have an effective internal control by the year 2000 (ASS, 1996).

Recent structural reforms — In 2001 the National Board for Occupational Health and Safety and the regionally structured Labour Inspectorate merged to form a central Work Environment Authority, with a close association with the National Institute for Working Life. Since then, efforts have been made to standardise its approaches within ten regions in which some 500 staff cover the 5.3 million people engaged in work and related activities that are embraced in the Work Environment Act in the whole country. In addition there are around 300 based at the Authority's head offices. As well as inspection activity the Work Environment Authority supplements and articulates the stipulations of the Work Environment Act as well as dealing with transposition of EU legislation. To these ends it issues amendments and new working environment rules. With a rise of nearly 70 million SEK in its budget the Labour Inspectorate is planned to increase in strength to that of nearly a decade ago (mainly by hiring more inspectors). The authority will also continue its strategic reorganisation towards a greater focus on organisational factors as much as technical ones, including systematic occupational health and safety management.

8.4 ACHIEVING COMPLIANCE WITH OELS

The background outlined in the previous section, provides an indication of the overall approach to regulating the achievement of better health and safety management and a clue to the likely role of OELs in this process. It shows that currently the emphasis in compliance strategies is with the achievement of systematic approaches to risk management by duty holders. Within this broad aim, there is a particular focus on certain issues for which improved outcomes are identified. Safety in working with chemicals is reflected in some of the current priority issues for the Work Environment Authority such as for example:

- hypersensitivity,
- the working environment in small enterprises and
- the working environment in an ecologically sustainable society,

But it is not identified as a priority issue itself. Nevertheless, using OELs in risk assessment is a clear feature of Swedish regulatory requirements and one in which the labour inspectorate engagement is specifically identified.

In addition there is a list of hazardous substances, for which annual exposure measurements are stipulated by law. Such measurements are required to be reported to the Work Environment Inspectorate. These substances include lead, cadmium, quartz, styrene, ethylene oxide, propylene oxide and synthetic inorganic crystalline fibres.

The regulatory requirements— Employers' duties of assessing risks and organising safe handling operations involving hazardous chemicals are specified in the Ordinances on Chemical Hazards in the Working Environment and on Occupational Exposure Limit Values and Measures against Air Contaminants 2000. Under these provisions, when assessing the chemical risks of the work environment, the hazardous chemical substances that occur or can be expected to occur in operations must be identified and assessment made of the risk of these substances causing ill-health or accidents. Documentation of risk assessment involving hazardous chemicals would normally be expected to contain the identity of the hazardous chemicals, note of their inherently dangerous properties and the exposure to which employees

can be subjected as well as the handling risks entailed and the risk reduction measures decided upon. Guidance⁴⁵³ states:

“If there is a reason to suspect that the activity gives rise to air contaminants, the extent of the exposure must be investigated and account taken of its nature, level and duration (author’s italics). Thus, if a general risk assessment shows that air contamination may occur, these conditions need to be investigated more closely. Basic sampling methods, for example by using detector tubes, may be acceptable means to confirm that the exposure is low. However, if the investigation shows cause to suspect that an occupational exposure limit is being exceeded, an exposure measurement must be carried out. This requires the person planning and carrying out the measurement to have the requisite knowledge to do so. It includes knowledge, concerning the choice of method and equipment, the timing and ability to identify the persons on whom the measurements should be carried out. The results of the measurements must be documented in a measurement report containing certain pre-specified data. Employees concerned must be informed of the results of the measurement and have access to the documentation.”

Regulation in practice — Compliance with these requirements however, is another matter. It is clear from the evaluations of the systematic health and safety management referred to previously, that this practice is far from being universal. It is not possible to tell from these evaluations the extent to which employers carry out exposure measurements when assessing risks as part of systematic health and safety management, as they are required to do when exposures to chemicals with OELs are suspected. Nor is it possible to derive any meaningful estimates of their significance from records of enforcement action. However it would seem unlikely that they would depart significantly from the generally limited compliance with systematic health and safety management that seems to be the norm. Moreover, according to officials of the Work Environment Authority, it is a problem to get many employers to even realise that OELs exist. They suggest that employers are in fact measuring less than they have in the past. They attribute this decline, which they regard as quite marked over the last decade, at least in part to prohibitive costs of prevention services carrying out such measurement⁴⁵⁴. This observation was strongly endorsed by trade union sources, who argued that not only did prevention services not monitor any more because employers did not request them to, but that such services did not promote monitoring and did little to raise employers’ awareness of its role⁴⁵⁵.

Trade union and other sources also claimed that preventive services have been employing fewer safety engineers and occupational hygienists since the demand for their services has become less, suggesting that there were increasingly fewer people employed by prevention services who *could* actually undertake monitoring properly. They also claimed that there has been a reduction in the provision of professional education and training to enable specialists to undertake monitoring. Such a cycle would inevitably contribute to fewer measurements being undertaken. Trade union sources suggested that greater expertise on monitoring was

⁴⁵³ See *Chemicals Control at the Workplace – Limiting Chemical Hazards at Work*, Work Environment Authority, Stockholm 2002 (in English)

⁴⁵⁴ As pointed out previously, prior to 1992 such services were heavily subsidised by the state. Removal of subsidies and the resultant increased commercialism of the services has influenced the extent to which they are used by smaller enterprises especially. Decline in the number of safety engineers employed by the services as well as an increased medical orientation further militates against their role in environmental measurement.

⁴⁵⁵ They in fact argued that such monitoring was only likely to occur if there was a trade union demand for it that was strong enough to oblige the employer to request such monitoring be undertaken by a prevention service

required within the inspectorate, commenting that while such expertise may have existed in the past, it was much less present amongst the current generation of inspectors.

It is partly for these reasons that since its recent reorganisation, the Work Environment Authority has attempted to standardise practices in its ten districts. This has included trying to ensure that, while employers continue to be reminded of their obligations to undertake or to commission measurement as part of risk assessment, the Labour Inspectorate in each district is also technically competent and equipped to undertake them. Indeed, because of a perceived need for more rather than fewer measurements, currently labour inspectors are encouraged to carry them out in situations in which it appears unlikely that employers have the capacity to do so.

Trade union interviewees argued that there was regional variation in the severity of the enforcement action that inspectors might take when they discover that workplace exposure levels exceeded OELs. However, the occurrence of such actions were so infrequent generally that it was not feasible to gather evidence to corroborate this claim.

It was also agreed that there was variation between sectors in how much monitoring takes place. In larger workplaces in industries such as plastics manufacture, motor vehicle manufacturing, in the paper industry and where certain substances are concerned, there is a tradition of monitoring. Generally larger enterprises in these sectors are the main users of monitoring, often having trained employees designated to carry it out. The problem is perceived to lie with smaller companies where there is little knowledge of the risks associated with the chemicals used and even less awareness of the meaning and use of occupational exposure limits. Interestingly, both the Work Environment Authority and the trade unions commented on the significance of the role of regional safety representatives in increasing awareness of chemical risks in such workplaces and also in working in co-operation with the labour inspectors to identify and resolve problems. Although there is variation between industries and regions, generally regional health and safety representatives meet fairly regularly with labour inspectors to decide on strategies for dealing with risks such as those from handling and using chemicals in small enterprises. They are an important source of information for the inspectorate, since, as has been demonstrated in previous studies they are far more numerous and visit workplaces considerably more frequently than the labour inspectors (see Frick and Walters 1998 and Walters 2002). They therefore can and do alert the inspectors to the existence of problems as well as playing a significant role in resolving other problems without the need for the engagement of the inspectors.

In practice employers tend to use the manufacturers and suppliers of chemicals as their major source of information and guidance on the safety use of chemicals. Manufacturers' information can, in theory, be used by employers and trade union representatives to jointly explore the range and availability of products, thus maximising the reduction of workplace exposure to airborne chemical contaminants. Since manufacturers and suppliers of machinery also have information on the performance specifications of machines, including performance in relation to OELs, and therefore potential chemical risks, this source is important in decision-making during the purchase and installation of new machines. In addition, a risk assessment is required when new machinery is installed, thus providing an opportunity to measure performance and check against standards such as OELs. However, trade union sources also point out that some employers, especially those responsible for small enterprises that are struggling for survival will often buy and install second-hand machines for which such information is lacking and moreover, they do not undertake the required risk assessments on installation.

Work Environment Authority strategies — Awareness of the problems of dealing with compliance across all the regions and sectors has prompted the development of current strategy within the Work Environment Authority. In terms of chemical risks and OELs it is concerned with what to measure, and how and in what form to promote the education of competent persons within organisations to undertake measurement. It also clearly wishes to promote the education of employers themselves concerning chemical risks and the role of OELs. In addition it supports the education of its own inspectors in this respect. It recognises there is still considerable need to reduce variation in understanding and practice at the regional level. Part of the strategic approach therefore includes efforts to achieve consistency across the ten districts. As a result there are joint projects on measurement between the centre and the district levels of the inspectorate as well as efforts to co-ordinate sharing experiences across districts. For example in certain districts a considerable amount of measurement is undertaken of exposure to wood-dust, while in other districts measurement is far less. Sharing experiences and expertise in this respect helps to promote better understanding of the nature of the problem of wood-dust exposure and helps improve the strategic approaches to achieving compliance. The Work Environment Authority would like to be able to eventually create an inventory of chemical usage in each region. It believes that it would then be possible to have a more systematic approach in the case of required measurement of exposure levels. It would also be able to match requirements for competence amongst employers, prevention services and the inspectorate, with needs for measurement in different sectors and regions.

Wood-dust and toluene —As one of the current priorities for the Work Environment Authority is hypersensitivity, wood dust is of some concern. However, achieving better control is the focus for the inspectorate, not measurement and monitoring of exposure levels. In the Stockholm district for example, a strategic aim is for inspectors to visit all furniture makers. While there is a concentration of visits made by inspectors, and a demand made for improvement, the use of OELs is not in the forefront of inspection activity. This is aimed more at encouraging employers to reduce wood-dust exposures at source. As in similar situations described previously in the Netherlands, there is a perception that where serious problems of airborne dust occur, they are obvious and it is equally obvious when effective control measures have been introduced. Neither requires systematic monitoring to define their nature or effectiveness. Enforcement, when it occurs, is therefore far more likely to be concerned with achieving such engineering control as improved exhaust ventilation than it is with measurement of OELs. There is also a strong emphasis on educating employers concerning risks in the use of products and processes that generate wood-dust.

According to both trade union and Work Environment Authority sources, OELs for wood-dust therefore do not feature significantly in enforcement actions in the wood-working industry. They are however quite important in setting specification standards for air quality to be achieved by new machines, manufacturers must therefore take them into account and they feature in the specifications of such machines, in decisions concerning their purchase as well as in risk assessment during installation. However, in many parts of the wood-working industry that are dominated by small enterprises struggling for economic survival, the same general problems as discussed above concerning the absence of attention to OELs in the purchase and installation of second hand machinery will apply to employers who are largely ignorant of the health effects of wood dust and the role of exposure limits.

There is little of specific interest to report in relation to seeking compliance with the OEL for toluene. Although used quite widely in many industries, its usage in some sectors such as printing has become increasingly restricted to specialised processes that are undertaken in

very few factories⁴⁵⁶. In other sectors such as metal processing its use is common but it occurs in combination with other mixed solvents. Emphasis in monitoring in such situations is normally on mixed exposures rather than solely with exposure to toluene.

8.5 CONCLUSIONS

The Swedish system has enjoyed a relatively long history of independent development in comparison with many of the other systems in the countries of the EU. It is also one in which traditionally OELs tend to be set lower than in other EU countries and in which there is a marked distinction between the processes for deriving the scientific basis for a limit and those for its economic/technical basis.

Nevertheless, it is clear that it too, is not without problems of implementation and operation. For example, poor awareness of OELs amongst employers, especially in smaller enterprises, is of concern to the Work Environment Authority. Systematic health and safety management is the central strategic objective of the Work Environment Authority. It wishes to make OELs a more integrated part of risk assessment in this process. At the same time it recognises a general problem of awareness about the existence, role and use of OELs amongst employers that continues to thwart their more systematic use.

A related issue is the apparent reduction in capacity of prevention services to undertake measurement of OELs. This seems to be influenced by both the absence of a clear regulatory definition of what should constitute the technical resources and role of occupational health services (unlike for example in other Scandinavian countries such as Denmark, where they are more clearly prescribed) and the increased trend towards the commercialisation of such services. The combination of these two influences means that occupational health services are driven by market forces to provide the kind of service that employers want. Employers are generally ignorant of the role and significance of OELs, they therefore frequently do not require monitoring from prevention services, preferring instead to concentrate their requirements more in areas such as medical surveillance⁴⁵⁷. This in turn has a long term effect on the capacity of such services to deliver more broad based preventive approaches including those associated with the detailed monitoring of OELs that should be part of risk evaluation and control for hazardous chemicals. These problems are further compounded by the general lack of access of small enterprises to prevention services.

A further issue relates to the meaning of the OEL. Although the legislation and the official guidance is clear that OELs adopted within the Swedish system are not solely health based, nor therefore 'safe levels', according to the officials of the Work Environment Authority, labour inspectors have in the past had no formal power to demand further reduction in exposure levels if the employer is able to demonstrate that measurements shows exposure to be already below the OEL. There is some interesting case law here which suggests that employers have been able to defend the position that they have done all that is legally

⁴⁵⁶ *Indeed, it was suggested that there were only one or two printing works in the whole of Sweden still using toluene in substantial quantities.*

⁴⁵⁷ *Clearly there are exceptions to this, especially amongst large employers in industries where there has been regular and long-term use of hazardous chemicals such as for example in car manufacture, in some parts of the plastics industry and in paper and board. There are also exceptions in relation to specific substances for which there is a high level of public concern about risks associated with using them. Currently for example, substances such as styrene and isocyanates fall into this category and may be the subject of more intensive monitoring. However, in both such cases the role of trade union representatives in demanding monitoring appears to be quite significant and they suggest that without such pressures both employers and prevention services would probably do less rather than more monitoring.*

necessary of them if they are able to demonstrate that they are working within limits defined by the OEL — even when the labour inspector believes it would be technically and economically feasible for them to reduce exposures to much lower levels⁴⁵⁸.

Clearly such success conflicts with the theoretical position and official guidance on the meaning of OELs, and sends extremely ambivalent messages concerning their use. This is especially so since Swedish OELs are based on comprehensive and reliable summaries of the toxicological literature. Division of the standard setting process into two distinct parts — one scientific and one regulative, aids distinction between the health and technical/economic grounds for setting them. The limits themselves are on average lower and therefore more protective than in other countries. Nevertheless as Hanson (1998: 98-102) has demonstrated, despite these positive aspects of the Swedish system, the regulatory ratios⁴⁵⁹ for many substances are too high for the exposure limit to protect against the critical effect of the hazardous substance and the limits are therefore not standards that will protect all workers adequately against hazardous substances.

So what is the role of OELs in practice in Sweden? Although the statutory provisions on monitoring are quite clear, it is recognised that there are problems with achieving good compliance with them. These are partly cultural and partly resource based, and there appears to be a link between them. At the same time it is not apparent to what extent or how strictly the labour inspectorate has enforced such requirements in the past or indeed is likely to do so in the future.⁴⁶⁰ Most interviewees, having identified the various weaknesses in the system that we have discussed here, nevertheless felt that the OEL has an important role. A loose synthesis of their views indicates a four-fold set of possible reasons for valuing the existence of OELs:

- They provide a standard for monitoring exposure to hazardous substances and therefore can be indicators of compliance with requirements for the systematic occupational health and safety management of hazardous substances. Their role in this respect may not be pursued rigorously everywhere, but its existence is nonetheless important and particularly useful in seeking improvements at the ‘dirty end’ of industrial activities. Compliance with such standards remains a useful indicator of good practice.

⁴⁵⁸ It was suggested during interviews with officials of the Work Environment Authority that in future the approach to persuading employers to reduce exposures to as low as is technically feasible below the exposure limit would be to use a combination of legal requirements drawn in part from those on exposure limits but also from other ordinances on more general measures to limit air pollution. However, in a case in 1996 (1996-12-05), the National Board acted to repeal a notice from the labour inspectorate to a firm (Setrab), to reduce exposure to gases at their workplace to levels well below the OEL, because of evidence of medically documented health problems at the OEL, arguing that the companies should be given a level playing field for OELs and therefore it was not acceptable to order some companies to reduce them further than others when there were alternative strategies (such as personal protection) that could be used (source Frick, K. NIWL, personal communication)

⁴⁵⁹ A term that Hanson uses in his discussion of the limitations of OELs as indicators of safe levels of exposure. It refers to the quotient between the OEL and the reference level (i.e. the lowest concentration at which adverse effects appear or the highest at which no adverse effects are yet observed). Thus, for example if an OEL of 10 ppm is based on the observation of the presence or absence of a health effect at 100ppm then the regulatory ratio would be 0.1.

⁴⁶⁰ We were unable to obtain any detailed records of enforcement actions or to compare their frequency or seriousness with enforcement actions on other aspects of health and safety at work. However, interviews with both the Work Environment Authority and the trade unions suggested that such enforcement was relatively limited.

- They provide an important informative and educative role in raising awareness on chemical risks. Even though there is considerable ignorance of their detailed meaning (and in some cases of their very existence) they are nevertheless an important reference point and objective standard for informing discourse on prevention strategies.
- They act as a norm, especially for larger employers. These (usually) comply voluntarily with OELs and other ordinances, but they nevertheless like to be told by authorities, such as the Work Environment Authority, what is right and what is wrong, and thereby also to have 'a level playing field'.
- While monitoring airborne exposures may prove difficult, OELs are an important feature of suppliers' information about the use of hazardous chemicals. They are important in determining specification standards, in the approach to risk assessment and in alerting employers, workers and their representatives to the need to take seriously risk management issues involved in processes concerning the use or substitution of such substances. They apply not only in the case of use and handling of hazardous substances themselves but are also helpful in determining risk management issues concerning the purchase and installation of new plant.
- They may have other important uses such as in claims for compensation resulting from work-related mortality and morbidity.

The problems with many of these uses of course, return us to debates concerning the scientific uncertainties on the levels of protection afforded to workers by OELs, the degree of clarity with which their meaning and their limitations are presented and the extent to which substances with OELs are representative of the full range of substances and the risks associated with their use at the workplace.

CHAPTER 9

CONCLUSIONS

9.1 INTRODUCTION

Our intention in this project has been to undertake a study that is relevant to the needs of the HSC's Advisory Committee on Toxic Substances, which is currently reviewing the British regulatory position on OELs in order to find ways in which to improve the contribution OELs make to the protection of workers' health. To contribute to this process our objectives were to review current procedures for setting and using OELs in EU Member States, to analyse their legal status, and their relationship to the IOELV Directive. They included an analysis of the methods and practices of the regulatory agencies in specific member states for achieving compliance with OELs for toluene and wood-dust and a discussion of compliance with OELs more generally. Finally, our findings were to be set in a wider discussion of the role of OELs in the regulation of occupational health and safety management.

We have sought to examine and understand practices involved in setting and using OELs in order to provide a European Union dimension to the issues that the HSC has raised in its Discussion Document. In particular these include:

- Concerns that OELs are little understood, with many employers in the UK, especially those in small enterprises, not knowing what they mean or how to determine whether exposure levels in their workplaces comply with the relevant OELs
- Problems of interpretation and meaning of OELs and especially with the notion that OELs represent 'safe limits'

In this final chapter we draw together the various threads of our investigation to help give a European dimension to the British discussion on the reform of the regulatory system for OELs. Since it is fundamental to the analysis of any strategic position on OELs, we begin by asking once again, what are OELs for? We continue with an exploration of the role of OELs in regulatory approaches to risk management drawing mainly on the conclusions of our country studies. We consider the significance of the regulatory framework and the role of regulation as well as the infrastructural support for monitoring exposure to chemical hazards in managing workplace risks and we identify some of the limitations of present systems. We conclude by noting some of the considerable parallels in continental systems with British circumstances and in the light of the UK review of the subject, we indicate some of the lessons suggested by these experiences in common.

The two linked and key questions around which our discussion revolves concern:

- What drives informed and competent risk management in chemical safety?
- What is the role (if any) of OELs in this process?

We have noted that the development of a regulatory function for OELs (as opposed to their previous technical/specialist reference function) has helped to create quite elaborate systems for agreeing OELs at national (and EU) level. In these systems, considerable efforts have been made to ensure clarity in the distinction between scientific deliberations on risks to

health and the economic/political discussion of what is feasible in terms of exposure levels at the workplace. But there is a contrast between the sophisticated national systems for the adoption and review of OELs and practices at the workplace level, where in the majority of workplaces that use hazardous chemicals it would seem that OELs play a relatively minor role in day-to-day decision making on risk management. While national level systems (quite rightly) involve wide-ranging expertise and rigorous debate, within many workplaces there seems to be a substantial problem of understanding amongst duty-holders concerning the meaning and appropriate use of OELs. This is a widespread finding in our national studies. In some cases the development of a *regulatory* function for OELs has arguably worsened the misconceptions about their meaning — illustrated for example by a tendency in many countries to regard the numerical value of an OEL as an absolute distinction between safe and unsafe exposure, by debates about what constitutes a low/moderate/high risk such as in Italy and by negotiations for exemptions from requirements on the use of competence in chemical risk management for the members of craft associations such as in Greece. These contradictions cannot be separated from the broader issues of transparency, public trust and public understanding of the development of governance strategies for risk regulation more generally. There are a number of related issues here, all of which need to be addressed if a wider appreciation of the strengths and weakness of using OELs in managing the risks of working with hazardous chemicals is to be achieved. However, there would seem to be a strong case for considering what can be done to counter the mythology of absolutes that seems to surround the use of numerical values in risk assessment.

Even where their meaning is understood, the role of OELs as tools in prevention strategies for chemical risk management at the workplace may still be a relatively limited one. While regulation is widely regarded as an important stimulus, we see quite clearly that technological development is regarded as the primary driver of improvements in reducing exposure to dangerous chemicals in most sectors and in most countries that we have studied. We also see that specification standards for processes and machinery play an important part in control strategies. While OELs have some significance as reference points in the development of specification standards, these standards are often used as evidence that there is no requirement for monitoring to test compliance with OELs in workplaces in which machinery and processes meeting them are in use.

In Germany and in the Netherlands for example, in the case of toluene this has meant substitution and closed/recovery systems and in the case of wood-dust, the advocacy of the use of abatement systems and other dust reduction facilities. The connection between monitoring compliance with the OEL and influencing these improvements is rather tenuous. In Germany we have seen that the main emphasis of the regulatory authorities and other professional agents of the OHS system concern designing model work-places that guarantee the compliance with the TRK value for wood-dust for example, by using recognised abatement and dust reduction facilities. Employers are not required to measure airborne exposure and labour inspectors simply check that certain machines are present and are working in the way they should. Measurement therefore becomes an exceptional requirement rather than a normal expectation. This is not only true for wood dust (and for toluene) but is a general approach in the German system of managing risks related to hazardous substances. As such, OELs may have an important value in determining the specification standards for machines, but a reduced importance as reference points for routine airborne monitoring — because the need for such monitoring may itself be much reduced in such circumstances.

Thus, the performance standard paradigm that has underpinned professional use of OELs, is often replaced by the (older) notion of specification standards in the practices of chemical risk management, not only carried out by duty holders but also encouraged and supported by the

demands of regulatory agencies. Similarly, the strategy of substitution has the effect of bypassing the need for OELs for hazardous substances, since such substances are, by definition, *replaced* by safer ones. While this does not exactly render the role of OELs/performance standards redundant, it certainly affects their significance in practical and achievable strategies in risk management and arguably requires a rethinking of their role in developing the philosophy behind chemical risk management at the workplace.

There are a number of pragmatic but none the less important reasons that appear to be informing regulatory inspectorates and their equivalents in their development of strategies to regulate risk management. They would seem to revolve around what is regarded as *possible and practicable* in terms of preventive approaches for managing chemical risks that might be undertaken by duty holders who are limited in their willingness and capacity to either understand or use the sophisticated notions of measurement of performance implied by a professional conception of OELs. They may also reflect the recognition of the limited resources available for the regulatory agencies to intervene in ways that would extend the use of OELs as performance standards. These 'pragmatic' prevention strategies have often been arrived at in agreement with trade unions and employers associations in the sectors they concern and thus their pragmatism is one shared by both representatives of employers and workers. In the following sections we consider the relevance of these approaches to policies on OELs in the UK. There is quite clearly a theoretical role for OELs as indices against which the measurement of hazardous substances may be undertaken in risk assessment and systematic management of health and safety. However, based on our findings in other countries, we question the extent of the reality of this role in practice and we conclude that while there are a multiplicity of functions for OELs, they are subservient to the various means available to order the management of chemical risks by legislative, economic, social and regulatory drivers.

9.2 WHAT ARE OELS FOR?

As we outlined in Part 1, there is legislation on health and safety in the use of chemical substances in all EU countries. It is usually in the form of some kind of framework provision supplemented by more specific requirements. Provisions emphasise process-based approaches to the management of risk to a greater or lesser extent in all national systems. National organisations for securing and monitoring compliance with these legal requirements are also present in all countries. They usually operate under the authority of a central Government Department or Ministry and mostly have some form of overall responsibility in both the setting and enforcement of OELs.

There are differences between countries, for example, in the extent to which national authorities are regionalised, deal exclusively with health and safety, have specialised resources for chemical safety and are sole enforcing authorities. Two particular exceptional situations should be mentioned. One is in the dual German model where social insurance associations also have rule making and enforcement authority in addition to that of the state inspectorate. The other is in Italy, where although the Labour Inspectorate have a national responsibility for health and safety under the Ministry of Labour, in practice the task of seeking compliance remains with regional and local structures of the public health system, under the Ministry of Health.

Within these regulatory systems there are strong similarities between the various structures and processes for setting and achieving compliance with OELs in the EU. Similarities are also

evident in the role of national research institutes for health and safety, which play a strong, independent, advisory role in the setting and adoption of OELs in most countries⁴⁶¹. A further similarity is in the way in which national structures for setting or adopting OELs allow for considerable stakeholder participation. However, these similarities do not entirely override national differences apparent in the setting, status and use of OELs as well as in their legal context. There are also broadly comparable scientific/occupational hygiene treatments of the limits themselves in terms of the use of time weighted averages, short-term exposure limits, ceiling values and annotations for special risks such as carcinogenicity, skin absorption, allergenic substances etc. But although there are similarities in terms of the classification used, there are differences in the detail of the way in which it is used in relation to different substances in different countries. There are also differences in the degree of sophistication and support for national systems and the extent to which they are capable of undertaking their appointed task. Generally those systems that have been in place longest, such as the German and Nordic ones, would appear considerably more robust than those of more recent origin, especially those of Southern European countries. Perhaps the most significant difference that is relevant to our interests is found in the German system where, the technical orientation and the extensive provision for surveillance through both the state inspection system and that of the BGs means that there appears to have been considerable more monitoring of exposures in relation to OELs by these organisations than we were able to document for the activities of the regulatory agencies of any of the other countries in the study.

The problems of understanding and use identified in the HSC's Discussion Document on the UK situation are largely borne out by experience in other EU countries. In the legislation and official guidance of most countries it is made clear that OELs are not solely health based, nor therefore 'safe levels'. Division of the standard setting process into two distinct parts — one scientific and one regulative, aids distinction between the health and technical/economic grounds for setting them. The general principle is that exposure should be as low as is possible and OELs, whether legally binding or otherwise are indicative of what should be achieved but not necessarily *all* that should be achieved.

Nevertheless, tendencies to regard them as 'safe levels' are persistent and are expressed to varying degrees by both employers' and workers' organisations. In all countries it is recognised that small company owner managers generally have limited awareness and understanding of the meaning of OELs and therefore little capacity to apply them adequately in their risk management strategies. Their capacity to do so is also severely constrained by their limited access to support from the expertise of prevention services.

This situation begs the question 'What are OELs for?' From our review of both the structures and processes for setting OELs in the EU and their use in the countries we have studied in more detail, it would seem that the answer is that they have a variety of functions:

- They are used as reference tools for monitoring systematic management of chemical risks in larger organisations where there is experience and support for such a task either within the organisation or through the use of technical assistance from external prevention services/occupational hygiene consultants. Clearly this is important in sectors of industry where dangerous chemicals are in use, where substitution is not possible and specification standards for machinery and processes do not mitigate the need for monitoring performance standards. Their use in these situations may have some benchmarking value

⁴⁶¹ *The UK is somewhat exceptional in the EU in that it does not have a national research institute for health and safety comparable with those found in most other EU states.*

for other workplaces, however, strong evidence of widespread transfer of good practice is hard to find.

- Their use as reference tools in monitoring workplace exposures in such firms is also a useful indicator of adequate risk assessment for regulatory agencies in enforcement practices in firms in which hazardous chemicals are in use and where it is suspected that exposure levels are high. Their role in this respect may not be pursued rigorously everywhere, but its existence is nonetheless important and particularly useful in seeking improvements at the ‘dirty end’ of industrial activities. Compliance with standards for which OELs are a reference point remains a useful indicator of good practice.
- They are also useful reference tools, from a scientific/technical perspective, for large scale surveillance of exposure such as has been practiced in relation to various substances in Germany, and which has helped to contribute to understanding concerning the health effects of exposures and the consequent need to reduce them
- They provide an important informative and educative role in raising awareness on chemical risks. Even though there is considerable ignorance of their detailed meaning (and in some cases of their very existence) they are nevertheless an important reference point and objective standard for informing discourse on prevention strategies. They may also be useful ‘norms’ for larger employers to follow. While monitoring airborne exposures may prove difficult, the existence of OELs provide an important pressure on suppliers to provide information about the safe use of hazardous chemical products that acknowledges and makes use of their OELs. As such they have a role in several different loci in risk assessment cycles. Moreover, they are important in determining the approach to risk assessment and in alerting employers, workers and their representatives to the need to take seriously risk management issues involved in processes concerning the use or substitution of such substances. A caveat concerning their use in this respect however concerns the need for a proper understanding of their meaning. That is, for example, if the notion that they represent safe levels, or even values above or below which dramatically different effects occur are persistent they undermine the value of OELs and contribute to their misuse.
- Provided the caveat concerning proper understanding of their meaning applies, they may have a helpful role in defining specification standards that can be used in determining risk management issues concerning the purchase and installation of new plant. In some situations where monitoring is anyway extremely unlikely, such specification standards may obviate the need for its use.

While these are all ‘positive uses’, they also need to be seen in the context of the enormous levels of ignorance about OELs amongst users of chemical products. British research has demonstrated this quantitatively (see Chapter 2 and HSE 1997). We were not able to match these quantitative estimates of ignorance amongst employers with similar quantitative studies in other countries, but nevertheless there was a strong consensus amongst interviewees that exactly the same situation prevailed. This of course leads us to question the extent to which the above ideal situations of OEL usage actually occur in practice. It also helps to explain the strong orientation amongst prevention specialists, trade unions and regulators towards the use of substitution, specification standards and technological development as means of dealing with chemical risks.

It should also be mentioned that OELs are sometimes subject to uses for which they are less appropriate and for which there seems to be no scientific or ethical justification. Aside from frequent abuses arising from ignorance or misunderstanding of their meaning, further examples of misuse include, their involvement in determining situations in which additional bonus payments for unhealthy working conditions have been negotiated such as in Greece, and their somewhat dubious role in cases involving compensation claims for work-related

mortality and morbidity, as well as their use in redundancy settlements as in the case of previous work with asbestos in Italy.

Additional to these uses and abuses, is the situation in which the adoption of EU systems for setting and using OELs is perceived to be at odds with a country's traditional approach to regulating the management of chemical risks and which therefore gives rise to a level of concern about the meaning and role of OELs as legal standards. Thus, interviewees in Italy articulated a worry that national adoption of EU 'pragmatic' standards that take economic considerations into account will undermine the Italian workers' constitutional right to healthy and safe workplaces. According to this argument the assumption of a level risk that is implicit in such standards is fundamentally at odds with workers' rights to health that are enshrined in the constitution. Italy was the only country in which this specific concern was expressed and arguably this is because it is the only one in the study where such rights are constitutionally defined. It is therefore a constitutional problem that may not have widespread application outside Italy. However, it is nevertheless indicative of the important changes in meaning that occur when OELs become part of the regulatory system. It is also related to other perceptions of the problem of the meaning of OELs, that are evident in all countries. Comments received from regulatory inspectors in countries such as Italy and Greece, but also in northern European countries such as Sweden and the Netherlands, suggest a concern that giving OELs a form of regulatory status creates both the potential for misinterpretation and equally unwanted limitations to inspectors' discretion. In such circumstances the existence of an OEL is sometimes viewed as an unhelpful distraction from the main business of improving the work environment. As a consequence it is perhaps marginalised somewhat in the regulatory inspectors' armoury of inspection tools for reducing exposures to as low as is technically possible.

9.3 THE ROLE OF OELS IN REGULATORY APPROACHES TO ACHIEVING CHEMICAL RISK MANAGEMENT

The regulatory framework — The predominant pattern in the countries of the EU is for an OEL to have some legal definition within the application of more generic health and safety legislation. Thus, in most countries authorities report that there are a number of OELs that are legally binding limits. In a few cases these appear to be restricted to those that are in force as a result of compliance with EU Directives but in many cases the list is considerably larger. We have not looked at the full lists of exposure limits for each country in depth, but we have noted from the available literature that while broadly comparable, there are differences in detail, both with regard to the number of substances included in the lists and in some of the values set. We have seen these differences manifest in relation to wood-dust, which was one of the examples of substances we looked at in greater depth. However, we also note that their significance is uncertain. They do not, for example, appear to have had any material bearing on the extent of measurement or its enforcement in the countries studied. Nor do they appear to be the cause of any differences in strategies on the part of the regulatory agencies to improve compliance.

In all of the countries in the study post-Framework Directive moves towards process regulation of OHS management dominated the approach to regulation by the regulatory agencies. Thus, their regulatory strategies were focused on the means of securing compliance with a systematic approach to health and safety management rather than with breaches of individual provisions. As we have already indicated, OELs could play a role in such strategies as reference points against which compliance with systematic approaches to risk management for hazardous chemicals might be monitored. Such an approach may have occurred in some

cases as is evidenced in Sweden, where regulatory authorities pointed out that measurements were made or checked by inspectors where it was suspected that OELs were in danger of being exceeded and in Greece and other countries where there was evidence of occasional enforcement actions in which proof of compliance with OELs was mandated. However such instances were exceptional. Far more significant in the strategies of the regulatory inspectors was the notion of a holistic approach to OHS management. This took a variety of forms in which arrangements for chemical hazards might be included. For example, in Greece considerable regulatory attention appears to be focused on trying to establish whether firms had made contractual arrangements to use prevention services or individual prevention specialists. In the Netherlands and Sweden where such arrangements were also important (and considerably better developed), chemical hazards were frequently subsumed into broader reviews of risk management especially in small to medium sized enterprises. Dealing with chemical risks in these contexts involves a complete cycle of risk management approaches ranging from the availability of suppliers hazard data information, through specification standards for machinery and processes to the possible requirement of evidence of performance standards in relation to OELs in the auditing of effectiveness of risk management measures. In practice however, the latter seem to be seldom invoked and not infrequently, simpler indicators of performance were sought⁴⁶².

Also quite strongly in evidence in some countries such as the Netherlands and Italy for example is the considerable attention regulatory agencies pay to gaining sectoral or regional/sectoral level agreement between representative bodies of employers and workers for OHS management improvements in particular industries. Typical of these initiatives are the sectorally based 'covenants' in the Netherlands in which specification standards on emissions for machinery and substitution principles for chemicals may be introduced. On a smaller scale, in Italy as well as in other countries, such 'partnership' approaches involve inspectors in negotiations on health and safety management with representatives of employers and workers at local/sectoral levels where the local density of small firms involved in similar activities make an agreement concerning the health and safety aspects of particular processes (including chemical hazards) especially viable. Again, in these situations the technicalities of monitoring and OELs are likely to be substituted by specification standards and simpler measures of performance.

A linked approach also much in evidence in Germany, Sweden and the Netherlands is the policy of regulatory agencies to focus on 'projects' in health and safety issues, which might concern specific processes, health effects such as sensitization, machinery, industries or localities or combinations of these. Again, chemical hazards, such as those arising from wood-dust or solvents are sometimes the focus of such projects. They generally involve a concentration of regulatory effort on particular sectors and processes, that is intended to result in not only improved OHS management practices in the workplaces that are the recipients of such attention but also, a cascading effect to other workplaces that is aided by the publicity for the project, peer group pressure within the sector/locality and the involvement of representatives of employers and workers in the sectors concerned. Although these approaches were much in evidence in the countries mentioned and interviewees were able to point to local evidence of their success, evidence of the success of the desired cascading effects was less easily come by.

In Germany, an overall approach to regulating chemical risks through using indicators of good practice and safe plant that could be reasonably assumed to indicate low risk of

⁴⁶² *Such as for example visible evidence of the presence of wood dust, or simplified occupational hygiene measurements, as in the Netherlands (see Chapter 7)*

excessive exposure to hazardous chemicals and thus reduce the need for monitoring seems to have been most systematically developed. However, similar approaches were also in evidence in Sweden and in the Netherlands. Also it was only in Germany that we found evidence of a more systematic and large-scale approach in which OELs clearly featured in the regulatory framework and were transferred to workplace surveillance in a systematic manner. As the example of the so-called 'negative list' in relation to the 2 mg/m³ OEL for wood-dust shows, there is an attempt to link requirements to achieve improved exposure levels with evidence of current levels of exposure and arrangements for measuring them. However, interviewees expressed skepticism about the widespread use of such measurement, especially in the small and medium sized firms for which, neither the state labour inspectorates, nor the inspectors of the BG had the resources to achieve significant access. There was also sometimes concern that the role of the different agencies with regulatory powers was potentially competitive rather than collaborative and might result in unnecessary duplication of effort and thereby a wastage of precious resource.

The role of regulation — Breach of requirements relating to binding values is either a criminal or administrative offence (or both) depending on the national regulatory system and the seriousness of the breach. Penalties are most commonly fines, the levels of which are defined usually in the relevant legislation. The extent of the use of such penalties is difficult to determine from existing records. However, interviews with subjects in all countries suggest that, as in the UK, compliance (or otherwise) with OELs is not a major subject for enforcement action — nor indeed is it even a significant aspect of regulatory actions that involve hazardous chemicals.

There seem to be several linked reasons for this, most of which relate to the limited resources of both inspectors and inspected as well as to a perception that there are frequently other, more appropriate means of achieving improved risk management of chemical hazards, such as we have already described. Thus, inspectors often question the *relevance* of focusing on monitoring OELs in chemical risk management. At the same time they frequently do not have the capacity to do more than demand evidence of measurement, they are neither equipped nor skilled sufficiently to be able to undertake such measurement themselves. In most countries, such skills and equipment are possessed by inspectorates but usually as specialist services to which ordinary inspectors may have limited access. In some cases such as in Sweden for example (and also possibly in the Netherlands and in Greece) an effort is being made to distribute such resources more evenly across inspectorates so all regions/sectors can have improved access to them. Furthermore, it is widely understood to be the responsibility of duty-holders to undertake measurement. As we have repeatedly stated, this may be reasonably well acted-upon in large companies that use hazardous chemicals, but such responsibilities are far more seldom exercised by the owner managers of the small enterprises that are also substantial users of hazardous chemicals. Moreover, the training and experience of inspectors themselves is not always adequate to ensure they are all confident in handling the scientific/technical issues involved in the interpretation of monitoring data in relation to OELs.

A further factor in the relatively low profile of enforcement actions in relation to OELs in some countries may be the previously mentioned involvement of the regulatory agencies in various means of securing compliance through exemplary 'projects' and especially through voluntary agreements such as the 'covenants' found in a number of sectors in the Netherlands. While by no means limited to issues of chemical risk, these initiatives often include chemical risk management as part of their remit and therefore are of some influence on regulatory strategies on hazardous chemicals. There are two aspects that are possibly significant in relation to enforcement.

One concerns the extent to which these efforts can be regarded as forms of ‘reflexive regulation’ in the sense that they represent efforts on the part of the regulatory agencies to encourage forms of self-regulation by agreement between employers and trade unions (and sometimes others such as suppliers or local authorities). This kind of ‘regulation of self-regulation’⁴⁶³ often implies a changed approach to enforcement activity⁴⁶⁴. Participating organizations, agree to meet particular specifications and to aim for performance targets agreed between themselves, the regulatory authorities and the representatives of their workers, and are spared a degree of external inspection of the minutiae of their activities since they are monitoring their own performance. The nature of such enforcement action that may occur in these situations is more likely to relate to failures in meeting generic systematic OHS management standards than it is to failures in relation to individual requirements such as monitoring of hazardous substances.

The second aspect relates to the desire of regulatory agencies to make overall progress in improving health and safety outcomes through cascading the ‘project’ approach. Interviewees from regulatory agencies in countries such as Italy spoke of the need for greater attention to an advisory role for inspectors in such initiatives and stressed the importance of their educational functions in approaches to improving health and safety through partnership and a focus on a more holistic approach. Again these might result in less obvious enforcement actions in relation to hazardous substances in ‘projects’, with the aim that good practice that is achieved with the help of education and advice from inspectors will be passed on to other firms.

Of course, it is probably also the case that enforcement actions in which issues of chemical risk management are addressed, including those in which OELs may be implicated, are recorded in ways in which these aspects are not prominent. The emphasis that regulatory agency inspectors and officials that were interviewed placed on ‘holistic’ approaches to ensuring compliance with systematic risk management, coupled with the difficulties in interpreting recorded enforcement data mean that a considerably more detailed study of inspection practices in process regulation is required before it is possible to make a definitive statement concerning true extent of enforcement actions in which OELs are involved in the countries studies. However, the strong impression gained from the interviews is that they are certainly no more significant than has been already demonstrated in the UK (HSE 2002).

Who monitors workplace air?— While measurement of airborne pollution to assess risks and monitor risk management is the responsibility of employers, in practice it is often undertaken by external expertise. Regulatory inspectorates, (perhaps with the exception of those of the dual system in Germany), rarely engage in proactive acts of monitoring themselves, instead it is undertaken by prevention services and/or a variety of other consultants. Indeed, a major difference between the UK and most other continental European countries is in the nature of the legislative provisions that oblige employers to use prevention services to support their management of OHS, and the further provisions that serve to define the competence of the services found in these countries — in contrast to the rather limited legislative requirements concerning competence that characterise the British approach. Although there is considerable variation in the detail of these requirements, they exist in most continental EU countries and many have been there for some considerable time. All have played a substantial role in national arrangements to implement the Framework Directive and in particular, to provide support for risk assessment/management. Not surprisingly therefore, in most countries in our study such services are perceived as having a front-line role in monitoring workplace airborne

⁴⁶³ see Chapter 2 for an explanation of this term

⁴⁶⁴ Indeed, critics argue it implies reduced enforcement activity

exposures to hazardous substances. In some countries an additional significant role is also played by a variety of other 'consultants'. In our country studies we were able to identify several problems with this (theoretical) position, which may contribute to undermine its effectiveness. They include:

- Variation in quality and competence of external prevention services/consultants. Although countries such as the Netherlands have certification systems in place that are designed to maintain high standards of competence from prevention services, the effect this has on their capacity to undertake occupational hygiene is not clear. While employers are obliged to contract with an *Arbodienst* to ensure that the risks of their enterprises are evaluated appropriately and risk evaluation is a statutory requirement for the services that the *Arbodiensten* supply to support employers, the degree to which such evaluation actually carried out appears to be less than optimal (Karageorgiou *et al* 2000:277-283). They are commercial organisations and the main market demand for their engagement is directed towards sickness absence and medical surveillance. Therefore it is likely that unless employers demand it, they will not undertake monitoring of workplace air. For the same reasons it is likely that, despite requirements on competence, many of the *Arbodiensten* may not possess the expertise required for sophisticated monitoring of OELs. Similar concerns were expressed in Sweden where it was suggested that, in fact, as in the Netherlands, the frequency of measurement undertaken by occupational health services had declined over the last decade.
- In Italy there has been considerable debate surrounding provisions (or more correctly, the absence of provisions) to ensure quality of prevention services that are a product of the Law 626 (implementing the Framework Directive 89/391). In November 2001, the European Court of Justice upheld a complaint that Italian legislation did not make the use of external prevention services compulsory where skills within undertakings were insufficient for risk assessment (ECJ Case C49/00 Commission v Italy, 15.11.01). Since then, what should constitute quality in external prevention services has been the subject of on going discussion but it is unclear what, if any, will be the legislative outcome of such discussion or what effect, if any it will have on the capacity of such services to undertake airborne monitoring.
- In Greece although much is expected of their role, external prevention services for OHS are a recent development. It is assumed that trained safety engineers and occupational physicians (constituting the specialist personnel of the EXYPP and ESYPP) will:
 - reduce the deficit in knowledge in relation to securing improved management of chemical risks within systematic OHS management,
 - the extent of exposure
 - future situations that require monitoring.

The EXYPP may provide the technical support to employers to enable them to understand the role of OELs as well as undertake monitoring for them. Increasing demand for their services will increase the need for people trained in monitoring. However, the reality is that at present there are extremely few of such services, they reach only limited numbers of enterprises and it is unlikely they all possess the capacity to undertake monitoring of workplace air.

The absence of a clear regulatory definition of what should constitute the technical resources and role of occupational health services (unlike, for example, in countries such as Denmark, where they are more clearly prescribed) and the increased trend towards the commercialisation of such services means that they are driven by market forces to provide the kind of service that employers want. Employers are generally ignorant of the role and significance of OELs they therefore frequently do not require monitoring from prevention

services, preferring instead to concentrate their requirements more in areas such as medical surveillance. In countries like Sweden and the Netherlands with prevention services of long-standing, this erodes their capacity to deliver broad based preventive approaches such as those associated with the detailed monitoring of OELs. In countries where such services are relatively new, the overall pressures are much the same and their effect is to make it unlikely that more than a minority of such services would gain this kind of capacity to begin with.

Whatever the capacity of prevention services to deliver monitoring of chemical pollutants in workplace atmospheres, a more significant problem concerns the limited access to such services enjoyed by the majority of enterprises. This seems to be the case regardless of the legislative provisions that control such services and require employers to use them.

It is a widespread problem and especially significant in small enterprises. It is generally acknowledged that for a host of reasons these are least well serviced by external prevention services, and relatively inaccessible to inspectorates (Walters 2001). It is therefore far from clear how frequently or how thoroughly monitoring actually takes place in practice in such firms, or with what results.

One corollary of poor access to and service by expert prevention services is poor awareness of the existence/meaning of OELs. This is a well-documented feature of owner/managers in many small enterprises that use chemicals in the UK (HSE 1997). There is somewhat of a cyclic effect here — where employers are unaware of the significance of OELs they are unlikely to engage the services of prevention services to monitor airborne exposures. Equally they are unlikely to do so because of prohibitive costs involved. As such, they will not benefit from any educational/awareness raising effects that might result from contact with prevention specialists. Regulators and trade union specialists interviewed during the study were often only too aware of this cycle and it was one of the reasons why they advocated the kind of alternative strategies we have already discussed — because, to a large extent they remove the need for employers to make informed decisions about risk management strategies for chemical hazards.

9.4 CONCLUSIONS

Although one of the consequences of the growth in significance of the EU as a legislative and policy making body has been greater harmonisation in many aspects of risk regulation, most comparative studies nevertheless stress the continuity of divergence amongst national systems. However, in the case of the issues we have examined in relation to securing improved management of chemical health and safety, we see considerable commonality in the nature of experiences across member states. This is particularly true of:

- National systems for setting and reviewing OELs and their position of such systems within OHS regulatory systems
- The limited role of OELs in control measures in use in managing chemical risks and in workplace OHS management
- The limited extent to which reference is made to OELs in monitoring risks management by the regulatory agencies
- The limited understanding of the meaning and significance of OELs by duty holders and notions concerning their meaning prevalent in wider society
- Other measures that are used in addition to or instead of OELs to determine control measures and good chemical risk management practice.

Documenting and analysing experiences from other EU countries in relation to these matters was the primary objective of the present study. In common with other authors⁴⁶⁵, we are at pains to stress that there are many features of national systems for health and safety and strategic approaches to regulating chemical risk management that remain divergent. However, in terms of the role of OELs within these systems, it is the convergence of experiences and approaches that is most striking. If we compare the salient points of our conclusions with the key objectives for the revised British system that are identified in the HSC's Discussion Document, we find a broad congruence of actions and issues covered:

HSC Key Objective 1. OELs should control risks to health

They should provide standards that can be used along with other information to decide on appropriate control measures and to assess the adequacy of measures in place.

Controlling risks to health was clearly the aim of all of the OEL systems we investigated. The extent to which they were able to do so however, was subject to considerable limitations, of scope, application and user understanding that are similar to those experienced in the UK. However, none of the systems we investigated had been subject to any detailed quantitative evaluation concerning their effectiveness, either in terms of health outcomes or, more narrowly, in terms of their use in risk assessment. The qualitative evaluations on which we drew suggested broad agreement about the limitations of OELs but at the same time pointed to a widespread belief in their necessity.

HSC Key Objective 2. OELs should be readily understood and accessible

The OEL framework should be based on a clear and coherent set of concepts that employers and employees understand, but application at the workplace needs professional input.

There were variations in the extent that it could be argued that OELs were based on clear and coherent principles but widespread agreement that nowhere were they either readily understood by the majority of employers or accessible to them. As far as professional input in their use was concerned, despite the existence of legal requirements on prevention services in most of the countries we investigated, there was shortage of professional input in the application of OELs in workplaces in these countries (Germany may be a possible exception). There was a widespread notion that such input was least accessible to employers in small and medium sized enterprises and that these were the duty holders that were least aware of the significance and role of OELs. There was also a worrying notion expressed in some countries that there had been a decline in the extent to which prevention services still had the capacity to provide the professional input required.

HSC Key Objective 3. OELs should be legally enforceable

They should provide legally enforceable standards for the adequacy of control by inhalation and they are for use when prevention of exposure is not reasonably practicable

OELs were theoretically legally enforceable in all countries. The extent to which they are enforced however is not great. Records are hard to locate or understand, but the strong evidence of observers was that in all countries enforcement, for many reasons that have already been discussed, is not an option practised widely. The practice of substitution is an important driver of improved chemical risk management through technological change in

⁴⁶⁵ *This is not the place to discuss the convergence/divergence debate in detail. However the point about continued divergence in national systems after the imposition of the harmonising effects of EU Directives is discussed at some length by for example, Walters 2002, Vogel 1993 and 1998 and Unger and van Waarden 1995*

most countries. It shows that in some cases (such as with toluene in printing for example) exposure has been prevented and it is possible to make a more concentrated effort to use OELs in assessing risks in the remaining situations where hazardous substances cannot be substituted (such as in gravure printing, for example). At the same time, regulation is widely perceived as an important driver of improved chemical risk management, however, OELs are only one aspect of such regulation.

HSC Key Objective 4. OELs should be comprehensive

The OEL Framework must be comprehensive and capable of application to all substances. It should be capable of application to generic groups of substances. It must be developed and presented in such a way that it will not encourage employers without OELs that are not adequately evaluated.

The systems we examined in northern Europe are as sophisticated and as highly developed as that of the UK. Similar issues to those identified in HSE Objective 4 are of concern to those engaged in their further development. Thus, we note that even the most developed systems only deal with a small minority of chemical substances that are in use in industry. There is therefore discussion of the means with which such frameworks for OELs could be applied to generic groups of substances. Generally, the strategies of substitution that we have discussed with interviewees in these countries are based on quite thorough investigation of possible effects of alternative substances and the ethos of substitution is not one that would encourage the introduction of inadequately evaluated and potentially harmful substances. The situation in southern European countries was less well developed and it was unclear the extent to which it was capable of addressing all these issues (although in Italy at least, there is considerable discussion of them).

HSC Key Objective 5. OELs should comply with EC legislation

This is an issue that is under review in all of the countries we studied in detail. The anticipated division between north and south is evident. The concerns of northern European countries are with the extent to which existing systems need to be adapted and the extent to which the achievement of compatibility with EC requirements can be achieved without reducing the quality of these existing systems. In southern European countries EC requirements are necessitating more fundamental reforms. There is some questioning of compatibility of these changes with national approaches (such as the constitutional debates in Italy) and the possible influence on quality. In addition, there are several other issues that are the subject of national debate in Italy and Greece which seem to be mainly to do with the extent of duties under the legislation introduced to transpose the EC requirements and the possibility of exemptions from its coverage.

HSC Key Objective 6. OELs should be flexible and able to take on board new developments in science and technology

As mentioned above, in the northern European countries we studied the systems for setting and reviewing OELs were as thorough and detailed as those in the UK (in some cases possibly more so). There was some concern in these countries about delays that occurred in the process of review and the resource intensive nature of the process of evaluating new information and reconsidering OELs in its light. In terms of applications at the workplace level, technological change seemed to be the driving force for improvement in all countries. OEL systems were generally flexible enough to allow for the development of substitution and specification standards. The position in relation to the discretion of inspectors to demand improvement of exposures to below the OEL was less clear. Concerns were suggested about

the role of an OEL regulatory framework in which numerical values are not properly understood, resulting in employer resistance to reducing exposure to as low as is technically feasible.

HSC Key Objective 7. OELs should provide incentives to reduce exposures

A similar situation applies here to that described above for Objective 6. Technological change is the driving force for improving the management of risks from chemical hazards. Substitution and specification standards operate alongside OELs in most countries we studied. At the same time concerns were raised about the misuse of OELs that result from faulty understanding of their meaning, which could include contributing a barrier to demands for the application of good practice from regulatory inspectors.

The Discussion Document identified several options for reform. The continental European experiences we have analysed would seem to indicate that its Options 2 and 2A, represent the best way forward: in which good practice is either supported by a single limit or a two tier system combining good practice with special arrangements for carcinogens. Either of these approaches are consistent with our findings concerning the positive uses of OELs. They would for example:

- encourage (or at least not *discourage*) the development of substitution strategies and the greater use of specification standards within a broader framework for chemical risk regulation
- not prevent inspectors from requiring improvements that were technically feasible
- help to reduce some of the misconceptions around the notion of ‘a safe limit’
- allow the enforcement of good practice and avoid the necessity of sophisticated monitoring in some situations where it is neither economically feasible nor really necessary

Our review of the issues that confront regulating chemical risks in other EU countries suggests that the current discussion of reforms to the regulatory framework for using OELs in the UK are steps in the right direction. However, it is by no means certain that such reforms would alone be sufficient to address the problems of achieving widespread compliance with measures to assess and manage chemical risks. They will not solve the problems of risk perception and risk communication that seem to be inherent in all the national systems for setting and using OELs that we have considered. While they may help improve the practice of risk management of hazardous chemicals amongst *some* duty-holders that currently fail to deal adequately with this subject, our analysis of wider European experience suggests there is no ‘one size fits all’ approach that can be applied successfully to this subject. Such reforms that are currently being canvassed are unlikely to reach all users. In particular, they will not guarantee that the practice of understanding and using OELs would be extended to *substantially* more duty-holders amongst owner managers in small enterprises, since their problems of compliance are considerably more wide ranging than can be addressed by this type of reform alone (Walters 2001). They also do not address other concerns that we have raised, such as the question of access to services with the competence and resources to undertake monitoring or the extent to which the regulatory inspectorates are themselves sufficiently resourced and skilled to always deal adequately with OELs.

We conclude therefore, that if substantial improvement is sought in the way in which *all* firms manage the risks of using hazardous chemicals, the kind of revision that is currently under discussion for the system of OELs in the UK would need to be part of a wider reform. It would need especially to address the issue of risk communication in rather more fundamental

ways than are currently proposed. It would require integration within additional reforms that would go some way to ensure the availability and use of professional preventive services that are sufficiently competent to undertake the monitoring of hazardous chemicals. Means to effect such availability and use would also have to take account of the particular challenges represented by small enterprises, which would additionally require special attention being paid to their education and information needs. Above all, the creation of an ethos of risk awareness for all involved in the use of hazardous chemicals is necessary. Some small steps can be made in this direction by clearer meanings for OELs such as currently suggested in the Discussion Document. Best practice in Germany suggests that combinations of indicators of safe materials, plant and processes can be used to achieve greater worker protection from chemical risks without necessarily resorting to extensive monitoring. But best practice in countries such as the Netherlands and in Sweden indicates that other measures to encourage participation, to make use of the skills and experience of trade union health and safety representatives and to engage with manufacturers and suppliers are also required. As the Dutch experience shows, substitution principles and specification standards steered by regulatory strategies can be arrived at by agreement between workers representatives, employers, manufacturers and suppliers, aided by the use of competent professional advice if participants are empowered to make such agreements. OELs, far from being redundant in these processes have a variety of potential roles to play, ranging from the provision of information on hazardous substances, through design specification, to monitoring performance standards.

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