Economic appraisal of EU safety at work legislation*

Recent initiatives at European level have emphasised the need to ensure that new legislation does not impose excessive costs on industry. These include the Commission White paper on employment and growth, the OECD jobs study and the Molitor report. Indeed, the Commission is formally obliged to assess the impact of new legislation on small and medium sized enterprises (SMEs). However, the current system of assessment does not require any explicit account of the benefits.

At the "macro" or European level the Davies and Jensen report consolidates work initiated by the Danish National Institute of Occupational Health which reviewed the use of impact analysis (IA) in member states. These impact assessments were first introduced in Denmark after concern was voiced by employers about the cost of health and safety proposals.

At the "micro" or enterprise level the authors build on previous work carried out by the Health and Safety Executive on the cost of accidents. Also relevant is a continuing Danish study of working environment accounting that is being conducted in various public sector organisations.

At the time of the original Danish study in 1989 only three member states, Denmark, Ireland and the UK, formally assessed the potential cost of new legislation. Only Denmark and the UK attempted to evaluate the potential benefits.

Cost benefit analysis (CBA) and IA have been used in OECD countries for appraisal of new road projects, ie monetary values have been compared against the risk of injury or death. These systems have also been used by the US Occupational Safety and Health Administration (OSHA) for more than 10 years.

Methodology

The research methodology used in the study involved two stages:
(i) *information gathering*: a written questionnaire was addressed to the regulatory authorities and industrial accident insurance associations in each EU member state covering topics such as:
- national arrangements for the assessment and implementation of new legislation;
- details of any studies at macro or micro levels detailing the cost of accidents and industrial ill health;
- details of quantitative studies or CBA of the effectiveness of control and preventive measures implemented at the workplace.
(ii) the results from the information gathering exercise were used in the second stage as a basis for the *development of CBA methodology* to assess the impact of new legislation. To this end the authors also utilised the existing techniques used in road safety CBA which they believed could be directly applied to the working environment situation.

National situations

Denmark
Economic assessment is an important part of the decision making process and was initially implemented in 1982. The requirement is extended only to Danish legislation and does not cover EU directives. The IA is included in the consultation process before a proposal is presented to the Working Environment Council and a preliminary IA must be provided to the Ministry of Labour. Employers provide the data regarding potential costs and workplaces affected whereas the Working Environment Service is responsible for the accident/health data and the aggregate analysis. The baseline measurement against which the costs and benefits are estimated is full compliance with legislation. Costs are sector-divided. Benefits are calculated using cost of illness valuation, ie the cost of death, invalidity and absence from work are measured using the value of lost production. The IAs have become an important factor in the decision-making process where they have led to a number of modifications to legislation. They have been taken as the ultimate decisive factor only where limit values for exposure to harmful substances were concerned. Also, IAs serve a special budgetary function as all ministries are responsible to local government for extra costs associated with their regulations. Ministries must provide compensation from within their budgets for the cost of preventive measures where there exists no equivalent credit for health-related savings.

Sweden
The National Board of Occupational Health and Safety (ASS) must submit IAs to the authority responsible for regulatory economics. The IA is gleaned from information from all the social partners although the methodology is not clearly defined. Some sources report that more than half of all proposals are not quantitatively costed and the valuation of benefits appear to be rather inconsistent. IAs are not an important factor in the decision-making process and the methodology is not as advanced as in Denmark. Sweden has a procedure whereby all legislation is reviewed 2-4 years after implementation. Some reviews have considered indicators such as knowledge of the regulations among the workforce whilst ignoring the economic impact on health and safety.

Finland
The National Safety and Health Division of the Ministry of Labour has a general duty to "reduce the socio-economic costs caused by deficiencies of the working environment". Since 1990 it has prepared IAs for any legislation which may have a "major impact". As in Denmark, all of the social partners are involved in the consultation

* See page 1 and Documents section.

process. The baseline measurement against which costs are estimated is taken to be industry practice rather than the assumption of full compliance with legislation. This practice differs from the other Nordic countries but is similar to that implemented in the UK. Benefits have been evaluated in only a few cases.

Germany

There is no duty to present any economic assessment for the implementation of new legislation. However, the expertise does exist and the Bundesanstalt für Arbeitsschutz has conducted pilot studies on CBA of preventive programmes at an enterprise level.

UK

The Health and Safety Commission has prepared CBAs in support of new legislation since 1982. HSE also submits IAs to the Council of Ministers regarding new EU directives. The assessments vary widely in their depth of analysis and they are modified as necessary during the consultative process. The methodology used is standard and is supplied by the Treasury. The IAs seek to express in common monetary terms the effect to society as a whole, and until 1994 the baseline measurement was complete compliance with existing legislation. A similar system to Sweden is now used. HSE also retrieves information from employers organisations, trade associations and selected firms. Since 1994 all government departments have been obliged to consult selected SMEs about the practicability and cost of implementing new legislation. The IAs themselves contain information on the estimated benefits of new legislation including accident and ill health reductions. Monetary values are often provided.

The Netherlands

There is no legal requirement to complete CBAs for new legislation although it is becoming standard practice to submit them. However, there is no formal role for IA in the decision making process. The legal framework governing health and safety has recently been extensively overhauled in response to concern about public expenditure related to sickness absence attributable to deficiencies in the working environment. This has effectively reduced the government's bill but has increased the financial burden on employers. Two assessments have been initiated by the Ministry of Social Affairs and Employment. The first details the costs to employers of the new legal framework. The second is concerned with the costs following the implementation of new manual handling controls.

Austria, France, Greece, Ireland, Italy and Portugal

No role for IA in the regulatory process was apparent in these countries nor have any studies been commissioned at micro or macro level.

Belgium, Luxembourg and Spain

No information was forthcoming from these member states.

Nordic studies

The HSE questionnaire revealed a significant number of studies both at "macro" level, ie the cost to society as a whole, and at "micro level", ie the cost to industry. The majority of these were implemented by the Nordic countries.

One study, commissioned by the Nordic Council of Ministers from Melderf Hansen (1993), estimated at "macro" level the costs of work-related ill health in the four countries. The main purpose was to develop methodology and validate the data sources. As such, the actual figures are illustrative rather than definitive. Data for the study was obtained from national health and social security statistics on hospital admissions, sickness absences, early retirement and death. Those aged between 20 and 69 were included and the data was disaggregated into eight WHO diagnostic groups, which accounted for 65-90% of all illness. For each of these groups the percentage of work-related ill health was estimated. A "cost of illness" methodology was used for valuation purposes ie. the value of lost output and medical costs were estimated although the subjective costs such as pain and grief were not considered. This methodology has since been adapted to provide revised and more accurate studies in Denmark and Finland. Hansen assessed the global cost of occupational accidents to the Nordic economies (in billion ECU) as follows (ECU cost per employee in brackets): Denmark 2.7 (1007); Sweden 9.6 (1661); Norway 7.3 (3300); Finland 1.9 (760).

There was a substantial variation in the costs between the four countries which Davies and Jensen attributed to inaccurate data on the amount of absence from work directly caused by occupational illness. The data for accidents was easier to evaluate and is more likely to be quantifiable. It should be noted that the level of accident-related absence from work was similar in all four countries. The most important component of total costs in all of the Nordic countries was musculo-skeletal disorders accounting for 37% of costs in Denmark, 42% in Norway and 53% in Finland.

Further work by the Danish Working Environment Service has built on and consolidated the Nordic study results and highlighted several aspects: the inclusion of public sector costs and provision of separate estimates for men and women. The results indicated that the total cost of work related disability was 3.1 billion ECU, equivalent to 1175 ECU per employee. The main costs were again musculo-skeletal, at 30% of the total, followed by cardiovascular disease, accidents and psychological disorders, each responsible for 12%.

Another study, carried out by the Norwegian Ministry of Labour, also adopted a Hansen methodology with two major differences: it used 11-12 WHO diagnostic groups; the cost of work-related ill health was calculated differently.

Two separate studies were performed to assess all sickness absence from work and that reported to be directly related to the working environment, respectively.

One study dealt with the total eco-

nomic cost while the other allocated financial costs to the private and public sectors and lastly to the individual. Total costs were evaluated at 6.2-6.5 billion ECU with the private sector bearing 11%, the public sector 81% and the individual 9%.

In other work reported by Davies and Jensen Finnish authorities utilised the same methodology as Hansen, with a little fine tuning. The principal difference was the re-evaluation of work-related ill health. The total cost was estimated at 3.2 billion ECU with musculo-skeletal disorders responsible for 33% of total work-related ill health.

Outside of the Nordic countries, some work has been done in Germany. The most recent study was conducted in 1993 by Baum and Niehus concerning traffic and industrial accidents. Unfortunately, the results could not be compared in any way to the Nordic studies as only accident data was investigated while work-related ill health was not considered at all. Another recent study by Weinberger (1992) considered the social cost of noise, which again could not be compared in any constuctive way with the Nordic results.

The first economic study carried out in the UK and specifically concerned with the workplace was in 1972 for the Robens committee. Subsequently, an HSE study by Morgan and Davies (1981) estimated that the total resource costs of industrial accidents and ill health (only a specified and limited number of medical conditions) to be 0.5-0.9% of the GNP in 1978/79. When subjective costs were included (ie money paid by the state to those individuals unable to support themselves), the cost rose to 0.8-1.2% of GNP.

In 1994 the study was re-evaluated and some of the methodology adapted. The total cost had escalated to 1.3-2.2% of GNP. The actual number of accidents had fallen although the total cost had grown substantially. This was understood to be due to more accurate methodology and to the increased value placed on subjective costs. Although it was more comprehensive than any other study in this area there were serious gaps, eg no consideration was given to infrequent, catastrophic incidents.

Overview

Comparison of all of these CBA studies is not possible because the methodologies used and the data sources vary widely. All detailed the medical costs of ill health and attempted to evaluate lost productivity but not all assessed the subjective costs. Only the Weinberger study and the two UK macro studies included this subjective cost estimation. Davies and Jensen considered that the UK reports were the most complete despite omitting several important considerations.

Future trends in environmental classification

*Dr. Steve Robertson**

Environmental classification was introduced into EU legislation by the 12th adaptation to technical progress of the dangerous substances directive 67/548 in 1991. This required, for the first time, substances supplied and used within the EU to be assessed for any dangerous properties with regard to the aquatic environment and to be labelled accordingly. This now familiar system, based on standardised criteria, was introduced into UK law through the CHIP regulations in 1993 with full implementation during 1994.

The category of danger "Dangerous for the Environment" with the accompanying symbol was introduced with the Seventh Amendment to the above directive 92/32. All new substances placed on the market are systematically reviewed by the notifier and competent authority and a classification proposed for inclusion in Annex I (the Approved Supply List in CHIP).

While no detailed analysis has been conducted, it is clear that in the region of 50 - 60% of new substances have or will be classified for this category of danger. The classification of existing substances remains largely the responsibility of the supplier who must use all available data to assign a classification and label according to the established criteria. This is the current position in UK law.

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This paper was presented at a Charles Simeons meeting in London last November.

Only those substances placed on Annex I of the directive have been reviewed by the regulatory authorities. Some 2000 substances are included in Annex I, largely as a result of dangerous properties for health and safety, and the Commission has established an Environmenal Effects Working Group to review each substance to determine whether they have any environmentally dangerous properties.

Each member state is represented on the working group, industry being represented normally through CEFIC. This working group is approximately half way through its task and is expected to take a further two years before the task is completed. Additionally, as substances are added to Annex I as necessary and all such new entries will include an appraisal of any environmental effects.

While the initial system applied only to substances and their dangers to the aquatic environment, the dangers to the ozone layer were later introduced, to be applied specifically to substances covered by the Montreal Protocol. This represents the current position with regard to environmental classification.

This paper presents some of the developments which have taken place since the system was first established. Some developments, such as the introduction of classification for land transport in Europe, are about to become reality; some, such as the

The economic appraisal of EU health and safety at work legislation - executive summary*

Introduction, background and research methodology

1. This report, prepared for DG V of the European Commission, presents an analysis review of methods for estimating the costs and benefits of new European Union (EU) legislation governing health and safety at work. Its specific objectives are threefold:
- to review current procedures, and available methods, for *assessing the economic impact (both costs and benefits) of health and safety legislation* at EU, national and enterprise level;
- to draw up practical models for *impact assessment at EU and national levels* (the 'macro' level), including specific proposals for EU directives; and
- to outline a method which *enterprises* could use to assess the costs and benefits to them of improvements in health and safety (the 'micro' level).

2. The most significant strand of the project is the development of methods for assessing the costs and benefits of new health and safety legislation, including a procedure specifically designed for EU directives. Analysis of the costs and benefits of a legislative proposal helps prioritise health and safety objectives, and helps ensure that the means selected to achieve these objectives incur the lowest possible costs. However, it must be stressed that cost-benefit analysis is an aid to the decision-making process - not a replacement.

3. A number of recent initiatives at the European level have emphasised the importance of ensuring that regulations do not impose excessive costs on business. Examples include the Commission White Paper on employment and growth, the OECD jobs study, and the report of the Molitor group. Indeed, the Commission is formally obliged to assess the impact of new legislative proposals on small and medium sized enterprises (SMEs) through preparation of a *fiche d'impact*.

4. Proposals for regulation of health and safety at work typically impose new duties (and costs) on employers. The benefits typically accrue to other parties - employees and the general public. The *fiche d'impact* system does not require any explicit account of these benefits. So there is a case for preparing assessments of new directives that count the benefits as well as the costs.

5. To be effective in shaping the legislative process, assessments of legislative proposals must be credible and based on reliable evidence. Assessments need to follow sound technical guidelines. The assessment process must also be properly resourced. Both these issues are covered in the report.

* Davies, Marshall, McCrea, Beatson and Jensen. Report to the European Commission.* (December 1995). See page 1 and main article, page 4.

6. The research instruments used to compile this report included a questionnaire sent to national authorities in member states, a literature review, and discussions with national experts.

Review of current practice

7. This chapter, largely based on the questionnaire sent to member states, reviews current practice regarding the appraisal of new proposals for the regulation of health and safety at work. The results have been used in developing proposals for the assessment of EU directives.

8. Experience to date shows that the *fiches d'impact* prepared in support of EU health and safety directives have had little impact on the legislative process. This has often been because of their variable quality.

9. A number of EU member states routinely produce impact assessments for domestic and (in some cases) EU legislation, namely Denmark, Sweden, Finland and the UK. Interest and expertise in impact assessment is also growing in Germany and the Netherlands.

10. There does not seem to be any role for the formal economic assessment of health and safety legislation in Austria, France, Greece, Ireland, Italy and Portugal. No reliable information is available for Belgium, Luxembourg and Spain.

Review of macro-level studies of the costs of work accidents and work-related ill health

11. The questionnaire sent to member states, plus a literature search, identified a number of studies that have estimated the costs to the economy, or to an industry, of work accidents and work-related ill health. These calculations are a vital input to any assessment of the costs and benefits of measures to improve health and safety.

12. A number of studies have been carried out in the Nordic countries, Germany and the UK. These show that the economic costs of accidents and ill health can be substantial. For example, the most recent UK study estimated the economic (resource) costs of preventable work accidents and work-related ill health at 1-2% of national output.

13. The studies differ in their precise methodology. Most of them estimated the direct resource costs flowing from accidents and ill health (e.g. costs of damage, medical costs, lost productive capacity). Only a few of the studies attempted to estimate the 'subjective' costs of work accidents and ill health (i.e. the loss of individual well-being due to pain, grief and suffering).

Review of micro-level studies of the costs of work accidents and work-related ill health

14. High levels of occupational health and safety can only be achieved by action at the workplace. The analysis of economic incentives - the profit motive in private enterprise, limited budgets in public enterprises - is the key to understanding and influencing events at the workplace. Studies of the impact of work accidents

and work-related ill health on firms are an important tool in raising awareness of health and safety among managers. These costs are seldom highlighted in conventional accounting systems.

15. A number of studies have been found in the literature, mostly from the Nordic countries, Germany, and the UK. There are two main approaches:
- *personnel accounting studies* are based on readily available management information. A typical study would collect data on, for example, the level and costs of sick absence, personnel turnover, production losses, etc. plus data on the number of accidents and cases of ill health. The data is then interpreted, with the management information being linked to the data on accidents and ill health. This typically involves comparisons - over time, between firms or departments, or with reference to national or industry benchmarks.
- *accident costing studies* usually involve a special data collection exercise. A typical study takes a sample of all accidents and cases of work-related ill health and, for each occurrence, investigates and identifies all the costs to the enterprise. With this method, there is no need for an interpretative phase.

16. Results from both types of study support the hypothesis that the cost of work accidents and work-related ill health can be significant to the individual enterprise. Evaluations of programmes designed to improve health and safety often yield payback periods of one to three years, with the planning horizon of most SMEs. It must, however, be emphasised that the enterprises included in these studies have usually started with above-average levels of accidents and ill health. The scope for improvement in other enterprises may be more limited.

17. The literature suggests that a few indicators could form the core of a general model for costing work accidents and work-related ill health (sickness absence, personnel turnover, damaged goods and equipment in the case of accidents). Personnel accounting studies using these indicators can largely be based on existing information flows, and this approach can be used both for accidents and for work-related ill health. The results, however, can sometimes be difficult to interpret. Accident costing studies can be more expensive to set up, but the results are typically less ambiguous.

18. Both these approaches would appear best suited to estimating the cost of lapses in health and safety (accidents and/or ill health), or of measures to improve health and safety. It may be more difficult to estimate the benefits of maintaining a high level of health and safety performance. Effects on productivity and product quality can also be difficult to measure.

A framework for the economic appraisal of health and safety in the individual enterprise

19. Chapter 5 builds on Chapter 4, by outlining a general framework which can be used by individual enterprises to evaluate their own health and safety performance. At the European level, only a framework can be described. An operational model would need to be adjusted in the light of national social security systems and conditions facing the individual enterprise.

20. The most simple model identified is based upon a 'stripped down' version of the personnel accounting framework, focusing on three main components:
- (i) the costs of sick absence;
- (ii) the costs of personnel turnover; and
- (iii) the costs of preventive measures, which need to be set off against items i and ii in any evaluation.

21. This model can be extended. In many manufacturing and transport industries, the costs of damaged goods and equipment could be included. Health and safety performance may have a considerable impact on productivity and quality, but measures covering these items must be tailored to the circumstances of the enterprise.

22. Enterprises will need to interpret this data in order to use it sensibly. This will require some form of cause-and-effect analysis, in order to identify the main links between costs (sick absence turnover) and preventive measures. The report identifies two possible aids: workforce questionnaires, and accident costing studies.

A methodology for the economic appraisal of proposals for health and safety legislation

23. This chapter sets out a general procedure for the appraisal of proposals for new health and safety legislation, which could be applied at a national level to both domestic legislation and EU directives.

24. The proposed method is cost-benefit analysis (CBA). CBA involves the identification of all the costs and benefits to society of a new proposal, whereas, for example, the *fiche d'impact* is restricted to the effects on industry. Wherever possible, these costs and benefits should be quantified and valued in common monetary terms.

25. The costs to be included in the CBA are what is known as resource costs, i.e. the value of the economic resources required to comply with a legislative proposal. These will not always be the same as the financial costs to enterprises, which may include taxes and subsidies. Information on potential costs will usually come from the affected industries or suppliers.

26. Changes to health and safety legislation may also produce benefits to industry, for example, if existing legislation is simplified. These would be quantified in a similar way.

27. Estimating the health and safety benefits involves three steps:
- identification of the types of accident and work-related ill health that the proposed legislation aims to prevent;
- an assessment of the effectiveness of the legislation in preventing these types of accident and ill health; and
- quantification - in terms of fewer accidents or less cases of ill health - and monetary evaluation.

28. In practice, health and safety benefits can be difficult to quantify and value. It is often hard to estimate precisely what the consequences of new proposals will be. Monetary valuation is common practice for the appraisal

of road safety measures in most EU member states [Annex 1 of the report summarises research on this subject]. The use of monetary valuation for the appraisal of workplace health and safety measures can be more complex. However, in the absence of other data, values derived from the traffic sector may be used.

29. Once all the costs and benefits have been identified and valued, they are aggregated and compared. Monetary costs and benefits which fall at different points in time are converted into current values using a procedure known as discounting. The comparison of costs against benefits shows where the balance of advantage lies.

A procedure for the economic appraisal of proposals for European health and safety directives

30. This chapter outlines a general procedure for the assessment of proposals for new EU legislation, using the CBA methodology described in chapter 6. The procedure is designed to improve the quality of assessments, to get more precise data from workplaces, and to ensure that national authorities are involved in the assessment.

31. European level assessments will need to be built up from national-level assessments. But, if the results are to be credible, this requires more than simply adding together assessments produced in individual member states. National-level assessments need to be based upon consistent principles. The exercise also needs to be properly resourced.

32. The report proposes that the Commission manage the process through a series of contracts. The Commission would contract with external bodies in a number of member states, each of which would act as 'national analysts'. These would produce national-level assessments of proposed EU directives. The Commission would also contract with one external body to act as 'co-ordinator' - who could also be a national analyst. The co-ordinator would develop the CBA methodology, check and collate the reports received from the national analysts, and transmit them to the Commission.

33. For a typical directive, this process would take between 4 and 6 months - a stretching but achievable timescale. In order to work efficiently, the co-ordinator would need a clear statement of regulatory aims from the Commission before work could commence.

34. As a final check on the results, the draft assessments should be discussed with national authorities. This is especially important when empirical studies cannot, for practical or financial reasons, be conducted in every member state.

35. The proposed model imposes costs and constraints on the Commission. There would need to be a considerable investment in terms of finance and management time. The requirement for a clear statement of regulatory objectives could also impose constraints on the legislative processs. These need to be set against the benefits of having more comprehensive and reliable assessments of proposals for new legislation.

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Assessing the benefits of safety legislation

The costs of occupational accidents and ill-health are shared between the victim, the employer and the state but the apportionment between the three varies significantly within the European Union. It depends, for example, on the availability of compensation, on social security provisions and on sick pay arrangements.

Nevertheless, the European Commission is obliged to assess the impact on industry of its proposals and is being pressed to improve the quality, and to broaden the scope of, the *fiches d'impact* which have accompanied "COM document" proposals in recent years.

A conference is to be held in Holland in May on the subject (see "Forthcoming events 1997", *ESN*50) and an expert group is being set up by the CEC's Luxembourg committee to discuss the issue. Perhaps the most important source of information available on the subject is an unpublished study jointly prepared two years ago by British and Danish enforcement agency officials which is reported in this issue of *ESN*.

"The economic appraisal of European Union health and safety at work legislation" (by Neil V Davies, Neil Marshall, Philip Macrea and Mark Beatson of the Health and Safety Exective, and Per Lunde Jensen of the Danish Working Environment Service) reviews the literature and describes what EU governments currently do in this area.

In contrast to the *fiches d'impact* which have been prepared in the past, the Davies and Jensen report considers not only the "burdens on business" associated with such legislation but also the "social costs" and, significantly, the benefits stemming from preventive measures implemented by employers complying with the legislation.

Not only have the Commission's impact assessments been one-sided, in that they have been only concerned with impact on one party - industry, but their validity has also been questionable: that prepared in support of the amendment to the use of work equipment directive was based on a general assessment of the directive's impact in only one member state (Italy), for example.

The Davies and Jensen report shows that only Denmark, Sweden, Finland and the UK routinely produce impact assessments for domestic legislation (and in some cases for EU directives) but that interest and expertise is growing in Germany and the Netherlands.

Although it was submitted to the Commission in December 1995 the report has not been published. However, a more extensive three-year, EU-wide collaborative research project has been conceived and tenders for its execution have been invited and received.

Like the Davies and Jensen work, the broader research would not only be concerned with assessing the impact of regulation at the "macro", national economy level but also with the development of methodologies for costing of accidents and assessing the benefits of prevention at the "micro", enterprise level.

(The two key documents produced by the HSE in Britain in this field were the "macro" study, "The costs to the British economy of work accidents and work-related ill health", published in 1994, and the collection of enterprise-level case studies, "The costs of accidents at work" (HS(G)96), published last year.)

The Davies and Jensen report is discussed on page 4 and an executive summary is reproduced in the Documents section on page 10.

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