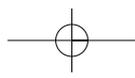
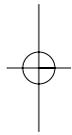
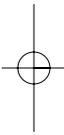


The implementation of the Machinery Directive
A delicate balance between market and safety

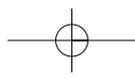
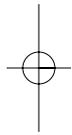
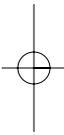


The implementation of the Machinery Directive

A delicate balance
between market and safety

Stefano Boy,
TUTB researcher

Sandra Limou,
Institute for Work, Robert Schuman University,
Strasbourg



Preface

The European Trade Union Technical Bureau places a high premium on identifying issues that affect the health and safety of workers. The TUTB is particularly well aware of the continuing high rates of accidents and injuries caused by machinery in many European countries.

The Machinery Directive is the cornerstone of work equipment law adopted under the New Approach¹. The Directive aims to combine free movement of machinery in the European Union with a high level of protection for workers and citizens. With the Directive now in the midst of a revision, the TUTB wants to make more information available on national practices and promote a public debate on the health and safety issues raised by the Directive's implementation.

This publication is the culmination of a European research project on the application of the Machinery Directive in selected Member States – Finland, France, Germany, and Italy – launched by the TUTB at the end of 2000. The project focused on writing four, interview-based national reports covering the main issues associated with the Machinery Directive and its application from the angle of workers' health and safety.

The project was rounded-off by a European Seminar bringing together stakeholders from thirteen European countries, at which the reports describing national experiences were discussed in a broader context. The event provided a valuable opportunity to exchange views on standardization, machinery risk assessment, integration of machinery into the workplace, market surveillance of machinery, accident investigation, and machinery users' feedback.

The TUTB hopes that this book will be of help to European and national stakeholders involved in the working of the

1. Council Resolution 85/C136/01 of 7 May 1985 (OJ N°C 136 of 4/06/85) laid down a New Approach in technical harmonization and standardization. Under the new regulatory strategy, harmonization of legislation goes no further than the adoption of essential requirements that go to safety or collective interests. The technical solutions by which these requirements may be met are described in separate harmonized standards.

Machinery Directive, and to trade unions in their commitment to influence workplace and work equipment design.

Marc Sapir,
Director of the TUTB

Table of contents

Preface	5
Introduction	9
Section 1 Project procedure	13
Section 2 National contexts	16
2.1. Finland	16
2.2. Germany	18
2.3. Italy	20
2.4. France	21
Section 3 The implementation of the Machinery Directive : the issues	24
3.1. Practical aspects	24
3.1.1. The interpretation of the Directive	24
3.1.1.1. Scope and definition of machinery	24
3.1.1.2. Essential requirements (Annex I)	29
3.1.1.3. Provisions concerning Annex IV machinery	33
3.1.2. The application of the Directive	36
3.1.2.1. Procedures	36
3.1.2.2. Harmonized standards	51
3.1.2.3. Examples of non-conformity	60
3.1.3. Training of the actors involved in machinery safety	64
3.1.4. Communication between manufacturers and users	68
3.2. A latticework of liabilities	70
3.2.1. Employer liability	74
3.2.2. Machinery manufacturers and sellers' liability	77
3.2.3. Manufacturers' civil liability for multi-tier sales of components and sub-contracting	82
3.3. Market control	83
3.3.1. Safeguard clause	85
3.3.2. Publicly organized market control	89
3.3.3. Emergent market surveillance at European level	96
Section 4 Overview	100
4.1. Practical aspects	100
4.2. A latticework of liabilities	109
4.3. Market control	113
Section 5 The inputs from the seminar	116
5.1. Confirmations	116
5.2. Additional facts on identified concerns	119
5.3. New elements	124
Section 6 Conclusions and ways forward	128
Annex Breakdown of replies to the TUTB survey	136

Acknowledgements

We gratefully recognize the contributions of the various organizations and national ministries that were involved in carrying out this study, especially their representatives: Tuuli Kerttula of the Finnish Ministry of Social Affairs and Health, Ulrich Bamberg of the German organization KAN, Emilio Borzelli, Roberto Cianotti and Antonio Di Mambro of the Italian institute ISPESL, Pascal Etienne and Marie-Noëlle Rouxel of the French Ministry of Labour, and finally, Francis Meyer of the Robert Schuman University in Strasbourg.

We should also like to thank all the people contacted for the survey who were willing to answer our questions and take the time to explain their views in detail.

Thanks also go to Glenn Robertson for the job done in revising and coordinating the language aspects of the successive versions of the report in English.

Introduction

2. Council Directive of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers (89/391/EEC) *OJ* 29/06/1989 No. L 183, p. 1.

3. Council Directive of 14 June 1989 on the approximation of the laws of the Member States relating to machinery (89/392/EEC) *OJ* No. L 183, p. 9. It has been in force in the Member States since 31 December 1992.

4. Eurostat, *Accidents at work in the EU, 1998-1999*.

5. COM (2000) 899 final, available at http://europa.eu.int/comm/enterprise/mechan_equipment/machinery_direct/proposal.htm.

6. COM (85) 310, June 1985.

The European Trade Union Technical Bureau for Health and Safety was set up by the European Trade Union Confederation in 1989 at the time of the Council's joint adoption of the Machinery and Framework Directives², to support trade union reps' involvement in the technical work that would result from both pieces of legislation, and to develop trade union cooperation on implementing the new legislation's objectives at the work place. The Bureau also monitors the transposition and application of other directives that affect the health and safety of workers.

As part of this, the TUTB is engaged with the discussion as to whether New Approach directives, and in particular the Machinery Directive, are genuinely achieving uniform levels of protection for workers all across the Community.

Nearly ten years after the Machinery Directive came into force³, an assessment study on its implementation in Europe was still lacking. The question of how the system set up by the Machinery Directive was working had never been put, even though the most recent report on work accidents in the European Union⁴ demonstrates that machinery operators are still seen as a "high risk group of persons".

The project was set up in response to the Commission's proposal for a revision of the Machinery Directive⁵. It is therefore hoped that the project outcomes will inform the debate by bringing to a wider audience elements that bear further investigation and improvement.

The background

In 1985, the European Commission published a *White Paper "Completing the Internal Market"*⁶. It sets out a programme comprising a series of objectives, including the removal of physical and technical barriers to trade, and tax barriers affecting goods. The initiative aimed to ensure common conditions for the marketability of goods on European markets, and to provide a legal framework for business in Europe. On the issue of removal of technical barriers, the case for a New Approach to

harmonisation of national laws was made on the basis of the principle of equivalence of safety policy objectives in Member States. Support for this was drawn from the 1978 Cassis de Dijon judgement⁷, which enshrined mutual recognition of national provisions. According to the Commission⁸, this approach has four components: the adoption and effective implementation of harmonisation directives, notification of draft national technical regulations⁹ to the Commission, and the existence of a European policy on standardisation and certification.

The Machinery Directive

Machinery Directive 89/392/EEC of 14 June 1989¹⁰ was adopted under article 100 A of the Treaty of Rome (now article 95 of the Amsterdam Treaty). It prescribes machinery design measures and calls upon Member States to give freedom of movement within the European Economic Area to equipment that complies with its provisions. Suggested technical ways of fulfilling these requirements are detailed separately in voluntary European harmonized standards.

From the beginning, the debate¹¹ focussed on the Directive's scope, manufacturers' and employers' responsibilities and finally, on the respective roles of public authorities and private bodies.

The Directive requires persons (manufacturers, importers or retailers) who intend to place machinery on the market to satisfy essential health and safety requirements and carry out a "conformity assessment procedure". On this basis, an EC declaration of conformity must be issued and supplied with the product, and a CE marking will be affixed to it.

The manufacturer of any equipment that falls within the definition of machinery¹² can himself certify its conformity. Compliance with harmonised standards creates a presumption of conformity to the relevant essential requirements. There are three types of harmonised standards supporting the Machinery Directive: A standards deal with basic concepts concerning all machinery; B standards deal with safety aspects concerning a range of machinery, or with components and devices; C standards are "vertical" standards covering a single type of machinery.

For some more dangerous products – exhaustively listed in Annex IV¹³ of the Directive – the conformity assessment procedure also requires an EC type-examination by a third party (a notified body): the body examines the machinery, and certifies that the example complies with the provisions applicable to it. If the products comply with harmonised standards covering all

7. The Court of Justice of the European Communities, 20/2/1979, Case 120/78 Rewe Zentral A.G / Germany.

8. Seventh report of the Commission to the Council and European Parliament concerning the implementation of the White paper on completing the internal market, COM (92) 383 final.

9. The first directive was adopted in 1983 (83/189/EEC) and codified in 1998 (98/34/EC).

10. The most recent version being that of 22 June 1998, 98/37/EC.

11. ETUC Executive Committee Resolution adopted on 11-12 February 1988.

12. For the purposes of this Directive, "Machinery", means an assembly of linked parts or components, at least one of which moves. It also covers an assembly of machines which are arranged and controlled so that they function as an integral whole (Article 1).

13. Annex IV contains woodworking machines (hand-fed surface planing machines, hand-fed vertical spindle moulding machines, hand-fed tenoning machines, thicknessers for one-side dressing, portable chainsaws); other machines for working with wood or meat (circular saws, band-saws); presses for the cold working of metals; injection or compression rubber-moulding machines and plastic-moulding machines; some types of machinery for underground working (locomotives and brake-vans, hydraulic-powered roof supports, internal combustion engines to be

fitted to machinery for underground working); manually-loaded trucks for the collection of household refuse; guards and detachable transmission shafts with universal joints; vehicles servicing lifts; devices for the lifting of persons; and machines for the manufacture of pyrotechnics. It is worth noting that many of the machines listed require manual loading, moving or unloading rather than automated operation.

14. Article 6.2 of the Machinery Directive.

15. These States were chosen chiefly for their very different national situations, and their importance as machinery producer or user markets. The United Kingdom was to have taken part, but eventually pulled out.

16. By the Robert Schuman University's Institute for Work, Strasbourg. S. Limou, *Rapport sur l'application de la Directive 98/37, concernant le rapprochement des législations des Etats Membres relatives aux machines*, TUTB – University of Strasbourg, 2000. This initial report was subsequently revised, condensed and published as S. Limou, *La directive communautaire relative à la conception des machines – L'exemple français*, Presses Universitaires de Strasbourg- TUTB, 2003.

17. Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro.

18. Kommission Arbeitsschutz und Normung.

the relevant essential requirements, however, they need not undergo the EC type-examination, and the manufacturer may again himself declare that his product conforms to the Directive without third party verification. The Machinery Directive also addresses the free movement of machinery intended to be incorporated into or assembled with other machinery to form a complex installation. Manufacturers of these products can place them on the market subject to issuing a declaration of incorporation which warns the buyer that the equipment supplied does not comply with the Machinery Directive. Such equipment will not be CE-marked, and need not comply with the essential health and safety requirements.

After the adoption of the Directive, the Commission handed European Committee for Standardization (CEN) and European Committee for electro technical standardization (CENELEC) a programming mandate (mandate CEN/CLC/16-91).

It was at this time that the Commission invited the Trade Union Technical Bureau to sit in on the working group of the Standing Committee for the Machinery Directive 98/37¹⁴. The TUTB has also been an associate member of CEN since 1993. It takes part in the work of CEN TC 114 - Safety of machinery - and submits comments on technical standards affecting workers' health and safety during the enquiry stage.

The project

At the end of 2000, the TUTB launched a research project on the application of the Machinery Directive in selected Member States – Finland, France, Germany and Italy¹⁵ – to identify practices and any difficulties those affected by the regulations are encountering.

A TUTB-supervised report written in 2000 on the application of the directive in France¹⁶ provided the basic groundwork for this new project. The French Ministry of Labour showed interest in the issue and decided that the European study merited part funding. The Italian OSH agency ISPESL¹⁷ (National Institute of Occupational Safety and Prevention), Germany's KAN¹⁸ (Commission for occupational safety and health and standardization), and the Finnish Ministry of Social Affairs and Health were also invited to participate in the project. They agreed to produce national reports on the implementation of the Machinery Directive in their country.

It was decided to focus on just one type of machine so as to have consistent data on which to base the analysis of the different

national systems. Woodworking machinery was chosen for their significant risks and the admittedly poor safety record of the woodworking industry. Many types of woodworking machines are listed in Annex IV of the Directive (circular saws, planing machines, band saws, tenoning machines, chain saws, moulding machines). A contributory factor was that the TUTB had previously commissioned two research studies on woodworking machines - one in Sweden¹⁹ and another in Italy²⁰.

The report

The present report is structured as follows. Section 1 describes the project procedure. Section 2 gives an overview of how the Machinery Directive works in the four Member States participating in the study. Section 3 contains the national reports integrated in a single framework. The authors in Section 4 summarize major findings. Section 5 presents an overview of the debate that took place at the TUTB seminar held in June 2002, at which the national reports were presented. Finally, Section 6 sets out the broad trends identified by the authors during the exercise. These concluding remarks address issues that the TUTB believes require further exploration.

19. Collaborative data collection project with the Swedish trade union confederation LO in 1997. Anders Söderqvist, *User-centered information: data collection report*, TUTB internal document, 1997.

20. Research project conducted by the SindNova trade union institute to feed input from workers and business in the effectiveness evaluation of woodworking machinery technical safety standards. F. Strambi, C. Stanzani, M. Bartalini, M. Cucini, *Ergonomia e norme tecniche di sicurezza : il contributo degli utilizzatori. La sicurezza delle macchine per la lavorazione del legno* (The user input to ergonomics and technical safety standards. Safety of woodworking machinery), FrancoAngeli and SindNova, 2001.

Section 1

Project procedure

The project was carried out in four stages: 1. Coordinating the writing of four national reports on the application of the Machinery Directive in four Member States (Finland, France, Germany and Italy); 2. Evaluating the development of the reports in periodic meetings with the national partners involved; 3. Consolidating the four reports into a single synthesis report; and 4. Organising a seminar to discuss the key outcomes of the exercise with a selected audience of European experts.

The objective

The project was designed to investigate the balance between the health and safety of workers, and the free market in the work equipment.

The TUTB is interested in how the multiple stakeholders involved in the working of the Machinery Directive are acting. Historically, each country has developed its own specific administrative set-up, which is locked into the national machine safety culture. Not only do the various stakeholders (manufacturers, public authorities, notified bodies, etc.) play their own particular role, they have also developed specific linkages with one another.

The way this balance is working and evolving along the chain of stakeholders concerned (from designers to end-users), and the way in which the Directive squares the roles of the public sector and private sector were investigated in the light of the health and safety demands of workers as being those most directly concerned by the proper application of the legislation.

This project was designed to identify the problems met by those involved with the Machinery Directive rules, and potentially to give insights into failings, gaps and loopholes in the machinery regulations. Of particular importance is to determine whether the Directive still accurately reflects changes in the market and technology.

The study should also help inform the rolling debates on the revision of the Directive, by giving perspectives on natio-

nal practices, and needs. Groundwork on revising this piece of Community legislation has been ongoing in various areas for several years. The Molitor Group²¹, tasked with examining the impact of Community and national legislation on jobs and competitiveness²², had put up a raft of proposals on machinery regulations back in 1995. The way its study was run²³, the proposals put forward, and the Commission's reaction²⁴ showed how critically important machinery regulations are to the public authorities, manufacturers and trade unions²⁵.

The basis for work – a common questionnaire

The project participants all agreed to write up national reports based on information collected from interviews. To this end, a twenty-page questionnaire was drawn up to help participants structure their national reports by identifying their interviewees, and ensure comparability of information. The questionnaire was addressed to woodworking machinery manufacturers, users²⁶, bodies notified by the Member State and consulting agencies. Public authorities in charge of market surveillance and labour inspection (both central service and front-line staff) as well as training providers for design engineers and machinery operators were also interviewed. The latter were questioned as sources of information on how future economic operators and workers were made aware of machinery risks. All these actors were chosen either because they are directly affected by or decisive contributors to the implementation of the Directive. Around eighty people were questioned²⁷; some were interviewed in person, while others were questioned by post or phone²⁸.

Questions focused on a number of "topics" identified from the previous TUTB report on the application of the Machinery Directive in France. This earlier report, carried out by Robert Schuman University's Institute for Work in Strasbourg, was also based on interviews of actors involved in the application of the Machinery Directive, in particular in the region of Alsace. The following topics were identified:

- the interpretation of the requirements and application issues;
- the legal liability of the actors;
- the role of the public authorities, in particular through market surveillance.

The interviews were adapted to the different actors. For example, questions for machinery operators did not refer to the wording of the Directive, because they would not be familiar with it. So, they were interviewed on the safety conditions at their workplace,

21. A group set up by the Commission, comprising seventeen independent experts, and chaired by Bernhard Molitor, a former high-ranking German ministerial official.

22. The group's brief covered four areas: the environment, employment legislation, food hygiene and rules governing machinery.

23. The group failed to produce a consensus document due to differences of opinions between the experts.

24. Document COM (95) 288 final.

25. For the TUTB's reaction to the Molitor report, see "Molitor Group: deregulation assault on health and safety", *TUTB Newsletter*, No. 1, October 95, pp. 2-3.

26. Three types of user were defined: business managers, employee OSH reps, and machinery operators. Different size firms were to be surveyed (1 to 9 employees, 10 to 50 employees, and 50-plus employees).

27. See annex.

28. The TUTB and the national bodies involved in the project agreed to keep interviewees' identities confidential.

and more specifically whether the safety devices fitted to machinery were considered appropriate, or on the information they were given after a work accident.

The development of the national reports

The participants wrote national reports based on the replies to the interviews. They took around four months to carry out the interviews. The preparation of the four national reports was periodically reviewed by a working group composed of representatives of the national organizations involved in the study (ISPESL, KAN, French Ministry of Labour, Finnish Ministry of Social Affairs and Health, University of Strasbourg). The first tentative Synthesis Report was drawn up around May 2002, incorporating the four national reports into a single document for discussion at the European seminar.

The European seminar

As the project set out to lay the groundwork for a European-level debate on the main findings from the synthesis report, the TUTB staged a seminar in June 2002 to bring together the European counterparts of the stakeholders interviewed at national level, (manufacturers, employers, notified bodies, etc.) national trade union representatives, and machinery safety experts and representatives of EU bodies.

General remarks

The project was carried out through periodic meetings. A total of six meetings were held in the headquarters of the participating national bodies over the period December 2000 – October 2002. Each national body prepared the report with its own resources. This inquiry lays no claim to be either exhaustive or representative, given the limited time and funds available, and the varying national situations. The information collected helps to identify problems encountered by the different actors.

Section 2 National contexts

This section gives an overview of the national systems through which the Design of Machinery Directive is implemented. The flow charts lay no claim to completeness, and are used only to illustrate the framework within which the national players operate.

2.1. Finland

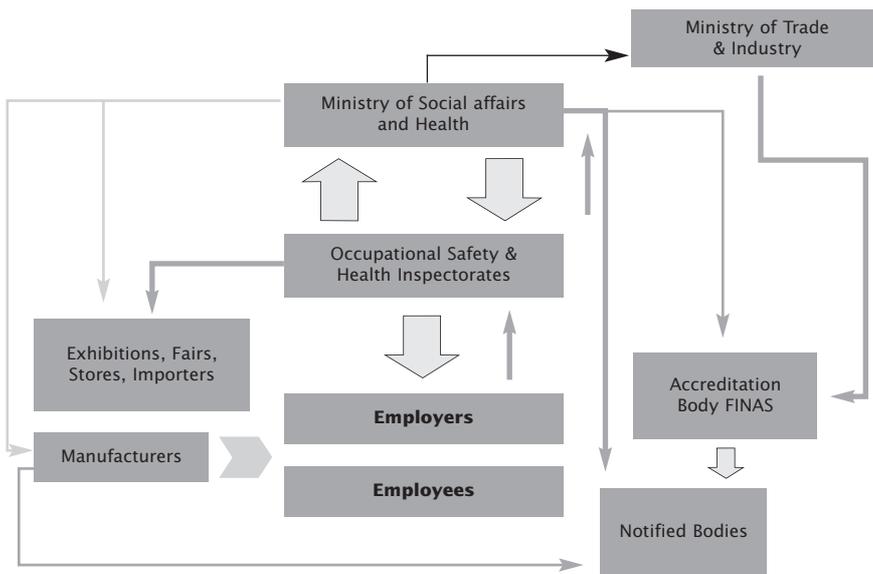


Figure 1 : The implementation of the Machinery Directive in Finland

The Ministry of Social Affairs and Health has charge of the implementation and application of the Machinery Directive, which was carried over into Finnish law by a Government Decision.

Responsibility for market surveillance is split between the Ministry of Social Affairs and Health (which deals with work equipment), and the Ministry of Trade and Industry (the consumer equipment watchdog).

The Ministry of Social Affairs and Health's Occupational Safety and Health Department frames strategy (in an annual meeting with inspectorates), plans national campaigns, and is the national provider of technical support, training and information. The Ministry also handles international contacts.

The health and safety inspectorates (of which there are eleven in Finland) control the safety of machinery as part of their general workplace inspections, at trade fairs and exhibitions, and on dealer and shop premises, and also provide local training and information. Over time, they have acquired increasingly wide decision-making powers and powers to take action in workplaces and towards manufacturers.

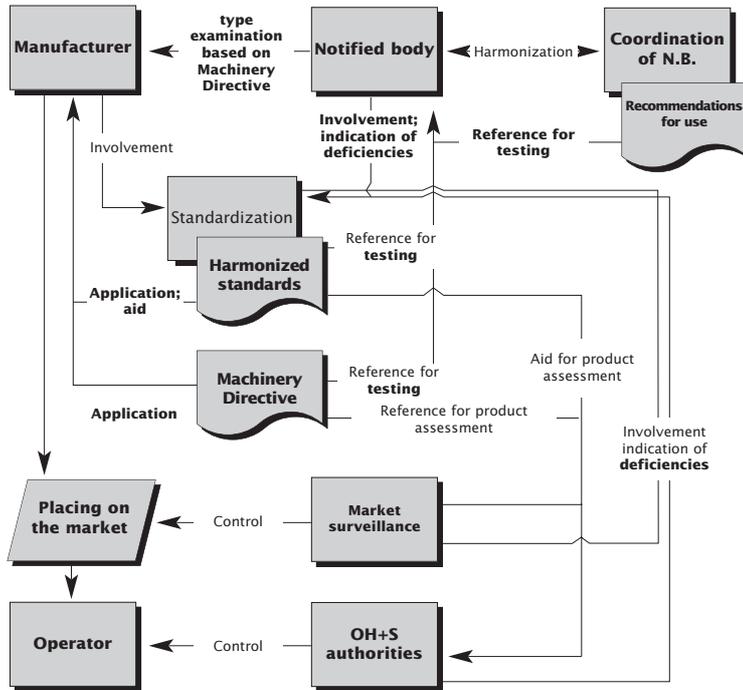
Each inspectorate has one or two inspectors who are more specialized in the Machinery Directive. Inspectors will report non Directive-compliant machinery to the manufacturers or importers in Finland, and can issue a temporary prohibition notice against the equipment. If improvements are not made, the case is reported to the Ministry, which will assess the seriousness of the infringement and contact the manufacturer or importer or both. It will then call the manufacturer or importer to a hearing, the outcome of which will determine the action to be taken. It may prohibit a machine from being placed on the market, or used until the defect has been corrected, or set limitations or conditions on delivery.

The Ministry of Trade and Industry's national consumer affairs department has charge of market surveillance of machinery intended for use by consumers. It can, if need be, restrict or ban the sale of equipment, invoke the safeguard clause procedure, and take other action under the Product Safety Act.

The Ministry of Social Affairs and Health assesses the competence of the notified bodies with the help of the Finnish accreditation body FINAS, and sends the Commission particulars of the notified bodies appointed by the Ministry of Trade and Industry.

The Ministry of Social Affairs and Health calls all Finnish notified bodies to a meeting twice a year to maximize the efficient allocation of responsibilities and plan their attendance at vertical and horizontal coordination meetings.

2.2. Germany



Notified Bodies in Germany are, for example, the testing and certification agencies of the individual *Berufsgenossenschaften* (statutory accident insurance bodies) and also private testing bodies (like the technical inspection agencies, TÜV).

Market surveillance is done by the *Land* industry, craft and shops health and safety inspectorates.

Occupational health and safety authorities: the *Land* health and safety offices and the *Berufsgenossenschaften* technical inspectorates carry out workplace inspections.

Figure 2 : **The implementation of the Machinery Directive in Germany**

Germany has had technical product safety regulations (machines, equipment, plant) for over a century, starting with the code of trade and industry regulations (*Gewerbeordnung*). A special Machinery Protection Act (*Maschinenschutzgesetz*) was passed in 1968, which in 1979 became the Equipment Safety Act (*Gerätesicherheitsgesetz*²⁹). Because its aims are broadly those of the Community Directives on technical products, this became the framework act. As a result, the Community legislation has been implemented through the national provisions. The EC Machinery Directive was adopted into German law as the “ninth

29. Technical Work Equipment Act (Equipment Safety Act), *Gesetz über technische Arbeitsmittel* (*Gerätesicherheitsgesetz*).

Regulation under the Technical Work Equipment Act (*Maschinenverordnung – 9. GSGV*)” in 1993.

Germany differs from the rest of Europe in having a two tier system in which occupational safety is governed not just by legislation, regulations and administrative measures but also by the accident prevention rules (*Unfallverhütungsvorschriften*, UVV) laid down by the statutory accident insurance bodies (*Berufsgenossenschaften*³⁰) tasked with using all appropriate means to prevent work accidents, occupational diseases, and work-related health risks. These rules have a broadly similar status to government regulations, but are drawn up independently by *Berufsgenossenschaften* committees composed of employers’ and workers’ representatives. Unlike legislation and regulations, however, these rules apply only to the specific *Berufsgenossenschaft’s* member firms. They are, however, subject to government (Federal Ministry of Labour) approval to ensure their legality.

For historical reasons, therefore, occupational safety law is a mix of dissimilar rules. This complexity seriously hinders the work of enforcement agencies who find it hard to have a full grasp of all the regulations. Despite “its haphazard structure and the confusing complexity that causes”, however, German occupational safety laws are “recognized as providing a high level of protection”³¹.

The existing German rules were not altered or significantly improved by the implementation of the Machinery Directive. They only needed to be restructured. The recasting of regulations in line with the New Approach principles has not been without consequences: accident prevention rules originally covered both the use of machinery, (i.e., rules directed at employers), and machine building and fitting requirements. These rules are now limited to machinery use, while product standards simply lay down design requirements without offering safety solutions for machine use.

30. The *Berufsgenossenschaften* are public organizations with a statutory duty to draw up work accident prevention rules and enforce the Code of Social Laws (*Sozialgesetzbuch*, SGB) (§15 SGB VII).

31. R. Opfermann, 1996, p. 731.

2.3. Italy

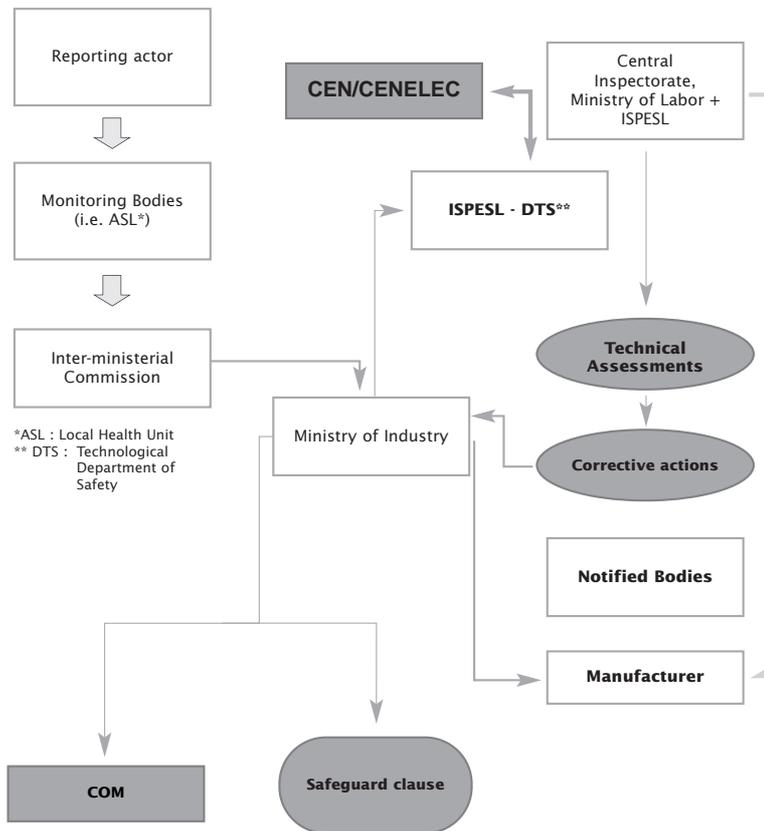


Figure 3 : The implementation of the Machinery Directive in Italy

In Italy, nineteen Regions and two Autonomous Provinces carry out regional planning and coordination across a growing range of spheres, especially health and safety at work. All prevention, monitoring, inspection, safety and health at work-related activities are carried out by Local Health Agencies' (ASL) prevention departments. ASLs are the local arm of the Italian Ministry of Health. They also have the power to conduct workplace inspections and machine safety checks, issue enforcement notices and penalties for using unsafe machinery under Presidential Decree No. 547 of 1955, which is still in force, and Decree N° 626 enacting Directives 89/391 and 89/655.

The Ministry of Labour and Ministry of Industry have joint

coordinated responsibility for the Machinery Directive. The Ministry of Industry has specific responsibility for the safeguard clause, and has empowered the occupational health and safety institute ISPESL to carry out the technical assessments designed to reveal non-compliance with the Machinery Directive. It has also set up an interdepartmental working group (GLI, Gruppo di lavoro Interministeriale) with the Ministry of Labour and ISPESL to scrutinize information on possible instances of non-conformity reported by consumers, users, local health agencies, members of the public, etc.

The Ministry of Labour's technical staff (the occupational health and safety inspectorate) provide support to the GLI's activities and check the changes made to non-compliant machines. If the GLI finds equipment not to be in conformity with Annex I, an administrative procedure is immediately set in motion by notifying both Ministries. If the reported safety risks are confirmed, the Ministry of Industry can order the temporary withdrawal of the machine and/or prohibit its use at the workplace. The Ministry can also report such cases to the Commission to enable consultations to take place within the Machinery Standing Committee, and decide on the action to be taken.

2.4. France

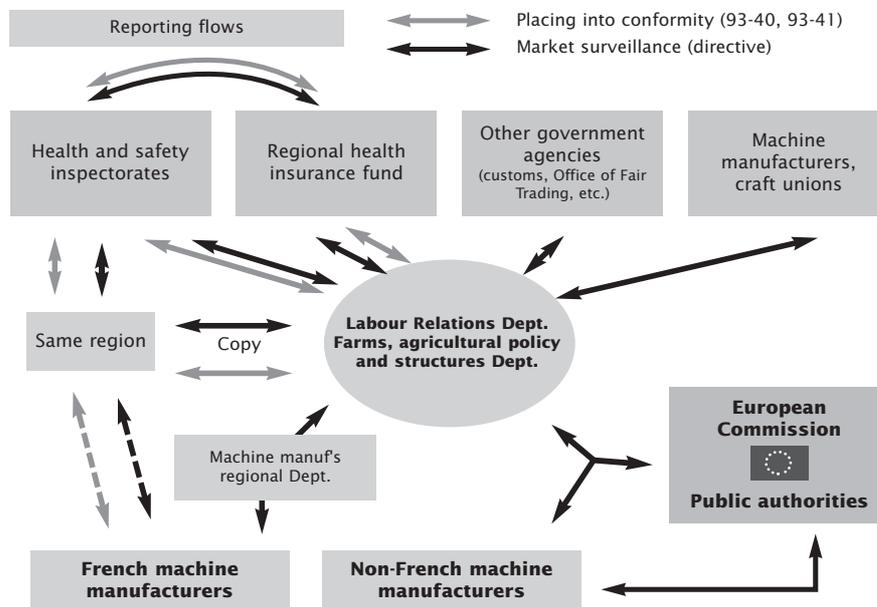


Figure 4 : The French prevention system and the Machinery Directive

The French workplace risk prevention system is a two-tier set-up of two interacting public systems for workplace action. The Ministry of Labour frames prevention policy which is enforced in the workplace by its operational arm - the health and safety inspectorate, while the social security agencies, as the insurers responsible for compensating work-related injuries and managing work-related injury and illness risks, carry out specific workplace checks and vigorously promote prevention in workplaces.

In framing prevention policy, the Ministry of Labour lays the groundwork for legislation, drafts regulations, and polices their application in the workplace. It is involved in the work of the EU Council of Ministers and sees that decisions taken at EU level are taken over into French law. The Ministry gave leadership in framing the Machinery Directive, and is also giving leadership in the revision process.

The provisions of labour law, especially on safety and working conditions, are enforced by health and safety inspectors, who have powers to enter workplaces, take part in WHSC³² meetings and are also significant sources of information and advice for employees, workers' representatives, and employers. They have particular responsibility for ensuring compliance with machinery regulations, which more specifically involves enforcing the rules on organization, information and training of operators, and the regulations enacted under the Machinery and Use of Work Equipment Directives³³ taken over into the Labour Code.

Where any of these provisions is contravened, the health and safety inspector may serve notice of his responsibilities on the employer (remarks), issue an infringement notice or, in cases of urgency, seek an interim injunction to stop dangerous machinery being used. When enforcing technical regulations, health and safety inspectors also have the power to require the employer to call in an approved organization to perform measurements (noise, work environment monitoring, etc.) or check the conformity of electrical systems and machinery. The technical agencies involved here are approved by the Ministry of Labour, but can also provide contract consultancy services to firms, and so play a significant role in implementing the machinery regulations.

When machinery is put into service, a health and safety inspector can also issue an infringement notice against a (French or foreign) manufacturer or seller who has supplied non-conforming machinery.

32. Workplace health and safety committee with a remit to discuss all health, safety and working conditions-related issues company-wide.

33. Directive 89/655 most recently amended by Directive 2001/45 of 27 June 2001.

The general social security scheme is responsible for the financial management of work-related injuries, and so is also keen to promote prevention of workplace accidents.

The Regional Health Funds' consulting engineers and safety inspectors have the same powers as health and safety inspectors to enter and conduct investigations in workplaces falling under the general social security scheme. They are a significant source of technical advice, and can request employers to take all necessary prevention measures.

These engineers and inspectors must report all instances of non Machinery Directive-compliant equipment to the Ministry of Labour, which must put the manufacturer on notice to take action on the reported machine, as well as all others of the same type that may have been put on the market.

Finally, firms can enlist assistance and expertise from various agencies - like the INRS (French National Research and Safety Institute), the ANACT (national agency for the improvement of working conditions), and the OPPBTP (specialized agency working for the prevention of work-related accidents and illnesses in the building and civil engineering industry) - to help them meet the prevention requirements.

Section 3

The implementation of the Machinery Directive: the issues

3.1. Practical aspects

3.1.1. The interpretation of the Directive

3.1.1.1. Scope and definition of machinery

Article 1 of the Directive defines its scope, and the term "machinery" as "an assembly of linked parts or components, at least one of which moves, with the appropriate actuators, control and power circuits, etc., joined together for a specific application, in particular for the processing, treatment, moving or packaging of a material". The definition of machinery also includes an assembly of machines which, in order to achieve the same end, are arranged and controlled so that they function as an integral whole, as well as interchangeable equipment modifying the function of a machine, which is placed on the market for the purpose of being assembled with a machine in so far as this equipment is not a spare part or a tool. This very wide definition is intended to cover the majority of products likely to present mechanical hazards.

The Directive also covers "safety components", defined in Article 1 to mean components, which the manufacturer places on the market to fulfil a safety function when in use, and the failure or malfunctioning of which endangers the safety or health of exposed persons.

The Directive also contains provisions concerning the placing on the market of other equipment: machinery intended to be incorporated into or assembled with other machinery to form a complex installation, within the meaning of article 1 of the Directive, unless it can function independently. Under article 4.2, it may be placed on the market subject to a simple 'declaration of incorporation' drawn up by the manufacturer.

As the Machinery Directive has been gradually implemented, a number of interpretation issues have emerged. Some of these have been addressed in the *Comments on the Directive*

34. European Communities, 1999

35. European Communities, 1999.

98/37/EC³⁴ and the *Useful Facts in relation to Directive 98/37/EC*³⁵ drawn up and published by the European Commission on the basis of consultations with relevant players. These documents - intended to help all "users" of the Directive to apply it uniformly - contain useful pointers on key interpretation issues and suggestions and advice on how to deal with areas of uncertainty.

Conference and seminar proceedings, as well as guidelines and leaflets written since 1989 by national public authorities, manufacturers' associations, and engineering companies, address many issues concerning the scope of the Machinery Directive.

This mountain of paperwork reflects the concern of all the players involved in the "machinery regulation system" to meet the Directive's essential requirements. But it also reflects the complexity of the New Approach strategy and the challenges of achieving alignment across the European mechanical engineering industry.

The following paragraphs present comments received from the national delegations in reply to a simple question as to the comprehensibility of the Directive's scope and the concepts "interchangeable equipment", "safety components" as defined in article 1, and the expression "machinery to be incorporated" referred to in article 4.

It should be borne in mind that answers received from authorities and notified bodies to this question may reflect general views extending beyond the woodworking sector proper.

General perception

In **France**, the health and safety inspectors and manufacturers interviewed reported that "machine" is given a very wide definition, and the meaning of "interchangeable equipment" is not clear.

Where woodworking machinery is concerned, the Directive's scope raises no problems for traditional machines: circular saws, surface-planing machines, tenoning machines, planing machines, mortising machines and even chain saws are clearly identifiable as machinery.

The problem, as the public authorities reported, is with categorizing certain borderline equipment. The Directive has been applied to products which it was never particularly intended to be. Painting cabins, for instance, were finally brought under the Community legislation. Although at first opposing this as

not fitting in with its traditional view of “machinery”, France subsequently bowed to the European interpretation that painting cabins (spray booths) do indeed fall within its scope. Such things as motorized valves are another vexed issue, since it is the intended end use of the product, which determines whether or not it is a machine within the meaning of the Directive.

French notified bodies have produced “data sheets” on the Directive in a bid to clarify certain points and harmonize the interpretation of the essential health and safety requirements. These data sheets have been validated by the Machinery Committee whose tasks include answering questions about the practical application of the Directive. This Committee consists of representatives appointed by the Member States and is chaired by a Commission representative³⁶.

Also, Low Voltage Directive 73/23 of 19 February 1973³⁷ on electrical equipment, last amended by Directive 93/68³⁸, seems to overlap with the Machinery Directive: some products are covered by both, so that manufacturers may not always be clear which requirements they must comply with.

36. Article 6.2 of the Directive.

37. *OJ* No. L 77 of 26/03/1973 p. 29.

38. *OJ* No. L 220 of 30/08/1993 p. 1.

In **Italy**, public authorities feel that the scope and definitions of the Directive could be made more comprehensible by redrafting sentences in simpler and clearer language. In fact, the scope and principles can be understood only by reading at least four Articles together, because Article 1 leaves many questions unanswered. Mechanical engineers might be happy with the present wording, but small manufacturers less-experienced in the field might have difficulties. Authorities also complain that the example given in the provisions for “interchangeable equipment” is inappropriate. They also point out the need for clarification of the procedures to be followed by the different national players in regulation, because the Directive too often fails to reflect the need for objective risk prevention measures.

Notified bodies are also mystified by the “interchangeable equipment” wording, but believe that interpretation issues are best addressed at meetings of Notified Body coordination groups at national and European level.

Manufacturers evidence an interesting strategy on interpretation issues: as well as seeking assistance from manufacturers’ associations, they frequently apply the technical solutions laid down in C-standards to equipment not strictly covered by them. For complex systems, for example, they refer to C-standards for

single units. Where C-standards are not available, they refer to A- and B-standards to apply more general principles.

According to the **German** report, all manufacturers are presumed know whether their products are subject to the Machinery Directive or not now it has been in force for more than ten years, and that any uncertainties must have been cleared up with the bodies responsible. It is true that initially there were major difficulties all round, but the scope and definitions are now better-understood. However, big problems remain with the concepts, not only in Article 1, but throughout the Directive. Serious efforts must be made when revising the Directive to make it more comprehensible. When the first draft was circulated years ago, suggestions were made on how to make the provisions more comprehensible, but were not followed up. The same objection has been made on three occasions, each time to no avail, at least not in this respect. Interpretation remains a problem. Most manufacturers of woodworking machines are small and medium-sized firms, among whom there is still a disturbing lack of knowledge about the Directive. They have divided opinions on its relevance and application to a particular machine. But even government inspection bodies may occasionally misinterpret terms.

In **Finland**, a consultancy body finds the scope of the Directive fairly readily understandable, apart from the Annex 1, point 4.1, requirement on lifting accessories. Nevertheless, notified bodies report wide variations in the way manufacturers interpret the Directives' requirements.

Public authorities feel that the scope laid down in Article 1 of the Machinery Directive has become clearer, and that the meanings of the expressions "interchangeable equipment" and "safety components" are readily understandable.

Machinery intended to be incorporated in other machinery (subassemblies and incomplete machinery³⁹)

39. The authors use the terms *subassemblies* and *incomplete machinery* to refer to the equipment governed by article 4.2, in line with the "Comments on Directive 98/37/EC".

Multifunctional integrated assemblies, often computer-controlled for added flexibility, are increasingly ousting single-function machines. This is also a growing trend across the woodworking sector, which uses CNC machining centres consisting of many interconnected units.

Generally, components and subassemblies are not covered

by the Directive. Article 4.2 requires Member States to allow free movement for subassemblies intended to be incorporated into or assembled with other machinery to constitute machinery covered by the Directive. Some equipment is readily identifiable as subassemblies, while others may strongly resemble complete machinery ready for use and so may not be easily classifiable. As the Commission Guide notes, equipment covered by Article 4.2 may be ordinary machinery from which the safety devices have been removed for the purpose of integrating them into a complex assembly; often, such equipment may also lack independent controls.

This is an area where uncertainties abound, as seems to be borne out by the following national views.

In **Finland**, public authorities and notified bodies agree that the Directive's provisions on subassemblies and incomplete machinery are gradually being applied in a satisfactory manner. But machinery operator trainers believe that these provisions are not easy to interpret. The Finnish authorities have issued draft guidance on how to apply the Directive's requirements to machinery which is intended to be incorporated in other machinery.

The **French** public authorities occasionally come across unfamiliar types of assembly: confronted with complex woodworking machines consisting of different interconnected units, they find it hard to determine whether the Directive has been applied. In fact, the industry is using increasingly sophisticated classes of equipment: recent years have seen the rapid spread - especially in sawmills - of units comprising multiple machines connected up by conveyer systems. There is also a demand for clarity from French manufacturers: the French Machine Industry Federation (FIM) is pressing for a point to be set below which an assembly of machines would cease being regarded as a single machine and be treated as a subassembly or incomplete machinery.

The final assembler of subassemblies intended to constitute machinery covered by the Directive must comply with the Community provisions. Where complex assemblies or machines to be incorporated into others are concerned, however, **Italian** manufacturers have particular difficulties understanding the respective obligations of suppliers and final assemblers, and whether to use the EC conformity or incorpo-

ration declaration to certify their equipment's compliance with Community rules. The same concern is voiced by training organizations. Notified bodies stress that their competence and the experience of their staff very often enable them to play a key role in advising manufacturers on the procedure to follow for complex assemblies. In this connection, the authorities feel that market surveillance activities are helping to dispel uncertainties: thorough examination of non-series machines by LHU Inspectors is leading to a better understanding of the wide range of situations in which different machines are assembled to make a single complex unit. A risk assessment must also be carried out on these units, which requires sound knowledge on the part of manufacturers and inspection officers.

Italian and **German** notified bodies do not rule out the possibility that the existence of particular provisions applicable to subassemblies and incomplete machinery might open the door to abuse.

German notified bodies, in particular, report that manufacturers' misinterpretations of the provisions for machinery intended to be incorporated in other machinery are due to their attempts to evade the liability and obligations arising under the Directive.

“People can be quite inventive here” – they remark. “We have often found smaller firms using ‘ready for use’ machines sold to the user as subassemblies or incomplete machinery. In these cases, the manufacturer provides only a declaration of ‘incorporation’, whereas in order to put ‘ready for use’ machinery on the market, he must comply with the Directive's essential requirements, supply an EC declaration of conformity and CE-mark it. In some cases, safety devices have to be removed in order to integrate them into a complex assembly. Manufacturers know this and try to dodge their responsibilities. Obviously, we warn operators: this is a ready-to-use machine. You need an EC declaration of conformity, and there must be a CE mark on it as a legal assurance that the machine complies with the Directive's provisions.”

3.1.1.2. Essential requirements (Annex I)

The Machinery Directive contains forty eight essential health and safety requirements that address the protection of consumers, workers, and property.

This section reports national delegations' thoughts on the comprehensibility, applicability, and completeness of the essential requirements as regards woodworking machinery.

In **France**, some manufacturers and importers of woodworking machinery find different essential requirements unclear. Notified bodies and consultancy bodies do not always agree on how to achieve the Community legislation's aims in practice: for example, the provisions on dust and noise are thought too general, while those on lighting are claimed to be difficult to understand.

Some employers and workers' safety representatives argue that woodworking machinery is a special type of equipment to which not all of the Directive's essential requirements apply: the emergency stop control, for example, is not relevant to most woodworking machines because even with the power cut off in situations of immediate danger, the blades on this type of machine still have quite a long stopping time.

Moreover, a Labour Ministry official claims that the French version of requirement 1.4.2.2.B on Type B movable guards is not exactly the same as the corresponding provision in the English and German versions. - more specifically, the provision that Type B movable guards are to be designed and incorporated into the control system so that "the exposed person cannot reach moving parts once they have started up".

Furthermore, point 1.1.2(d) of Annex I stipulates that "under the intended conditions of use, the discomfort, fatigue and psychological stress faced by the operator must be reduced to the minimum possible taking ergonomic principles into account". Manufacturers are requested to take body dimensions into account when designing work equipment – i.e., to assess the operator's postures, body movements and physical strength. Notified bodies argue that the Directive's requirements in the matter are anything but substantive. Ergonomics is a young science whose principles have yet to find widespread acceptance in industrial circles. Manufacturers seem unable to properly interpret and apply what it has to offer.

In **Germany**, interviewees declared that Annex I is wide-ranging and deals with a long list of hazards. But there is a crucial fault in the system, where some provisions are too general, and others too specific.

The public authorities cite the example of the design of safety devices, which is so precisely, and sometimes so tightly

40. Machinery risk management, as a series of logical steps aimed at designing safe machinery, will be considered in section 3.1.2.1.

regulated as to make standardization nigh-impossible. So, the Directive specifically requires that a movable guard must be interlocked, such that the hazardous machine components “covered” by the guard cannot be started up until the guard is closed. As a result, an interlocking limit switch is needed on each movable guard on electrically-powered machines. This is obviously a boon for switchgear manufacturers, who may and must install their limit switches everywhere. But such arrangements may be less desirable from the viewpoint of user convenience. And looked at from the machine hazard angle – i.e., not just analysing but also assessing the risk⁴⁰ - it is a complete nonsense to require an interlock for a movable guard on a band saw.

This, the public authorities say, is because a machine band saw has a large roller at the top and bottom, and an openable hatch through which to remove the saw band. An interlock fitted to this door - the “movable guard” - would cut the power to the saw when it is opened. If the drive takes more than ten seconds to shut off, a latching function would activate preventing it from being opened until the machine had come to a standstill.

Public authorities say that in the decades that this system has been in operation, there has not been a single accident with such machines resulting from the hatches being opened while they are running or coasting to a halt. Before the Machinery Directive came in, interlock switches on band saws were unknown; now they are compulsory. There is certainly a potential source of harm, but does that also constitute a risk? For the authorities, Germany’s experience suggests not: no accidents of this kind have occurred.

The need for movable guards depends on the type of machine. For multiple-blade circular saws for splitting boards or planks, an interlock with a holdfast until the tool has come to a standstill has been a regulation safety requirement since the mid-Eighties, due to the very serious accidents that occurred when machines were opened while still coasting to a halt, e.g., for cleaning.

The conclusion is that the existing Directive is too stringent in some areas, and leaves type-C standard developers too little leeway.

In **Finland**, consultancy bodies argue that the essential requirements are not detailed enough for clear-cut interpretation. It is not understanding the requirements, but implementing

them, that is the problem.

Notified bodies point to a range of problems when trying to apply the woodworking machinery regulations, and especially the essential requirements.

The public authorities say that the essential requirements have generally improved the safety of woodworking machinery, but that the risk of contact with a rotating blade has not been properly addressed. Their interpretation of the Directive read subject to the harmonised standards is that the permissible stopping time of a woodworking machinery blade can be as long as ten seconds, whereas the pre- Machinery Directive safety requirement in Finland was a time of less than five seconds.

Trainers find the essential requirements to be ambiguous, and that safety aims and requirements are not clearly distinguished. The terms used are not consistent, they argue, so that the Machinery Directive does not form a readily comprehensible whole. However, adding to the Directive's provisions may be difficult because it is established in people's minds in its present form. Manufacturers claim that it takes no account of highly automated machinery lines supplied as fully-assembled sets of machinery under subcontracting agreements. The essential requirements which manufacturers found most difficult to apply are: safety distances, labelling, noise nuisance, measured vibration level, drawing up a technical construction file, controls (placing and guarding), starting and stopping devices (especially emergency stops), and guarding of power transmission devices.

Italian public authorities feel that a number of essential requirements are too detailed to be properly applied to all machinery. In point of fact, the practices and attitudes that have evolved through application of Low Voltage Directive 93/68 have created problems with the understanding and management of the more detailed and markedly more rigid requirements of the Machinery Directive. A new working method has had to be developed to apply the Machinery Directive.

Admittedly, the essential requirements as currently worded do enable satisfactory standards to be developed. But the authorities also emphasize that while detailed requirements facilitate inspection and enforcement activities, they do not easily apply to the wide range of products that are continually appearing on the market. Also, it is hard to understand and get to grips with the state of the art when standards are not available.

41. The conformity assessment procedure for Annex IV machinery is dealt with in section 3.1.2.1.

3.1.1.3. Provisions concerning Annex IV machinery

Annex IV of the Machinery Directive lists types of equipment that are considered to be higher-risk, and so are subject to a stricter certification procedure ⁴¹.

The origin of the Annex IV list lies in the negotiations on Directive 89/392/EEC, when some Member States were calling for certain equipment to be subjected to prior inspection. Some Member States did in fact already have regulations that required manufacturers to carry out such inspections. But other factors were taken into account when negotiating the contents of Annex IV, such as operator intervention in danger zones, and how widely available the equipment was on the market.

This section reports the views collected from the national delegations on Annex IV.

In **France**, health and safety inspectors, and one notified body fail to see why some particularly dangerous woodworking machines are not listed. Hand-fed cross cutting mitre saws cause very severe work accidents, but responsibility for the EC declaration of conformity for this type of machine is left to the manufacturer himself without a third party check. Under the old French regulations, such equipment had to be type-approved by the Ministry of Labour or Ministry of Agriculture.

A translation problem with point four of Annex IV has also created some confusion among machinery manufacturers: the term "band sawing machines with fixed or mobile bed" has been translated in French as "scies à ruban à table fixe ou mobile". But the term "bed" used in English has a different meaning from that of the term "table" used in French. It has therefore been spelled out, particularly in the Commission's "Comments on the Directive", that what is meant is worktables and not part of the machine's frame supporting certain mechanisms.

In **Germany**, Annex IV seems to be a vexed issue. Many of those concerned merely read the first sentence (1.), "Circular saws for working with..." and overlook the fact that whether a machine belongs to one of the four following groups (1.1 – 1.4) determines its classification as an Annex IV machine. Some testing bodies have exploited this failure to require manufacturers to have unnecessary tests performed.

Also, the descriptions in Annex IV are beyond the average user's comprehension. Terms are used that derive from the

origins of the Directive and are not generally used in engineering. Certain existing French concepts were adopted and translated, with varying degrees of accuracy, into all the other languages.

For example, Annex IV, Item 1.1, says "Sawing machines with fixed (*feststehend*: stationary, in the German version) tool during operation". But the tool is not stationary – it rotates. A stationary saw blade usually does not cut. Had it instead said "bench and panel circular saws", it would have been clear to all what was meant.

One expression in Annex IV has been slightly modified, namely the description of band saws. This was especially critical, since the scope has been interpreted differently according to the language version used. In German, they are termed "*Bandsägen mit beweglichem oder unotifiziert bodieseweglichem Sägetisch und Bandsägen mit beweglichem Schlitten mit Handbeschickung und/oder Handentnahme für das Bearbeiten von...*". French version: "*Scies à ruban à table fixe ou mobile et scies à ruban à chariot mobile, à chargement et/ou déchargement manuel pour le travail...*". English version: "Band-saws with a fixed or mobile bed and band-saws with a mobile carriage, with manual loading and/or unloading, for working with...". This is a special machine having a bed and a carriage on which the work piece is clamped for working.

These terms are taken in France and Germany to cover different machines. This interpretation has had direct impacts on the EC type-examinations done in both countries. In France, machines which in Germany were not covered by Annex IV, may very well have undergone an EC type-examination. This flies in the face of reason.

Annex IV has been accepted as an initial list. Public authorities say that they can live with it, but it is not based on hazards arising in connection with the use of woodworking machinery. The machines listed in Annex IV were not chosen for their hazards, but for historical reasons – they are the ones that required official certification, in France. Such machines had to be tested by a testing body, and were assigned a certification number without which they could not be sold or used in France. Had the list been based on hazard classifications, it would have to have included other machines.

In crosscutting mitre saws, for example, the work piece is clamped to the machine, and the sawing unit performs a cut by advancing. These machines are listed in Annex IV. By contrast, manual feed crosscutting mitre saws are not included in Annex

IV, although accidents are very frequent, since the machine is operated by hand. When cutting, the sawing unit is manually guided downwards against a spring or a weight, performing the cut, and when released, springs back to its initial position and locks there. Many left hand injuries are sustained on such machines, which are mainly used by craftsmen, on construction sites, and in interior finishing work. This is because the safety guard is opened with the right hand; the machine is positioned to the mark, and may need to be corrected by a half-millimetre, all the while forcing down with the left hand a spring-loaded strip that may be two metres long. If care is not taken, the hand may be pushed up and the back of the hand will come into contact with the saw blade.

Such left hand injuries from manual feed crosscutting mitre saws are relatively common. But there are hardly any accidents with power-operated crosscutting mitre saws, which are either in a closed housing or fitted with two-hand controls that keep both hands in place until the operation is completed.

Another example is veneer guillotines. These make a clean, smooth cut in stacks of veneer eighty to a hundred mm thick, like a stack of paper, so that the pieces of veneer can be joined together afterwards to cover chipboard. The blade makes a slanted, shearing cut, while a hold-down bar holds the work pieces in place. The safety device consists either of a two-hand control or safety light barriers, or a combination of the two. Accidents have occurred due to defects in the blade-bar control, so that the machine has not come to a standstill, but overshot, resulting in the loss of a hand, and in one case, both hands. This is a very dangerous machine, which should be treated like a metalworking press, in particular with regard to the controls, because it also involves cyclic manual intervention: manually adjust the stacks, withdraw the hands, and then initiate operation. This is similar to the procedure with a metal press. But veneer guillotines are not listed in Annex IV.

In **Finland**, the public authorities think that Annex IV covers an adequate range of machinery, whereas in **Italy**, they feel it should be extended to other potentially dangerous machines found across many mechanical engineering sectors. In other words, Annex IV should be updated in the light of technological progress. The authorities argue that it is no longer possible to gloss over the fact that Annex IV reflects a political compromise between a number of Member States. The Italian authorities respect this decision, but now – in light of their experience

– wish to make a technical point: Annex IV should either be scrapped – because the machines concerned are now so well-established that there is little scientific scope left for making further safety improvements - or be given real technical value, by listing machines that are nowadays recognised as dangerous. As things stand, hundreds of new machines and systems are put on the market every year.

3.1.2. The application of the Directive

3.1.2.1. Procedures

In order to place their machines on the market, manufacturers must satisfy essential health and safety requirements, carry out the conformity assessment procedure described in Article 8 of the Directive, and affix the CE mark.

There are two types of procedure :

- One applies to all equipment classed as "machinery" and safety components, apart from those listed in Annex IV of the Directive: for these, the manufacturer declares under his own responsibility that the equipment satisfies all the relevant essential requirements⁴².
- The other applies to Annex IV equipment, whose conformity to the essential requirements must be certified by a notified body.

42. This procedure – as noted by the Commission in its Comments to the Machinery Directive – is known as the "self-certification procedure".

In both cases, the manufacturer must carry out a risk assessment on his equipment, compile a technical construction file, and provide instructions.

Technical construction file, Risk assessment, Instructions

Technical construction files are highly specialized documents which describe the design steps taken. In particular, they contain the technical information needed to substantiate compliance with the essential requirements.

For Annex IV machines, the technical file must be submitted to the notified body, while for non-Annex machinery, the file is submitted only on the express request of a national authority, stating its reasons. The manufacturer need only submit that part of the file that relates to the reason given by the authority.

The instructions for use and the results of the risk assessment are the two key ingredients of the technical file.

Manufacturers' obligations to carry out a risk assessment of their machinery are laid down in Annex I, especially in the third preliminary observation. The risk reduction process is introduced in paragraph 1.1.2 "Principles of safety integration".

Instructions for use are an integral part of the machine: unclear instructions which result in harm to workers are treated as engineering design faults. Instructions must contain all the information needed for users to identify and deal with hazard situations and risks which have not been either eliminated or minimized.

Where machinery is covered by a Type-C harmonized standard, manufacturers can use the risk assessment carried out by the standard developers.

In **Finland**, notified bodies report that the first version of the technical construction files accompanying manufacturers' applications for EC type-examination certificates is in most cases unsatisfactory. Manufacturers normally need guidance on the procedure, especially concerning the identification of risk factors and the description of different ways of eliminating or minimizing them. Another problem is that a notified body cannot know whether the manufacturer regularly updates the technical file or not.

If there is no standard available for a machine, manufacturers assess the risks and decide the necessary requirements on the basis of general machine safety standards. Warning labels and instructions for use are used to alert users to residual risks, as well as guidance drafted by the Federation of Finnish Metal, Engineering and Electro technical Industries. All these documents are based on standard EN 1050 *Safety of machinery – principles for risk assessment*. However, manufacturers find these risk assessment provisions particularly complicated: if such assessments are not carried out regularly, their basic principles are soon forgotten.

More generally, public authorities report that instructions lack the information necessary for checking correct machine operation and fault finding, are often supplied late on in the process of putting the machinery into use, and are seldom available in Finnish.

Users had varying opinions of machinery manufacturers' instructions: they often provide a satisfactory overview of the machinery, but ought to give more detailed and specific information. The quality of instructions was found to be very variable. One firm reported that normal operation was not

covered by the instructions, and the requirements were too demanding.

In **Italy**, manufacturers see no real point in the obligation to compile a technical construction file for Annex IV machinery, or to supply one on demand by a Member State for other machinery: they argue that more preferable and much simpler would have been to require that all technical reports on the machine should be kept and produced to authorities when asked. Manufacturers of machines covered by harmonised standards or draft standards tend to apply the solutions given in these documents, without carrying out their own risk assessments. Where there are no such standards, manufacturers apply the technical solutions described in standards for similar machines.

Public authorities stress that instructions they have come across are often unclear, particularly where machine tools are concerned. This problem is even more plain to see as regards the different operating conditions of the machine; operator-machine interfaces are not described, setting and maintenance are not properly covered. Provisions on safeguards and personal protective equipment are "tacked onto" instructions without explanation.

In **Germany**, the quality of the technical documentation supplied by manufacturers to notified bodies is very variable. The notified bodies remark that "A machine may be poorly-designed but supplied with excellent documentation. For example, the Directive or standard requires that machines in which the tool can be touched by the operator while it is coasting to a stop must have an automatic brake. We found a machine that was seriously deficient in this respect, but the technical documentation and circuit diagrams were spot-on. Everything was fine, apart from the poor design. Things like that happen". In other words, good quality documentation does not automatically spell a safe machine.

First-time applicants for EC type certification have problems. So, one testing body compiled a sort of basic package of information and documents which is sent out to manufacturers wanting to commission an EC type-examination. The experience is that data supplied by manufacturers are usually presented in a haphazard and inconsistent fashion, so the guidance includes a suggested outline for the technical documentation and sample operating instructions.

Instructions are an abiding problem. The most common complaints are that they are not available in German, do not give adequate information about machine safety in line with Machinery Directive requirements, and do not give sufficient warning about residual risks. One testing and certification body observed that "Every set of operating instructions crosses my desk, and in twelve years of experience, every single one I have seen has had to be heavily revised on the safety aspects. Even so, I am not sure that we achieve much with our suggestions, when we propose emphasizing safety provisions by setting them out in separate boxes using distinctive colours, or some other special form of highlighting".

On the other hand, it seems that some users only skim through the operating instructions, or ignore them entirely. So, one recommendation to make is for operating instructions to be written in understandable terms, and limited to the essentials.

Some users note that "Nobody reads operating instructions that are more than thirty pages long anyway. They need to be short and to the point, but the key points need to be got across. If the manual is too thick, nobody reads it".

A manufacturer agrees that "It can be alarming to see how little equipment users understand of what the operating instructions say, if they even read them at all. Maybe it is because we are in some way experts that we cannot conceive that other people don't understand what we are writing. Quite a lot needs to change in that respect, particularly for complex systems. But it may be true for simpler machines, too".

In **France**, notified bodies and manufacturers think that the Annex VI description of the contents of the technical file is sufficiently precise. But, notified bodies do not always find the quality of documentation satisfactory in practice: it varies from one manufacturer to the next. Some notified bodies provide fill-out forms to help manufacturers create their technical documentation, leaving only the odd remaining shortcoming to put right.

The notified bodies and public authorities interviewed report that when the Machinery Directive came in, some machinery manufacturers refused to design for safety, while others rushed the process and failed to do a proper risk assessment beforehand. They, and health and safety inspectors, report that even today, risk assessment is generally not being done properly.

Manufacturers - especially SMEs - should be given better

information. It is important that they should understand that assessing risks and designing machinery in line with the Community provisions adds little to the cost (less than 3%), compared to the very high added cost of retrofitting non-compliant equipment (20 to 30% of the machine price). Since the rules came into force, industrialists have gradually become more aware of the importance of assessing risks and designing for safety, but it has not yet become a reflex.

One notified body was concerned that if one machine in a production line consisting of machines put into service before 1993 was replaced by a new machine, the regulations only required a check on the new machine and interfaces, not the entire line. So a provision should be added to the Directive requiring the entire production line to undergo integrity and safety checks in such circumstances.

As regards instructions, machinery users find that large manufacturers generally supply well-written documentation, but smaller firms often omit details about the noise level of machinery, for example. Likewise, machinery bought in from abroad may not come with instructions in French, and it may be difficult to get a translation. And where a French version is supplied, it is often poor, e.g., literally translated.

Conformity assessment of Annex IV machines

Article 8 of the Directive requires a notified body designated by a Member State to carry out the conformity assessment of machines listed in Annex IV. More specifically, if the manufacturer of such equipment has not complied, or only partly complied, with European harmonised standards (or if such standards are not available), he must submit an example of the machine to a notified body for an EC type-examination. The notified body examines the equipment, verifies that the relevant provisions of the Directive are satisfied, and issues an EC type-examination certificate. On this basis, the manufacturer may issue an EC declaration of conformity and affix the CE mark to the machines examined.

On the other hand, if an Annex IV machine has been manufactured in compliance with the applicable European harmonised standards covering all the relevant essential requirements, the manufacturer has three options :

1. He may simply forward the technical file on the machine to the notified body, which will merely acknowledge receipt of the file without examining it.

2. He may submit the technical file to the notified body, which will check against the file to see that the applicable harmonised standards have been correctly applied and then issue a certificate of adequacy for the standards-compliant machine.
3. He may submit an example of the machine for EC type-examination.

In **Germany**, the procedure for simply sending the testing and certification body a document for safekeeping is very infrequently used. Likewise the other option of having notified bodies only check the technical file. The EC type-examination procedure is the one most commonly used.

One possible reason for this is the lack of harmonized standards for Annex IV machinery in the past. These standards have only recently been developed, so the procedures whereby notified bodies merely acknowledge receipt of the technical construction file (procedures 1 and 2) did not exist in practice.

Another reason manufacturers tend to opt for EC type-examination is because there is little or no difference between the procedures in the amount of work (and hence the costs) involved.

The conformity procedure chosen by manufacturers also depends on the complexity of the product and the manufacturer's experience. German notified bodies would prefer a prior consultation process (compulsory if possible), which would give a manufacturer wishing to design equipment to a harmonized standard the benefit of background knowledge.

Notified bodies feel that manufacturers who have a long working relationship with them are now capable of designing safe products that satisfy European harmonized standards, unaided. By contrast, manufacturers new to the market cannot design machinery in line with harmonised standards without their advice: if a consultation procedure could be introduced upstream of designing equipment to harmonized standards, more use could be made of the two technical file submission procedures.

This would then require harmonization of the procedure where notified bodies only check the technical file. In fact, some testing bodies treat this procedure almost as an EC type-examination: they scrutinize the documents in detail, and if they find fault with them, the manufacturer must to make improvements. Notified bodies query the value of the procedure where technical files are simply archived.

An EC type-examination can involve a significant amount of work, as illustrated by the example cited by a notified body: “For one particular safety component we analysed, the documentation filled twenty to thirty loose-leaf ring binders. The component was a programmable controller, so the software, hardware, and tests were all described in detail. Afterwards, the whole thing filled thirty to forty binders. That was a one-off. But if the Annex VI provisions are to be taken seriously, they have to be put into hands-on practice, using a method that varies from product to product. As we see it, for complex systems with software, the ‘detailed and complete plans’ mentioned means that the file must contain not only design drawings, but also a software listing. After all, we are supposed to be able to reproduce what the machine does.”

Manufacturers well know how to acquire a testing certification quickly. Some testing bodies tend towards laxity, which can rebound on them. Not long ago, a large German chain store wanted to market a small circular-saw bench. It had to abort the scheme because the product was found to have serious safety defects, even though two German notified bodies had tested it and certified its conformity with the Directive.

The competence of the notified body

The competence of the testing and certification body is particularly important. To illustrate this, one notified body reported that “In the early Nineties, a German manufacturer of computer-controlled light barriers approached both a Dutch and a German testing body. The Dutch test would cost five thousand marks, and the German one, sixty to seventy thousand marks. This price differential alone shows that different bodies may use different approaches to carry out conformity procedures on the same equipment. The question is whether the examination of the machine would be equally thorough in both cases. Notwithstanding the cost, the German body was commissioned to do the test. Subsequently, the two agencies, which had been in contact for some years, had an exchange of experiences. The Dutch agency is now performing more comprehensive examinations and plans to change its approach, having seen, partly from exchanging experiences with other countries, that things like software and microprocessor technology involve significantly more additional evaluation work. Its initial quote had simply disregarded this, and worked on the assumption that because what was involved was a light barrier, the methods for testing whether it worked or not were

fairly straightforward. Discussions with other agencies showed it that matters are not quite that simple, and that a more thorough-going and detailed examination is required. And that costs time and money, because the testing body has to pay its testing staff.”

Double certification of the same product may occur. This cannot be prevented, even though forbidden by the Directive. It is quite simple: re-serialising a model from, say, "AS 500" to "AX 500" makes it a different machine. The contents of the nameplate are different, the paintwork is probably still the same, and close inspection will probably reveal no differences. Yet, in a strictly formal sense, it is a different machine. Such cases have occurred, and the Directive's provisions are flouted by them.

A German notified body also cites another important aspect, namely the quality assurance certification procedure added by the European Commission in its recent proposal for an amendment to the Machinery Directive⁴³. This procedure is not considered a suitable solution for certifying a machine's conformity with the Directive. To assume that machines are safe merely because there is a certified quality assurance system in place is definitely not an acceptable approach.

Many small testing bodies in Germany, especially those of the individual *Berufsgenossenschaften* (industrial accident insurance associations) and their expert committees, specialize in certain machines. This has the advantage that the *Berufsgenossenschaften* testing staff are informed via the technical inspectorate how the equipment is used in workplaces. This has enabled them to build up knowledge on, for example, meat-processing machines or woodworking machines. Specialized small testing bodies are more effective than larger bodies that first need to familiarize themselves with a special field because they tend to focus more on general problems like noise, vibration, or safety components – i.e., issues applicable to all categories of machinery.

In some countries, many notified bodies do not, or no longer, test in their notified areas. They were among the first to be notified, and over time, their activities have become specialized. Now, different areas of concern have come to be concentrated in a just few testing bodies; this applies to woodworking machinery, among others.

One German testing body questioned reports receiving most of its commissions from Germany, followed by Italian manufacturers, even though Italy has twenty one notified bodies qualified to test woodworking machinery. It also works for manufacturers

43. This procedure ("module H") is described in Annex XI of the Commission proposal COM (2000) 899 final.

in France, the United Kingdom, and Switzerland. As Germany is the main market for their products, they consider the German test mark as giving them a marketing advantage.

In conformity assessment, it is rare for any machine to meet all the requirements. Manufacturers may prefer to take a chance on doing nothing rather than risk doing something wrong. The testing bodies then have to spell out to the manufacturers that it is not their job to develop the safety concepts for them.

Matters would be different if consultation of notified bodies were permitted, or better yet required. The current situation pulls the testing bodies in opposite directions, as one remarked: "On the one hand, we have to act just as examiners. We are presented with something, and we shake our heads and say 'Not like that; we will come back in three months, when we want to see something different.' Then we return three months later, and still shake our heads. Nobody really benefits from that. On the other hand, we help find solutions. But what we cannot do is answer the question we often get asked: What do I need to do, what do you want?"

For the testing body to make recommendations would mean the testing body testing a product it had itself designed, and this is exactly what the Directive and the Commission do not want.

One shortcoming that should be corrected is the lack of accreditation. Not all testing and certification bodies in Europe are accredited, i.e. government recognized. This should be done in accordance with EN 45000, or in future, with ISO 17000.

There has not yet been an instance of a testing and certification body having its status notification revoked in Germany. German notified bodies also report instances in which machinery certified as in conformity in one Member State has been judged non-compliant with the Directive in another; such incidents highlight the key role played by coordination activities at national and European level.

Coordination among notified bodies

Germany has twenty two notified bodies for woodworking machinery, but their willingness to co-operate is limited. Although participation in the national co-ordination group is compulsory in Germany, only fifteen bodies actually attended the group's last session.

Across the EU, there are seventy one notified bodies

authorized to conduct EC type-examinations for woodworking machinery. The European Co-ordination of Notified Bodies was established to eliminate problems of differing interpretations of the Directive, and deal with queries that individual testing bodies might have. Apart from the central body (Horizontal Group), the exchange of information is carried on through twelve specialist groups, including Vertical Group 1 "Woodworking Machinery". They address such issues as individual test cases, and the leeway where testing bodies' interpretations differ slightly. Of the seventy-one notified bodies invited, just seven attended the last VG 1 meeting in September 2001 (the fifteenth session). About thirty five to forty testing bodies have never attended a session, or even contacted the group. The active testing bodies would therefore like to see some action taken, e.g., by revoking notifications.

As a general rule, discussion first takes place in the national co-ordination group; the European co-ordination group then tries to agree on what is called a "Recommendation for Use", which describes how testing bodies should proceed when confronted by a specific issue. The German notified bodies consider that this procedure has worked well.

The exchange of experiences at national and international level tends to be fairly harmonious, and consensus is the rule. Generally, a solution is found that can be interpreted uniformly across the European Union.

Even so, much work remains to be done, because there is not yet complete harmonization, and not all testing and certification bodies in Europe meet the same criteria. Many never take part in the co-ordination groups; for example, of the forty bodies dealing with safety components, only about a third to a half regularly attend. Nothing is known about some of the others, nor how they operate.

Greater harmonization of notified bodies at the European and international levels could be achieved by making it compulsory for them to take part in the co-ordination group, and abide by its decisions. As things stand, these decisions are not binding, and nothing can be done in the unlikely event that a body should choose not to follow the co-ordination group's agreed solution. There is no mechanism for applying sanctions against a testing body.

In **Finland**, the notified bodies interviewed have never received any technical construction files from manufacturers

of Annex IV machines, for safekeeping, so they have no experience with this procedure as yet. In the event, however, their idea is to check the contents of the file, draw up a table of contents and send out an acknowledgement of receipt to the file's sender. This procedure will hardly guarantee the same level of safety as a full EC type-examination, because experience has shown that technical files always need to be added to, and because manufacturers have difficulties in applying the conformity procedure.

Nor have the notified bodies interviewed any experience with procedures for checking whether harmonised standards have been properly applied. They feel that the present EC type-examination is both apt and the best way to maintain a certain level of safety. But it can be a very costly and onerous procedure for small manufacturers who only make one or two machines, mainly for their own use. Notified bodies also point out that the EC type-examination system precludes the mention of noise emission in the documentation where no reference is made to any calculations carried out by a competent body.

The procedure for informing all notified bodies of one particular notified body's refusal to give a EC type-examination certificate is very unwieldy. It would be easier to send this information via the authorities. Also, a validity limit (say, five years) should be set for EC type-examination certificates, which would allow the bodies to periodically record changes made to the machinery and be kept up-to-date with developments in technology (the state of the art, standards).

The Ministry of Social Affairs and Health, which is responsible for notifications, arranges twice-yearly co-operation meetings that deal with general issues relating to different vertical groups. Notified bodies may keep up telephone contacts if need be, but no agreements are reached on detailed interpretations of the Directive applicable to a machine in this way.

The notified bodies hold differing views on the co-ordinated operation of bodies specialised in woodworking machinery at European level. One is in favour of co-ordinating operations, while others differ, arguing that this would centralize examinations in one or two notified bodies, and probably not one whose working language is Finnish. It is important for small manufacturers to be dealt with in their own language in their own country. Some small firms have no export business at all. Why should they need to go to a foreign body in order to sell Annex IV machinery on their home market?

These Finnish bodies would like comparative studies done

to see whether the results of EC type-examinations carried out by different notified bodies are at the same level, and whether requirements are consistent. One problem for Finnish notified bodies is the small volume of their business, which makes EC type-examinations expensive to perform, and adds to the cost of certificates for manufacturers.

The notified bodies feel that the notification procedure should already be uniform across the Member States. If it is not, it should be harmonised but not made too bureaucratic.

No notified body has been held liable in Finland for any work injury sustained when using machinery examined by it, even though an accident has occurred abroad with a machine examined by one of the Finnish bodies. But as the accident investigation did not report details of what actually happened, it is not known whether the accident was due to non-compliance with particular requirements, or operator error.

In **France**, the notified bodies interviewed report that the conformity assessment procedure involving the forwarding and archiving of the technical file is rarely used. They do not think that this procedure guarantees the safety of machinery, and some argue that it should in fact be scrapped. The procedure for a manufacturer to submit the technical file to the notified body to ascertain whether the European harmonized standards have been correctly applied is also little used in practice.

The bodies interviewed regard the EC type-examination procedures set out in Annex VI of the Directive as sufficiently detailed.

Health and safety inspectors and notified bodies report that purchasers will often accessorize machinery themselves, potentially rendering the assembly non-compliant with safety rules. Load-lifting equipment may be fitted with caged work platforms to become equipment for the lifting of persons, for example. But, the two types of machinery are governed by two different sets of Community provisions. The former requires only an EC declaration of conformity, whereas the latter must be examined by a notified body. The assembler is responsible for ensuring conformity of the entire assembly, and so must go through a fresh conformity assessment procedure, but regrettably, all too often does not bother. That said, it would appear that machinery users in the woodworking industry do not often retrofit new equipment to meet their specific needs.

Notwithstanding the failings of "self-certification" reported by the notified bodies, therefore, it does not seem feasible to require

EC type-examinations for all machinery. One notified body argued the case for a dual certification system: one at the design stage before machinery is put on the market, the other at the user's premises, clearly identifying its conditions of use. Likewise, users could be required as a matter of course to draw up detailed technical specifications spelling out their needs. This type of document is drawn up only in certain circumstances at present, mainly for prototype production.

In France, a national co-ordination group of notified bodies was set up in 1992 to harmonise their methods of conformity assessment: the Ministry of Labour tasked Eurogip (European Prevention Institution Grouping) with providing its permanent secretariat. It is therefore responsible for setting up meetings and exchanges of experiences, collecting, finalizing and distributing information produced by the co-ordination group, and forging links with similar European organizations.

But this range of national provision is not enough, according to public authorities: a manufacturer in one State is free to have his machinery certified by a notified body in another State. So, European-level coordination is needed to ensure equal treatment between manufacturers, and a high level of safety.

In 1994, the European Commission set up a European-level coordination group of notified bodies at Eurogip's urging. The Commission tasked Eurogip with providing the permanent secretariat of the European Co-ordination of Notified Bodies for Machinery, which comprises a Horizontal Committee responsible for all general issues, and twelve vertical groups by class of machinery.

In practice, however, the European Co-ordination group has made comparatively little headway, and the notified bodies interviewed have not built up real links with this organization. Even so, there is a strong case for harmonizing the practices of the different notified bodies, according to the public authorities.

As to accreditation, French notified bodies are officially appointed by Ministerial Order: to qualify, they must meet the Annex VII criteria. They must also agree to make an annual report on their activities, participate in national and European coordination activities, and take part in standards development work. These undertakings are set down in a formal agreement between the French Ministry of Labour and the notified bodies. Even so, as was seen earlier, not all notified bodies are actively engaged with their tasks.

A French memorandum issued in 2000 by SQUALPI addressing the notification of bodies tasked with conformity assessment, puts forward a series of measures to harmonize Member States' notification practices, bring about a real policy for monitoring and supervision of the notified bodies, and define the role and place of accreditation. SQUALPI is a branch of the Department of Industry, Information Technologies and Postal Services tasked with promoting quality in business, standardization, certification and testing. It also assists the Interdepartmental Standards Group in applying general policy on standardization.

Amongst other things, the memorandum suggests framing a single set of benchmark rules that lay down the technical criteria for authorization used by States, and strengthening tie-ups between national accreditation bodies.

The recent creation of a European network of occupational health and safety experts involved in standardization, testing and certification is of interest here. The main aim of this network – called EUROSHNET (EUROpean Occupational Safety and Health NETwork) – is to facilitate contact with other experts, and to achieve harmonization of requirements for accreditation of notified and testing bodies.

CE marking

By CE marking machinery, manufacturers confirm that their product complies with all applicable essential health and safety requirements. Machinery users, in turn, are entitled to buy CE marked machinery in full confidence that health and safety requirements have been properly complied with. The question is whether purchasers of new machinery know their rights and their supplier's obligations, so as to avoid buying dangerous or unsuitable equipment.

This section concentrates on what machinery users think CE marking means. Where available, information is also given on how machinery is purchased, and the criteria followed by companies when purchasing equipment.

In **Germany**, public authorities want the misuse of CE marking to be tackled through co-ordinated measures. At present, the CE mark does not normally indicate whether an outside body was involved in conformity assessment. They argue that CE marking ought to make this clear to the buyer. For instance,

assigning an identification number to the notified body that performed the conformity assessment on a machine would enable purchasers to easily make inquiries of it.

The large number of national voluntary certification marks evidences a significant demand by manufacturers for testing by an outside body. Such tests are clearly a marketing aid, since buyers tend to have more confidence in checks conducted by an independent agency.

There is a view that a European mark evidencing voluntary certification by an outside testing body should be introduced.

One notified body says “We would be in favour of having non-Annex IV machinery tested by testing bodies, and having an independent safety assurance mark, like the German GS (*geprüfte Sicherheit*) mark, awarded. The problem is that the CE mark is more to do with free trade in goods than safety. I think it would be a good idea if an additional mark were to be introduced at European level evidencing a voluntary application to a testing body, so that buyers would have the certainty that equipment carrying a CE mark and an additional distinctive symbol had been tested. Otherwise, all they have to go on are the manufacturer’s sense of responsibility and concern to abide by the Directive. At the end of the day, manufacturers’ disregard often comes down to a matter of money”.

In **Italy**, users often see CE marking less as a guarantee of safety than as a pure formality. They fail to see how the mark ties into the essential requirements.

In **Finland**, machinery users tend to be well aware that CE marking has to do with safety. But some purchasers still believe it reflects third party permission to affix the CE mark. Key safety people in firms have been given training in the matter, but purchasing managers are not sufficiently aware. Before purchasing equipment, companies will shop around for what best meets their needs, and will also often consult machinery operators first. Often, sales agreements include a stipulation that machinery and equipment must have been accepted as-is by the occupational safety and health inspector. Finally, machinery is often bought in co-operation with occupational safety and health experts and environmental experts.

In **France**, machine operators have noticed a general improvement in the safety of their work equipment, but have only a

vague idea of what the CE mark means. And even workers in safety-conscious larger firms are comparatively unfamiliar with what CE marking means or the machinery design regulations.

In most cases, industrial organizations (trade unions, trade councils, etc.) will inform employers about the Community provisions on the use of machines they are planning to buy. When planning new machinery acquisition, employers may ascertain that it is CE-marked, but do not query whether the essential health and safety requirements have been met.

One employer interviewed had lost confidence in the CE mark: he had bought a new CE-marked edging-matching machine⁴⁴ from a French manufacturer in 1998. After some time, it became apparent that the machine had serious design flaws, and he was obliged to make the machine safe himself by acquiring added safety devices from the manufacturer.

According to one French woodworking machine manufacturer, CE marking does not facilitate real freedom of movement of goods, because some German customers do not regard the CE mark as sufficient, and want only GS-labelled machinery. So, to sell his machines in Germany, the manufacturer has to pay for additional controls in order to obtain the GS mark.

44. A machine fitted with a scanner, which cuts timber into boards.

3.1.2.2. Harmonized standards

The European Committee for Standardization (CEN) has developed three types of harmonised standards for machinery: A standards deal with basic concepts applicable to all machinery, B standards deal with safety aspects for different categories of machine, while C standards are 'vertical' standards covering a single type or specific group of machines.

To date, safety standards for woodworking machines and tools have been mainly drafted by CEN/TC 142 and CEN-ELEC/TC 61F.

According to CEN TC 142 's Business Plan⁴⁵, the main focus of the committee's Work Program has been the drafting of safety standards for woodworking machines. Each Work Item (WI) is dealt with by a dedicated Working Group (WG) with its own Convener. The Plan highlights the spread of computer numerical control (CNC) woodworking machines, making the future updating of standards already published by CEN/TC 142 vitally important both to reflect technological progress and promote greater safety.

45. Available at <http://www.cenorm.be>.

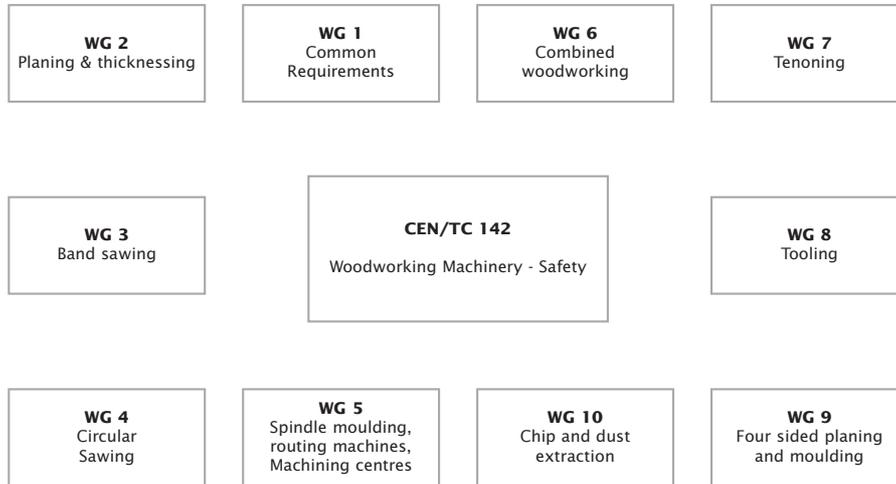


Figure 5 : CEN/TC 142's organization chart

This section reports the views and remarks of notified bodies, machinery users, authorities, manufacturers and training providers.

In **Germany**, standards, even though not mandatory, are of major importance in practice to manufacturers, testing and certification bodies, and the inspection and surveillance authorities, in assessing a product's conformity to the Directive's requirements. Without a sufficient number of high quality harmonized standards, it is hard to be certain whether the Directive's requirements have been met.

Product standards are absolutely essential to machinery evaluation and accident investigation. In the words of public authorities, "Where A, B, and C standards exist, manufacturers should follow them. This makes it easier to achieve a uniform level of safety, and provides a means for checking technical compliance. The more standardization progresses, the more uniformity and better safety can be enforced in practice from the inspectorate's point of view".

"The C standards for machine tools are very specific and highly detailed, so that machines can be designed by reference to them from the ground up. A regulation which goes into specifics makes it easier to identify the shortcomings. In this respect, I consider standards, especially product standards, definitely a helpful aid to greater safety", say public authorities.

Standardization in the field of woodworking machinery is judged satisfactory.

Most of the Annex IV machines are in use in the woodworking industry. But the aim laid down in the European Commission's mandate of drawing up a harmonized standard for most of these machines in the shortest possible time has not been met. Understaffing of standard bodies is doubtless one reason for the slow progress.

Manufacturers seem to be scaling down their involvement in standardization. Some technical committee meetings take place without a single manufacturer's representative present. Manufacturers blame costs for their declining participation. One said, "It costs me too much. I can't do without a good man for three days while he goes off to London or somewhere to attend standard technical meetings".

Also, many woodworking machinery manufacturers are smaller businesses, lacking material financial or human resources. And standardization is usually initiated at the European level – in CEN/TC 142 for woodworking machinery. One expert reported, "Starting work off in the German mirror committee, and then taking it to CEN, is not the way things are done now. That is too slow and cumbersome. The groundwork is done directly in CEN committees, which saves time among other things".

The collection of woodworking machinery standards is inevitably very patchy. The wide range of machines makes it impossible to draw up a separate standard for each machine. The idea of creating a sort of catch-all "woodworking machinery" standard was dropped in favour of trying to develop a set of standards with as few omissions as possible, concentrating on the most widespread machines: bench circular saw, bench milling machine, band saw. But even for this handful of machines, only a minute proportion of the standards has been harmonized to date.

Some standards have been passed by CEN, but not yet published in the *Official Journal*. Other standards have been submitted to CEN, but not yet actioned. Some issues have also been left in abeyance and not passed on to it .

Machinery manufacturers are most affected by these gaps in provision, since they cannot opt for self-certification until the standard has been published in the *Official Journal* of the European Union. Before harmonized standards came in, all Annex IV machines required an EC type-examination certificate.

Once the Machinery Directive came into force, manufacturers

and trade associations gleefully proclaimed that they could now self-certify the safety of their machines and that third party intervention was no longer needed. But that proved not to be the case, and manufacturers turned back to testing bodies, either to have their products independently tested, or for endorsement of deviations from the solution specified in the standard.

In the case of bench circular saws, one testing body estimates that only 10% of the machines it tested had been built strictly to standard, and that 90% deviated from it in some respect or other.

Testing bodies use standards as benchmarks to assess what manufacturers have done, and cannot demand more than the standard. But where a manufacturer's protective measures against a specific hazard are not as described in the standard, the testing body will study them and accept them if they prove to be equivalent within the meaning of the Directive.

Furthermore, even standards may require more detailed explanations in some circumstances.

Some experts involved in standards development note that "it is not often that a manufacturer goes by what the Directive says alone. If he relies on standards – often on precursor papers, draft standards – he has considerable leeway for interpretation. Anyone who has taken part in drafting a standard themselves will obviously be up to speed with the nuances and the exact reasons as to why one sentence is worded one way, and another differently. It may be that an expression written in on the first reading is interpreted differently by the manufacturer. In cases like that, we obviously try to improve that part so that the final version of the standard is clearer, just as we invite every manufacturer to get more involved in drafting standards. It is a great help if the manufacturers are from the start".

People with no experience in a field – e.g., who have never tested a woodworking machine or dust-extraction unit before – are as likely as not to misinterpret the standard. They only acquire the necessary knowledge through talking to those with extensive experience in the field. It is not possible to write a standard that can be interpreted in exactly the same way by someone with no experience in the field and someone with twenty years' experience.

Given the problems with standardization, standards makers seem reluctant to start up new projects, preferring to complete work in progress first. There are at most two or three new projects in the pipeline for woodworking machines which have

excited particular interest. For woodworking machines not covered by harmonised standards, the only source of design provisions is in principle Annex I of the Directive. As the contents of the Annex are open to interpretation, those concerned in Germany are comforted by being able to refer back to previous national law via the ninth Implementing Regulation to the Equipment Safety Act (*Gerätesicherheitsgesetz*, GSG) and the associated registers.

Before the Machinery Directive came into force in Germany, national standards were only available in a very few cases. For woodworking machinery, only one standard was available – that on circular saws for use on building sites. The design of all other machines was regulated by accident prevention regulations, and "safety rules" based on them. Manufacturers therefore had a single, handy document that listed all the relevant binding and non-binding rules and regulations. These safety rules continue to be in demand, especially for those machines for which there is not yet – and probably never will be – a European standard. These are machines not listed in Annex IV.

The present situation of having rules scattered among many statutory regulations makes it hard for users to get an overall view. The German report argues the case for having a small number of statutory regulations, with everything else needed for a particular machine collected and concentrated in a few documents.

One view expressed was that: "We have two things - the Machinery Directive with its requirements, and the body of standards. I see the problem as being that in Germany, we also have accident prevention regulations, safety rules, and technical instruction sheets. That isn't good for users, because the bigger picture gets lost".

Despite the new legislative system established in Europe, some practitioners still hanker after the status quo ante.

In **Italy**, the public authorities report that existing harmonised standards for woodworking machines are generally of good quality. However, because technology advances faster than standards can be developed, similar risks get dealt with in different ways by different documents. For example: different harmonised standards do not deal consistently with the risks associated with automatic clamping systems and control systems.

This is because it takes several years to get standards in a publishable state: some have been published when the wor-

king group responsible was already developing new technical solutions (which, of necessity, were available only when the standard was revised). In other cases, A and B standards have been modified while woodworking C standards were being framed. Sometimes, inadequate technical solutions have not been improved until the drafting of the next version.

Public authorities argue that there is no real joined up approach between the three types of standard (A-B-C). Another issue relates to the unduly narrow scope of some harmonised standards, excluding equipment which is nevertheless in widespread use. One example is prEN 1870-11 *Horizontal cutting auto and semi automatic cross cutting sawing machines (radial arm)*, drawn up by CEN/TC 142/WG4. This excludes manual radial arm sawing machines, which are commonly used in some European countries, with the result that that these Annex IV woodworking machines are still not covered by harmonised standards. Another example is EN 1870-01:1999 *Circular saw benches (with and without travelling table) and dimension saws*, also drawn up by CEN/TC 142/WG4; this standard excludes building site saws with a saw blade diameter less than three hundred and fifteen millimetres and with tilting blades, which are present on the market.

This latter standard is also flawed in that it requires an interlocked adjustable guard, rather than a fixed one, when replacing the blade “5.2.7.1.5 - The saw blade below the table shall be guarded with a fixed guard. Any access which may be required for maintenance purposes or for changing the saw blade shall be via a moveable interlocked guard”. This technical solution does not reflect the current state of the art, and is not required by EN 953:1997 *Safety of machinery – Guards – General requirements for the design and construction of fixed and movable guards*. Moreover, notified bodies say that improvements are needed to EN 954-1:1996 *Safety of machinery – Safety-related parts of control systems*.

A final relevant example is prEN 1870-04 *Single and multi blade rip sawing machines with manual loading and/or unloading*, which clearly says that EN 294 *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs* does not apply to the loading and unloading of material, but in so doing fails to provide any dimensional data for appropriate safeguard design.

Harmonized standards are meant to embody best engineering practices, and Italian notified bodies consider this aim is broadly achieved for simple – i.e., manually loaded and unloaded –

woodworking machines. But they argue that as well improving the speed of standards delivery, standard developers should also pay attention to the practical implementation of the technical solutions proposed. EN 1870-02:1999 *Horizontal beam panel saws and vertical panel saws*, is an example of a harmonized standard which could be improved to take account of new technological developments in automatic loading and unloading via hydraulically driven roller conveyors.

Some Italian manufacturers argue that the design solutions proffered by harmonized woodworking standards must be validated in the workplace, because the evidence is that actual use is often far-removed from that for which they were designed. This situation is made worse by the lack of communication with final users who – some manufacturers claim – never read the instruction manual.

Italian employers confess to little or no knowledge of standardization activities in the woodworking machines sector. They want officially-sponsored training and information schemes so as to fully benefit from the technologies proposed in standards.

In **Finland**, some consultancy bodies find specific wood processing machinery standards to be satisfactory. But the lack of harmonized standards is often problematic because the essential requirements are not detailed enough to allow of unambiguous interpretations.

The representative of one notified body finds harmonized standards – especially C-type standards – a valuable aid to implementing the Machinery Directive and verifying the essential requirements. Having them is a great help to machinery manufacturers and greatly eases the EC type-examination procedure. The purpose of harmonized machinery safety standards is to lay down and spell out the generally accepted safety level. Without an objective safety standard giving expression to policy, it would be difficult in practice to decide what level of safety satisfied the Directive's essential requirements.

There is a risk, however, that harmonized standards may be treated as absolute requirements and as the only way to achieve the level of safety set by the Machinery Directive. But compliance with a standard alone does not necessarily equate to compliance with the legislation.

Notified bodies confirm that harmonized standards are of widely varying quality and may only cover some of the issues within CEN's remit. While it can broadly be said that new

harmonized standards reflect the state of the art of their time, a standard is usually several years in preparation and drafting before its reference gets published in the *Official Journal*.

As notified bodies also point out, neither the most recent developments and real potentials of modern technology, or new types of machinery, always make a timely appearance in standards because machinery develops at a rate that standards cannot keep pace with. One example of this is the cutting chain saw, now widely used in forestry, but for which there are no standards. The only standard there is, is that for circular saws, which creates problems for guarding and safety distances. Some standards, like EN 609-1, are too focused on established technical solutions and leave no scope for development.

Finnish manufacturers claim that Machinery Directive standards make no allowance for product lines, and that some of their technical solutions are outdated.

Large manufacturers take part in a national standardization group, through which they are briefed on new standards, draft standards, and new legislation. Smaller manufacturers are informed about these things through a notified body, which is also involved in standardization. Public authorities also provide help when requested. The best way to get information on the safety of machinery is to contact authorities, notified bodies and organizations involved in standardization. Central organizations in the woodworking sector are not as valuable an information source.

Public authorities believe that the Machinery Directive and European harmonized standards have overall improved the safety of woodworking machines, and the quality of technical design provisions. However, some vexed issues concerning the state of the art remain unresolved.

Some occupational health and safety inspectors claimed that manufacturers tend to put a different gloss on standards, so that different manufacturers may fit the same kind of machinery with either a guard built into the machine's operating system, or a much less effective one.

In **France**, all the interviewees believe standardization to be essential because a product's compliance with the Directive cannot be validly established on the say-so of expert opinion alone without detailed technical specifications. Even if the standards are not mandatory, they are generally applied, because they simplify the job of designers and manufacturers.

Even so, some failings were noted: labour inspectors invei-

ghed against the fact that only one side of the social partners was involved in standards development work. As things stand, few worker representatives are in a position to have a bearing on the process in practice. An Industry Secretariat official spoke out against the “unbalanced representation of social and economic interests in favour of business and against labour organizations”. And this is despite one recital of the Machinery Directive calling for an effective and appropriate contribution by employers and employees to the standardisation process.

There are various obstacles to their participation: financial (the Member States should provide funding for them to participate effectively), but also time. Also, workers’ representatives are not always qualified to take part in highly technical discussions, and not all speak English, which is the working language for most meetings.

The French authorities have tried to facilitate their participation in the standardization process: proposals have been made for paid attendance at meetings, training and information initiatives have been run, and an ad hoc group on standardization has been set up within the Occupational Risk Prevention Board. Likewise, the Ministry of Labour is encouraging labour inspectors and engineers back into the technical committees.

Also, the main trade unions have looked for ways of getting workers effectively involved in the process, given the constraints that exist. The proposed introduction of a system of flagging sheets is a step in this direction: these are documents by which to inform the standards developers’ work with the real-life experiences of workers who use machinery built to harmonized standards. The scheme has not proved the hoped-for success, because informing and energizing the grassroots requires perseverance – it is no easy task to get such a disparate group of individuals interested and involved in so complex an issue so far-removed from their daily concerns.

Moreover, participation by SMEs-SMIs is also noticeably low, because they know little about how standards get made, and are short on funds and people. They are probably also put off by the complex and protracted process.

These failings may in some circumstances have had a pernicious effect on the levels of safety set: some notified bodies, and labour inspectors find the quality of some standards to be lacking. They add nothing of value to the essential health and safety requirements they are supposed to support. Some C-type standards present unclear technical solutions, and fail to take account of working conditions. Neither noise, vibrations or

ergonomic issues are properly addressed. Standard EN 1870-4, apparently modified after a serious accident, is a case in point.

Machinery manufacturers and importers, as well as training providers, claim that standards are often hard to understand, and requirements over-complex.

Some woodworking machinery user groups claim that a yawning cultural divide separates the development and application of standards. For example, circular sawing machine standards specify a blade diameter of three hundred and twenty millimetres - a dimension not found on the market (blades are three hundred or three hundred and fifty millimetres). These groups argue that without additional explanations given through brochures, glossaries and information meetings, woodworking professionals would find the standards incomprehensible. In an AFNOR (French standards institution) survey done in 1997-1998 among purchasers and users of general safety of machinery standards, 42% of respondents admitted to difficulties applying the standards (40% due to understanding the documents' technical requirements) while 64% wanted an explanatory guide for all the standards concerned.

Furthermore, some French observers argue that the legal status of European standards needs clarification, because they have no existence in their own right: a European standard has no physical existence, it is not published directly by CEN, but appears only when transposed by the national standards bodies. It has no official status until transposed.

3.1.2.3. Examples of non-conformity

This section gives examples of non-compliance with essential requirements reported by public authorities (especially labour inspectors) and notified bodies. The purpose is to highlight the technical requirements that manufacturers most frequently neglect.

In **Germany**, public authorities offer the following illustration of how two different manufacturers design safety devices: "One machine we saw had safety devices designed to the relevant standards. But we also saw the same machine made by a different manufacturer, and there, we found that the operator had disabled some safeguards in order to be able to use the machine. In other words, the controls of the second machine are not designed so that it can be set up easily and safely. We still come across situations from time to time, where a manufacturer

leaves out safety systems, presumably because he lacks the necessary know-how. But he may also be trying to simply disregard the existence of regulations in Europe. In that sort of case, the manufacturer will definitely have problems with the labour inspectorate”.

In **Italy**, workplace inspections have brought to light many failings on complex assemblies. Fixed safeguards, in particular, were not properly sized to isolate moving parts, while movable guards, which the Directive required to be interlocked, were not.

Labour inspectors also reported incidences of non-compliance involving adjustable guards on circular and band saws, and a host of other equipment assembled and/or modified by the user. In one case, electrical equipment was found to have been modified, but the machine documentation had not been updated to reflect the change. Moreover, electrical and mechanical devices were used in “negative mode” (signal generated only on detection⁴⁶). Electromagnetic sensors had been fitted without the regulation duplication and redundancy.

Notified bodies listed the essential health and safety requirements that manufacturers most often ignore (following the Annex I numbering) as: 1.2.1 - Safety and reliability of control systems; defective electronic components; 1.2.2 - Defective control devices; 1.3.7 - Risks related to moving parts; 1.3.8 - Inadequate safeguards; 1.4.2.2 - Deficient movable guards; 1.5.1 - Prevention of electrical hazards neglected; 1.6.3 - Insufficient isolation of energy sources.

ISPESL maintains a detailed database, from which the following summary has been extracted.

46. Sensing and switching devices normally operate in one of two modes: *in positive mode* a signal is permanently emitted and a detection causes an interruption; also, any internal fault will cause the machine to stop. *In negative mode* a signal is generated only on detection. In the absence of a signal, no distinction can be made between a fault in the sensor or no presence in the detection field.

Table 1 : Results of a 1999 non-conformity survey on woodworking machinery	
Essential health and safety requirements	Incidences of non-conformity
Safety devices	9
Controls	4
Warnings, labels, instructions	6
Stability and resistance	1
Other mechanical hazards	11
Electrical hazards	1
Other	4

Inspections in the Tuscany region also highlighted the following incidences of non-compliance with requirements:

- motor start-stop: circuits modified without updating documentation;
- maintenance: moving parts not adequately protected;
- falling and ejected work pieces: removal of circular saw guard plates;
- electrical earth conductors damaged.

In **Finland**, occupational safety and health inspectors for the woodworking industry confirm that the most common breaches of woodworking machinery regulations relate to instructions and markings.

Woodworking machinery manufacturers have self-planned and developed machinery safety control systems. But, these checks, especially as regards risk assessments, are often inadequate, so that the safety solutions are also deficient. Mechanical guarding of conveyors and isolation of danger zones are particular problem areas.

All the user companies interviewed reported having to fit additional safety devices on machines.

Furthermore, during workplace inspections, inspectors often find machines built or assembled by the employer which do not conform to the requirements. Obviously, not all cases are reported to the inspectors. The problem is that in the woodworking sector there are many work phases for which no purpose-built machinery exists, so firms must self-build, have them contract-built - usually by a small engineering shop - or modify basic ready-made machinery. Again, the firm may not be well-enough informed, particularly about the importance of risk assessment or how to use it. Also, the firm's project leader may not be conversant with the regulations, or it may not even have one.

In summary, the most common incidences of non-compliance relate to:

- safety distances, labelling, compulsory noise notification, measured vibration level, drawing up a technical construction file ;
- controls: placing and guarding ;
- starting and stopping devices, especially emergency stop: in particular, over-long stopping times ;
- guarding of power transmission, and especially the work process, failings in the guarding of blades.

One final thing to note is that although machinery designed and manufactured for use in industry tends to have adequate safety levels, that intended for non-professional use often falls short of the Machinery Directive requirements in practice.

In **France**, notified bodies, public authorities, and health and safety inspectors report frequent incidences of non-compliance. In the woodworking sector, traditional machinery which is mostly subject to EC type-examination has to be distinguished from other more sophisticated equipment like machining centres.

Annex IV equipment manufacturers often omit to display the requisite information on their machines: identification of control devices tends to be overlooked, as does information about tool movement direction and the identification plate. Protective casings are undersized to save on production and transport costs, or fitted incorrectly. Smaller manufacturers are often careless in that regard. It is not that manufacturers of this class of machine are comprehensively flouting the rules, however, but simply overlooking the odd point, which can easily be added by the notified body.

Machinery which comes with the manufacturer's self-declaration of conformity, however, may breach the most basic safety principles laid down in the Directive. Generally speaking, employee safety is a major concern in large firms, which have considerable financial resources and employee representatives. But in smaller workplaces, health and safety inspectors not infrequently come across equipment which does not comply with the design rules.

For example, one inspection of a paper manufacturing firm found that the protection system on a roll tilter (machine used to lift the rolls of paper vertically) bought from a Swiss maker did not offer sufficient protection against crushing hazards. The machine was actually fitted with a pneumatic proximity sensor system to halt it in the event of human object contact, but had no guards to bar access to danger zones. Likewise, the power isolators (a means of isolating a machine from the electrical supply in order to carry out repairs safely) on several machines comprising a hundred metre long production line were not conveniently positioned close to the machine whose power they controlled. This was a hazard situation, since any machine could have been started up by an operator without noticing a mechanic working underneath it. Unprotected pulleys and guards with apertures made in them were also observed in different small sawmills.

Likewise, some woodworking plants and sawmills with no satisfactory dust extraction system were operating with heavily dust-laden atmospheres.

Finally, according to health and safety inspectors, guards are often not appropriate for the work the machine is intended to perform. Operators find them difficult to work with, and eventually remove or bypass them. Certainly, for some machines, guards may not be easy to adapt.

Also, employers may modify machines they have purchased, rendering the final equipment unsafe or not compliant with the Directive.

3.1.3. Training of the actors involved in machinery safety

Designing safe machinery requires designers to understand the work-related risks that operators may be exposed to, as well as the optimal allocation of machinery functions and operators' tasks. Training of machinery designers and manufacturers is essential to this. It is also important for operators to know what work-related risks they may be exposed to, and the need to use the safety devices provided by machinery manufacturers.

This section offers an overview of machinery training provision in France, Germany, Finland and Italy. This kind of training often reflects the national mechanical engineering culture, and the importance placed on workplace health and safety.

France

University/school training of future machinery manufacturers and users

Generally, occupational safety awareness training is not a central feature of the curricula of French engineering colleges: a 1996 survey (carried out for the INRS⁴⁷ among fifteen colleges in one region of France) found that safety training occupied between two and thirty hours of an average five-year course of study, according to college. It is a relative newcomer on syllabuses, and tends to be taught by outside lecturers rather than full-time staff who do not feel qualified to teach it.

The survey showed that in many colleges, prevention is seen more as a regulatory constraint than an integral part of the engineer's job. It is tacked onto an already crowded syllabus, and it is hard to find more time for it. Sometimes it is assumed that students will learn it during their work experience training

47. (French) National Research and Safety Institute.

stint. One problem is that university education is split up into clearly defined fields of study, whereas preventive safety cuts across many areas, and lecturers who specialize in a particular subject are reluctant to change their practices.

Even so, most of the colleges questioned expressed interest in it, especially if environment-related issues could be addressed at the same time.

In recent years, the INRS has been developing contacts with engineering colleges to build up their awareness of preventive occupation safety issues and encourage them to increase safety awareness teaching. The INRS has been funding research and training schemes in three networks of colleges.

This type of partnership has much to commend it; the success of the scheme has inspired other projects.

Accident prevention training for future machine operators in vocational secondary schools is addressed in theory and practice courses. This type of education is relatively recent, and is increasingly forming part of the core curriculum in vocational education, but without extra time-off for teachers, which is resented by staff. European legislation on machinery design is not covered in school syllabuses. Teachers even know nothing about it.

Safety precautions are explained in practical workshop demonstrations so that students can learn about safe working practices. Some educators regret that the time spent on practical work has been heavily cut back in recent years, and would prefer students to be split up into smaller groups.

Spells of in-plant training, usually called work experience training, are also an integral part of vocational education and training. But there, trainees face an inconsistency: at school, they work safely on machinery fitted with proper safety protection, but on work experience, things are often very different: machines very often lack the necessary guards, personal protective equipment is not always available, they have to work to strict time schedules, etc.

A recently-established training project for second stage processing in the woodworking industry aims to make safety at work an aspect of vocational qualifications in its own right: the "Synergy" project links together the National Education Ministry, various professional organizations and occupational risk prevention agencies. The European Commission is also supporting the project. It has found considerable success, and is set to spread nationwide and into other industries.

Knowledge after training

Industry associations seem to be the main source for manufacturers seeking information on the essential health and safety requirements and European harmonised standards. Euro Info Centres also provide information on the provisions of European Union legislation and regulations. Notified bodies that carry out EC type-certification are often contacted. French legislation requires employers to inform workers about health and safety at work and, in some cases, provide specific safety training. However, health and safety inspectors report that in practice, workers are not always given that information, especially in SMEs.

Germany

Engineering education places little premium on machine safety training, although the University of Wuppertal offers a course in safety engineering.

Some educators say that “there certainly should be more courses like that offered. Designers focus exclusively on machine operation, its ability to perform a series of tasks. Only when this is completed might they consider safety aspects. But by then, it is too late and so they produce ill-conceived safety concepts that prove ineffective in practice. This often leads to machines being sold with safety devices that will certainly be dismantled or unused. The unspoken assumption is that the user will rig the machine, because otherwise he will be unable to use it properly. This is still quite common, unfortunately”.

The alternative to this is testing during development, where the manufacturer notifies the testing body of his plans to launch a new product at the following year’s trade fair, and his wish to check the conceptual design with the testing body.

Educators also say that “using a 3-D CAD⁴⁸ program, you can strip away and look behind the mechanical layers of the machine in order to analyse a range of safety aspects that can then be incorporated into the design at an early stage.”

Testing bodies regard this as a very effective form of training.

Machine users learn safety techniques as part of their vocational training. So, for example, safety measures on woodworking machines form part of carpentry/joinery training. A two-week safe working course is a compulsory part of apprentice training. The *Holz-Berufsgenossenschaft* (Institution for Statutory Accident Insurance and Prevention in the Woodworking Industry) is specifically concerned with trainee and trainer training.

48. Computer-Aided Design.

Finland

The Institute of Occupational Safety Engineering at the Tampere University of Technology gives wide-ranging safety education, mostly in courses on machinery and equipment, process automation and industrial ergonomics. Occupational safety law and risk management are also taught. The courses comprise both theory, practicals and exercises, and are taught by people with PhDs and Masters degrees in science and technology with experience of applying the Machinery Directive.

Subjects taught include the application of the Machinery Directive, risk assessment, the essential health and safety requirements, other directives concerning machinery, and market surveillance. The machinery and equipment safety course is a two-week programme of twenty eight lessons, and includes a study, a seminar, and a final examination. The course is quite short, but students can broaden their knowledge by carrying out a special study on the subject (three-five weeks).

Accident reports are covered during the course, but The European harmonized standards are not specifically dealt with.

Future machinery users are trained in vocational education institutions. Courses are taught by staff at all levels right up to college principal. Machinery users receive both theoretical and practical training in safety measures and safe methods of work with machinery. Occupational safety and health authorities are not involved in this education, but do carry out annual inspections and ensure that any failings found are put right.

Training focuses on the use of personal protective equipment, but students do not always take it on board properly. Practical examples of work accidents are given with the help of safety guides published by occupational safety and health authorities, among other things.

Work-based training is a problem because safety levels in workplaces are not as high as in educational institutions.

Teaching staff themselves receive no compulsory in-service booster training in safety. A project recently set up, entitled "Teachers at work", provides the opportunity for refresher stints at workplaces, working in their own specialized field. For example, woodworking teachers spend two to three months working in a woodworking firm. Teaching staff are also under-informed about recent changes in regulations, but stay in touch with occupational safety and health officials.

Italy

Engineers receive safety theory training, whereas operators receive theory and practice training. Unfortunately, there is no national regulation to harmonize the content of training courses, which are run independently by educational establishments and official bodies. The same applies to teacher training. Broadly speaking, those concerned want official action to improve consistency of training and optimise resource use, especially in private training establishments.

Manufacturers want public help in acquiring and updating their technical knowledge, training, clarifications, and involvement in the standardization process. In the woodworking sector, the only source of information for individual manufacturers is ACIMALL (the Italian woodworking machinery and tools manufacturers' association).

Employers that use machinery own up to a poor knowledge of legislation and technical standards. Authorities could help to build their awareness of the need to improve working conditions; they report that the situation in SMEs, in particular, is getting worse.

3.1.4. Communication between manufacturers and users

Key aspects of machinery design that affect operators' health and safety can be under-rated or even ignored by manufacturers if they are unaware of the real conditions in which the machine will be used.

Analysis of production and manufacturing systems often uncovers big differences between predicted performances and those observed in practice, including management of deviations, production constraints, equipment service life, evolution of production systems, process variability, etc. This gap is currently considered as one of the main causes not only of poor machinery performance, but also of risk-taking by operators needing to respond to situations not foreseen in the design phase. Hence the need to develop communication between manufacturers and users.

In **Germany**, there are no real channels for the organized feedback of information to manufacturers on the use of their machines in workplaces.

But it is important for manufacturers themselves to train operators and explain how the technology actually works in situ. Operators need information, without which they cannot proper-

ly use the safety technology, especially on the most complex machines. So far, big machinery manufacturers have tended to provide voluntary training through their field engineering service, but this should be a matter of course. Manufacturers do get feedback on accidents, and will then try to investigate the causes.

But smaller firms only get feedback on the actual use of their equipment if they are specifically asked or contacted about a defect. And even when accidents occur, there is seldom any direct contact between the operator (i.e. the machine user) and the manufacturer – it takes place via the *Berufsgenossenschaft*.

In **Finland**, customer feedback about the safety of machinery is considered very important. Manufacturers work on the assumption that the machinery will be used in the conditions foreseen by the designer. If not, they disclaim liability. They also expect customers to inform them of any need to deviate from the expected conditions of use, and any safety hazards that arise, so that safety can be improved and the issue addressed before the next delivery. Manufacturers would like to see this type of communication developed further.

In **Italy**, woodworking machinery with innovative technical features is followed-up either through direct contacts with customers, or sales and after-sales service networks. The method of communication differs with the type of machinery: for mass-produced machinery, contacts are made through the sales network; otherwise, contact is with the customer directly or via after-sales services. Generally-speaking, most manufacturers come into contact with users only when asked for technical support on specific problems.

But even where communication does take place, it is rarely about improving safety. Users seem more productivity gain-focused, in fact, and so tend to see safety devices as pointless and costly extras which are likely to make the work harder to perform. Manufacturers cite instances of communication failure with users, who modify machines and/or use them in ways they were not designed for, going even as far as removing guards and/or modifying operating characteristics.

In **France** the employers (machinery users) interviewed claim that once machinery is installed and paid for, manufacturers tend to take no interest in whether operators are likely to bypass safety features or use the machine in ways it was not designed for.

A purchaser of new work equipment who discovers that it does not meet the safety requirements will notify the manufacturer. If the machinery has already been paid for in full, the manufacturer may not be willing to address the issue. In most cases, though, manufacturers and users do work out a compromise: for example, users may add protection guards, relocate a poorly positioned electrical control enclosure, or even replace the dust extraction system with a more powerful one. Rarely do they resort to the provisions of the French Labour Code to rescind a sale or lease of work equipment which puts people's safety or health at risk.

3.2. A latticework of liabilities

Liability is the condition of being answerable by law for loss or damage caused to a victim, and being responsible for the civil and/or criminal consequences. This is a particularly crucial issue where the application of the Machinery Directive is concerned. The consequences of a failure to observe the Directive's provisions were studied in Germany, France, Finland and Italy.

Liability for implementing these essential requirements attaches to different people: manufacturers (at whom the Directive is chiefly aimed), notified bodies, public authorities and employers who have bought work equipment. Each country has its own peculiar national administrative and legal set-up, within which specific responsibilities attach to these various players. It is therefore instructive to consider these systems, to see what impact applying the Directive has had on each national legal system, because specific enforcement issues arise in each case. Finally, the Machinery Directive's reliance on standards may affect the legal liability rules in the states under study.

This is both a compelling and complex matter, because the different national systems are not readily comparable. Also, a number of points are still shrouded in uncertainty for want of clear guidance from courts.

Before addressing the liability issue, the measures taken in each state when a machinery-related work accident occurs are first considered for the light these arrangements shed on the safety roles of the different players.

This is followed by an examination of the respective liability of the employer, manufacturer and seller of machinery.

Finally, since few machines are built by a single manufacturer, the civil liability of different manufacturers in multi-tier sales of components and sub-contracting arrangements will be analysed.

Post accident follow-up

The occupational safety and health managers of three **Finnish** firms using woodworking machinery⁴⁹ reported that the manufacturer or importer of the equipment concerned is contacted when a work-related accident occurs. An internal accident investigation is always carried out, and any failings in the machinery are put right and dealt with by the firm's own occupational safety and health body, which then notifies the employees by letter.

The workers' occupational safety and health delegates⁵⁰ said that all machinery-related work accidents were always reported to them.

In such a case, the employer must always notify the police immediately, who will investigate the circumstances of the accident. He must also inform the Occupational Safety and Health Inspectorate, which will conduct its own investigation. The investigation findings are sent to the public prosecution service for a decision on whether to prosecute the employer or manufacturer.

The Finnish public authorities report that the occupational safety and health administration keeps a large database of all the accident reports written by the Inspectorate, which includes information on woodworking machinery accidents.

The Federation of Insurance Accident Institutions, assisted by research institutes and other experts, also investigates most fatal accidents, and releases its findings in its own publications. It also keeps a database of all work-related accidents (resulting in work absences of more than three days) and compiles statistics based on that information.

The workers in the Finnish firms surveyed reported that measures to prevent repeat accidents were worked out in a joint effort with the workers' occupational safety and health delegates, machinery users, assemblers and foremen. "Near-misses" – i.e., particularly dangerous situations that have almost caused an accident – are also taken into account and investigated. One firm surveyed gives training on past accidents to employee instructors.

In **France**, the various survey respondents⁵¹ reported that after a machinery-related work accident, company management

49. These are large woodworking firms, employing from 50 to 250 or more workers, more specifically using sawmills and plywood and chipboard manufacturing equipment.

50. The occupational safety and health delegates have the power to stop dangerous work and take part in inspections. One delegate regularly inspected the different departments of the firm with the health and safety manager. Another wanted wider powers to stop dangerous work. In all three firms, these employee representatives are involved in examining machinery before it is first put into service. But one had no right to a say in the process of purchasing the new machinery.

51. Employers, employees and employees' occupational safety and health representatives from 7 firms using woodworking machinery, mainly small sawmills and joinery firms. Some have up to 9 employees, others 10 to 50 employees, but some large firms (from 50 to 250 employees and upwards) also agreed to answer different questions.

usually calls a meeting of the various witnesses and victim's co-workers (plus the victim if he/she is able) to uncover the facts of the occurrence. Also, operators are reminded of the safety procedures to be followed when using the machinery.

In the biggest firms, the occupational safety and health committee examines the causes of the accident, and takes steps among the workforce to prevent a repetition. These may include such things as risk awareness campaigns, or adding guards to machinery.

The work accident data collected annually in France by the national sickness insurance institution (CNAM-TS) provide statistics on the number of recognized and compensated accidents, levels of compensation paid out, industry-specific data, and the type of injuries sustained.

The conclusion drawn from the different interviews conducted with employees and employers, and the production sites inspected, is that firm size is decisive in France. Large organizations are highly safety-conscious, and when work-related accidents occur, financial and material resources are invested to ensure that no repetition takes place. They also have workplace health and safety committees tasked with helping to protect employees' safety and health at work, and improving working conditions. Indeed, such committees are compulsory under the French Labour Code in firms with fifty employees or more. They consist of the employer or his representative, and employees' representatives. Large firms also tend to have a safety department, which may work in conjunction with the committee.

Small and medium-sized firms, by contrast, which have neither such preventive provision nor deep pockets, may be less safety-conscious. They are very often a one-man show, where the employer is responsible for financial management, human resources, sales, purchasing, sometimes the bookkeeping, and finally the safety of his workplace. With the many other demands on his time and energy, safety is not always high on his agenda.

This situation is probably not confined to France: the three Finnish firms questioned on the matter, which seem to put a greater focus on the prevention of work equipment accidents, all had 50 to 250 or more workers.

In **Germany**, the KAN (Commission on Industrial Safety and Standardization) reports that after a machinery accident, the safety expert informs the employer, and makes an accident

report within three days after the accident. This report has to be signed by the employer, the safety expert and the workers' representative and sent to the two health and safety inspectorates, namely, the public accident insurance agency (*Berufsgenossenschaften*), and the factory inspectorate (*Gewerbeaufsicht*).

According to the German report, safety devices on machinery have been considerably improved, and advances in machinery design have radically reduced accident risks over the past 25 years. This positive trend is borne out by the accident figures. But the *Berufsgenossenschaften* statistics do not contain detailed information. So, for woodworking machinery among others, the KAN is trying to compile more detailed cause-of-accident data through more specific reports and questionnaires.

Many accidents are caused by technical failings in machinery, usually when the essential requirements have not been properly complied with. Sometimes, however, machines involved in accidents are fully regulation-compliant, which suggests that the regulations may need changing. This kind of information is collected to inform standards revision work. Where a revision of the standards on bench circular saws is in the offing, for example, occupational safety experts proffer their expertise in work-related accidents and proposed revisions to the standardization body.

The **Italian** occupational safety and health agency ISPESL reports that when a work accident occurs, the Local Health Unit (LHU) will investigate the circumstances, either of its own initiative or by order of the relevant judicial authorities. The Local Health Units have prevention departments that are tasked with ensuring that the provisions of Legislative Decree No. 626, enacting the provisions of Community Directives 89/391 and 89/655 into Italian law, are being complied with. The decree imposes criminal penalties for contraventions. Both ISPESL and the LHUs have the same powers of entry into company premises as police officers investigating a criminal offence. An initial report on the breach of regulations can then be laid before a judge who can open proceedings against those responsible. At this point, the applicable laws, relevant provisions and parties involved will be identified. The parties are then contacted with a view to determining their liability. Depending on their involvement with the accident, one or more parties may be committed for trial if the court finds sufficient *prima facie* evidence of an

offence. Finally, district surveillance bodies may at the same time report the contravention to the judicial authorities in whose district the machine manufacturer is situated.

The Local Health Unit must inform the Ministry of Industry and Ministry of Labour of any machine built after 21 September 1996⁵² found in the course of its inspections not to be in conformity with the essential requirements.

In short, two types of procedure are carried out in tandem when an accident occurs: the administrative market surveillance procedure against the manufacturer conducted by the Ministries concerned, and the criminal prosecution - against manufacturer and employer - by the judicial authorities with local jurisdiction. The former is conducted under Machinery Directive 98/37, the latter under Decree No. 626.

One concluding point to make is that Italy has no specific set-up for the management of machinery accidents, mainly because all workplace incidents are handled by the justice system. Further improvements are needed, but the Machinery Directive is certainly an invaluable lever for consolidating technical knowledge, promoting communication between the actors, and providing a framework for machinery safety.

52. The date when the Machinery Directive was incorporated into Italian legislation through DPR (*Decreto del Presidente della Repubblica* - Presidential Decree) No. 459.

3.2.1. Employer liability

Community Directive 89/391 of 12 June 1989⁵³ on the introduction of measures to encourage improvements in the safety and health of workers at work makes the employer responsible for taking the measures necessary for the safety and health protection of workers. Having the necessary authority to see that the regulation is being properly applied in the firm, therefore, he may find himself liable to an employee injured in a work accident.

53. *OJ* No. L 183 of 29/6/1989 p. 1.

The KAN reports that the employer's liability in **Germany** is unclear and in need of clarification, as is the way in which liability may also attach to other parties. Practice on the matter is also not clear.

The firm using the equipment is not *prima facie* liable unless manifestly at fault. If not itself the manufacturer, it will often not have the text of the Machinery Directive or the standard on work equipment.

One notified body interviewed argues that the operator cannot be blamed for a lack of familiarity with specific safeguards. It said: "All we can do is to keep advising the safety engineers to look for the CE mark, declaration of conformity, operating

instructions, and technical documentation on a new machine, make sure that at least all of these are present, and then run a cursory check for any obvious defects. After that, they should be safe in concluding from their checks that the machine should comply with the essential requirements. An issue not identified by the health and safety inspectorate is unlikely to be caught by the operator, either. Non-compliance is only usually discovered after an incident or accident”.

In **Finland**, the public authority respondents reported that the employer might incur *civil liability* if the work equipment put into service was defective, and he knew (or should have known) about the defect. Likewise, he may be liable if the equipment is not used and serviced in accordance with the manufacturer’s instructions.

The key provisions of civil liability law are in the Occupational Safety and Health Act and the Act on Compensation for Damage.

The different types of liability that may attach are tort liability (failure in the duty of care), contractual liability (breach of contract), and strict liability (no-fault liability if the equipment is intrinsically dangerous).

Tortious liability can be invoked only where the tortfeasor (party causing the damage) was negligent. Liability under contract requires proof that the contract was not performed, and that the purchaser is not responsible for such non-performance. Finally, strict liability arises where the risks inherent in particularly dangerous equipment have not been correctly, properly or effectively eliminated. So, the employer, manufacturer, or even purchaser may be liable, even in the absence of negligence. Strict liability persists for damage which occurs when using the dangerous equipment.

Independent contractors are liable not just for their own safety, but also for that of others. The above safety considerations may apply to damage caused by an independent contractor’s work equipment.

Employers may also be *criminally liable* for equipment which is not in conformity as a result of their negligence or intentional act. The criminal penalties applicable are laid down in the Occupational Health and Safety Act, and in the Penal Code.

Death or injury caused by such negligent or intentional act is punishable under Finland’s Penal Code by a fine or imprisonment. The financial penalty is a day-fine of an amount calculated

by reference to the offender's income. The usual period of a day-fine is between ten and eighty days.

Corporate manslaughter, where a worker is killed at work, is not punishable by a day-fine.

In **Italy**, where there are latent design defects – defects not readily discernible by inspection – criminal proceedings will be brought under Presidential Decree 758/94; the relevant LHU will issue an enforcement notice requiring the employer to put the machine into compliance with the regulations. Criminal penalties will not be applied if the employer complies with the enforcement notice. In high-risk circumstances, the LHU can temporarily impound the work equipment until the faults have been put right. Where an LHU does discover an obviously defective machine, the employer will be issued with a simple warning, and no steps will be taken against him.

In **France**, the employer may incur civil and/or criminal liability towards an employee who has suffered a work-related accident.

He incurs *civil liability* if the accident is caused by his or his agent's "gross negligence". Where the accident is due to a fault of this kind, the victim may apply to court for an increase in his accident pension and compensation for pain and suffering. The French courts are increasingly entertaining pleas of gross negligence from employees injured when working with machinery. There is a substantial body of precedent to this effect. Since 1941 this kind of negligence has been defined by case-law as an exceptionally serious fault arising from a wilful act or failure to act where the employer had no proper and sufficient grounds for and should have been aware of the danger.

However, in a series of recent decisions, the French Supreme Court first redefined "gross negligence" in relation to occupational diseases (more specifically, for workers suffering from asbestosis), and later in relation to work injuries. What these rulings do in fact is to lighten the burden of proof in such negligence cases by asserting that the employer has a contractual duty to ensure safety at work.

The employer may also incur *criminal liability* if he commits a wrongful act which contravenes a health and safety provision of the French Labour Code, e.g., failure to fit machinery with guards, which is a Code offence.

Criminal liability may also attach under the French Criminal Code to an employer who causes death or actual bod-

54. The purpose of the reform was to limit the scope for prosecutions of local politicians.

55. *Guide to the implementation of Directives based on New Approach and Global Approach*, Office for Official Publications of the European Communities, 2000.

56. Directive of 25/07/1985, OJ L 210 of 7/08/1985 p. 29.

57. Directive 1999/34 of 10/05/1999, OJ L 141 of 4/06/1999 p. 20.

58. For the purpose of this Directive, "product" means all movables even if incorporated into another movable or into an immovable. "Product" includes electricity. (Article 2 of the Directive amended in 1999.)

59. And any person who, by putting his name, trade mark or other distinguishing feature on the product presents himself as its producer.

60. Unless he informs the injured person, within a reasonable time, of the identity of the producer or of the person who supplied him with the product. Where two or more persons are liable for the same damage, they shall be liable jointly and severally.

ily harm. Where there is only the risk of an accident, the employer may be prosecuted for the offence of exposure to danger. A recent revision of the French Criminal Code's provisions on unintentional offences may make it harder to attach criminal liability to employers⁵⁴ by introducing a new distinction between direct and indirect wrongdoers. The former may be criminally liable for any fault committed, even slight negligence, whereas the latter can be prosecuted only for the two types of faults mentioned (involuntarily causing death or actual bodily harm, and exposure to danger).

The new provisions affect employers because in the event of a work accident, they may be held to be the indirect wrongdoer. Recent rulings by the criminal division of the French Supreme Court, however, suggest that the reform does not attach criminal liability to employers. It transpires from a long series of decisions that the employer's failure to observe safety rules is regarded as serious fault or deliberate breach, as the case may be.

Machinery manufacturers and sellers may also incur liability.

3.2.2. Machinery manufacturers and sellers' liability

Under the New Approach, the manufacturer is any natural or legal person who is responsible for designing and manufacturing a product in order to place it on the Community market under their own name⁵⁵.

The Machinery Directive gives manufacturers crucial obligations for the safety of workers at work. They must fulfil the Directive's various essential requirements, draw up the technical file and instructions for use, have the machine CE-marked and make a declaration of conformity with the technical rules. Failure to do so may render them liable.

Product Liability Directive 85/374/EC⁵⁶ (amended in 1999⁵⁷) also applies in this area, and lays stringent obligations on Community manufacturers by imposing no-fault or strict liability on producers for damage caused by their defective products⁵⁸. A product is defective if it does not provide the safety which a person is entitled to expect. The producer is defined in the Directive as a manufacturer of a finished product, a component part or any raw material⁵⁹. Also, the person who imports into the Community a product in the course of his business is similarly liable under the Directive. If the producer of the product cannot be identified, each supplier of the product is treated as its producer⁶⁰.

This Directive applies to all products that fall under the New Approach, and complements the Machinery Directive in ensuring an adequate level of protection.

Finally, General Product Safety Directive 92/59 of 29 June 1992⁶¹(amended by Directive 2001/95 of 3 December 2001⁶²) aims to ensure that only safe products are placed on the market. It applies to products whose safety is not covered by specific Community legislation, and where regulations on a specific type of product do not cover certain safety aspects, or all categories of risk. Because safety of machinery is specifically dealt with by Community Directive 98/37, Directive 92/59 has no application to it. Nevertheless, the system for the rapid exchange of information between market surveillance authorities provided for by the General Product Safety Directive in emergency situations is used for machinery, as Directive 98/37 makes no such provision.

61. OJ L 228 of 11/08/1992, p. 24.

62. OJ L 11 of 15/01/2002 p. 4.

Before considering specifically how the machinery manufacturer or seller may incur liability, it may be informative to examine how far the entry into force of the Community legislation has changed their attitudes towards safety of machinery.

National situations prior to the entry into force of the Machinery Directive

Finland's pre-Directive national legislation laid down a series of safety obligations that equipment had to fulfil before being sold. The public authorities (National Board of Labour Protection, NBLP) required certain types of machinery⁶³ to undergo type approval inspection by an independent government-appointed or NBLP-recognized research agency, conducting the inspection in accordance with an NBLP-approved programme.

63. Chain saws, presses, different kind of cranes, tractors, lasers, construction lifts, excavator, trucks, etc.

So, the manufacturer's self-certification system introduced by the Machinery Directive was completely new to Finland. Some types of machinery previously subject to official public control had, after the Directive, to be certified by the manufacturer himself as being in conformity with the essential requirements. The Ministry of Social Affairs and Health reports that some manufacturers have still not taken this new principle on board.

In **Italy**, the New Approach made no big changes to the existing national system, since manufacturers were already subject to work equipment safety obligations laid down in Presidential Decree No. 547 enacted in 1955 and still in force today.

But these provisions differ significantly from the essential requirements of the Community legislation. The Decree is not specifically directed at machinery manufacturers, but at everyone involved in safety at work (manufacturers, employers, health and safety inspectorate, etc.) Also, it set very detailed technical requirements, whereas the Machinery Directive set general requirements in terms of objectives, which were to be achieved through specific technical solutions detailed separately in harmonized standards. Finally, the Italian legislation neither prescribes a risk assessment, nor requires the manufacturer to draw up a technical file or instructions for use, or even to prove that he has designed for safety, because manufacturers had no duty take safety of machinery into account in the design stages. To that extent, the Machinery Directive has affected the scope of manufacturers' obligations.

In **France**, the public authorities and notified bodies questioned consider that transposition of the Machinery Directive's requirements has not substantially changed the national rules, since they are very much akin to the principles laid down in the Act of 6 December 1976. What the Community legislation has done, however, is to extend the "safety by design" principle to a wide body of machinery.

Finally, in **Germany**, safety obligations were generally unchanged by the implementation of the Machinery Directive. But there is one sense in which the Directive goes further than the previous German obligations – the added duty to fulfil ergonomic requirements.

Current national situations

In **Finland**, the machinery manufacturer may incur *civil liability* for a product which is faulty due to a manufacturing defect, or if the instructions for use and maintenance are inadequate. The seller may incur civil liability if he knew (or should have known) of the existence of the defect, or if he knew that the instructions were insufficient.

They may incur tort, contract or strict liability on the same terms as the employer under the Occupational Safety and Health Act, and the Act on Compensation for Damage. The penalty is cancellation of the sale for having supplied goods which are not according to contract, or compensation for physical injury to individuals, or property damage.

The Finnish Ministry of Social Affairs and Health has no information about any civil proceedings brought against manufacturers under the Occupational Safety and Health Act.

Prosecutions have been brought, however, and compensation may be secured in this way. Machinery manufacturers and sellers may be held criminally liable for the deliberate or negligent manufacture or sale of equipment which is not in conformity with the Directive's essential requirements in the same way as employers, designers, purchasers, assemblers, independent contractors and even employees⁶⁴. The person responsible may incur a fine⁶⁵ or a term of imprisonment for causing death or bodily injury.

Here, a machine's conformity with a harmonized standard is proof of its conformity with the Directive's provisions.

The Finnish public authorities questioned knew of no legal proceedings brought by an employer against a manufacturer as a result of a work accident on woodworking machinery. But in relation to other categories of work equipment, the courts have ordered the executive director of an exporting firm to pay compensation for safety at work offences. In cases like this, the penalty incurred is usually a twenty five to seventy day fine, and the manufacturer or importer is also ordered to pay compensation for causing disablement or death. But there are no rulings on these issues from a higher court.

In **France** manufacturers may incur *civil liability* for equipment involved in causing personal injury or property damage. A manufacturer who sells machinery must also fulfil the two obligations placed on sellers by the French Civil Code: supplying goods in conformity with the contract, and warranting the goods sold free of "latent defects". On this basis, the purchaser of machinery which is not in conformity with the Directive's essential requirements may have a remedy against the seller.

In addition to these obligations, the Labour Code provides that machinery must be designed and built so that when installed and in use, it does not expose people to safety or health risks. Breach of this provision entitles the seller or hirer to rescind the sale or hire agreement.

Also, compliance with the essential health and safety requirements is a contractual obligation, entitling the seller to rescind the contract if these requirements are not fulfilled.

The customer may also sue on the basis of liability for defective products: the Act of 19 May 1998, transposing into

64. Although employees are rarely held criminally liable.

65. Of a daily amount calculated by reference to the offender's income. The usual period of a day-fine is between ten and eighty days.

national law Community Directive 85/374, may give the purchaser of machinery a remedy against the manufacturer. Nevertheless, in practice it seems that victims do not bring this kind of action against machinery manufacturers.

The manufacturer may also incur *criminal liability* on other grounds, like negligence. The penalty for causing death by negligence (manslaughter) is three years imprisonment and a fine. Such penalties have been handed down to some manufacturers. A French court recently even convicted a German moulding machine manufacturer of negligently causing actual bodily harm as a result of a work accident suffered in France. The French Labour Ministry was a prime mover in this, following-up the case and asking the prosecuting authorities to appeal against an inferior court ruling which cleared the company of blame.

Criminal liability may also attach to manufacturers whose breach of a mandatory regulation results in negligent wounding or manslaughter, but no cases have been identified on this.

Liability may also attach for breach of a technical regulation contained in the French Labour Code. So, for example, an Italian importer of saws was held criminally liable for marketing them in France without having gone through the conformity procedure first.

Finally, manufacturers may be guilty of the offence of fraud and deception, such as by claiming that the machinery sold is in conformity with the Directive's essential requirements, when in fact it is not.

French courts are ready to find employers liable, but less so manufacturers.

Question marks also remain: because the legal status of standards is not clear, it is uncertain whether the manufacturer will incur liability for breach of a standard, if damage results from the use of the machine.

In **Germany**, manufacturers are liable for defects in manufactured products. If an accident can be proved to have been caused by faulty machinery, a remedy may well lie against the manufacturer. In practice, such court cases have been protracted affairs.

In some cases, manufacturers have taken action against third party testing bodies. In one such case involving several thousand safety components, the problem was brought to light not by an accident but by malfunctions in the manufacturer's testing laboratory.

In another case, a testing body's oversight or disregard of a problem could have resulted in an accident. After examination, the testing body advised the machinery manufacturer what changes to make, and advised him that his third party accident insurance would cover the costs, if need be. The manufacturer resolved the never previously encountered safety problem, and refitted the machinery already supplied to the purchaser at his own cost.

This case showed that testing bodies themselves are not infallible.

In **Italy**, an LHU that discovers latent or patent defects in work equipment will ask the Ministry of Industry and Ministry of Labour to open an investigation under the administrative market surveillance procedure. At the same time, it serves an infringement notice on the manufacturer under article 6 of Legislative Decree 626/94 (manufacturers' duties).

The public authorities stress that successful prosecutions of non-European Community manufacturers are rare. If there is no identifiable importer, the seller is contacted and may be prosecuted. Such court cases in Italy are helping to clarify safety obligations, and reflect an attempt by the Italian authorities to awaken users, dealers and retailers, importers, and manufacturers to their respective specific obligations. Retailers, for example, are frequently reminded about the dangers of knowing too little about the origin of the products they are selling, and the need to always identify a legal representative of a foreign manufacturer.

Manufacturers may also incur civil liability in cases of multi-tier sales of components and sub-contracting.

3.2.3. Manufacturers' civil liability for multi-tier sales of components and sub-contracting

Much machinery is a composite of elements manufactured by different firms, so that between design and assembly with other parts, some components may be sold on several times, or manufactured by a subcontractor firm.

If a machine component is defective, the question arises as to the remedy that the purchaser may have against the manufacturer. The Directive provides that the component assembler is responsible for complying with the essential health and safety requirements. However, if the design fault is in a specific

component of the machine, the manufacturer of that part may also be liable.

The **French** courts have held that where an offending component has been sold on down a chain, a purchaser of machinery may have a contractual remedy under the manufacturer's warranty, while if manufacture of the machine part was contracted out, the subcontractor is liable only in tort.

In **Italy**, by far most "complex assemblies" are non-series machines assembled to user specifications, and so are considered as "one-offs". ISPEL does not itself examine these machines as part of market surveillance activities if technical modifications suggested by LHU officials have been accepted and complied with.

Where different suppliers form a consortium and provide a single machine (a "single specimen") LHU Inspectors will impress upon the members that a single responsible person must be identified as supplier so that the Article 4.2 requirements can be properly applied to a wide range of machinery configurations. LHU inspectors make manufacturers and users aware of the need for a single person to be identified as responsible for the conformity of a machine resulting from the assembly or incorporation of different parts.

Finally, the lack of information on the civil liability of component manufacturers in France, Finland, Germany and Italy suggests that the matter has yet to come before the courts.

3.3. Market control

Article 2.1 requires the Member States to carry out surveillance of their machinery and safety components markets in order to ensure safety of equipment and fair competition between manufacturers. To achieve that, Member States are expected to ascertain that equipment meets the Directive's requirements, take action to ensure that non-compliant equipment is made compliant, and hand out penalties if necessary.

Directive 98/37 leaves most machinery to be self-certified by manufacturers, placing great reliance on their sense of responsibility, willingness and ability to take the Directive's essential requirements on board.

Although market surveillance cannot take place during the

design and production stages, efficient enforcement usually requires surveillance authorities to work collaboratively with manufacturers and suppliers in order to prevent non-compliant products being placed on the market. National authorities strike up informal contacts and other forms of collaboration with manufacturers and suppliers who are well-disposed to accept technical support, training, and information. To that extent, a "pre-market control" can be said to exist.

Pre-market surveillance can be effected by monitoring how notified bodies are fulfilling their conformity assessment role, and ensuring that they and manufacturers interpret the essential health and safety requirements in the same way at national level.

Post-market control of machinery, by contrast, essentially lies in the monitoring of CE-marking and action on unsafe machinery. The public authorities may develop a range of different measures to this end:

- inspection of production and distribution facilities;
- customs controls;
- checks at trade fairs and auctions;
- checks in the distribution network of shop-sold machinery for private use;
- action after accidents.

The Machinery Directive contains its own control procedure in the article 7 safeguard clause which allows Member States to restrict the marketing of machinery or withdraw a seriously deficient European harmonized standard. This aside, the Directive makes no special requirements on how national market surveillance should be organised and carried out. Member States are free to determine their own market surveillance infrastructure as they see fit, e.g., placing functional or geographical constraints on the allocation of responsibilities between authorities. This is because countries have developed different infrastructure and operational means for dealing with the production and marketing chain as a whole: instruments, powers and areas of responsibility, correction mechanisms, strategies and policies for enforcement, penalties, and functional and geographical arrangements differ widely. These diversities are not necessarily an issue, however, as market surveillance actions are broadly comparable in terms of effectiveness.

Effective administrative cooperation between competent national authorities is essential to achieve a consistent level of

protection Community-wide notwithstanding that market surveillance remains a strictly national affair.

This section reports machinery users' and public authorities' views on machinery market surveillance. Public authorities were specifically quizzed on the functioning and effectiveness of the safeguard clause, the means put in place by different countries to control the machinery market, and cooperation between Member States to improve the effectiveness of surveillance activities.

3.3.1. Safeguard clause

There are two types of safeguard clause. One applies to cases of manifest non-conformity with the applicable essential requirements. A Member State which judges a CE-marked machine to be unsafe, therefore, can take measures under article 7 of the Directive to prohibit the manufacturer from placing it on the market.

The other procedure involves the harmonised standards that confer a presumption of conformity to the Directive's essential requirements. A Member State that finds a safety issue with a harmonized standard – e.g., that it breaches the Directive's provisions – can call for it to be amended.

To date, the first procedure - intended to restrict the free movement of machinery - has been invoked only once. The second has frequently been threatened and/or applied by national standard bodies and authorities.

Finland has never invoked the article 7 safeguard procedure for machinery. The Finnish authorities point out that a Member State which takes this kind of measure must notify the Commission of its decision and have clear proof that the machinery concerned is dangerous. That means having a report from the notified body or other testing institute (third party) to substantiate its concerns. But, as the authorities point out, testing is a costly business.

To avoid compensation claims for harming a manufacturer's competitive position, therefore, Member States will refrain from invoking the safeguard clause except where they can be sure of what the Commission will decide, rendering them less willing to be proactive on product safety.

Decisions to impose a sales ban are taken by the Finnish central government, specifically by the Head of the Department

for Occupational Safety and Health. Finland has issued one prohibition on the marketing and use of a second-hand machine - a crane imported from a third country. The importer was regarded as the manufacturer of the equipment, and found to have failed to make it compliant with the essential requirements. This case was considered to be a one-off, however, and so a safeguard clause procedure was not considered necessary. The other Member States were informed of the case at a meeting of the Administrative Cooperation Machinery Committee (AdCo)⁶⁶.

A Finnish national notification was sent to the Commission in one case concerning a safety issue with imported chain saws. The importer subsequently voluntarily withdrew the items from the market. The Commission appended the case to a summary concerning the application of the safeguard clause and sent it to the Machinery Committee Working Group⁶⁷ for information, along with the summary.

In **France**, the safeguard procedure is initiated by Order of the Ministers with responsibility for labour, agriculture, customs, industry and consumer affairs. These Orders are submitted before signature for the opinion of the Occupational Risk Prevention Board and the National Commission for Health and Safety at Work in Agriculture, in which the social partners are represented. The manufacturer concerned is invited to attend and put forward his arguments.

In cases of serious or immediate danger, the general product safety rules may apply. The Consumer Protection Code says that the Minister with responsibility for consumer protection and the minister or ministers concerned may – by joint Order – suspend the manufacture, import, export and placing on the market of a product supplied free or for consideration for a period of up to a year. The ministers must then “take evidence from the professionals concerned without delay, and at the latest within fifteen days of the making of a suspension order”.

According to the public authorities, safeguard clause procedures against products are very complex and resource-intensive. The withdrawal of presses is to date the only example of an administrative ban on placing machinery on the market. These part-revolution clutch presses were examined for an EC type-examination procedure by a notified body, which found no particular defects. However, CRAM (Regional Health Insurance Funds) officials and the French health and safety inspectorate found major breaches of the machinery design

66. Further information on the AdCo Committee is given in paragraph 3.3.3 Emergent Market Surveillance at European Level.

67. Article 6.2 of the Machinery Directive.

regulations. More specifically, the operating mode could be selected to allow the press to be used without a light curtain, there was no safety device on the pedals, and the light curtain was not suitable and had a poor detection capability. These machines were banned from sale or distribution in any form in France by a joint ministerial stopping order, after consulting the occupational risk prevention board on which the social partners sit. The ban applied not just to the manufacturer, but all dealers and distributors, too. Firms already in possession of such presses were prohibited from using them until they had been put into conformity, or without taking compensatory measures. The Commission endorsed the French authorities' action against these machines in an opinion issued on 5 July 1999.

France has already used the safeguard clause against a number of European standards. One such was the procedure against Standard EN 692 *Safety of mechanical presses* before the reference was published in the *Official Journal* of the European Union, on the grounds of major failings. Reports of accidents involving this kind of press found that operators often had to enter the danger zone to carry out normal operations, and the standard contravened essential requirement 1.2.3 of Annex I of the Directive, since it allowed safety devices to be fitted which would allow the machine to be started up without voluntary actuation by the operator. The standard also breached Machinery Directive requirement 1.2.4 since, once the clutch was engaged, no emergency stop was possible.

The Commission sided with France. This now means that the safeguard clause can be invoked before the reference of the standard is published in the *Official Journal*.

Another example of action against standards was the appeal launched by AFNOR (the French National Standard Association), with the French government's backing, against a CEN formal vote authorizing the adoption of a harmonized technical standard. Essentially, this was a threat to invoke the safeguard clause. The CEN Secretariat asked the group responsible to review the draft standard, which took a long series of meetings to finalize.

This appeal procedure was first by AFNOR used to block the adoption of draft standard EN 693 on hydraulic presses, which was in need of significant improvement on risk analysis for closed tools, control guards, and light curtains.

The same procedure was used against standard EN 280 *Mobile elevating work platforms*, which did not require these

platforms to be fitted with a system to detect overloading and prevent tipping caused by it, despite this being one of the Directive's essential requirements for lifting operations involving persons. The problem was that French manufacturers were complying with the obligation, while manufacturers elsewhere in the EU were not fitting such systems, in reliance on the European draft standard. This put France at a competitive disadvantage, as fitting the protective device concerned made its equipment costlier. French manufacturers called their Ministry of Labour's attention to the situation, and AFNOR appealed against the CEN formal vote. Work on amending the standard is still ongoing.

Finally, the French authorities support the idea that governments should have a more central role in standards development, which was previously left to the standards institutions, on the grounds that responsibility for protecting workers' health and safety ultimately lies with states.

In **Germany**, there have been three Article 7 safeguard clause actions against types of woodworking machinery.

Although not enough information about "safeguard clause" actions against machinery filters through to the local inspectors, some information could be gleaned.

Particular safety issues have arisen with CNC (computerized numerical control) machine tools, in large machining centres for woodworking. On receiving a complaint from a machine user, the *Berufsgenossenschaft* as a technical inspectorate will investigate the matter and notify the manufacturer that the Directive has not been complied with, and that Article 7 proceedings are necessary. But the *Berufsgenossenschaft* can only recommend action. The decision to bring proceedings lies with the inspection service of the *Land* concerned. As a rule, however, the mere threat is enough; after initial resistance, manufacturers usually prove willing to co-operate.

To sum up, safeguard procedures and appeals were threatened or pursued against the following standards and draft standards, mostly based on accidents and near misses:

- EN 12999:2002 *Cranes – Loader cranes* (appeal supported by the German authorities);
- EN 1501:1998 *Refuse collection vehicles* (appeal supported by the German authorities);
- EN 1459:1999 *Industrial trucks – variable reach* (safeguard clause invoked by the German, Italian, and French authorities);

- EN 1726-1:1999 *Industrial trucks up to 10 000 Kg capacity* (safeguard clause invoked by the German, Italian, and French authorities).

In **Italy**, no safeguard action has been taken against a product or harmonized standard for woodworking machinery. Italy did invoke a safeguard clause against EN 703:1995 *Agricultural machinery – Silage cutters – Safety*, after noting a rise in fatal accidents in Italy involving the use of silage cutters manufactured in accordance with EN 703:1995. As a result, the reference of standard EN 703 was withdrawn from publication in the *Official Journal* of the European Union. Italy has also supported the German safeguard action against the two standards EN 1459:1999 *Industrial trucks – variable reach* and EN 1726-1:1999 *Industrial trucks up to 10 000 kg capacity*.

3.3.2. Publicly organized market control

Control of the national market is a fundamental duty of Member States towards applying the Machinery Directive. They must ensure freedom of movement for safe equipment and act against unsafe machinery. Such surveillance is a key factor in the regulation of the Internal Market, by determining whether all the Directive's essential requirements as written into national law have been observed.

National provisions are unique to each country, determined by the interplay of national market forces, the legal and administrative frameworks, financial and staffing resources, the potential health and safety risks of products on the market, and the efficiency of inspection. Mechanical engineering experiences in the matter also differ from country to country.

In **Finland**, the actors involved at national level are:

- the Department for Occupational Safety and Health, for surveillance of machines used at work;
- the National Consumer Administration, for surveillance of machines for private use.

Market surveillance is among the responsibilities of the Occupational Safety and Health Administration, which comprises the Department for Occupational Safety and Health and the independent occupational safety and health inspectorates. Even so, no staff are specifically assigned to market surveillance.

The Ministry estimates that 3 to 4 man-years are used for the market surveillance of machinery (plus personal protective equipment and chemicals which require 1.5 to 2 man-years). The occupational safety and health inspectorates expend approximately 15 man-years on market surveillance, i.e., about 5% of their staff.

New woodworking machinery now undergoes regular official inspections in large plants. Smaller machinery and lines are inspected at the employer's request. Many purchase contracts include a requirement that machinery must be provided in a condition accepted by the occupational safety and health inspectorate..

The occupational safety and health authorities and the consumer protection authorities keep in regular contact, and have conducted joint examinations of machinery with combined home / professional uses.

Finland's customs authorities have no market surveillance powers over machinery. However, they play a limited role under an agreement to alert the market surveillance authorities to certain classes of machinery imported from third countries.

A sales ban was recently imposed on a mitre saw of a type typically used by both consumers and professionals, imported from an EU Member State, after tests at the Institute of Occupational Health's safety laboratory showed that the saw had no brake for the blade, or locking mechanism for the guard. The blade continued to rotate silently for nearly three minutes after the saw was turned off and there was nothing to stop the user lifting the guard and touching the still-rotating blade. Local health inspectors took care to see that shops took it off sale. The Ministry of Social Affairs and Health's accidents register for 1989-1998 reports forty accidents involving circular saws. In declining order of importance, the causes were misuse; upper guard on the riving knife not used; upper guard and riving knife not in the right position; design fault. There is evidence that the guard could not be used as intended in real-life work situations. Usability factors and anthropometric dimensions also needed improvement.

The Finnish authorities circulated their findings on these mitre saws to all importers in the hope that they would intervene directly with manufacturers. In this particular case, the importer did not agree with the grounds on which his product was banned and appealed to the Supreme Administrative Court.

In **Germany**, market surveillance, and occupational health and safety as a whole, are based on two pillars:

- State-run occupational health and safety inspection services (some still called *Gewerbeaufsichtsamt*: Trade Inspection Office);
- the technical inspection services of the industrial accident insurance bodies (*Berufsgenossenschaften*).

Berufsgenossenschaften staff have a sound knowledge of the standards and their practical application, whereas government inspectors focus more on the application of laws and regulations, and less on individual specific product standards.

Despite years of effort, however, co-operation between the State and *Berufsgenossenschaft* inspectorates still leaves much to be desired. *Berufsgenossenschaften* inspectors are expected to have a thorough grasp of detail, and to give practical assistance and advice on workplace implementation and changes. Each one has responsibility for an average 250 to 350 machine building companies.

Some degree of specialization is inevitable, because the range of fields to cover has widened to such an extent in the European Union, with the harmonization of laws, and the growth in harmonized standards, that it is no longer possible to have a full grasp of all the provisions. Even greater specialization is needed, therefore, but is not pursued consistently enough in the *Berufsgenossenschaften* yet.

One inspector reported, "Our centre makes considerable efforts to keep up with the Machinery Directive's provisions, always have the latest standards to hand, and no matter what, to keep contacts going with machinery manufacturers. As many of these are represented in the standardization bodies, we also try to get hold of source information, so that we can give proper advice on-site". The quality of consultancy which member companies expect and demand benefits from this specialization. The amount of work involved in consulting is determined not just by company size, but also to a great extent by its activities.

"A plumbing firm might consist of a storeroom and small office run by the owner's wife, while he and his staff work off-premises; an inspection of that firm will obviously be quickly done. But you may also have to deal with a large, eight-man workshop using ultramodern machine tools, an overhead crane and industrial trucks, that also does welding. That will involve much more time and work."

Inspectors who have supervised many companies over a number of years know the problem firms and try to inspect them more frequently. But this is growing increasingly difficult under the weight of added responsibilities, and the share of inspection work is steadily declining.

Possible sanctions

Inspectors who find a faulty machine tend to try for an informal solution first, which means getting the operator to tell the manufacturer that the technical inspection service has found a defect that must be put right.

If the informal approach fails, the *Berufsgenossenschaft* lodges an official safety complaint describing the faults (with photographs, if necessary) and explaining the legal position.

If the manufacturer or importer makes changes, the inspectors will normally return to the company to ascertain whether the fault has been properly eliminated, or to help correct it by discussing how the machine can be put into compliance with the safety requirements.

If the manufacturer or importer takes no action on the complaint, the State Inspection Office is notified. In such circumstances, a satisfactory safety outcome may take two or three years to achieve.

The technical inspectors have the power to issue an immediately enforceable order in the case of an imminent danger to life or health, but it is seldom used. They say, "We are very cautious about using it. If a small or medium-sized firm has a large machining centre with safety faults, and that machine is shut down, it can very well lead to the entire business folding."

Instead, they tend to apply special interim measures, including organizational ones, to enable factories to keep working while the safety faults are put right.

They add, "As an industrial injury insurance body, we clearly don't go laying the law down to the member companies. We try to talk them round into taking our advice, so as not to have to roll out the big guns."

Prohibition orders – which the State Inspectorate can serve – are usually imposed on large volume items, like Christmas-tree lights, toys, toasters, or the like, and only rarely on power equipment or machine tools that are used only in small numbers in industry.

A certificate was revoked for abuse in one case where manufacturers had to offer tested machines for tender. As they had

no test mark for the machines concerned, but did have one for comparable products, they submitted falsified documents as the required certificate. Once this was discovered, they were threatened with withdrawal of the mark. The company went into bankruptcy, however, and no longer exists in that form.

According to notified bodies, where problems are found with tested products, the most stringent sanction - calling in the market surveillance authorities - is seldom applied. Competitors who discover safety issues with another machine will inform the testing body, and the manufacturer concerned usually receives a written warning to alter the product or take it off the market.

The Ministry of Labour is the sponsoring department for **French** public action on market surveillance, which takes place at three levels:

- At borders with non-Community countries, where the customs services retain sole jurisdiction.
- Within the internal market: under the Labour Code, this is done by the DGCCRF (Office of Fair Trading, a government agency with responsibility for competition, consumer goods and fraudulent trading), the customs service, mining and industry engineers, and occupational health and safety inspectors. These controls are mainly carried out among wholesalers, dealers, retailers, etc.
- Among users: health and safety inspectors have the power to order the conformity of machinery to be checked by a Ministry of Labour-approved organization. They take workplace action following work accidents, on regular inspections, or when a problem with non-regulation, dangerous machinery comes to their attention.

The actions of regional health and safety inspectorates and safety engineers are often coordinated with those of the CRAM (French Health Insurance Funds) preventive services, whose safety inspectors and consulting engineers have the same powers of entry and investigation in relation to workplaces as the health and safety inspectors, with whom they work in close liaison.

Manufacturers' federations or users' associations may also report failings.

All these agencies carry out two types of control: regular controls as a normal part of ongoing activity, and targeted controls on equipment selected on specific grounds, e.g., special

campaigns run on problem classes of machinery. This type of action is chiefly run for consumer equipment. A ministerial department will run separate campaigns that address its own concerns, while others will be coordinated between different control bodies.

So, for example, the French Ministry of Labour ran a campaign in 1999 on machine woodworking. Officials were sent out in each region to control woodworking firms according to locally-set criteria. A total of 2,175 controls were carried out in 17 regions, including a number of checks on small firms.

Targeted controls are also carried out on special occasions - trade fairs and exhibitions, for example, where newly designed machinery is on show are ideal opportunities for identifying non-regulation machinery. They also give insights into how manufacturers eliminate certain risks, and how technologies are developing.

A system for processing the information gleaned from controls - the "reporting procedure" - was developed in 1984 by the Ministry of Labour. It has been since modified to accommodate the new European set-up, with the idea of taking action against the manufacturer or person responsible for putting machinery on the market whenever justified by the type or scale of the breach of regulations. There is a wide range of penalties for non-conformity. The customs authorities at borders with non-Community countries may block machinery which lacks a CE mark or declaration of conformity.

Putting non-conforming work equipment on the market is a criminal offence. The penalties are intended to be deterrent. Prompt corrective measures are proposed to make equipment safe. The most stringent penalties are handed down only in the worst cases, or where manufacturers have failed to take the appropriate measures asked of them.

The Ministry of Labour reports that between 1 January 2000 and 20 September 2001, 248 instances of non-conformity were dealt with in the course of market surveillance activities. 43% of these were discovered as a result of work accidents, 41% by workplace inspections, 16% by other means, mainly controls at fairs and exhibitions, and in a handful of cases by the machine builder himself. In 80 of the 248 cases concerned, the machine manufacturers were French; 50 involved Italian manufacturers, 39 German, and 11 Dutch. (The remainder being Belgian, Spanish, Japanese, Finnish, Swedish and others).

In the Ministry of Labour's 1999 campaign on machine

woodworking, a third of the firms inspected were found to be using non-regulation machinery (generally older equipment), some of it in a dangerous condition: guards were in disrepair, not fitted or not used. Both employers and employees well-knew the mechanical hazards of machinery use, but did not always pay particular regard to them. Finally, the cancer risks, mainly from wood dust, and chemical hazards very often went unrecognised. Noise and electrical hazards tended to be under-rated, although proper attention was paid to fire hazards.

In **Italy**, checking that machinery and safety components are in conformity with Annex I of the Machinery Directive is a joint responsibility of the Ministry of Industry and the Ministry of Labour. It is an ad hoc activity. Both ministries can commission ISPESL and other national technical agencies to carry out the task for them. They will immediately report any non-conformities discovered to the ministries, and serve written notice on the manufacturer of the machine examined. If the breach of regulations is confirmed, the manufacturer will be asked to take the necessary steps to ensure the highest level of operator safety.

An interdepartmental working group (known as the GLI) of the Ministry of Industry, Ministry of Labour, and ISPESL was recently set up to analyse information on hazard situations reported by national accident prevention bodies (mainly Local Health Units, LHUs) and other actors (such as consumer associations, private citizens, etc.), collected in the course of monitoring activities or following accidents. If the GLI finds equipment not to be in conformity with Annex I, it immediately sets an administrative procedure in motion by notifying both Ministries of the fact. The Ministry of Industry, after confirming the reported safety risks, can order the temporary withdrawal of the machine and/or prohibit its use at the workplace. It also notifies the Commission, to enable consultations to be held within the Machinery Standing Committee, and a decision to be reached on the action to take.

In their machinery policing activities, the LHUs refer not only to the Machinery Directive, but also to Italian Presidential Decree 547/55: no conflicts between the two instruments have been reported to date.

The civil procedure for market surveillance can lead to one of two outcomes: either the machine will be modified as suggested by the enforcement authorities – mainly the LHU Inspectors - or it will be withdrawn from the market.

In fact, LHUs have not yet developed a system for collecting and organizing all reports on non-compliant machines. There is still no database where such information can be consulted, to help avoid repetition of the same kind of occurrence.

A consensus view sees a growing conflation between the two types of procedure – that of the LHUs and that of the market surveillance authorities. The ideal outcome would be to develop a "knowledge base" of specific cases, usable to help define and update the "state of the art" and identify limitations of technical standards. It is not so long ago that two different LHUs could react in different ways to the same technical machinery problem, for example, by offering two distinct technical ways of putting machinery into conformity with the Directive. All the evidence now suggests that the Machinery Directive is fostering a new cultural base in which technical interpretations by different actors are coming into line.

In other words, the application and understanding of the Machinery Directive, and the development of the market surveillance system, are helping to forge technical and cultural links between different people, create a common language and even a single framework for the different actors involved, bringing consistency to their responses to machinery-related accidents.

3.3.3. Emergent market surveillance at European level

All EU countries well know that effective market surveillance is not possible today if countries remain locked into inward-looking nationalism. Closer cooperation between Member States has in fact been flagged up in European documents: a Commission Communication in 1994⁶⁸, Council Resolutions of 1994⁶⁹ and 1996⁷⁰, and the Action Plan for the Single Market⁷¹ all went down this road.

Networks for administrative cooperation between Member States are slowly emerging. The MACHEx network has helped link together health and safety inspectorates in the different Member States in a way which respects their differences. Each inspectorate can get information from its other country counterparts for use in its own national enforcement action. So it is at once a signalling and mutual assistance network, and a means of extending the reach of enforcement action to a manufacturer in a different Member State. The network has been operating satisfactorily for some years. But it only covers

68. Commission Communication on administrative cooperation of 16 February 1994.

69. Resolution on the development of administrative cooperation in the implementation and enforcement of Community legislation in the internal market, making the technical harmonization directives a priority focus of cooperation. Council Resolution of 16 June 1994, *OJ C* 179 of 1 July 1994, p. 1.

70. Expanding on the principles of the previous Resolution, and inviting the Member States and the Commission to examine different possibilities in that connection. Council Resolution of 8 July 1996, *OJ C* 224 of 1 August 1996, p. 3.

71. The Commission's action plan for the single market, presented on 4 June 1997, set out to "make the rules more effective", "provide better access for business to information", and "evaluate its policy on conformity".

Member States where market surveillance is done by health and safety inspectors, and comes under DG Social Affairs whereas market surveillance is DG Enterprise's jurisdiction.

Another network - entitled PROSAFE - links together consumer protection enforcement officers, and so has a remit limited to consumer products.

The RAPEX network established under the Community General Product Liability Directive deals with consumer goods and does not interface well with the safeguard clause procedures. Not all the authorities concerned use it.

At its meeting of 6 and 7 October 1999, the Directive 98/37 monitoring committee laid the groundwork for a working group, later called ADCO, to facilitate administrative cooperation between public authorities. This group is made up exclusively of representatives of national public authorities and Commission representatives, and works in hand with the monitoring committee. It has a rotating chairship, and the Commission has no decision-making role. It is supposed to meet twice a year.

At its second meeting, the group set up a formal system for States to liaise on matters in the works, proposals made, and proposed safeguard clause procedures.

Under its Italian chairship, ADCO reached a preliminary agreement of intent to carry out market surveillance technical inspections. More specifically, ADCO members recently agreed on a single form to be used for exchanges of information, and confirmed their plan to develop common databases.

The impact of this ostensibly worthwhile progress must be kept in perspective. The fact is that the surveillance group has no legal existence, and so no real leverage. As French Ministry of Labour officials observed, had it been a subgroup of the Directive monitoring committee, it would have had stronger policy instruments.

This kind of administrative cooperation is essential for consistent surveillance of the European market, but falls short of what is needed to overcome current discrepancies in market control. The problem is that this cooperation operates on a voluntary basis, so only countries which already have organized market surveillance will be interested in setting-up European-level surveillance to increase the effectiveness of their own system while husbanding resources. For as long as the scheme relies on Member States' initiative, the existing enforcement disparities will endure. Real harmonization is needed to achieve consistent and fair surveillance.

Information exchanges and requests for mutual assistance are increasingly being used to address issues stemming from cultural differences. So, the **French** Ministry of Labour and the **British** Health and Safety Executive cooperate over wood-working machinery. The request for assistance, backed up by a case file, is studied and discussed, and then enforcement action is taken towards the manufacturer on behalf of both authorities.

Common market surveillance initiatives have already been organised in a number of Member States. One example is the decision by the **French** and **Italian** public authorities to run a joint campaign targeted on four classes of equipment: mobile elevating work platforms, agricultural equipment, vibrating machines, and multi-blade edging machines. Checks on the latter will focus mainly on work piece ejection and body-blade contact hazards. The equipment technical files are to be examined by the Italian public agency ISPESL, while enforcement officials will check the edging machines themselves. The campaign is 40%-funded by the European Commission, and will also lay essential groundwork for an initial stocktaking of how the recently amended standard EN 1870-4:2001 *Safety of woodworking machinery – Circular sawing machines – Single and multi-blade rip sawing machines with manual loading and/or unloading* is being applied.

The **Nordic** countries co-operate in market surveillance and have started a 2-year project on the development of information exchange (2000-2001). Additionally, a joint theme day on the control of personal lifting equipment, and information on market surveillance generally, was recently staged in the Nordic countries. A theme day on safety of trucks was staged in 2001 with the key focus on safe use of machinery.

One important issue still in need of clarification at European level is the nature of contacts between authorities and manufacturers. For example, it is still unclear whether an authority that has identified non-compliant machines should contact their manufacturer directly, even if located in another Member State. If so, what is to be done about the language barrier, and to prevent overlap and duplication between different Member States simultaneously contacting the manufacturer concerned? Issues have also arisen about making contact with notified bodies not situated in the same country as the authority. Should the authority contact the national authorities in the other Member State to establish cooperation for a joint approach to

the notified body, or should it contact the other State's notified body directly? The consensus view is that national authorities should be responsible for supervising the activity of notified bodies in their country, and be capable of taking action against them if need be.

Section 4

Overview

This section summarizes the four national reports from France, Italy, Germany and Finland, and advances tentative conclusions. For ease of understanding, it follows the structure of section 3. Views and remarks on ergonomics and emission hazards have been collected in a separate sub-section.

4.1. Practical aspects

The interpretation of the Directive

As reflected by the national reports, German, French and Italian authorities, notified bodies and manufacturers think that greater clarity is needed in Article 1. The scope and definitions need structural improvement. Significantly, some manufacturers (e.g., in Germany and Italy) do not know whether their machines are covered by the Directive or not. No difficulties are reported for traditional woodworking machines, but categorization issues exist around some other types of equipment, and manufacturers need more help to dispel uncertainties. The expressions "interchangeable equipment" and "safety components" are still a source of confusion in all countries apart from Finland.

The woodworking industry now has a growing installed base of complex assemblies. Public authorities, notified bodies and manufacturers report lingering uncertainties about whether some subassemblies incorporated into complex units fall within the scope of the Directive or not, leaving the duties and obligations of component suppliers and final assemblers unclear. Although a working practice on this has gradually developed in Finland, attempts to exploit these grey areas for financial gain have been seen in Italy and Germany. But public authorities and notified bodies are developing better means of analysing complex units and categorizing their components, to advise buyers.

The reports show that the very wording of the Annex 1 essential

health and safety requirements is a vexed issue: too general, and they are of limited use for machine design; too detailed, and they may hold back new and potentially safer technological developments.

The views collected raise more specific questions about:

- The application of and compliance with the essential requirements: some French manufacturers and employers judge various essential requirements (emergency stop, lighting) hard to apply directly across the wide range of woodworking machines.
- Essential requirements and procedures: some notified bodies (in Germany, France and Finland) and public authorities (in Italy) argue that the wording of some essential requirements are no help to inspection and assessment of conformity with the provisions.
- The relationship between essential requirements and harmonized standards: public authorities and notified bodies argue that some essential requirements do not provide a fitting basis for the development of C-type standards. Some requirements are so inflexible that they restrict standards developers' options in framing design solutions to meet those requirements.

None of the reports found any objections to the Annex IV list of machinery among interviewees. However, Member States' experts are embroiled in discussions about the limitations of the current procedure. For one thing, opinion is divided on the need for improvements to the contents of the Annex. Translation issues have led to confusion among manufacturers in France and Germany. But the reports also reflect a consensus on the need to revise the list on the basis of new data. The public authorities in Germany and France, in particular, favour updating and extending it to other woodworking machines. The Italian authorities argue the case for removing from the list machines whose design has been significantly improved, and adding to it those involved in a high number of reported work accidents. Amending the Annex IV list appears to raise some methodological issues, however. There is no doubt that listing a number of high-risk machines has improved knowledge about them. But still there appear to be no instruments available to determine what the Annex has done to improve workers' safety in practice so far.

The application of the Directive

It is clear from the reports that notified bodies do not always find the quality of the **technical files** submitted by manufacturers applying for EC type certification satisfactory. Feckless or unscrupulous manufacturers may dismiss the obligation as just paperwork, and skimp the time and money spent on drawing it up; diligent manufacturers, by contrast, quite often have difficulty compiling the file and seek advice and suggestions from notified bodies.

By general consent, the technical file is the key to understanding how the manufacturer has complied with all the applicable essential requirements. That also makes it an invaluable market surveillance tool.

The reports reveal that many manufacturers still put too little focus on **risk assessment**. The Italian and Finnish reports show that manufacturers in both countries stick to the technical solutions illustrated in C-type harmonised standards for their machines; and if there are none, they refer to more general machine standards. Manufacturers argue that the risk assessment provisions are often unduly complex. The public authorities and notified bodies in France found that poor risk assessments have resulted in inadequate protective measures on machinery. There is a high incidence of this in small and medium-sized firms, who often lack design knowledge.

Inaccurate risk assessment inevitably results in **instructions** that fall short of the Directive's requirements.

The public authorities and notified bodies report substandard instructions, the most neglected items including operating mode descriptions, descriptions of the worker-machine interface, setting and servicing, and use of personal protective equipment.

Users' views differ: broadly, they find the instructions provided by larger firms generally more complete than those supplied by smaller manufacturers. Some buyers of machinery complain that instructions are not supplied in their own language, and find them either incomplete or too detailed and difficult to understand. Others find the information too dispersed or not supplied in a user-friendly form. On the other hand, simple, short instructions may not describe all the operating conditions. For all these reasons, users often do not bother to read instructions.

In all four countries studied, the **conformity assessment** proce-

cedure for **Annex IV machines** whereby the technical file is submitted to the notified body for filing purposes only is little used.

The same applies to the procedure where notified bodies verify that the relevant standards have been correctly applied, because the work (and costs) involved are broadly the same as for EC type-examinations, so manufacturers tend to opt for the latter.

Broadly, notified bodies report that many manufacturers applying for EC type-examination put up machines which do not meet all the applicable essential requirements. Some French and German notified bodies would welcome a formal, pre-conformity assessment consultation procedure, which would help dispel manufacturers' uncertainties and preclude their submitting 'unfinished' machines to secure notified bodies' help in making design improvements. Manufacturers not infrequently seek advice on the best technical way to address the relevant essential requirements.

Finnish notified bodies suggest setting a validity period (e.g. five years) for what are at present unlimited certificates. This would allow notified bodies to keep abreast of technological developments (state of the art, standards), and periodically log modifications made to certified machines by users. French notified bodies report that users often accessorise machines they buy, but some modifications may be so major as to warrant a new conformity assessment examination.

Accreditation of notified bodies by national authorities is a key means of ensuring that they fulfil the relevant requirements of the directives. On the evidence, no notified body in the four countries studied has had its notification withdrawn under article 9 for ceasing to meet the criteria laid down in Annex VII of the Machinery Directive.

The different countries' notified bodies operate in very different conditions (market characteristics, size, engineering culture, etc.). The problem is that differing national requirements for getting and keeping notified body status could possibly distort competition between them, and undermine the credibility of CE marking. So far, the attempts to develop a directive to regulate accreditation have not met with success, mainly because of divergent national interests, and the way in which the different national authorities delegate public responsibilities (e.g., for interpreting legislation) to private organizations. The study outlines the procedures that national authorities

have put in place to assess and control the bodies they designate. Interestingly, a memorandum, drawn up in France by SQUALPI, a branch of the Department of Industry, Information Technologies and Postal Services, puts forward a series of proposals for harmonizing Member States' notification practices, to bring about a policy for effective monitoring and supervision of notified bodies, and finally to spell out the role and place of accreditation.

The national reports also contain interesting views on **coordination** issues.

Coordination of notified bodies is critical to ensure consistency in technical interpretations of the Machinery Directive. After the Community legislation came into force, the notified bodies in each country began exchanging information and recommendations at national and European level. Over time, however, significant disparities emerged in notified bodies' activities, not least in the way EC type-examinations were carried out. What emerges from the reports is the general recognition of a need for notified bodies to have a uniform approach in prosecuting their remit: their sphere of technical intervention, the appropriateness of their assessment, their control of compliance with the essential requirements, the information supplied to clients, and their input to solving technical problems. However, "coordination" seems to mean different things to different people in different countries.

On national coordination, Finland's Ministry of Social Affairs and Health calls meetings to discuss general issues, but specific interpretation issues about the Directive are not on the agenda. Participation in the national coordination group is compulsory in Germany, but the Report reveals only a limited willingness to cooperate among the twenty-two notified bodies for woodworking machines. That said, national exchanges of experience would seem to have left only a handful of interpretation issues outstanding around the Machinery Directive. Discussions often focus on individual test cases and the acceptable leeway for interpretation in case of minor differences between notified bodies. In France, the Ministry of Labour has tasked Eurogip with providing the permanent secretariat of a national coordination group.

On coordination at European level, the reports reflect broadly positive views among notified bodies on exchanging information with one another: issues of interpretation of the essential requirements can be discussed on the basis of specific individual test

cases. The “Recommendations for use” issued by the European Coordination of Notified Bodies are generally thought a useful aid to dispelling uncertainties, although not all notified bodies take them into account. The value of these documents largely depends on the extent to which they are circulated to notified bodies and taken up as common solutions to specific problems.

Coordination works when there is real participation. Arguably, this is not always happening, and fall-off rates are very high. Only half of notified bodies for woodworking machinery in Europe seem to regularly coordinate their activities and exchange information; the same holds true of notified bodies that test safety components. This is not calculated to encourage active bodies to become more involved in coordination and meet the costs involved (travel, accommodation, lost work time, etc.).

Finally, the scope of coordination differs between countries: in some – as in Finland - the woodworking machine industry is mainly geared to the home market, and notified bodies certify only a limited number of machines in any year. This puts these countries in a very different situation from those where many notified bodies provide both in- and out-of-country services.

German notified bodies provide evidence that EC type-examination certificates issued in one European Union country are not always accepted in another Member State.

The German report argues that **module H**⁷² is not considered to be an appropriate means for certifying a machine’s conformity with the Directive. In practice, this procedure is not meant to check compliance with the essential health and safety requirements, but rather to see that the company’s production process fulfils certain quality standards criteria. The report indicates that this is not felt to be an appropriate means of giving application to the Machinery Directive.

The comments by machinery users on **CE-marking** clearly reflect mistaken perceptions as to its meaning. More specifically, they perceive it as a “quality” mark rather than simply a manufacturer’s declaration that the machine complies with the Directive’s essential requirements.

The credibility of CE-marking is determined by market surveillance actions against infringements. Larger firms – as in Finland - often have the advantage of being better-informed about CE-marking from having a purchasing department, which helps dispel uncertainties and informs work equipment procurement choices.

72. Module H is the full quality assurance procedure introduced by the COM in the proposal for the revision of the Machinery Directive COM (2000) 899 final: it would apply to Annex IV machines, and would represent the third discretionary conformity assessment procedure for manufacturers alongside compliance with harmonized standards and the EC-type examination of the machine.

Some German manufacturers prefer to have their machines tested by an independent technical body that awards a quality mark, because this gives a major marketing edge by addressing customer demands.

Discussions on voluntary certification and marking schemes are high on the agenda.

The comments received from authorities, manufacturers, notified bodies and users on **harmonized standards** illustrate both the benefits and limitations of the New Approach strategy based on European standards organizations giving technical content to the essential health and safety requirements.

Harmonized standards are widely seen as a significant help in resolving conflicting interpretations and giving uniform application to the Directive's requirements.

The reports reflect low participation by woodworking machinery manufacturers in standards development, not least because many are SMEs with very finite resources. The same holds true for trade union involvement, where the French report points to lack of technical skills, financial resources, time, and language skills as obstacles to participation.

The German report reflects manufacturers' views that participation in national mirror groups to influence CEN's technical committee activities does not deliver satisfactory practical results. Some see standardization as of limited interest, wanting their machines nevertheless tested both to address customers' demands and to explore alternative technical solutions. Notified bodies confirm that manufacturers tend not to adhere strictly to the technical content of standards.

Some machinery users argue that without additional explanations from industry associations through information leaflets and meetings, they would find the standards incomprehensible. Some Italian employers confess to some confusion between the Directive and standards. Large woodworking machinery manufacturers in Finland and Italy are well informed, while SMEs get information from notified bodies. The authorities in Finland and France are trying to put out more information on standards. Some financial support has been made available to promote participation by workers' representatives in seminars and training.

The reports seem to suggest that woodworking machinery standards tend to reflect good engineering practices. But the time taken to get them to the publication stage means that their technical content is often outdated.

Italian authorities and notified bodies argue that some harmonized standards have an unduly narrow scope (which excludes some widely-used equipment), and offer impractical design solutions. This latter claim is backed up by some manufacturers, who argue that the design solutions proposed in standards need to be validated in the workplace.

Finally, the legal status of European standards arguably stands in need of clarification.

The reports evidence a high level of **non-conformity** in relation to mechanical hazards created by machines and machine parts.

Safety devices are not always satisfactory: they are often inappropriate for the task the machine is designed for. Operators find them difficult to work with, and may eventually remove or disable them. Other examples are cited of machine control systems that make machine setting difficult and inadequate exhaust ventilation systems resulting in heavily dust-laden atmospheres.

Defects in complex assemblies are also reported, such as undersized fixed safeguards not isolating movable elements, or movable guards not interlocked when they should be.

Other instances of non-compliance are due to machinery users: employers have been found to modify equipment they have purchased, rendering the final system unsafe and no longer Directive-compliant. They also fail to modify or update the documentation on the machine.

Electrical hazards are often not properly taken into account. For example, motor cut-outs may not halt the machine when tripped, electrical control enclosures may be highly dangerous because they lack protection against contact risks with live terminals, or their leak-tightness has not been checked. Machines intended for non-professional users are also an area of concern.

Finally, field inspectors make the telling point that most claims relate to mechanical aspects, probably because they are more easily detected. But less “visible” elements - like those associated with computer controlled machines – also require attention.

Training for the actors involved in machine safety regulation

Except for Italy, the national reports point to an increasing health and safety focus in engineering education and training for machinery users. Nevertheless, some issues cannot go unmentioned.

With the noteworthy exception of Finland, occupational health and safety generally remains unrecognized in university education, where course programs are apt not to include risk prevention and safety technology. Also, industrial legislation, standardization and accident reports seldom feature in course work.

Post-graduate and post-secondary theoretical and practical vocational training provision is available to manufacturers and operators. The training is reported to be satisfactory, but teaching staff lack access to information on legislation, and are not encouraged to update their practical knowledge through in-plant training, nor keep abreast of technological advances. Industry associations are another source of technical information for manufacturers. Finally, some owners of small machinery-using businesses have been found to have a poor understanding of health and safety. They tend to know nothing about the residual risks of the machines they buy, and fail to provide appropriate specific training.

Communication between manufacturers and users

The reports point to a lack of communication between manufacturers and users.

In Finland, some manufacturers are proactive in maintaining and improving communication with users. Some, but far from all, big German machinery manufacturers provide information and advice to operators. The French users interviewed feel that once machines are installed and paid for, manufacturers are little minded to admit to let alone try to solve problems that may arise in use. Safeguards, for instance, may be well-designed but simply unsuitable in a workplace with particular constraints in terms of material flows, job procedures, production rates, and special maintenance access requirements. All this may add up to an inherently safe machine not being able to be safely used in a workplace.

Users may be uncertain about their legal remedies against a manufacturer, and so tend to look for an arrangement to minimize lost production due to machine down-time. It could be argued here that users who were better-informed about their rights when buying machinery might be more demanding on safety-by-design. Put differently, well-informed customers would create market demand for safe machines.

Finally, on the issue of operators who disable or remove guards or other protective devices, Italian manufacturers often

argue that the blame lies with these users for using machines in a way the designer did not intend, simply to boost productivity at the expense of safety.

4.2. A latticework of liabilities

The Directive lays not only on machine manufacturer a duty to comply with the essential health and safety requirements, but also notified bodies, employers who buy work equipment, and the public authorities. Liability for safety may attach to all these actors.

Steps taken after a work injury

A machine-related work injury in Finland and France leads to both workplace action and legal proceedings. Investigations are conducted to identify the circumstances surrounding the accident and prevent any recurrence of similar workplace safety problems. Firm size appears to be decisive: large firms with substantial financial and material resources appear to be more safety-minded. Firms with workforces above a certain size, for example, have worker representatives who are involved in prevention of work-related risks.

In Italy, the Local Health Units (LHU) investigate work-related accidents, and two types of procedure are carried out in tandem: an administrative market surveillance procedure carried out by the Ministries concerned, and criminal proceedings conducted by regional justice administration authorities.

Every machinery-related accident in Germany is reported on by the safety expert. His report is jointly signed with the employer and worker's representative, and then forwarded to the health and safety inspection agencies. If the machine involved is compliant with European harmonized standards, information on the circumstances of the accident is collected for use in the revision of the relevant technical solutions.

Employer's liability

Liability for machine-related accidents may attach to employers in Italy, Finland, Germany and France. This is because Community Directive 89/391 of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers requires the employer to take the measures necessary to ensure the safety and health protection of workers.

This general obligation takes different forms in different countries: in Italy, the employer is liable to prosecution under a presidential decree for breach of his obligation. But he is allowed time to put the machine into conformity.

In Germany, the employer's liability is not clearly defined and needs to be clarified. Machinery-using firms are seldom familiar with the provisions of the Machinery Directive or work equipment standards, and tend to be held liable only for gross negligence.

In France and Finland, by contrast, the employer has a wider civil and criminal liability. In France, the employer is liable for a work injury under the occupational risk rules, for which lump-sum compensation is payable. A victim seeking higher compensation must show that civil liability attaches to the employer by proving "inexcusable fault" (gross negligence). This was not easy to establish, but French case law has recently relaxed the evidential criteria and the situation now is that the employer has a strict safety obligation under the employment contract. So, the employer must do everything necessary to ensure the safety and health of his employees, and a presumption of liability will arise against him in the event of a work injury or work-related illness.

In Finland, an employer may incur tortious, contractual and strict liability where he knows (or should have known) that a machine in service is defective, or where equipment is not used in accordance with the manufacturer's instructions.

Penalties for criminal liability are levied in Finland where the non-conformity of equipment is due to the employer's negligence or intentional act. In France, criminal liability may attach for infringement of or non-compliance with the provisions of the Criminal Code, and health and safety rules contained in the Labour Code. The employer may be prosecuted for manslaughter, causing actual bodily harm, or for the offence of placing person or persons unknown at risk. A recent revision of French criminal law established a distinction between the inflicting of direct and indirect harm. Under the new provisions, a person who indirectly inflicts harm will be criminally liable only if guilty of a "specific breach of duty of care", and this extends to employers.

In the four Member States, therefore, primary liability for work injuries lies with the employer: it is to him that the injured employee will turn first as being responsible for ensuring his health and safety at work.

Nevertheless, the Machinery Directive's primary focus is on manufacturers.

Manufacturer's liability

The manufacturer must comply with the Directive's essential requirements, and declare that the machinery is in conformity with the technical regulations. Failing that, he may be liable under both civil and criminal law.

Product Liability Directive 85/374 of 25 July 1985 may also apply where safety of machinery is concerned. It places strict civil liability on European producers. Compensation does not depend on the injured party proving that the manufacturer was at fault.

The four Member States already had their own machinery design regulations before the Machinery Directive came into force, so transposition of the Community legislation did not involve radical changes to the different national laws. Even so, some principles laid down in the Directive were unknown to different Member States: the manufacturer's self-certification system was completely new to Finland, for example, where prior to the Directive, much machinery was subject to compulsory checks by the public authorities. Likewise Italy had no national rules requiring manufacturers to perform a risk assessment, or carry out safety-by-design of machinery. It had highly detailed technical requirements addressed to everyone involved in safety at work, whereas the Machinery Directive set general requirements expressed in terms of general objectives. This meant some manufacturers having to learn to respond differently, and get to grips with their new responsibilities.

Manufacturers in Italy, Germany, France and Finland can now be taken to court for failure to fulfil the Directive's essential health and safety requirements. But this responsibility is given a different basis in each national system.

In Finland, they may incur tortious, contractual or strict liability in civil law. In France, a manufacturer that sells the machinery himself must fulfil the specific obligations of a vendor (i.e., the duty to supply goods in conformity to contract, and warrant the machinery against "latent defects"). The Labour Code entitles purchasers or hirers of machinery to rescind the sale or hire agreement if the equipment supplied is not designed and built so that when installed and in use, it does not expose people to safety or health risks. Furthermore, compliance with essential health and safety requirements is a contractual obligation, and the purchaser has a statutory remedy to rescind the contract if these requirements are not fulfilled.

Finally, the French Act transposing Product Liability Directive 85/374 in theory gives the purchaser of machinery a right of action against the manufacturer, but in practice this type of case seems not to come to court.

According to the German report, manufacturers may incur liability for defective products, and liability may also attach to testing bodies.

In Italy, a contravention notice may be served on a manufacturer under Manufacturers' Liability Decree 626/94. The Italian authorities stressed the problems of bringing legal proceedings against manufacturers established outside the Community.

Manufacturers may also be criminally liable: in Finland, a manufacturer who wilfully or negligently manufactures equipment that is not in conformity with the Directive's essential requirements commits an offence. In France, manufacturers may be prosecuted for breach of a mandatory regulation, unlawful wounding or manslaughter. They may also be liable for failure to comply with a technical regulation which is part of the French Labour Code, or a mandatory regulation on the placing on the market of work equipment, or for fraud or deception.

As the French report pointed out, the role of the harmonized standards in litigation remains shrouded in uncertainty. The question is whether compliance with the standard relieves manufacturers from liability for loss or harm caused by the use of machinery.

Finally, as machinery is often a composite of parts made by multiple manufacturers, the civil liability of each must be identified.

Civil liability of different manufacturers

The Directive identifies a single manufacturer as being responsible for complying with the essential health and safety requirements. This is the person responsible for design and manufacture, whose name is affixed on the machinery, i.e., the person who has assembled the different parts and components. If there is a design fault, the purchaser has a remedy against the assembler

But where the design fault relates to a specific component of the machinery, the manufacturer of that part may also be liable. The part may have been the subject of multi-tier sales, or its manufacture may have been outsourced. The basis of liability proceedings in such cases seems to be an open question in each of

the four Member States. In fact, no case law was found stating exactly how liability might attach to the different professionals in the marketing chain in such circumstances.

In France, where there is no case law on this type of redress for machinery design faults, an analogy may be sought in the case law on general actions under warranty in chain contracts (i.e., a series of sale and resale contracts for the same item), and subcontracting: in chain contracts, the subsequent purchaser of the article, i.e., the purchaser to whom a previous purchaser has transferred his rights, has a contractual action in warranty against the manufacturer for non-conformity of the goods supplied. By contrast, the client (the person who ordered the works and undertakings, the final purchaser) has an action in tort against the subcontractor.

4.3. Market control

The safeguard clause

The national reports reflect the view that this is a very complex procedure. Collecting clear evidence that machinery is dangerous is highly resource-intensive. Test reports are needed, and must be paid for. And a manufacturer whose machine cannot be proven dangerous may choose to sue for damages.

However, it is of value in being the most effective way to call attention to design problems encountered in a Member State. This is because where non-compliance issues are resolved in the workplace through agreement by national authorities and manufacturers, no formal procedure exists for informing other Member States. And such cases are not widely-publicised even within countries.

Publicly organized market control

The reports bear out that surveillance of the machinery market and the marketing chain of manufacturers, distributors, wholesalers, importers and retailers, right down to the final user, have been shaped in unique ways in each country by a great number of factors. Each country has developed different infrastructural and operational ways of dealing with the general production and marketing chain. These differences are seen at all levels, be it in relation to tools, areas of responsibility, correction mechanisms, strategies, enforcement policies, penalties and functional organization.

The German report notes the need for improved cooperation between the different technical bodies responsible for market surveillance. It also praises the quality of on-site inspections by *Berufsgenossenschaften* staff, and the leverage they as industrial injury insurance bodies can exert where non-compliant equipment is found.

The French report points to the excellence of coordination between different market surveillance bodies: customs officers, health and safety inspectors, and regional health insurance fund preventive staff work in close contact. Two types of control are carried out: regular controls as a normal part of ongoing activity, and targeted controls on equipment selected on specific grounds.

The Finnish report offers recent examples of market control strategies for machines for professional and non-professional users, where occupational health and safety authorities and consumer authorities have worked together, circulating the results of their coordinated initiatives to all interested parties. The Italian report evidences a need for improved communication between area surveillance agencies (Local Health Units) and the central authorities (Ministries for Industry and Labour) in charge of monitoring compliance of machinery and safety components. Surveillance campaigns are run and seem to deliver results, mainly because of the ability of field inspectors to take advice and information into small workplaces.

Emergent market surveillance at European level

The cooperation called for in various Community documents is now emerging to ensure manufacturers of equal treatment, and users of a high level of safety. Different networks for administrative cooperation have gradually developed. At the end of 1999, the Directive monitoring committee decided to set up a working group made up of representatives of national public authorities and Commission representatives specifically to develop this kind of cooperation. The group is supposed to meet twice a year, and has set up its own system of liaison on matters in the works, proposals made, and proposed safeguard clause procedures.

This kind of administrative cooperation is essential but falls short of what is needed.

The public authorities in the Member States are stepping up exchanges of information, and have mounted a number of common market surveillance actions.

To judge by the national reports, the Directive's **ergonomic, noise and vibration** requirements are seen as relatively impracticable.

Ergonomics is perceived as a young science whose principles have yet to find widespread acceptance in industrial circles. Manufacturers seem unable to properly interpret and apply what it has to offer. Some, in particular, argue that the essential requirements do nothing to help them apply ergonomic principles directly across the wide range of woodworking machines.

The Italian report emphasizes that some manufacturers see no link between psychological stress, discomfort and fatigue, and machinery design.

It is noteworthy, however, that industrial ergonomics training is provided by some institutions (in Finland the Institute of Occupational Safety Engineering at the Tampere University of Technology).

The survey suggests that too little attention is paid to machine noise – manufacturers often omit noise emission data from their instructions. Also, the CE type-examination system precludes the mention of noise emission in the documentation where no reference is made to any calculations carried out by a competent body.

Section 5

The inputs from the seminar

The seminar staged by the TUTB in June 2002 in Brussels⁷³ gave an opportunity to present the first version of our report to the different experts and representatives of bodies involved in machinery regulation, and to engage the debate on the findings of our study, and on the application of the directive in general.

The seminar was attended by representatives of the European Commission⁷⁴, manufacturers⁷⁵, employers⁷⁶, trade unions, national authorities⁷⁷, and other stakeholders: the Chairmanship of the European Coordination of Notified Bodies for machinery and safety components⁷⁸, CEN⁷⁹, occupational health and safety and research bodies⁸⁰.

The discussions both bore out various of the survey findings (5.1), helped fill out our findings on particular issues we had previously identified (5.2), and brought some new aspects to light (5.3).

5.1. Confirmations

The evidence of the seminar was that more efforts are needed to improve understanding of the **definition** of machinery and the scope of the directive. More specifically, confirmation was given of the information collected by the survey about confusion in the duties of subassembly suppliers and final assemblers. Some speakers reported that customers buying incomplete machinery and simple machinery components had asked manufacturers to supply them CE-marked. In the belief that CE marking denoted full conformity with the essential health and safety requirements, and relieved them of liability to employees for accidents caused by the final machine into which these sub-assemblies were to be incorporated.

To help clarify the meaning of some problematic provisions, Commission staff drew up two documents: the *Comments on Directive 98/37/EC*⁸¹ contains a line-by-line annotation of the legislative text, with examples and references. *The Questions*

73. On the seminar, see also: Giulio Andrea Tozzi, The Machinery Directive, gains and challenges for the New Approach, *TUTB Newsletter*, No. 21, June 2003 p. 3.

74. Directorate General Enterprise.

75. European Liaison Groups (CECE, ORGALIME) and Regional Liaison Groups (AGORIA, ASM/VSM, CECIMO).

76. UNICE - Union of Industrial and Employers' Confederations of Europe and ORGALIME - Liaison Group of the European Mechanical, Electrical, Electronic and Metalworking Industries made a joint contribution.

77. From Sweden, Belgium, Norway, France, Italy, Germany, Finland, United Kingdom, Austria, Denmark, and Spain.

78. This coordination organised in twelve Vertical Groups (VG). VG1 deals with woodworking machines.

79. Consultants, rapporteurs of the two Machinery Safety and Occupational Health and Safety advisory "nucleus" groups.

80. INRS (National Research and Safety Institute, France), Eurogip (public interest grouping-French social security system), HVBG (the German federation of institutions for statutory accident insurance and prevention), BauA (Federal Institute for Occupational Safety and Health, Germany) and Elinyae (Hellenic institute for occupational health and safety).

81. European Communities, 1999.

82. European Communities, 1999.

*and Answers report*⁸² contains possible solutions to diverging interpretations on “scope” and “definitions” issues, plus a series of information sheets drawn up by the European Co-ordination of Notified Bodies for Machinery and Safety Components to help in checking products' compliance with the Directive's requirements.

Clear confirmation was given to misgivings about the **length of the standards development process** due to the wide-ranging consultations needed to achieve a consensus which accommodated all stakeholders' interests. One possible spin-off of this is that standards may already be partly obsolete by the time they are published in the *Official Journal* of the European Union: standards developers do not ensure that documents can be rapidly modified and updated to keep pace with technological innovation and to incorporate improvements in quality and safety.

The difficulties of ensuring that “standards themselves must remain flexible enough to allow for technological progress while, at the same time, providing a sufficiently precise level of specification to ensure smooth implementation of the directives”⁸³ were firmly reasserted. More specifically, speakers' arguments distinguished between standards that clearly provide advanced design solutions which are still open to a diversification of technologies, and standards drafted with very general objectives that add little of significance to the directive's essential requirements. Finally, other standards go into excessive technical detail that may restrict design but add nothing safety, or have methods of verification that are too loosely-worded to ensure reproducible results: some design solutions may also be at variance with the needs of small manufacturers, whose competitiveness is often based on design aspects different from those illustrated in existing standards.

Another body of remarks related to the **status** of European harmonised standards. The New Approach gives a central role to these provisions, since they confer on compliant manufacturers a presumption of conformity with the essential requirements of the machinery design directive. They take precedence over existing national standards, which they are intended to replace. As some experts pointed out, the European harmonized standard have no physical existence; they are not published directly by the CEN, but acquire formal embodiment and status only when transposed by the national standards bodies. Their legal scope is uncertain: compliance with the

83. Efficiency and Accountability in European Standardization under the New Approach, Report from the Commission to the Council and the European Parliament, COM (1998) 291 final p. 3.

standard confers a presumption of conformity with the essential requirements, but where loss or damage arises from the use of the machine, it is unsure whether compliance with the standard relieves the manufacturer of liability. Likewise, the legal effect of publishing the standards' references in the European Union's *Official Journal* is not clear.

The seminar debate also confirmed the survey findings on **Annex IV** of the directive: this list embodies the compromise achieved by the Member States when negotiating the Machinery Directive so as not to undermine the different national approaches towards certain hazardous equipment. Member States have clearly voiced many concerns at different stages since then, but to date, no convincing basis for a radical change has been put forward, although some experts came out unambiguously in favour of either cutting out Annex IV or revising the list on the basis of current operational data.

Moreover, it was confirmed that **coordination of notified bodies** at European level – which is vital to ensure consistent, uniform application of technical provisions – is a widely neglected exercise: few take part in the coordination or use the deliverables of coordination activities (recommendations for use). The CEN occupational health and safety rapporteur continues to invite these bodies to attend coordination activities, but has noticed a regrettable side-effect of the failure to harmonize practices: some notified bodies bespeak the puzzlement about European harmonized standards, considered as *fallible* technical documents and rely on consolidated legal requirements. But standards provide a valuable basis for harmonizing the work of notified bodies. Speakers also saw a need to clarify the status of the Recommendations made by the European Coordination of Notified Bodies for machinery and safety components, especially the implications of their "approval" by Member States and their "acceptance" by the European Commission. Finally, renewed emphasis was placed on the need to harmonize divergent national practices to carry out the task of monitoring the work of notified bodies.

Monitoring machines placed on national markets, on the one hand, and **cooperation** between competent national authorities to ensure an equivalent level of protection, on the other hand, were confirmed as central issues in the enforcement of the Machinery Directive. Various attendees admitted a problem

with a rising toll of reported accidents involving new machines introduced into workplaces over the past five years.

It is a clear fact – as the Danish Presidency's representative pointed out – that no Member State can check on every machine that is operating across the country: a combination of regular visits to business establishments, workplaces, and trade fairs needs to be supplemented by sampling of machines and campaigns. These activities should be given direction and supported by accident and complaint reports.

In this connection, it was stressed that cooperation and coordination initiatives at European level are a valuable means for putting national resources to efficient use and improving harmonization of practices. Administrative cooperation between labour inspectorates in Europe (MACHEx) and administrative cooperation over the Machinery Directive (ADCO) were presented in more detail. Initiatives like these are helping to equalise the level of worker protection, but there is a need – not least in view of relations with potential new European Union Member States – to improve the exchange of information on defective machines, and to run an efficient database of machinery information, as pointed out by the British Health and Safety Executive representative.

5.2. Additional facts on identified concerns

The new issue of **standards maintenance** has added to concerns about the protracted standard preparation process. One question raised was how to ensure that the revision process involves collecting information, in order to better reflect best engineering practices. It was also pointed out that maintenance has a key role where standards are rushed into existence by standard developers' belief that the benefits of having standards published sooner outweigh the drawbacks of inevitable flaws. It remains to be seen whether the standard revision process as it stands can resolve any technical failings revealed in application: this will depend very much on the ability of standard makers to address those shortcomings by taking into account feedback from the users of machines designed to those standards. Also on standards maintenance, the CEN Rapporteur for Machinery Safety called participants' attention to the scope that CEN affiliates and members had to interact directly with CEN Technical Committees, and contribute suggested essential improvements to the CEN Secretariat. This,

however, was an opportunity very rarely taken up by interested parties, he said.

The concerns about **quality of standards** were also expanded on and copiously exemplified. The case of garage hydraulic car lifts illustrated a good standard that is broadly disregarded by the market. These lifts necessarily involve operators working below a suspended load. Because the weight of cars is not uniformly distributed (being engine-heavy), lifts should be designed so as to safely carry the cars regardless of which way they are loaded. Harmonized standard EN 1493:1998 *Vehicle lifts* works towards this, but the market thinks otherwise. As a result, less robust (and cheaper) lifts, certified by notified bodies, are put on the market that require cars to be loaded from one end only. Foreseeable misuse by loading cars from the other end would expose operators to the risk of being crushed by the lift collapsing.

Authorities also have doubts as to whether some other standards adequately support the essential health and safety requirements. Standard EN 474-1:1994 *Earth moving machinery*, for example, was claimed not to fulfil essential requirement 3.2.1 "Driving position"⁸⁴ in light of the state of the art on closed circuit television (CCTV). Also, standards EN 708:1996 *Soil working machines with powered tools*, EN 704:1999 *Pick-up balers*, and EN 632:1995 *Combined harvesters and forage harvesters*, were singled out as harmonized standards that laid down different design provisions for similar types of protection (although EN 708 was challenged in a safeguard action introduced by the United Kingdom). Finally, other examples were also provided of design solutions thrown open to question after serious accidents had occurred on wood chippers, power and other presses, transport platforms, and platform lifts.

The quality of standards and appropriateness of essential requirements were also queried in connection with safety control systems. The general view of national authorities and notified bodies that manufacturers should pay more heed to the directive's requirements on **controls** was further expanded on at the seminar. Confirmation was given that safety in the wood-working sector increasingly depends on automated solutions where essential functions are already governed by programmable logic controllers (PLCs). A closer look at whether Annex I needed to be improved in line with new technology development and market trends (i.e. multi-purpose machines). It was

84. "(...) Where necessary, appropriate devices must be provided to remedy hazards due to inadequate direct vision".

stressed in this connection that occupational health and safety prevention experts were apt to spend time only on "visible" aspects of safety (mechanical & electrical, etc). They were not condemned for this; rather, it was used to illustrate that the "intangible" safety side of software systems may go unrecognized, and it is not uncommon for reports of accidents involving PLCs to categorize them as an "accident, cause unknown". Without a new approach (and additional regulatory instruments) towards such technological development, any hidden shortcomings of software would be undetectable through traditional market surveillance practices.

Another focus of discussion was the **link between harmonized standards and essential requirements**. In a nutshell, Annex ZA of a "candidate harmonized standard" designed to support Machinery Directive essential requirements contains a correspondence table showing which clauses of the standard support the essential requirements. However, when the whole standard supports one or more essential requirement(s) of a New Approach Directive, there is no need to list in a table the correspondence between the clauses of the standard and the essential requirements of the New Approach Directive. That said, the issue is to determine which essential requirements are covered by the presumption of conformity. Certainly, some harmonized standards published by the Commission do make a strong and clear linkage between clauses and essential requirements; but, it was argued, that linkage could be improved. This kind of direct relationship would help authorities to monitor the linkage between legislation and standardization; it would facilitate standard developers' work; it would also enable CEN consultants to speed up their verification of candidate harmonized standards and their compliance with the Commission mandates. Finally, a clear link between standards clauses and the Machinery Directive's essential requirements would also raise the international profile of the unique linkage created by the New Approach between legislation and standards.

Central to all the discussions of standards and essential requirements was the question of how to improve **worker participation** in workplace and work equipment design. This fundamental issue, which recurred throughout the survey, was confirmed and expanded with additional comments and clarifications. In the words of the former chairman of the special group tasked with the revision of EN 292, the role of machinery operators (users) as

a source of knowledge for machinery design is currently underrated. One argument in support of this view is that the experts in charge of framing the Machinery Directive and the first basic safety standard EN 292 tended to focus on the role and duties of machinery designers. This approach is probably revealing various limitations. In areas where standards development has been slow, experience in formulating technical provisions is lacking, and prevention is still in its infancy, in particular, there is a risk of falling into serious error if the actual conditions of use of machines are not taken into account. It might be that users would put in place safety parameters and features where manufacturers would not, as a CEN consultant noted. This propensity to focus on designers has over the years resulted in a lack of systematic information channels for making designers aware of operators' experience with machinery. This raises the whole issue of what tools are really available to feed user information back to designers⁸⁵.

The European Council⁸⁶ and European Commission⁸⁷ reaffirmed the blatant disregard of the principles on social partner participation in the standardization process. The picture here is disturbing, as only a very few national authorities have taken steps in this direction. Only in a handful of cases has the problem gained recognition at national level. As far as 'organizations' are concerned, cases in point are the creation of Eurogip⁸⁸, and the creation of the tripartite (authorities, workers, employers) Commission on Industrial Safety and Standardization (KAN) in Germany. Initiatives of note include the French Ministry of Work's Bureau CT5, which is attempting to compensate for the under-representation of workers' interests in standards development by holding information meetings to encourage labour inspectors and workers representatives back into technical committees; and the increasing involvement of worker safety representatives to help identify machinery deficiencies in the United Kingdom. Other initiatives specifically aimed at bringing machinery operators' concerns to the attention of standard developers and designers were signalled. Examples are the 'flagging sheets' recently distributed in France to firms in different regions⁸⁹, and the user feedback methodology devised in Italy in 1999⁹⁰.

Standard developers' lack of awareness about shortcomings in standards could also be a result of employers and manufacturers' limited (and often non-) participation in various technical committees and working groups: framing standards is a costly business which interests like SMEs⁹¹ cannot always

85. The TUTB and SALTSA (The Joint Programme for Working Life Research in a European Perspective) are currently running a project on "Trade union strategies for improving mandated European technical standards". SALTSA is an undertaking by the Swedish trade unions LO, SACO and TCO and the National Institute for Working Life. See *TUTB Newsletter*, No. 18, March 2002, p. 23.

86. Council Resolution of 28 October 1999 on the role of standardization in Europe clauses 12, 39, *OJ n° C 141*, 19/05/2000 p.1.

87. Comments on Machinery Directive, article 5.3. (Community legislation on Machinery, comments on directive 98/37/EC, European Communities, 1999.)

88. The social partners are involved in the management of Eurogip (www.eurogip.fr).

89. *TUTB Newsletter*, No. 10, December 1998, p. 14.

90. F. Strambi, C. Stanzani, M. Bartalini, and M. Cucini, *Ergonomia e norme tecniche di sicurezza: il contributo degli utilizzatori. La sicurezza delle macchine per la lavorazione del legno* (The user input to ergonomics and technical safety standards. Safety of woodworking machinery), *Sociologia del lavoro teorie e ricerche*, Milan, FrancoAngeli, and Sindnova (an Italian trade union institute). See *TUTB Newsletter*, No. 18, March 2002, p. 20.

91. Interestingly, employer and industry participation was addressed by the Commission in the comments on article 5.3 (Community legislation on Machinery, comments on directive 98/37/EC, 1999), in which it stressed that participation by manufacturers was essential to avoid standards deviating from good engineering practice.

92. *Guide to the implementation of directives based on the New Approach and the Global Approach*, European Commission, 2000, p. 28.

afford. In this connection, under-resourcing also hampers participation by authorities, whose input to the standardization process is significant “to help ensure that public concerns are properly taken into account in the process”⁹².

Finally, the seminar also looked at **legal aspects** of application: the UNICE and Orgalime representative stressed that since the directive had come into force, equipment safety had come significantly to the fore in business dealings between machinery manufacturers and purchasers (e.g., contracts may expressly refer to a European harmonized standard) and the cost of safety-by-design now accounts for a material part of the total price of machinery. There is no longer any question of safety of machinery being a post-purchase, hit and miss affair. Manufacturers cannot just stick a standard form clause on safety in the contract for sale of equipment. Unsafe machinery is grounds for non-performance of the contract.

The same representative claimed that to avoid liability for non-compliance with the essential requirements, manufacturers tend to take the safe option of a literal and restrictive reading of the Community legislation. So, the instruction handbook may contain a long list of “don'ts” to guard against any non-compliance against the relevant provisions of Community law. For instance, it may expressly say that the machinery must not be used with the guard open.

The same expert observed that the uncertainties and lack of clarity around the application of the legislation were an obstacle to real certainty in the law governing dealings between machinery suppliers and buyers. He queried exactly what kind of obligation compliance with the essential requirements involved (a strict liability to perform, i.e., achieve a specific result; or a duty to exercise skill and care, where liability attaches only for carelessness or negligence). The same concern for certainty in the law prompted the UNICE and Orgalime representative to express fears about a substantial revision of the directive, arguing that it would sow confusion among manufacturers. Other seminar participants stressed that while this was a legitimate concern, certainty in the law cannot be the main aim. That is to ensure the safety of machinery users. A revision of the Machinery Directive could help clarify its provisions, which would deliver added certainty in the law.

5.3. New elements

New and divergent views emerged over the fundamental issue of **communication between manufacturers and users**, and the more general issue of information flow. Some seminar participants stressed that manufacturers have a considerable depth of knowledge about the use of their equipment (design problems, near misses, and accidents), which is an essential component of their competitiveness. It was argued that diligent manufacturers always try to collect safety information on the use of their machines, although the problem is how to ensure that they actually factor that knowledge into the design process. Other participants, by contrast, argued that manufacturers are unaware of problems posed by their products, and that workers reps may take specific cases to the employer, who may try to resolve the problem by asking the supplier to modify or exchange the machine. Operating issues are therefore dealt with at company level, unseen by manufacturers, and so the experience is of no benefit to users of similar machines in different workplaces.

The focus then turned to the **visibility of non-compliance**. Reportedly, when machinery that is not compliant with essential requirements is discovered by labour inspectors, the official response may be to request manufacturers to modify just the model (or family of machines) concerned. As a result, if the non-conformity relates to a systematic design flaw, similar defective machines may continue to move freely in other countries. In some cases, this information is not widely circulated even within the country, and goes no further than the workplace inspected.

The lack of visibility of design failings was seen as the reason for authorities' growing concern to simplify the **safeguard procedure**. It is clear that dealing with non-conformities through the procedure laid down in the Directive⁹³ (the "Safeguard Clause") brings proven design flaws to the notice of other Member States only at the end of a process that may drag on for years in which authorities carry out resource-intensive tests and develop supporting documentation, while the Commission processes the file by consulting relevant stakeholders. During all this time, the authorities taking the action may be exposed to claims from both manufacturer and users. Also, legal and market uncertainties may arise from having

93. Article 7.

machinery that is illegal in one Member State but not in others. More importantly, similar machines might cause accidents elsewhere. In the view of some seminar attendees, this might explain why authorities may be reluctant to engage such formal proceedings. The fact that only one case has so far ended with the machine being withdrawn (the French safeguard clause against a model of part-revolution clutch press), reinforces the belief that the procedure should be simplified. But it was also suggested that two other steps were needed. One was to further clarify the essential requirements to give authorities more confidence about using the safeguard clause. The other was to see that manufacturers were always in a position to argue their case against official action taken against their machines.

A case in point is the more specific debate on circulation of information on **emission hazards**, where trade union representatives called for users to be supplied with machinery emission data to enable them to make an informed choice of work equipment.

Compared to the very few emission hazard concerns unearthed by the TUTB survey, the more detailed seminar discussions revealed much greater interest in how both the directive and technical standards could better address noise, vibration, radiation and toxic substance hazards. The general consensus was that the Annex I coverage of these is not on a par with the increasing recognition of their role and impact on the health and safety of exposed persons.

Some clearly defined concepts, like emission, stand in need of further clarification; while the use of different terms to describe the same thing (e.g. achievable values, reference values and indicative values), are causing confusion in the engineering community. It was also argued that the Machinery Directive should contain a reference to the need to collect and compare emission data: additional analysis and research is needed, for instance, to address the state of the art on such aspects as noise reduction. It was suggested that emission data should be compiled on specific machines, pointing out that the creation of an emissions database at European level had been discussed in the 98/37/EC Committee's Working Group on Machinery: most national delegations had been in favour of the idea, although with some misgivings about how the data could be efficiently used.

The need to disseminate more information on emission hazards

was also the focus of discussion on **ergonomics**. While claiming that ergonomics is a young science whose principles have yet to find widespread acceptance in industrial circles, standard developers nevertheless argue that standards reflect good ergonomic practice. Yet, standard developers tend to disregard ergonomic aspects simply because of the difficulty in evaluating them. A number of ergonomics standards already exist, others have been recently endorsed, and yet others are in the making, although some are long overdue because of the overlap between some requirements and matters under the working environment directives⁹⁴.

Authorities and the TUTB, by contrast, argue that manufacturers seem unable to properly interpret and apply what ergonomics has to offer. Man-machine systems have inevitably become more sophisticated, placing increasing demands on the mental rather than purely physical ability of operators: regrettably, machinery designers seem reluctant to take these facts on board.

All this seems to point to the need to expand the range of instruments for circulating information on machinery hazards. In this connection, two other issues were raised. One was the importance of **prevention networks** in supporting standards development (and balancing diverging views on safety): Better coordination and cooperation among occupational health and safety bodies could help to formulate and supply standard developers with common positions on safety design elements. The other was the **availability** of standards. It is well-known that manufacturers are not the only "users" of machinery standards. Safety standards, in particular, although developed by private bodies, address issues of great public concern. It was argued that some clarification was needed of how to reconcile the private and public facets of standards. Standards should be made publicly available on the grounds that they codify good and safe engineering practices. A related point raised was that those responsible for educating future machinery manufacturers seem ready to accept standards as the underpinning for their teaching programmes when instructing future machinery designers.

Where **market surveillance** is concerned, authorities signalled interesting divergences. In Sweden, a surveillance campaign run in 1996 for coordinated inspections of two thousand workplaces and some three thousand new machines found failings

94. It was acknowledged that the close link between ergonomics and the work environment makes it difficult to operate on the borderline of these two themes: however, the TUTB does not accept this as an argument for not improving the content of the Machinery Directive to ensure that ergonomics is better integrated into machine safety as the best way to make design more human-centred.

in half of them. Incidences of non-compliance were also found in half of the 324 "Annex IV" machines inspected.

German and Finnish inspections had found other incidences of non-compliance in connection with instructions not being supplied in the users' language, and often not providing essential information on operational issues and residual risks. At the opposite end of the spectrum, in Denmark, very few CE-marked machines were found to be non-compliant, apart from poor quality instructions for use. Most accidents were found to be the result of misuse not in accordance with the designer's instructions, while others occurred during servicing activities. That may suggest a productivity-orientation that prompts Danish buyers and customers to opt for costly but high-quality products.

95. It is worth mentioning that when Module H was introduced by the European Commission in December 1996 – when a revision of the Machinery Directive was under way – “Member States, European federations, CEN, and the Industry were against the Total Quality Assurance” for the Machinery Directive.

Diverging views were expressed about whether Module H⁹⁵ fits into the Machinery system. On the one hand, there are indications that authorities would welcome Module H for Annex IV machinery. The European Commission – which encourages the introduction of Module H – also stressed two factors. Firstly, it would bring to light some form of feedback on the functioning of installations. And secondly, in module H, Notified Bodies would be obliged to review certificates. It was argued that such procedures would not ultimately produce safe products.

Section 6

Conclusions and ways forward

With this research project, the TUTB basically aimed to census national practices on implementation of the Machinery Directive to determine what issues those involved in regulation face and assess how the law was standing up to changes in technology and market trends.

The study, national reports and seminar discussions brought to light a series of failings and gaps in the system, from which the TUTB has ventured possibilities, suggestions and proposals. Some of these concern the Directive's wording - changes are needed to make some provisions simpler to understand, or to clarify the duties and responsibilities of some of those involved in the system. The Annex IV list and article 7 safeguard clause provisions also stand in need of revising. On a more general note, the notified bodies and national market surveillance practices need to work more in concert. These considerations about the system as a whole also take in the quality of European harmonized standards, the areas of cross-over between the Machinery Directive and the Use of Work Equipment Directive, and finally, communication between manufacturers and users. The European institutions need to work in a more effective, better-organized way.

Make the Directive more readily understandable

Diverging interpretations of its terms and areas of uncertainty mean that both the Directive's scope and definitions ("machinery" and "safety components" are cases in point) require clarification. Likewise, the precise legal effect of publishing the reference to European harmonized standards in the *Official Journal*, and the linkage between them and the Directive's essential requirements, needs to be made clear. All this should be done by revising the Directive, or issuing new explanatory documents like those already published by the European Commission. Some manufacturers see a full reworking of this part of the Directive as undesirable - they know what it provides and fear that major changes might create fresh areas of

confusion and new gaps in the law.

Clarify the duties and responsibilities of those involved in the system

The duties and obligations of the players involved must be clearly delimited if there is to be uniform application of the Directive across the European Union. This means dispelling a series of uncertainties. The obligations, and liability for design flaws, of sub-assembly manufacturers must be made clear. What is the legal position where European harmonized standards have been followed, but poor machinery design still results in harm? It is unclear whether compliance with these provisions relieves manufacturers from their public liability.

These lingering doubts are not just bad for certainty in the law of business dealings in machinery, but also for people injured by a failure to satisfy the essential requirements.

Despite the many instances of such non-compliance uncovered by our study, prosecutions of manufacturers in breach of their duty seem few and far between. The national public authorities should do more to make injured workers and employers aware of their legal remedies against manufacturers of equipment that causes injury

There also needs to be more openness in the way Member States notify conformity assessment bodies. At present, this is at States' discretion - notified bodies do not have to meet the criteria laid down by the Machinery Directive (annex VII)⁹⁶. Harmonization of the designation procedure is essential to deliver consistency of national practices in this area. Here, the TUTB supports the Commission's Recommendation⁹⁷ for a uniform designation system, which also contains interesting provisions on the administrative procedure for marketing prohibitions laid down in article 7 of the Directive.

Revise the machinery safeguard clause

Our survey found this to be an unwieldy and complex procedure which Member States find hard to use. The TUTB suggests that a simpler procedure would be more effective. We support the European Commission's proposal to change this clause, which is found in most New Approach directives⁹⁸, especially to ensure a more uniform approach throughout the directives, and shorten the process.

But a "fast track" procedure could be introduced for cases where a manufacturer admits and agrees to correct a non-

96. The criteria are spelled out in the EN 45000 standards.

97. Commission Communication to the Council and the European Parliament, *Enhancing the implementation of the New Approach Directives*, COM (2003) 240 final.

98. *ibid.*

conformity notified by the Member State. It would be pointless for the Commission to enlist technical expertise in such cases - a simple consultation with the parties concerned (the Member State that initiated the safeguard action and the equipment manufacturer) and an exchange of information between States would arguably be enough. This arrangement would add flexibility to the existing system.

The procedure was also found to be slowed down when expertise was enlisted to enable the Commission to assess whether appropriate measures had been taken. The Commission lacks in-house technical expertise, and so has to call for tenders. This raises the issue of its permanent expertise resources.

Revise the Annex IV list

Much knowledge and information has been developed on the machinery listed in this Annex since it was first compiled when the Directive was drafted, and C-type standards have been adopted for them (fewer than thirty to date)⁹⁹.

The Annex IV list needs to be updated by reference to advances in safety technology. For this, an EU-wide study needs to be done on new machinery that is intrinsically unsafe to use. That information can be gleaned from work injury statistics reported by Member States, national data on machinery use, and from a survey to canvass the views of players in the system, essentially notified bodies. The personal evidence collected for this report could provide useful pointers and the initial groundwork for a proposed revision of the Annex.

Establish effective European coordination of notified bodies

Our study found a range of views among these bodies as to their role, spheres of competence, quality of service, and how they reconcile their public interest goals with being bound by market rules

But, the lack of concerted working by notified bodies (and the failure to apply recommendations drawn up by the European Coordination) can have disastrous health and safety consequences for workers. Programmable electronic systems (PES) are a case in point. The spreading use of such systems is a risk factor in itself, because their failure is unpredictable and often undetectable. Notified bodies conducting EC type-examinations may apply different criteria for checking such systems as part of an Annex IV-listed woodworking machine. This may result in design and manufacturing faults in PES going unde-

99. Over 400 harmonized standards under the Machinery Directive had been published in the *Official Journal* by August 2003, comprising 79 A- and B-type standards, 206 C-type standards (27 for Annex IV machinery), and 90 C-type standards on safety aspects and equipment.

100. A number of cases of PES failures causing accidents were presented at the 2nd International Conference "Safety of Industrial Automated Systems", Bonn, Germany, 13-15 November 2001.

tected, placing operators at risk¹⁰⁰.

The answer is to step up coordination and address particular difficulties currently faced by the bodies engaged in this type of business. Because the costs of testing have to be covered, they may fear undermining their own competitiveness by disclosing their know-how, and see the committing of resources into drawing up "recommendations" that have no legal worth as a waste of time. There is no easy way at present to square this kind of coordination with fair competition between notified bodies.

The TUTB argues that these issues could be addressed, and a whole new dimension added to coordination, by making it compulsory for notified bodies to take part in the coordination activities which have been in place since 1994. Eurogip, which provides the permanent secretariat to the groups currently involved, could take the new organizational set-up in charge, or hand it to a new body.

Improve coordination of national market surveillance practices

Our study found that manufacturers are continuing to ignore some fundamental machinery design principles. This suggests that public control systems are still not working effectively.

There is a clear lack of European coordination here. For example, the Member States are not systematically passing on data on market surveillance, risk assessment, and official corrective action taken on non-conformities discovered. At present, Member States exchange information on accidents and near-misses¹⁰¹ on a purely voluntary basis, and strict disclosure rules often impede data flow. The very few instances of cooperation are good examples of national authorities' commitment to sharing data, analyses, and joint actions.

National public authorities have a real role to play in market surveillance, but they must join up their activities and strategies effectively. They should have an explicit obligation to do so. We believe that the national authorities should have a duty to collect the data concerned and pass it on to the other States.

And it is detailed information that is needed - just accident numbers are not enough to work on, for many go unreported. The circumstances of the accident or near-miss should be described, with particular reference to the operator's exposure, the particular configuration of the equipment, and the age of

101. Information on near-misses offers a valuable opportunity to investigate a safety issue and take pre-emptive action before serious harm occurs. Whether an accident turns out as minor or fatal is very often pure chance.

the machine - all details that rarely feature in the statistics at present. This would make it possible to frame common prevention strategies and joint solutions to machinery safety issues.

In the long-term, harmonization of national systems should be considered.

Improve the safety aspects of European harmonized standards

The European standards are of varying quality. Development times are so long that some solutions are already overtaken by the technology, while some requirements prove inappropriate in real-life working conditions. The limits to standardization are shown by how it addresses the operator-machine-working environment interface. This is why the TUTB argues that workers should be a valued source of information for standards developers, which they are not at present. The Directive provides for users of machinery to be involved in standards development, but in reality few workers' representatives have any input into the process.

The TUTB believes that giving workers' representatives compulsory seats on CEN technical committees would be the right thing to do, and that Member States should provide financial assistance to enable them to participate in a real sense.

Standards developers should also have access to national data on work accidents involving machinery and partly-completed machinery, occupational diseases, and market surveillance information. A database to hold this information would be particularly useful; it could be set up and managed in partnership with the different Member States either by the Commission, an occupational safety body, or even by CEN. It would give standards committee members ready access to knowledge on the health and safety issues raised by work equipment as used in workplaces.

Improve the interlock with the Use of Work Equipment Directive

The survey and seminar findings bore out that the Machinery Directive and Directive 89/655, last amended by Use of Work Equipment Directive 2001/45¹⁰², must complement each other¹⁰³. They should be implemented with the combined aim of ensuring that only safe machinery is put into the working environment.

These Community Directives complement and partially overlap each other, so it is important for manufacturers and

102. Directive of 27 June 2001 concerning the minimum safety and health requirements for the use of work equipment by workers at work, OJ L 195 of 19/07/2001 p. 46.

103. As emphasized in recital 7 of the Machinery Directive.

employers to be familiar with them. Our project found that opinions in different Member States still diverge on the link between the use of work equipment and the workplace. What is beyond doubt is that employers cannot discharge their duty to choose work equipment appropriate to their business without considering factors that stem from the manufacturer's own risk assessment. The information collected revealed that many variants of the same machine may be found on the market today, the cheapest versions of which often harbour significant residual risks and may be sold incomplete, with essential safety devices offered as an optional extra. So, by applying the Use of Work Equipment Directive, the employer may be obliged to take costly measures that should have been taken by the manufacturer¹⁰⁴. Poor safety systems are often the result of a less-than-satisfactory risk assessment.

The TUTB was interested to see the new requirement introduced in the European Commission's initial proposal COM (2000) 899 final, that manufacturers' instructions should remind users of their obligations to comply with Directive 2001/45.

This is a move in the right direction, because it is important for manufacturers and machinery users to work more closely together.

Improve the flow of information on machinery between manufacturers and users

It is clear from this study that the Directive cannot be efficiently applied without interaction between manufacturers and machinery users. Our suggestion is that more formally-organized communication should be established between them.

Before the act of purchase, prospective machinery buyers should have more information by being supplied with the manufacturer's risk analysis.

After purchase, users should also be better informed. Procedures should be put in place to ensure that European users have access to full health and safety details. At best, information is currently collected by manufacturers on their products for use and inclusion in their technical construction files, which can be seen only by the national competent authorities on making a "duly substantiated request"¹⁰⁵, or by the notified bodies in specific circumstances. Users only get to see this kind of information when responsible manufacturers

104. There is evidence that small and medium-sized business owners are gradually starting to inspect machinery before purchase to ensure that it conforms to the essential safety requirements.

Guidance has been published in France (CRAM Nord-Est), Italy (*Snop Bulletin* No. 51-52, 1999, www.snop.it), and the United Kingdom (Health and Safety Executive) to help employers evaluate and choose new machinery.

105. Machinery Directive, Annex V.

take accidents and near-misses into consideration to revise and update their instructions.

Making it compulsory to keep a register of users' particulars and complaints would be a useful first step towards setting up formal channels of communication between users and manufacturers. It could be a duty on the first purchaser to make periodic entries by sending in relevant information to the manufacturer who would have the register in his safekeeping. This duty to collect information would prompt manufacturers to supply more detailed particulars in the instructions about machine malfunctions, prohibited uses, and foreseeable misuse¹⁰⁶. This would be an easy way for manufacturers to stay informed about user demands and take the necessary measures. Systematic feedback of information on the use of work equipment to designers and manufacturers is essential. Another option would be to set up an official agency to check that safety information was being properly used to improve design.

The only way to square the Directive's two objectives of free movement for products and improved levels of health and safety for workers is to step up contacts between manufacturers and employers. Recent regional schemes have shown that such cooperation can work to their mutual benefit. Similar schemes should be set up in different sectors of industry as a matter of urgency.

We also believe that a European database on machinery design defects should be set up. It would give visibility to the social aspect of the Machinery Directive¹⁰⁷, which affects the lives and health of millions of European machine operators.

The database could hold information on the countless risk factors behind accidents and near-misses, as well as operator-machine interface issues. Whatever the limitations of the conclusions that can be drawn from data collected from different sources (e.g., industrial accident insurance organizations like the BIA in Germany and INAIL in Italy), Community action to improve knowledge on accidents and near-misses is essential. The latter, as well as minor safety system failures, are warning signals that in practice are rarely read properly¹⁰⁸.

This database could be linked to the proposed database on European harmonized standards. A general clearing-house of this kind on machinery could facilitate the transfer of knowledge and experiences, and a safety impact and effectiveness assessment of the system in place.

106. The "CEN Sector Forum for Occupational Health and Safety" held a seminar on information supplied to users on 18 October 2002 in Brussels chaired by Mr Vigone, CEN rapporteur, for standards institutions, the European Commission (DG Enterprise), industrialists, consumer organizations, trade unions, public authorities and CEN consultants.

107. The need to give a social dimension to the implementation of the Single Market is recognized by both the Council and the Commission.

108. See, for example, the consultation document published by the UK's Health and Safety Commission, *Proposals for a new duty to investigate accidents, dangerous occurrences and diseases*, available on <http://www.hse.gov.uk/consult/condocs/cd169.htm>.

The TUTB project on the application of the Machinery Directive has brought health and safety aspects of the legislation to the attention of a broader group of experts. It calls for new discussions with a larger number of actors in regulation.

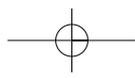
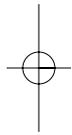
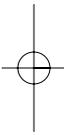
There are compelling arguments for having a permanent forum on the Directives that affect workers' health and safety to establish consultation between all those involved in the operation of the legislation. That would be the very minimum needed to overcome the inevitable differences of views over the provisions of legislation and the technical means required.

Annex
Breakdown of replies to the TUTB survey

	Manufacturers*	Users			Public authorities		Third bodies		Training providers	
		Machine-using business manager/owners	Workers' Representatives	Operators	Central service staff	Field staff	Notified bodies	Consultancy / training agencies	Engineer (future manufacturer) trainers	Machinery operator trainers
Finland	2 1 multinational (50-250 or more employees) 1 firm with 10-50 employees	3 (50-250 employees)	3 (50-250 employees)	2	Department for Occupational Safety and Health at the Ministry of Social Affairs and Health	3 occupational safety and health inspectors	2	1	1	1
France	2 (10-50 employees) 3 importers (2 with 1-9 employees and 1 with 10-50 employees)	8 business owners/managers (woodworking machine sector) interviewed personally; 3 with 1-9 employees; 3 workers and 2 with 50-250 employees. 7 business managers fill out a questionnaire sent by fax.	2 (50-250 employés)	Operators interviewed in 5 firms: 2 with 1-9 employees, 1 with 10-50 workers, and 2 with over 50 employees.	5 Ministry of Labour staff	3 occupational health and safety inspectors	4	2 notified bodies interviewed also provide consultancy.	1	3 Schools (7 teachers)

Germany				2	2	1 from federal health and safety inspectorate (<i>Gewerbeaufsicht</i>) and 3 <i>Berufsgenossen-</i> <i>schaften</i> staff.			
Italy	11 (with 50-250 workers) and 1 woodworking machinery manufacturer's association: ACIMALL	2 woodworking machinery firms (1-9 employees)	2 mechanical engineering firms, 1 with 1-4 employees, and 1 multinational (86 employees)	Ispeil Ministry of Industry Ministry of Labour Central inspectorate of Ministry of Labour	2	Ispeil (Rome, Piacenza and Bologna head offices) 7 Local Health Units	2		

* In the questionnaire, specific questions were drawn up according to 3 types of manufacturers: manufacturers as such, assemblers of machines and manufacturers/users. Replies have been received only from one type of manufacturers: manufacturers as such.
Note: Some organisations - 2 German, and 1 French - involved in European standards development were interviewed.



TUTB Publications



La directive communautaire relative à la conception des machines : pour un équilibre entre libre circulation des équipements et protection des travailleurs – L'exemple français
(The Community Directive related to machinery design : balancing free circulation of equipment and workers' protection – The French case)

Sandra Limou, ed. Francis Meyer

FR
TUTB / Institute for work, Robert Schuman University, Strasbourg
2003, 128 pages, 16.5 x 24 cm
ISBN : 2-86820-254-3
15 €



Globalizing technical standards
Impact and challenges for occupational health and safety

Ed. Theoni Koukoulaki and Stefano Boy

EN - FR
TUTB / SALTSA co-publication
2002, 104 pages, 15.5 x 24 cm
ISBN : 2-930003-44-8
20 €



Market surveillance of personal protective equipment in France

Legal and practical aspects

Ian Fraser

EN - FR
TUTB
1999, 136 pages, 15.5 x 24 cm
ISBN : 2-930003-36-7
20 €

Coming soon :

Developing a participatory approach to the design of work equipment

Assimilating lessons from workers' experience

Wendy Morris, Prof. John Wilson, Theoni Koukoulaki

EN - FR
TUTB / SALTSA co-publication

To order TUTB publications :

by post: TUTB – 5 bd du Roi Albert II,
B-1210 Brussels

by fax: +32-2-224 05 61

by e-mail: tutb@etuc.org

on internet: <http://www.etuc.org/tutb/uk/publication.html>