

OCCUPATIONAL ACCIDENTS IN OECD COUNTRIES

A. INTRODUCTION : HEALTH AND SAFETY AS POLICY CONCERNS

Employment is more than simply a contract to render services in return for payment. In modern industry, it often involves working within an organisation, and hence working under the conditions which that organisation imposes. Too often in the past, these conditions included considerable occupational risk, and indeed a high incidence of workplace injury and death. This chapter presents information on the current-day situation in OECD countries with respect to fatal and non-fatal occupational injuries, i.e. unforeseen and sometimes violent events arising from work situations which may cause cuts, burns, fractures, loss of limb, eyesight or hearing and, in the extreme, of life itself.

The data presented in this chapter indicate that every year, a total of over 10 million occupational injuries leading to absence from work arise amongst the 300 million employees in the OECD area. While the total number of fatalities has been substantially reduced since the late 1960s, more than 14 000 fatal occupational accidents occurred in 1987 — more than 3 000 in the United States, over 2 000 in Japan and around 1000 each in Germany, Italy, Turkey and Spain. Many more accidents result in workers' permanent partial or total disablement, often accompanied by **loss** of work and income.

Somatic and psychosomatic health hazards are increasingly recognised as being inherent to many work processes. Typical occupational health hazards include toxic and carcinogenic chemicals, gases and dusts, often in combination with noise, heat and other forms of occupational stress. Results of exposure to these hazards can be acute or chronic occupational illnesses such as cancer, respiratory disease, heart disease, poisoning or neurological disorders.

In contrast to the immediate effect of workplace injuries, occupational diseases may appear only after considerable latency periods. Furthermore, the prevention of occupational disease is made difficult by the changing character of, and lack of knowledge

about, potential health hazards. There are numerous substances — especially chemicals — that were once thought to be harmless or of manageable danger yet which subsequently have turned out to be major health hazards. The burden of proof as to whether certain diseases are work-conditioned, and what constitutes a “safe” level of exposure to toxic materials, is thus a major issue, handled differently by Member countries' regulatory agencies [Ashford (1976); Kelman (1981); Wilson (1986)]. Occupational accidents and injuries² are more easily grasped by workers, management and regulatory agencies, because links between accidents and death or injury can be more easily established. It is mainly for this reason that much discussion of safety and health problems focused, at least until the 1970s, on safety issues.

Hazardous working conditions affect the labour market in a variety of ways. A low safety and health record of a particular occupation or work task may make it difficult to recruit people for job vacancies in these areas without paying high wage premia. Where hazardous practices become evident, they necessitate the possibly painful choice between continuing work processes that are dangerous to workers or to the general environment and shutting down hazardous production units, thereby creating sometimes considerable and sudden unemployment.

Most occupational safety and health regulation in OECD Member countries is the result of government intervention. A number of countries strengthened relevant laws and regulations during the 1970s, often as part of a general drive towards workplace humanisation. The collective bargaining parties were generally given considerable influence over national standard-setting and inspection procedures. A number of countries also instituted workers' representatives and bipartite safety committees at company level to ensure the better implementation of standards. In addition, in many countries, regulations requiring enterprises to devote resources to safety and health matters were strengthened³. Despite recent calls for cost-cutting regulatory reforms and attacks on “misguided” regulation, inspired by the argument that the

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Occupational disease and injury are part of the human and social costs of production. These are primarily the suffering and possibly life-long disadvantages of affected workers and their families. Furthermore, a large number of studies have demonstrated the high economic cost of accidents borne by enterprises and governments. Direct costs for enterprises, such as material damage and down-time, and financial losses through experience-related insurance premia and a share of the medical expenses, are obvious. In addition, hidden *costs*, such as overtime work made necessary by accidents, retraining expenses and intangible factors such as loss of company prestige and deteriorating industrial relations, may have a substantial impact on the quality and profitability of production. Some authors estimate these hidden *costs* for enterprises at several times the direct costs [Andreoni (1986); Heinrich, Petersen and Roos (1980); Celebrezze (1987)].

Taking into account three overall cost factors — consequential expenditure due to injury as well as to material damage; production losses; and administrative costs — total economic costs of work accidents for society have been estimated as ranging from around 1 per cent of gross domestic product in the United Kingdom and the United States to a little above 3 per cent in France, without even accounting for expenditure on prevention [Andreoni (1986), p. 126]. Using a different measure, studies by the International Labour Office have shown a ratio of accident insurance expenditure to total social security expenditures of between 3 and 7 per cent [Andreoni (1986), p. 104].

The costs of accidents may be distinguished from costs of accident prevention. These include the work of staff administering and enforcing safety legislation, the financial cost of expenditure on safer equipment, and possible losses of productivity that may arise through constraints on working methods introduced for safety reasons. A rational accident-prevention policy is, of course, one whose costs are more than compensated by a reduction in the costs associated with actual accidents, such as loss of quality of human life and expenditure on treatment and rehabilitation. There is widespread agreement in OECD Member countries on the need for government regulation to play a major role in this area; in fact, protection against work accidents has historically tended to be the first area of government intervention into the workplace. Such intervention has been based on the belief that the predominance of the private market would lead to socially unacceptable levels of occupational injury, disease and death.

There continue to be, however, sharply differing views among social scientists and safety experts concerning the extent to which market forces can be relied on to regulate occupational safety and the optimal extent of government control. Using a market paradigm, a number of authors criticise regulatory agencies' alleged failure to weigh sufficiently the costs imposed by their standards and ask for the substitution of economic incentives for state regulation. For example, it has been suggested that a special tax on injuries would prove superior to a reliance on standards and inspection. Another major economic incentive may be provided by strengthening the "experience-rating" of firms, i.e. the setting of workmen's compensation insurance premia according to company safety records [Butler and Worrall (1986); Mendeloff (1979); Thompson (1981); Viscusi (1983)].

As several authors point out, theories favouring the private market for safety are based on unfulfilled assumptions. First, firms frequently do not have sufficient knowledge about the hidden costs of accidents to enable proper cost-benefit accounting. Nor do they typically have enough experience with fatalities to be able to take preventive measures in all necessary areas. Workers are also likely to underestimate the full costs of accidents, thus reducing the significance of the safety professional's slogan that "safety pays" [Mendeloff (1979); Ashford (1976); Kclman (1981)]. In particular, younger workers may take higher risks because of increased pay, neglecting safety precautions in the process. The long-term costs of the accidents which result can be particularly high, and will inevitably be borne in part by the families of these younger workers and by society at large.

Another major feature of the market paradigm seems equally questionable, i.e. the notion that "risk premia" fully compensate workers for additional hazards, while inducing employers to institute adequate safety measures. In a society with no social provisions, such risk premia could be argued to be the method by which the market "regulates" safety [Olson (1981); Sider (1985); Biddle and Zarkin (1988)]. However, once societies provide care for individuals who are partly or totally incapacitated — a situation typical of OECD countries — risk premia agreed between employers and employees will no longer reflect the full cost of injuries.

cost of regulations outweigh their benefits, this process has not been reversed to date. The accompanying note on the Economics of Occupational Safety addresses these issues further.

This chapter presents available data on the evolution of occupational injuries in OECD Member states over the last several decades. Section B considers the available statistics, and outlines some of the wide differences in concepts used and data gathered among Member countries, which have the effect of severely limiting comparability. Section C outlines the evolution of fatal and non-fatal injuries, drawing together available data on the incidence and severity of injuries, broken down by industry and other categories, where available. Finally, section D summarises the main findings and conclusions. It is intended to continue the analysis of occupational safety and health in the *1990 Employment Outlook*, which will discuss the evolution of occupational diseases and major trends in safety and health regulation.

B. PROBLEMS OF COMPARISON THE DATA AND THEIR LIMITS

Occupational accident and disease prevention requires the availability of consistent, comparable information on the intensity and incidence of occupational injuries and diseases occurring within countries. Such comparative information can help countries to identify successes and failures of their safety and health policies, to target major remaining problem areas, and to make informed decisions about the channelling of resources.

International recommendations

A number of International Conferences of Labour Statisticians held by the International Labour Office (ILO) — most recently the 13th Conference of 1982 — have called for the establishment of an adequate statistical basis for the analysis and measurement of occupational injuries and diseases. The ILO has, for example, recommended that countries regularly classify accidents in a variety of ways, such as by industry division, occupational status, duration of incapacity, etc. [ILO (1988)]. Similar, though less detailed, guidelines have been developed by the OECD as part of a list of Social Indicators which was approved by the OECD Council in November 1980 [OECD (1982)].

In spite of such efforts to standardize concepts and classifications, there remain large cross-country differences — and frequent intra-country discrepan-

cies — concerning the scope and coverage of occupational injury and disease statistics. On the whole, these data are undoubtedly less developed than some other labour statistics, such as those on the labour force, employment and unemployment.

The difficulties involved in harmonizing safety and health statistics may be illustrated by the experience of the European Community. Two EC Programmes of Action on Health and Safety have, *inter alia*, called for special efforts towards achieving greater comparability. The Division for Health and Safety within the Directorate for Employment and Social Affairs, as well as the European Foundation for the Improvement of Living and Working Conditions, are working towards this goal. However, Member countries frequently continue to follow their established ways of data gathering and reporting, and the situation seems to be improving only slowly, if at all.

Sources of statistics

A main reason for cross-country differences in the type of statistics available is their close relationship to national methods of record-keeping and organising worker protection. With few exceptions, the statistics are a by-product of administrative work processes and regulations. The following are some of the major areas where cross-country differences arise.

In large part, data on occupational injuries and diseases are collected and published via insurance companies and social security agencies. This situation leads to a variety of data limitations. First, in general only compensated injuries are covered by the statistics and many minor injuries — knowledge of which could be equally important for the development of preventive policy — are not registered. Second, insurance companies — especially those that combine health and accident insurance — may not be sufficiently precise in differentiating occupational injuries, diseases and sickness absenteeism, because these categories may be treated alike in terms of compensation. This is less the case in countries such as Austria, Germany, Italy and Switzerland, whose injury compensation schemes are separate from general health insurance. Third, changes in the organisational set-up of insurance systems or in the amount of compensation available to accident victims may have direct consequences for a country's reported number of occupational injuries⁴.

In addition, insurance agencies — often with particular historic jurisdictions — adhere to those traditional jurisdictions in their statistical reporting and data gathering, and so continue to compile statistics for industry divisions or worker collectives that are often not comparable and not consistent with the

International Standard Industrial Classification (ISIC) (examples of such agencies are the *Berufsgenossenschaften* in Germany and the *Comités Techniques Nationaux* in France). Some industries, such as agriculture, shipping or public administration, may be covered only partly, or not at all, by national insurance schemes; accidents occurring in these industries may subsequently be only partially counted.

In some countries, such as the United Kingdom, labour inspectorates serve as the principal data-collecting agency. Where inspectorates are only an auxiliary source of information, and injury and illness are, in theory, reportable both to them and to the insurance agencies, important data disparities often arise, partly due to widespread ignorance about reporting requirements. In Germany, for example, only half of the injuries handled by insurance agencies are also recorded by the labour inspectorate [Mertens (1984)].

In Japan and the United States, surveys on occupational injuries and diseases are conducted by statistical offices. While this method may represent a more accurate approach than the others mentioned above, the comparability of such survey data is limited by omissions from the sampling frame, such as the omission of establishments below a certain size (for example 100 employees in Japan and 11 employees for agriculture in the United States).

Coverage and classification

Statistical comparability is also severely hindered by the different extent to which people employed are covered by national reporting systems. Published statistics may cover from half, or even less, of civilian employment (Greece, Italy and Turkey), to as much as 90 per cent or more (Austria, Germany and Sweden). Coverage is often nearly total in mining, manufacturing and construction (at least for wage- and salary-earners), yet low in agriculture and the tertiary sector.

Whereas in some countries the self-employed may seek insurance in public insurance agencies — and their accidents and diseases are thereby recorded — in others all employers, the self-employed, and/or trainees may be omitted from records through not having such insurance. In all countries, this is likely to be so for the marginally employed without a proper work contract. The problem raised by the exclusion of the self-employed is an important one for the construction and transportation industries; however, it is especially acute in the agricultural sector where, in most Member countries, the bulk of the working population consists of independent farmers and unpaid family workers. Also, the treatment of mem-

bers of the public who are involved in a work-related accident (for example when passing a construction site) may vary. In the United Kingdom, for example, they **are** counted should they be fatally injured, but not otherwise.

Countries **also** differ as to what are considered to be reportable or notifiable occupational accidents. While in some countries, such as Belgium, Spain and the United States⁵, reporting of all accidents which have caused injury is required, in others accidents are counted only if they have caused worker incapacity for a specified number of days (such as 1 day or more in Denmark, France, the Netherlands and Portugal, or 3 days or more in Germany, Italy and the United Kingdom). In addition, some countries may include accidents occurring on the way to and from work, while others exclude or list separately such “in transit” occurrences. A similar problem arises with traffic accidents during working hours, which are excluded, for example, in the United Kingdom although they cause everywhere a considerable number of occupational injuries, especially of fatalities.

In addition, a number of other social and psychological factors which influence occupational injury statistics should be noted :

- employers may fail to notify the appropriate authorities, fearing either increased inspection activity or rising insurance premiums ;
- in certain enterprises, competition between departments for the “safest” production record may lead to under-reporting ;
- workers may not report injuries because they **fear loss** of attendance bonuses, or other personal **disadvantages**, such as becoming prime candidates for redundancy [Opfermann (1985)].

The 1990 *Employment Outlook* will address the even greater limits to data Comparability across countries which seem to apply to occupational diseases. Above all, there **is** no consensual definition of what constitutes an occupational disease — just as indeed the medical profession itself differs over the exact definition of “health” and “illness”. The remainder of this chapter examines occupational injury data.

C. THE EVOLUTION OF OCCUPATIONAL INJURIES

1. Comparative measures

For an analysis of the evolution of occupational injuries over time, merely looking at declines or increases in terms of absolute numbers is clearly insuf-

ficient. As was pointed out in an ILO resolution on the subject, sound comparisons can be made only if numbers of injuries are considered in conjunction with other factors such as employment, hours of work, production volume, etc. [ILQ (1988)]. It is therefore necessary to resort to relative measures such as incidence, frequency and severity rates.

Incidence rates show the proportion of employed persons suffering from occupational injuries during a given period. The most common measure used by Member countries is the rate per 1 000 workers. This carries, however, the disadvantage that no dimension of working time is included in the measure, and differences in contractual work time, the spread of part-time work, the amount of overtime working, or the average length of vacation periods are not considered. If, for example, a relatively large number of part-time workers performs a given volume of work, the injury rates per 1 000 employees will be correspondingly low.

Theoretically, a frequency rate which measures the number of injuries relative to the length of time that workers are exposed to risk, will more accurately present comparative levels. Countries that calculate this, such as Belgium, Japan and Sweden, typically present the rate in terms of occurrences per one million working hours. However, in most countries complete information on hours worked is not available, especially within agriculture and parts of the service sector. In addition, the measure of working hours in the denominator is more difficult to visualise than the relation between injuries and average total employed.

An incidence rate that does contain a dimension of working time is the rate per 1 000 "full-time equivalent" workers, as calculated, *inter alia*, by Germany, Italy, Switzerland and the United States. In this concept the overall number of employed is recalculated on the basis of a fictional full-time worker who works, for example, 50 weeks at 40 hours each (such as in the United States) or a total of 1 620 hours yearly (such as in Germany since 1986).

Incidence and frequency rates treat all occupational injuries alike. However, clearly a small number of relatively severe occupational injuries may still lead to greater amounts of time lost. The severity (or gravity) rate assesses the extent to which this occurs by measuring the amount of time lost due to injuries as a proportion of time worked or the number employed. A number of OECD Member countries measure this by the number of workdays lost per 1 000 workers⁶. Another type of severity index used by Member countries is the average number of working days lost per injury. Finally, information is available in some countries on the number and extent of

recognised and compensated work disabilities resulting from occupational injury. While there are wide differences in national practices of compensating disabilities, these measures are helpful in providing an indication of whether the seriousness of occupational injuries is declining or increasing.

2. Occupational fatalities

a) *The evolution of occupational fatality rates*

This subsection considers the evolution of fatal occupational accidents in OECD Member countries. As mentioned above, over 16 000 fatal accidents are reported yearly in Member countries. While this figure remains high, it appears to represent a considerable improvement over the situation in the 1950s and 1960s, when it was closer to 25-30 000. Further, most data **show** a declining proportion of occupational fatalities among total fatal accidents, a large majority of which occur at home **or** on the road⁷.

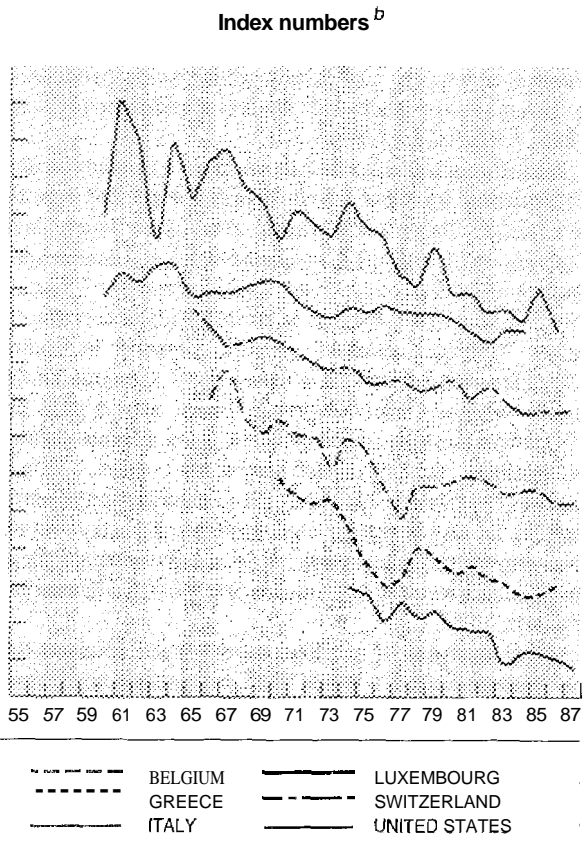
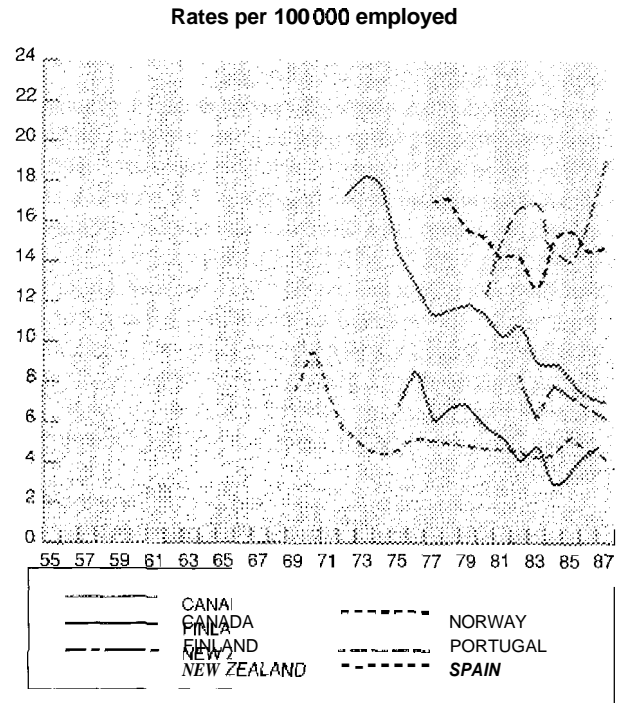
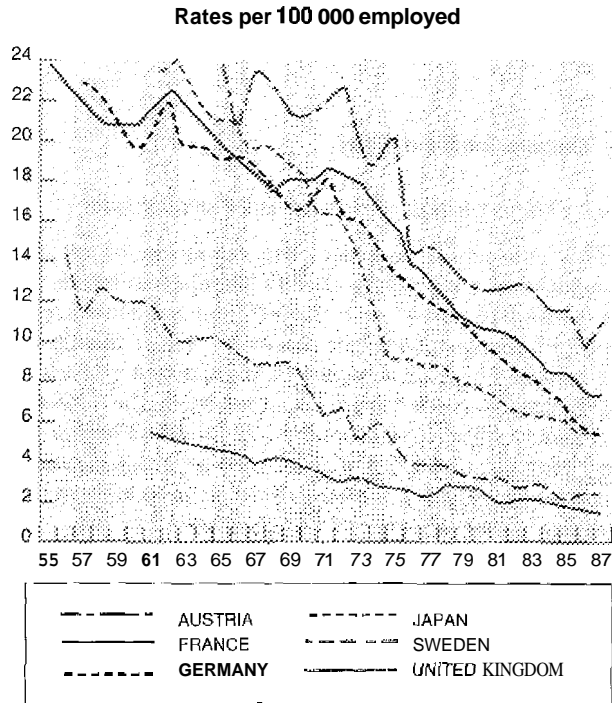
Occupational accidents in general, and fatal accidents in particular, can be grouped according to a variety of causal factors. First, many material features of working conditions present safety risks by not being sufficiently adapted to workers' physical and mental capacities. For example, heavy physical work and strenuous working positions may combine to produce early exhaustion and fatigue. This in turn reduces vigilance and increases reaction time — factors that become especially important when work processes are bound **to** the pace and rhythm of machines [Clerc (1985); ANACT (1980)].

Second, organisational factors play a major role in determining accident levels. Fragmented and repetitive tasks, short cycle times and piece work can combine with long and irregular working hours and inadequate rest to produce "accident-prone" situations. In addition, systems of remuneration can affect safety. "Danger money" is still common in some industries, where workers striving to increase their wages volunteer for dangerous tasks, and if paid in proportion to their speed of work, may neglect safety precautions for personal monetary gain. Thus, changes from piece-rate systems to monthly payment, such as in the Swedish iron mining industry, have been shown to reduce serious accidents because they tend to lead to a reduction of work pressure [Faverge (1983)].

Many analyses of accident causes have focused on the "human factor". While there are indeed causative features related in large part to the individual, such as lack of experience, youthful attitudes or carelessness, some theories of accident proneness that put

Chart 4.1

OCCUPATIONAL FATALITY RATES^a



a. Rates are shown as incidence rates per 100 000 employed, with the exception of Belgium for which frequency rates per 1 million working hours are given. In the main, data refer to employees only although for Austria, Canada, Germany, New Zealand and for the agricultural sector in Italy, varying proportions of the self-employed are contained in the statistics. In Germany, Switzerland, the United States and for private industry in Italy, rates are calculated on the basis of 100 000 "full-time equivalent" workers.

b. Each interval on the vertical scale represents a change in the occupational fatality rate of 20 per cent. Indices are graphed at different levels for presentational purposes only.

Sources : Data were taken from annual publications by insurance agencies or labour inspectorates or were communicated by national authorities. See Annex 4.A for detailed country sources and further definitions.

the main focus on the properties of individual workers, appear to be exaggerated. Accidents usually result from a combination of factors, and often involve a complex relationship between man and machinery. An ILO summary of the accident literature, while acknowledging the human element in safety, concludes that accidents are in large part the product of poorly-designed work tasks, hazardous lay-out or inadequate maintenance, rather than "accident-prone" workers [Cazamian (1983) ; Chhokar (1987)].

Against this background, consider the evolution of occupational fatality rates over the last two decades, shown in Chart 4.1 for the majority of OECD countries. The rebuilding of the productive apparatus, rapid economic growth and increasing mechanisation of the post-war period produced rising numbers, as well as rates, of occupational fatalities almost everywhere, with high plateaus often being reached in the 1950s and early 1960s (for example, between 1955 and 1965 Japan recorded around 6 000, Germany around 5 000 and France and Italy around 2 500 fatalities on a yearly average). However, the period since the late 1960s has, almost without exception, been characterised by considerable declines.

While the first two diagrams in Chart 4.1 show actual rates for a number of countries, in the third only index numbers are given, thereby showing the growth or decline of fatality rates relative to countries' respective base year. The first two groups of countries include close to or above 90 per cent of employees in their statistical base, while the others have a sometimes considerably lower proportion of their employees covered by their reporting or data-gathering system. Typically, workers in the tertiary sector, where a smaller number of fatalities occur — but also those in agriculture, where the opposite is the case — are to varying extents neglected by countries in the latter group. They were therefore judged to be countries for which the magnitudes of the rates were not comparable.

There also remain important problems of comparability for countries shown in the first two diagrams, due to differing degrees of under-reporting and conflicting definitions of what constitutes an occupational fatality. Whereas some countries consider as fatal only those accidents which lead to immediate death, others may record deaths which occur up to one month or one year after the accident, or even regardless of the lapse of time. In France and Germany, for example, accidents are classified as fatal if the victim dies before a decision is made on the award of a pension. This produces a variable time limit, and hence inconsistencies in tabulation.

For these reasons, caution has to be observed when trying to derive judgements on countries' relative

safety performance from comparisons of the rates given. In 1965, country rates showed between 5 and 24 occupational fatal accidents per 100 000 workers ; in 1987, there remained a range of rates from 2 to 19 per 100 000. Such marked differences seem surprising, and may not in all cases accurately reflect reality, due to varying reporting accuracy and classification methods. However, it is likely that at least some of the wide inter-country divergences reflect real differences — which are in turn the product of factors such as predominance of specific industries, establishment sizes, safety standards and national enforcement effort.

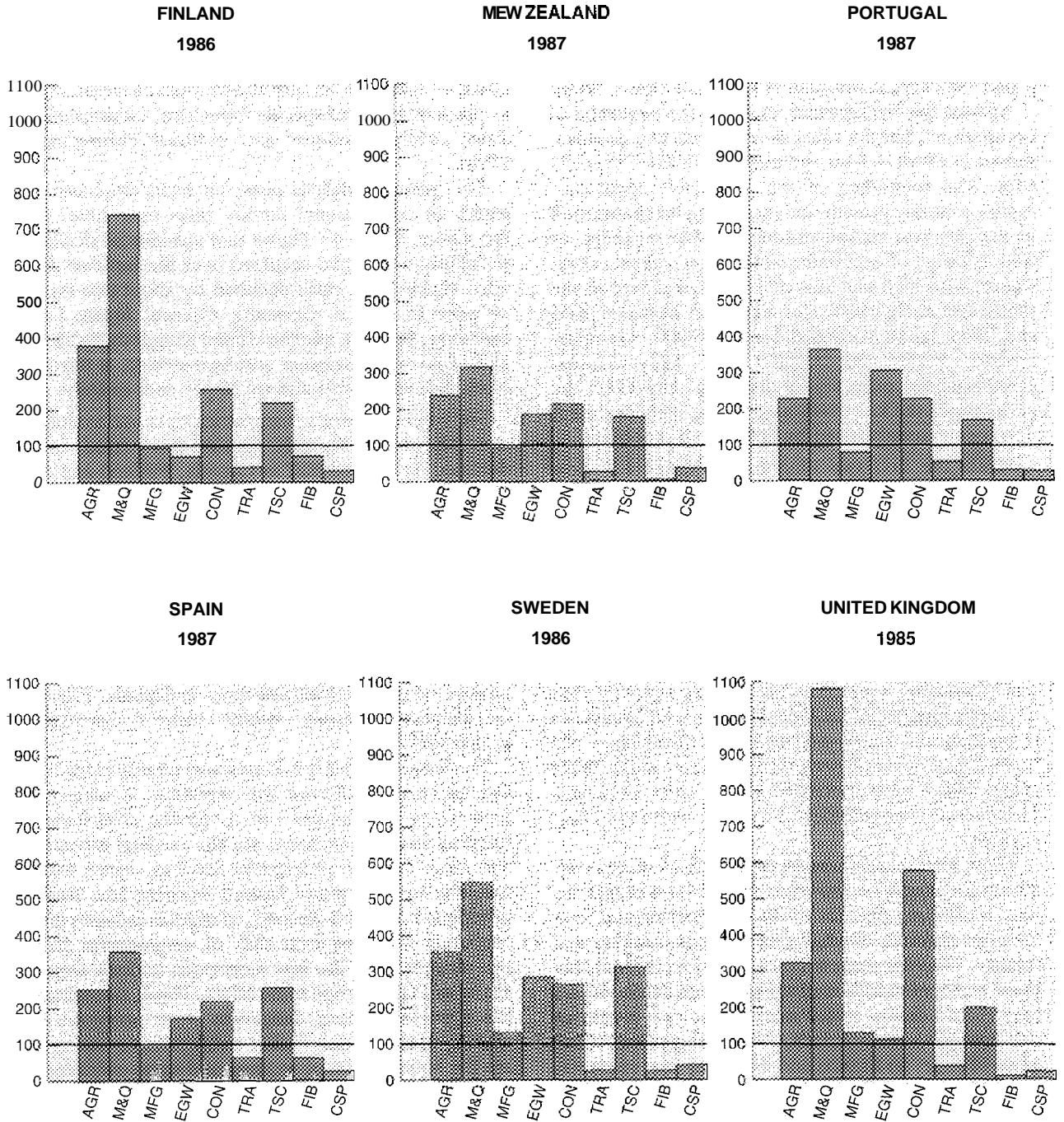
The present analysis puts the main emphasis on trends in occupational fatality rates over time. On the whole, Chart 4.1 shows that substantial declines in fatality rates have occurred over the last two decades. Since 1965, rates declined by about two-thirds or more in France, Germany, Greece, Japan, Luxembourg, Sweden, and the United Kingdom, by about half in Austria, Belgium and Switzerland, a third in Norway (since 1969) and by 20 per cent in Italy.

For some countries, time-series data are available since the mid-1970s only. During this period, rates declined by around half in Canada, Finland and the United States⁸, and by more than 10 per cent in Spain. It has been suggested that declines in fatality rates are now levelling out after these considerable declines have been achieved [Clerc (1985)]. This hypothesis would seem substantiated at least in part by slowing declines, stagnation or even a temporary reversal of fatality rates during the 1980s in such countries as Finland, Italy, Portugal and Spain. However, continuing or even accelerating declines in Canada, France, Germany and Japan render such a conclusion premature⁹.

The large declines in occupational fatality rates over the last two decades are not surprising. A variety of factors may be singled out as having contributed. Possibly first among them are the medical advances and more efficient emergency services, which today save the lives of many injured workers who would otherwise have died. Second, changes in industry mix, especially the long-term shift of employment from the secondary to the less hazardous tertiary sector, are bound to have had some effect. Third, automation has eliminated many dangerous work processes by making human intervention unnecessary ; examples are the robotisation of welding and spray-painting in manufacture¹⁰. Very probably, the increased sophistication of machinery has also increased the effectiveness of safety devices. As a general tendency, "built-in safety" at the design stage of plant and equipment, as well as ergonomic aspects of workplace design, are today given increasing weight.

Chart 4.2

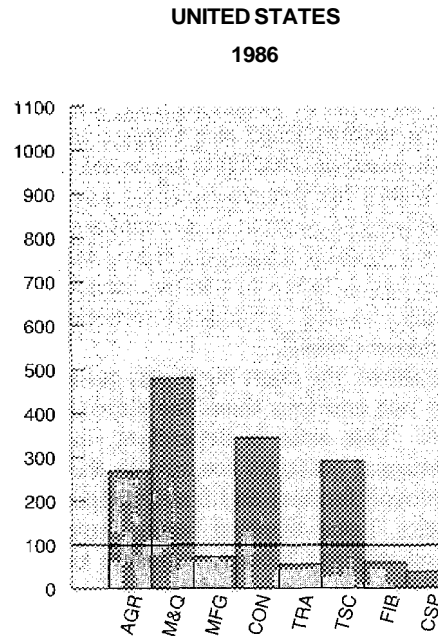
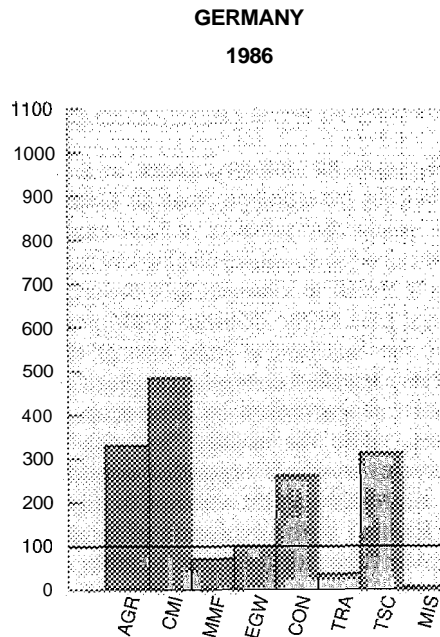
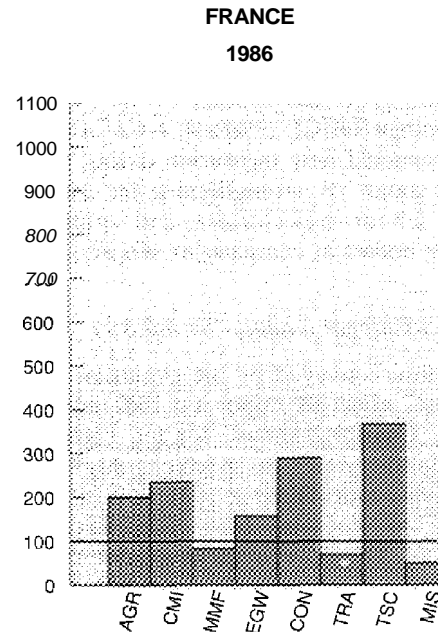
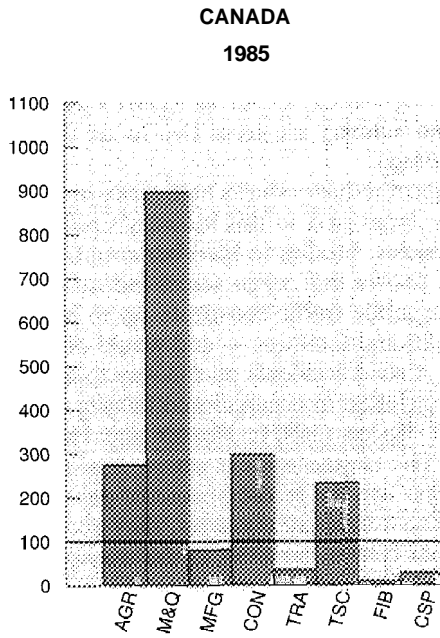
RELATIVE FATALITY RATES BY INDUSTRY ^{a, b}



AGR = Agriculture, hunting, forestry and fishing
 M&Q = Mining and quarrying
 CMI = Coal mining
 MFG = Manufacturing
 MMF = Metal manufacturing
 EGW = Electricity, gas and water
 CON = Construction

TRA = Wholesale and retail trade and restaurants and hotels
 TSC = Transport, storage and communication
 FIB = Financing, insurance, real estate and business services
 CSP = Community, social and personal services
 MIS = Miscellaneous services

Chart 4.2 (continued)



a. Ratios of individual industries to all-industry averages, which are shown as 100. Ratios are given for employees only, with the exception of Canada, Germany and New Zealand, for which varying proportions of the self-employed are contained in the statistics.

b. For the majority of countries shown, industries refer to the categories of the International Standard Industrial Classification of Economic Activities (ISIC).

In Canada and the United States, the industry "electricity, gas and water" is contained in the industry "transport, storage and communication". In France, hotels and restaurants are excluded from "wholesale and retail trade", and "miscellaneous services" refer to the insurance branch "interprofessionnel". In Germany, "miscellaneous services" refer to health and welfare services only.

Sources : See Annex 4.A for detailed country sources and further definitions.

A growing awareness of occupational hazards and the need for preventive measures have contributed to the move towards new forms of work organisation which increase worker autonomy and reduce their dependency upon machine pace and rhythm". In addition, workers' views concerning lay-out and the adaptation of equipment to human needs are increasingly taken into account in workplace bargaining and participation processes around the introduction of new technology [OECD(1988e)]. A majority of countries also enacted new legislation during the 1970s, tightening standards, strengthening the enforcement powers of labour inspectorates, and setting up new monitoring bodies at company or shop-floor level.

b) Occupational fatalities by industry

The picture conveyed by the evolution of overall fatality rates conceals important differences across industries. Chart 4.2 shows, for ten countries, the ratios of fatality rates in specific industries to the overall fatality rate (taken as 100). Several industries are seen to contain high occupational risks everywhere¹². These are, in varying order, the mining, construction, agriculture and transport industries.

Historically, mining has been one of the most hazardous industries. That it continues to be so is illustrated by the fact that its fatal injury rates are consistently between three and eleven times the national average. A host of factors, such as the extent of employment in underground vs. surface mining, and, within the former, mineral formation, depth of mine, and even the type of coal extracted (bituminous, anthracite or lignite) affect risk levels¹³. With about 20 deaths at work per 100 000 employees in the last year for which a breakdown by ISIC was available, 1985, the difference relative to national averages was highest in the United Kingdom; this after the rates having been much lower in the two previous years, due, in part, to the prolonged national miners' strike [Goddard (1988)].

For agriculture, the chart highlights industry ratios of between two and four times the national average fatality rate. This ratio is dependent, in part, on different national practices concerning the inclusion of self-employed farmers and family helpers in accident statistics. Long working hours, inexperienced seasonal and migrant labour, exposure to weather and temperature extremes and remote and isolated workplaces contribute to high fatality rates in this industry. As data from, *inter alia*, Canada, New Zealand and the United Kingdom show, at the 2-digit-level, forestry and logging appear to be often considerably over-represented among agricultural fatalities.

Similar factors may explain, to some extent, the

comparatively high fatality rates in construction :*inter alia*, seasonal and casual labour, exposure to weather and the transient nature of work sites. In addition, measures at construction sites to control safety hazards are never permanent; they disappear when the site is closed. Falls from heights and electrocutions are among the most common among specific causes for occupational deaths in construction [ILO(1987b)]. Among the countries shown in Chart 4.2, fatality rates for this industry are from two to six times the national average.

The transport industry shows high ratios in all countries, due in large part to this industry's reliance on highway vehicles. Studies in Member countries have consistently shown that, even across industries, fatal accidents in public traffic constitute up to one-third of all occupational fatalities — and would often constitute half, if road accidents on the way to and from work were included in occupational fatality statistics [Cotter and Macon (1987); Henter and Hermanns (1987)]. In the United States, where over-the-road motor vehicles are the leading cause of deaths in all but one of the 8 industry divisions, they account for around 60 per cent of fatalities in the transportation industry [U.S. Department of Labor (1988)].

Compared with these industries, rates in manufacturing are close to the national average in all countries¹⁴. The remaining industries in the service sector consistently show rates below average. On the basis of these data, there seems sufficient reason to assume that fatal accident rates will continue to decline, as the process of tertiarisation continues — quite independently of safety efforts within individual industries.

The information by industry given in Chart 4.2, together with that on trends in overall fatality rates in Chart 4.1, raises the question of how much of the overall declines is due to improvements within industries, and how much to changes in industry composition. At least part of the declines could perhaps be explained by the fact that at least two of the "high risk" industries identified above (agriculture and mining) have been characterised by long-term employment declines, while the usually "low-risk" service industries have everywhere expanded considerably.

Table 4.1 represents a first attempt to answer this question by looking at the evolution of fatality rates by industry over time, for a limited number of countries. While the limits to comparability of absolute levels should be kept in mind, and industry categories do not always conform to the International Standard Classification, the chart shows considerable declines not only for total rates but for all industry rates, except for agriculture in Italy. Among the four high-risk industries, declines were especially notable for con-

	France			Germany			Italy			United Kingdom		
	1965	1975	1987	1965	1975	1966	1965	1975	1984	1965	1975	1985
Total	19.9	15.9	7.6	19.2	13.5	5.5	22.0	20.4	18.2	4.6	2.9	1.9
Agriculture		34.4	12.7	47.1	41.0	17.8	12.1	19.4	16.9	..	11.7	6.0
Mining and quarrying ^b	60.2	37.4	22.0	66.9	38.8	26.5	42.5	35.3	..	..	24.7	20.1
Manufacturing ^c	14.2	10.1	5.9	12.8	10.2	4.1	11.0	7.8	4.4	..	3.7	2.4
Electricity, gas and water	23.0	13.7	9.6	13.7	10.0	5.7	27.9	12.9	..	..	..	2.0
Construction	51.1	43.5	21.4	30.2	25.7	14.4	81.7	52.7	24.1	..	17.7	10.5
Trade ^d	11.4	8.8	6.0	9.4	6.7	2.2	..	..	..	..	..	0.7
Transport	53.1	50.0	32.7	57.0	32.6	17.1	41.0	33.6	2i.4	..	..	3.6
Services ^e	..	..	..	3.2	2.2	0.3	..	..	..	..	..	0.3

struction in Italy, for mining in France, and for transport in Germany, while they stayed below average for mining in the United Kingdom, construction in Germany and for transport in France. Whereas in 1965 more than 1 out of 2 000 workers per year were killed on the job in mining and transport in Germany; construction in Italy; and construction, mining, and transport in France, such risk levels are no longer encountered in any of the countries shown. In sum, the data seem to indicate that much of the overall decline in fatal accident rates is due to improvements within industries.

Generally, the data are not complete or consistent enough to enable the standardization of national fatality rates for changes in industry mix. However, an analysis for Germany based on the partially incomplete data contained in Table 4.1 indicates that the shifts in the industry pattern of employment since 1965, without any change in the sector-specific fatality rates, would by 1986 have reduced total fatalities by about 25 per cent. While this is important, it contrasts with a fall in the average fatality rate by a factor of nearly 4. Thus, of the total fall in fatality rates, shifts in employment patterns account for about one-fifth and other factors for about four-fifths. Statistics for France, which are less complete, show a similar pattern.

Chart 4.3 gives an indication of which specific industries show the greatest shares in the distribution of fatal occupational accidents across all economic activities. For each country, the four "high-risk" industry divisions and manufacturing are shown. In all countries, with the exception of France, these industries contain more than 70 per cent of all occupational fatalities.

It is not surprising, first, that manufacturing shows a high share of fatalities. Given that it is everywhere the industry with the highest employment share outside the tertiary sector, it will for that reason alone **also** have noticeable fatality shares, even though its fatality *rate* may not be above average. Outside manufacturing, many countries are characterised by high proportions of occupational deaths in agriculture, construction and transport, which far exceed these industries' specific employment shares. In all likelihood, agriculture's share would be larger in countries such as France, Portugal, the United States and especially Turkey, were it not that the data refer only to wage- and salary- earners or, in the case of the United States, exclude agricultural establishments with fewer than 11 employees¹⁵. Finally, the high shares held by transport in Norway¹⁶, by mining in Turkey and by construction in Japan point to industries for which improved safety precautions might be particularly effective in reducing overall accident rates.

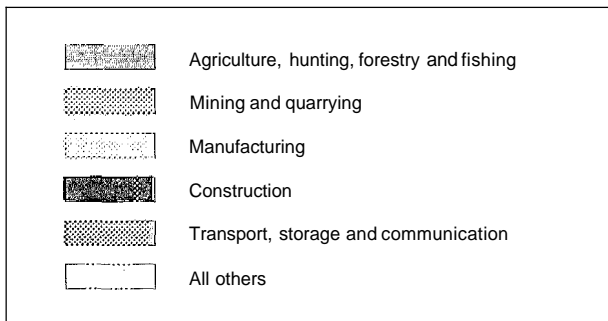
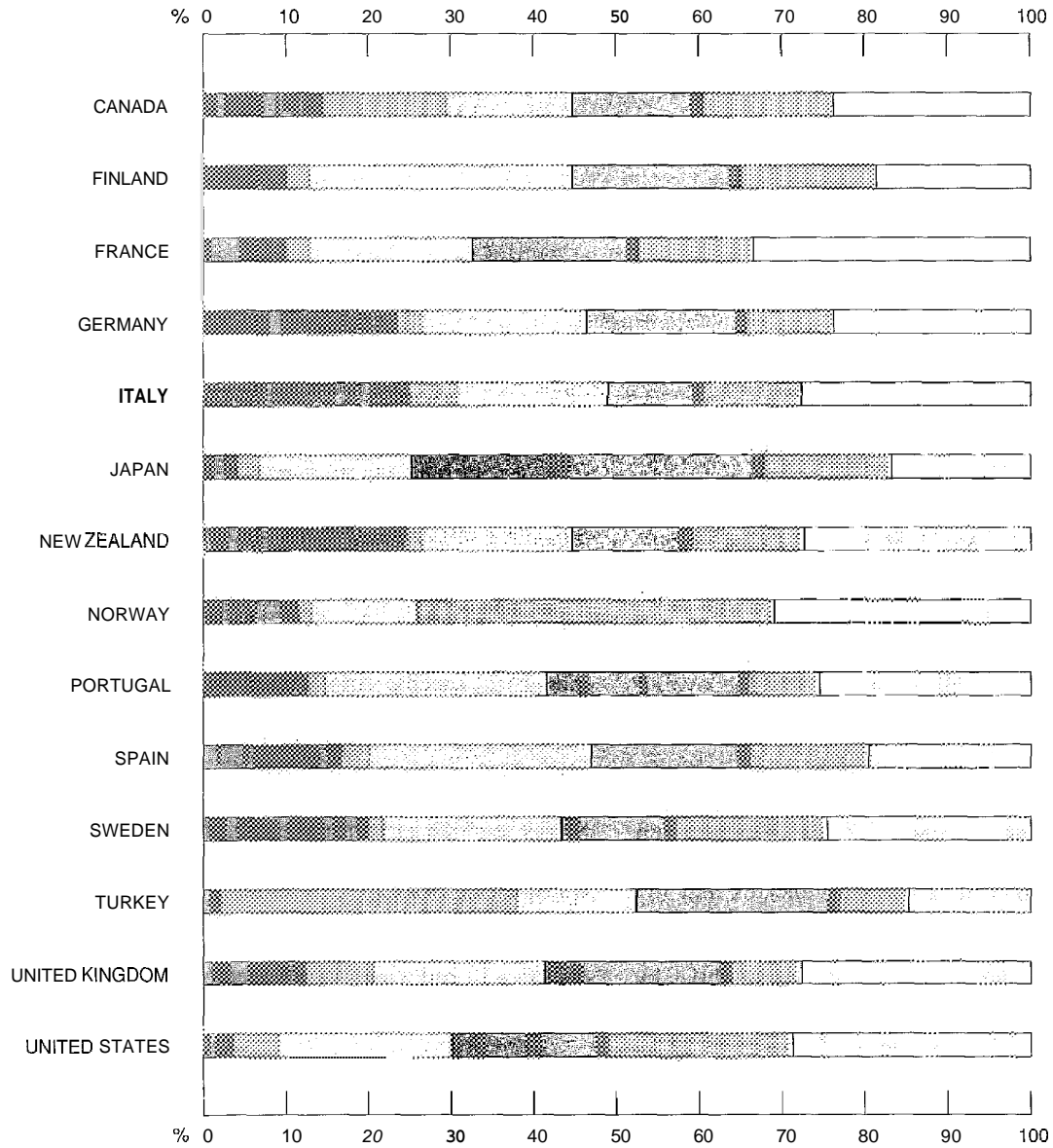
3. Occupational injuries

a) *The evolution of occupational injury rates*

This subsection considers the evolution of overall occupational injury rates in Member countries. As was the case *for* fatal accidents, in a number of countries high plateaus of overall injuries were reached during the post-war years of high economic growth. In Germany, for example, the number of reported injuries requiring an absence of three days or more almost tripled between 1949 and the early 1960s. For almost two decades after 1955, absolute numbers

Chart 4.3

SHARES OF INDUSTRIES IN OCCUPATIONAL FATALITIES^{a, b}



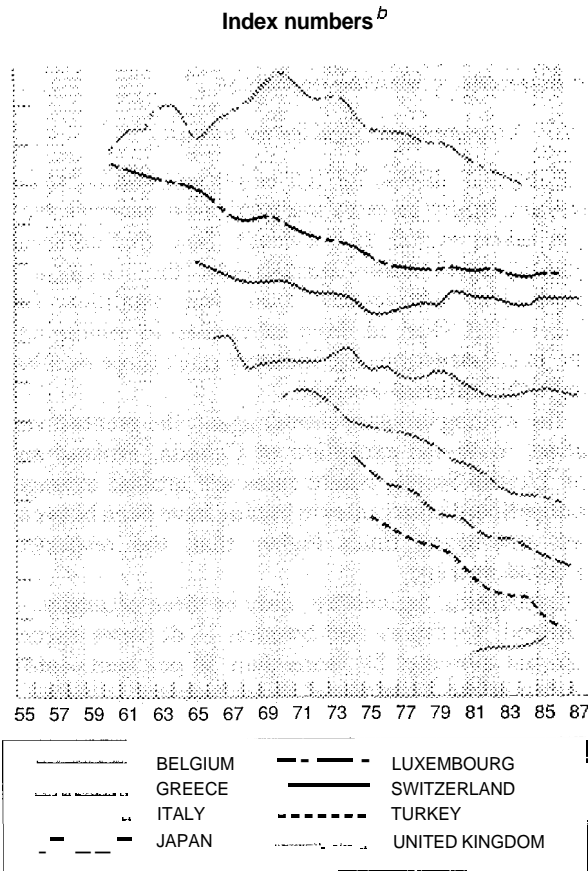
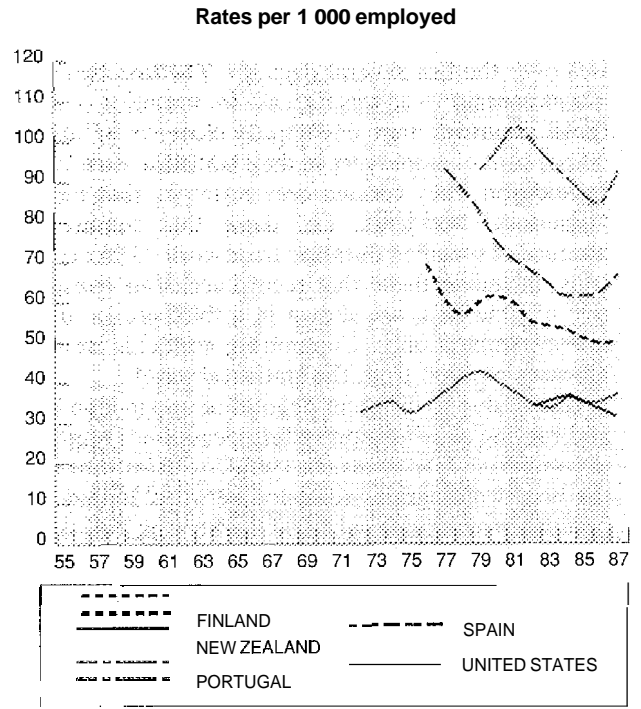
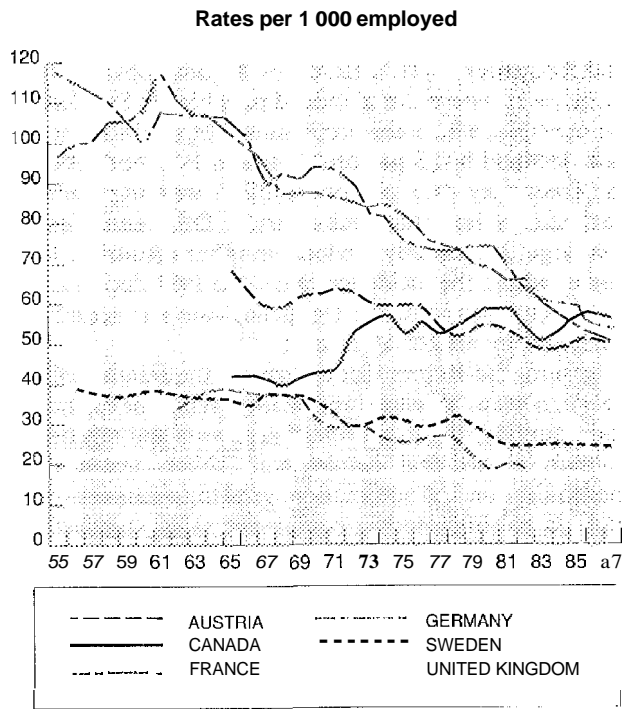
a. For Canada, Germany, New Zealand, Sweden, the United Kingdom and the agricultural sector in Italy, data are based on total civilian employment. For all other countries, data refer to fatal injuries among wage and salary earners.

b. Data refer to 1984 for Italy and Sweden, to 1985 for Canada, France and the United Kingdom, to 1986 for Finland, Norway and the United States, to 1987 for Germany, Portugal and Spain and to the period from April 1987 to March 1988 for New Zealand.

Sources : See Annex 4. A for detailed sources and further definitions.

Chart 4.4

OCCUPATIONAL INJURY RATES ^a



a. Rates are shown as incidence rates per 1000 employed, with the exception of Japan and Belgium, for which frequency rates per 1 million working hours are given. In the main, data refer to employees only, although for Austria, Canada, Germany, New Zealand and for the agricultural sector in Italy, varying proportions of the self-employed are contained in the statistics. In Germany, Switzerland, the United States and for private industry in Italy, rates are calculated on the basis of 1000 "full-time equivalent" workers.

b. Each interval on the vertical scale represents a change in the occupational injury rate of 20 per cent. Indices are graphed at different levels for presentational purposes only.

Sources: Data were taken from annual publications by insurance agencies or labour inspectorates or where communicated by national authorities. See Annex 4A for detailed country sources and further definitions.

remained above a level of two million yearly. Similarly, the absolute number of time-loss accidents in France passed the 1-million mark in the early 1950s and stayed way above that level for a considerable time.

Chart 4.4 shows the evolution of occupational injuries over the last several decades. The first two diagrams contain — as was the case for fatalities — only those countries that encompass close to or above 90 per cent of employees in their statistical data base. In addition, they contain only countries that record “time-loss” accidents, i.e. those that require an absence of specified duration from work. Other countries, including those that record accidents irrespective of time loss, are shown in a third group, using index numbers only. Commuting accidents were in all cases omitted from the statistical base¹⁷.

Again, due to different degrees of under-reporting and varying classification systems, caution is required in comparing *rate* levels. In 1965, countries shown in the first two diagrams recorded between 36 and 106 occupational injuries per 1 000 workers; in 1987 there remained a range from 25 for Sweden to 96 for Portugal. However, most of these countries today report occupational injury rates of between 30 and 70.

As for fatalities, the main emphasis of comparative analysis in this subsection is on trends over time. As the chart highlights, since the mid-1960s there have been substantial declines in occupational injury rates in most countries for which such time-series are available. The picture conveyed is, however, not quite as positive as was the case for fatalities. While the rates declined by about half in France, Germany, Luxembourg and the United Kingdom, by about 30 per cent in Austria, Belgium and Sweden and by about 20 per cent in Italy and Switzerland, they increased by over a third in Canada and by 15 per cent in the United States.

For several countries, consistent time-series data are available only since the mid-1970s. Among them, reported injury rates declined by about half in Greece, Japan, and Turkey, a third in Spain and a quarter in Finland. A levelling-out of declines in the 1980s can be observed for Belgium, Luxembourg, Sweden and Switzerland. In addition, for Portugal and Spain the chart highlights increasing trends. A similar rise is notable in the United Kingdom where the incidence rate of “major” injuries shown in the third diagram increased by almost 10 per cent between 1981 and 1985¹⁸. In other words, fewer than half of the countries shown are characterised by continuing vigorous declines in occupational injury rates.

On the whole, it does not appear that total injuries have declined to the extent that occupational fatalities have over the last two decades. Several countries that

were characterised by declines in fatalities even show increasing trends for overall injuries. Since working hours have also been declining, this general tendency would be even more noticeable, were injury rates shown per million working hours. While most national data sources do not allow a comparison of incidence and frequency rates, differences become obvious in those cases where this is indeed possible. In Sweden, for example, where the occupational injury incidence rate declined by 33 per cent between 1965 and 1986, the frequency rate per one million working hours declined by less than one-quarter. Differences are less large, but equally obvious, in other countries. In Spain, where the incidence rate since 1981 decreased by about 6 per cent, the frequency rate has actually increased by almost 4 per cent.

In sum, the factors that determine the relationship between man, machine and work environment and, consequently, the evolution of accidents and injuries — such as sectoral employment shifts, levels of mechanisation and automation, growing awareness of hazards, use of protective equipment, safety standards and enforcement effort — seem to have had a greater impact on reducing fatalities than on total occupational injuries. A major reason for the difference in trends may be found in life-saving medical advances and more efficient emergency services, mentioned previously. Finally, increased reporting accuracy may have a more immediate impact on injury as compared with fatality statistics — where accuracy has always been relatively higher — and thereby lead artificially to increases or slowing declines¹⁹.

b) Occupational injuries by industry

Chart 4.5 shows, for ten countries, relative occupational injury rates by industry, with national averages taken as 100. It is evident, first, that although industry rates differ considerably, the variation is much less substantial than for fatalities (cf. Chart 4.2.). Only in three cases (two in mining and one in construction) are industry rates three or more times the national average.

The mining industry shows, again, the greatest variation. With the exception of Canada, Finland and the United States, where rates are around average, occupational injury rates in mining have been between two and seven times higher than the respective national average.

Concerning agriculture, only in three countries — Finland, Germany and Sweden — do rates exceed national averages by more than 50 per cent. Information at the 2-digit level shows forestry as having a considerably higher injury rate than does the agricultural sector as a whole [Hagggar-Guénette (1988); Laflamme and Vinet (1988); Vayrynen (1982)].

While for fatalities, rates in manufacturing have, more often than not, been below average, this is not so for total injuries. In all countries, injury rates in manufacturing have been above the national average — in Canada by a factor of two. At the 2-digit level, lumber and wood products as well as food products are often considerably over-represented among occupational injuries, as is the case in New Zealand, the United States and the United Kingdom. Several studies of some highly-mechanised sections of manufacturing industry have found that injuries tend to be more frequent in maintenance and repair than in production work. Such findings, again, should be of considerable help in targeting preventive action [Vautrin (1983); Saari (1977); Health and Safety Executive (1985)].

For the construction industry, the chart highlights injury rates consistently two to four times above the national average rate, often above even that for mining. Injury rates in the transport sector do not differ much from national averages, and have been below in Finland and the United Kingdom. Finally, the remaining industries in the service sector show consistently low rates²⁰. In conclusion, at least two of the four “high-risk” industries singled out during the consideration of fatalities — mining and construction — remain “high-risk” in the context of the incidence of total occupational injuries. In addition, acute problems appear in the manufacturing industry, while injury rates in agriculture also remain above average.

Finally, concerning the distribution of injuries across the economy, industry shares in total injuries present a somewhat different picture than for fatalities. Manufacturing generally has higher shares in overall injuries, approaching half of the total in a

number of countries. Industries in the service sector outside transport also have higher shares. On the whole, then, injuries are somewhat more evenly spread across industries than are fatalities.

c) Severity measures

For an adequate cross-country analysis of accident rates, it is insufficient to merely differentiate between fatal and non-fatal occupational injuries. All injuries are clearly not alike; on the contrary, different injuries can have a disparate impact on, for example, the extent of temporary or permanent disability, or on the length of time required off work. Taking into account measures of accident severity, therefore, throws additional light on safety hazards.

Tables 4.2 and 4.3 present available evidence on the evolution of accident severity over time, using the measures of permanent disability and of average lost workdays per time-loss injury. Consider first the evolution of permanent disability rates over the last two decades, shown for three European countries in Table 4.2.

It is evident, first, that since the mid-1960s, rates of permanent disability due to occupational injury in Italy, France and Germany are characterised by long-term declines, which go hand in hand with the declines in non-fatal injury rates shown in Section C.3.a. In France and Germany, rates actually declined by about half during this period, i.e. to the same extent as did their overall injury rates. Second, this also means that the share of the more severe injuries leading to permanent disability among all injuries is stagnant in these countries: since 1965, around 3 per cent of all non-fatal occupational injuries in Germany, between

Table 4.2. Permanent disabilities^{a)}

	France ^{b)}		Germany			Italy			
	1980		1965	1980	1987	1965	1980	1984	
Total	9.66	7.23	5.10	3.56	2.26	1.65	4.58	4.19	4.19
Agriculture	..	11.94	11.72	..	6.48	5.97	3.29	4.55	5.27
Mining and quarrying ^{f)}	..	22.57	36.19	12.20	10.24	8.61	7.58	4.79	..
Manufacturing ^{d)}	12.07	7.89	5.38	3.24	2.39	1.79	4.27	2.74	1.86
Electricity, gas and water	8.52	7.72	6.09	2.18	1.57	1.08	2.95	1.34	..
Construction	18.40	17.68	14.14	4.72	4.63	3.65	10.54	7.02	5.00
Trade ^{e)}	5.14	4.54	3.29	1.59	1.09	0.74	..	..	..
Transport	16.12	12.40	8.38	4.42	3.22	2.49	4.3;	3.2s	2.11
Services ^{f)}	..	..	..	1.10	0.54	0.41	..	..	..

a) Newly disabled per 1 000 employees per year. For Germany and the agricultural sector in Italy, the self-employed are also included.

b) Totals refer to employees insured with “régime général” only.

c) Refers to coal mining.

d) Refers to metal manufacturing.

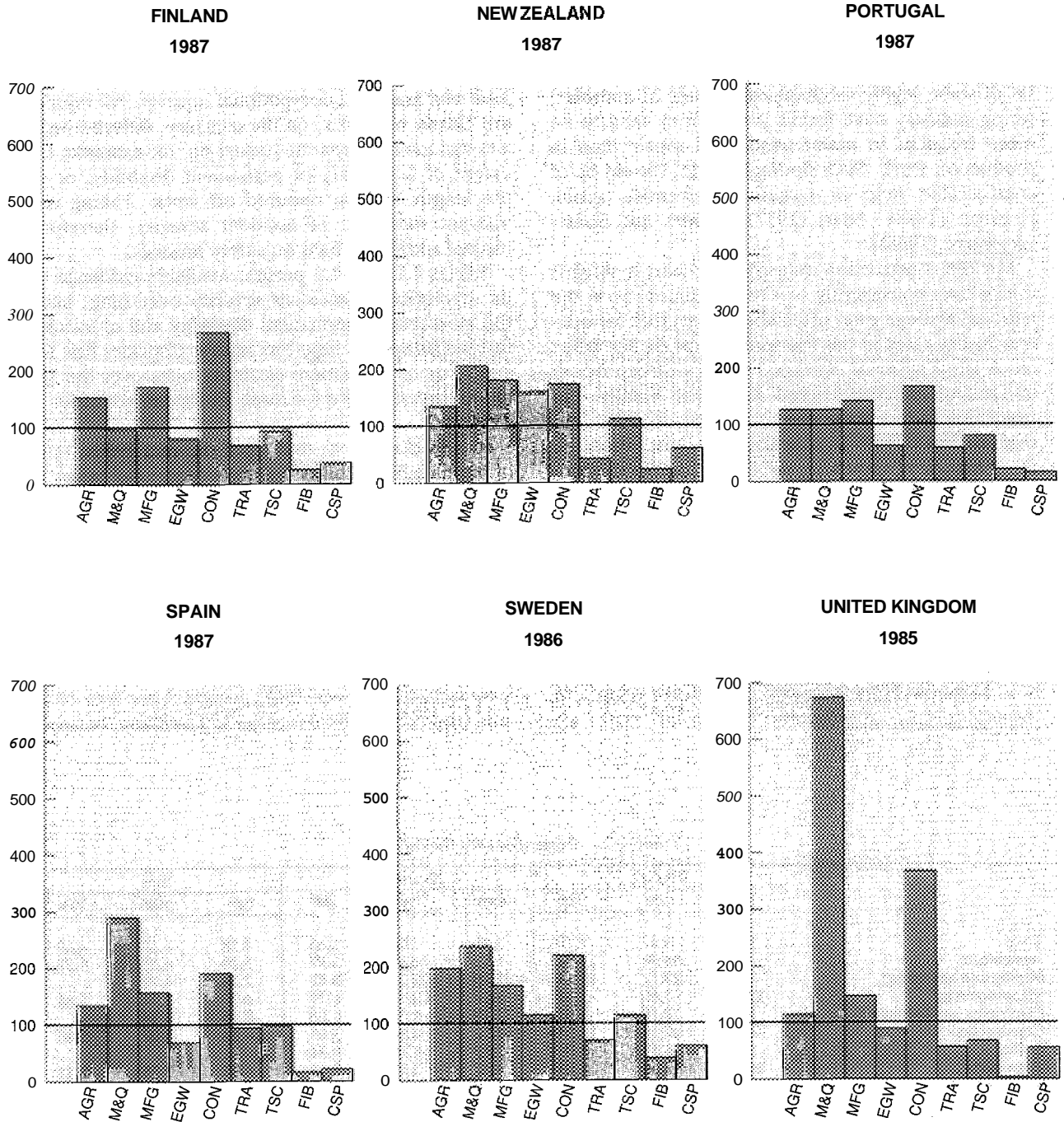
e) Excludes food stores and restaurants in France.

f) Refers to health and welfare services in Germany.

Sources: - See Annex 4.A.

Chart 4.5

RELATIVE INJURY RATES BY INDUSTRY ^{a, b}

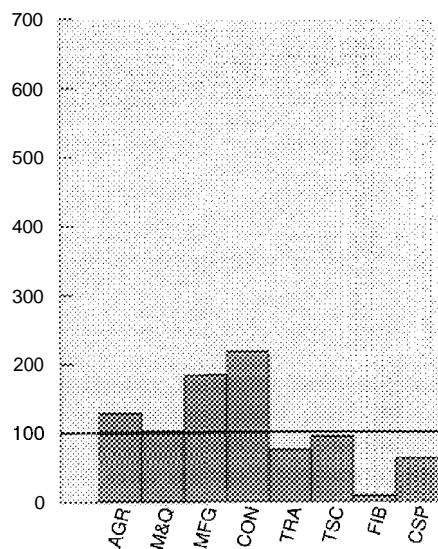


AGR = Agriculture, hunting, forestry and fishing
M&Q = Mining and quarrying
CMI = Coal mining
MFG = Manufacturing
MMF = Metal manufacturing
EGW = Electricity, gas and water
CON = Construction

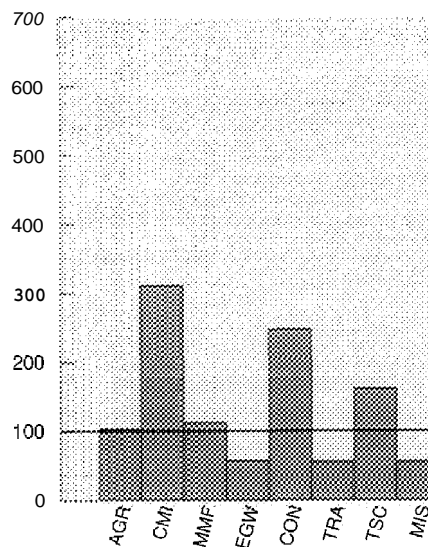
TRA = Wholesale and retail trade and restaurants and hotels
TSC = Transport, storage and communication
FIB = Financing, insurance, real estate and business services
CSP = Community, social and personal services
MIS = Miscellaneous services

Chart 4.5(continued)

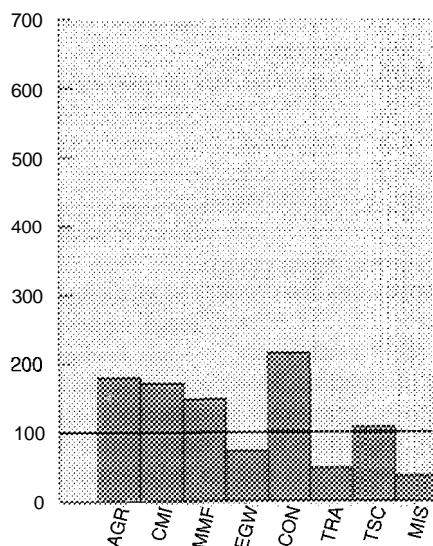
CANADA
1986



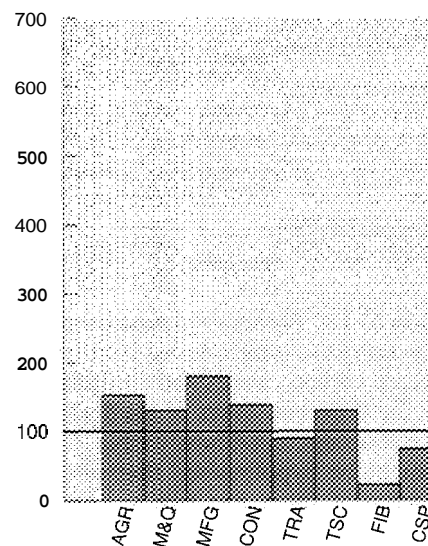
FRANCE
1986



GERMANY
1986



UNITED STATES
1987



a. Ratios of individual industries to national averages, which are shown as 100. Ratios are given for employees only, with the exception of Canada, Germany and New Zealand, for which varying proportions of the self-employed are contained in the statistics.

b. For the majority of countries shown, industries refer to the categories of the International Standard Industrial Classification of Economic Activities (ISIC).

In Canada and the United States, the industry "electricity, gas and water" is contained in the industry "transport, storage and communication". In France, hotels and restaurants are excluded from "wholesale and retail trade", and "miscellaneous services" refer to the insurance branch "interprofessionnel". In Germany, "miscellaneous services" refer to health and welfare services only.

Sources : See Annex 4A for detailed country sources and further definitions.

	United States			France ^b			Sweden			Spain	
	1972	1980	1986	1970	1980	1986	1970	1980	1985	1981	1987
Total	14	16.3	17.8	25.2	28.1	31.9	22	20	27	37.5	44.1
Agriculture ^c	..	14.5	17.1	..	30.4	35.1	25	22	29	48.3	46.7
Mining and quarrying ^d	..	25.4	30.3	..	28.0	38.1	26	21	31	69.3	59.8
Manufacturing ^e	15	16.2	17.8	21.6	23.6	26.7	21	19	24	35.2	42.6
Electricity, gas and water	..	..	..	24.9	25.2	27.2	25	21	27	45.2	53.2
Construction	15	17.9	19.6	27.2	33.9	38.8	23	21	28	42.4	52.9
Trade ^f	13	15.0	16.2	25.0	27.7	31.1	21	20	26		
Transport ^g	16	19.1	21.0	30.5	34.6	41.6	23	23	30	} 34.4	40.0
Services	12	14.9	17.1	..	..	..	26	22	32		

3 and 4 per cent in Italy and around 10 per cent of all such cases in France have led to some form of permanent disability. In addition, in Japan, where frequency rates are published both for overall injuries and for permanent disabilities, the share of the latter has, since 1979, decreased from 7 to less than 5 per cent [JISHA (1987)].

Absolute levels are, in large part, dependent on national definitions of disability and are therefore not strictly comparable. Germany, for example, includes only those cases which have been compensated on the basis of a disability rating of 20 per cent or more, while in France a rating of one per cent is sufficient for a case to be counted as a permanent disability in national health insurance statistics, and a substantial majority of cases are, indeed, rated at between 1 and 10 per cent. In France, it is also possible to compare the average percentage ratings of recognised occupational disabilities over time; they in fact show a long-term downward trend, declining from 15.8 per cent in 1955 to 9.5 per cent in 1986 [Wisniewski (1983); CNAM (1988)].

In Section C.3.a, advances in medical practice and emergency services, which today save the lives of many accident victims, were cited as a possible explanation for the different slopes of the declines of fatal and non-fatal occupational injury rates. Correspondingly, it might be hypothesised that while lives are saved — some of them just barely — the share of disability cases in all injuries would increase. On the basis of the data presented, this is, however, clearly not the case; at least in those countries for which corresponding data are available, there is no sign of any significant increase in the share of disability cases arising from occupational accidents — this in a period

of time where, in most countries, criteria for recognising disability have been sometimes extensively expanded for social and labour market reasons.

Turning to permanent disability rates by industry, it is evident, first, that they have declined in all individual sectors, except for agriculture in Italy and mining in France. Furthermore, several of the “high-risk” industries identified above with respect to occupational fatalities also have a high relative rate of permanent disability. In Germany, the risk of suffering from a permanent disability is especially high in mining, where it is more than five times the inter-industry average, and in agriculture where it is almost four times that average. In France, also, it is the mining industry where this risk is particularly high. In contrast, the data for Italy show a more equal distribution of risk, although, somewhat surprisingly, disability rates for metal manufacturing and the transportation industry are considerably below average.

Consider next the average number of workdays lost per occupational injury. Available data from most countries show that the number of workdays lost per 1 000 workers due to occupational injury — often defined as the “severity rate” — has declined alongside overall injury rates. However, these declines have turned out to be sometimes considerably smaller than those of the respective injury rates. Table 4.3 shows that this discrepancy is due to substantial increases of the average number of workdays lost per case. All country averages, as well as all industry averages, with the exception of agriculture and mining in Spain, show such increases over time.

For all countries, large differences become apparent between industries. The average number of workdays lost per case ranges from 40 to 60 in Spain, from

27 to 41 in France, from 16 to 30 in the United States and from 24 to 32 in Sweden. The industries with the highest number of workdays lost are mining (United States, Spain), transportation (France) and services (Sweden).

The across-the-board increases in average lost workdays are somewhat surprising. Used as one of several possible measures of accident severity, they seem to contradict the data on permanent disability which have shown no increase in the proportion of serious accidents leading to long-term work impairment. A possible reason for this discrepancy may lie in the social climate of modern "post-industrial" society that gives increasing attention to health matters and makes it legitimate for accident victims to stay off the job for longer periods.

d) *Occupational injuries by sex and age*

Table 4.4 throws some light on the relative incidence of occupational injury by sex and age group. Turning first to male and female totals across all ages, remarkable similarities become apparent for all countries shown. The overall injury rate for women is in all cases less than half the total rate and between a third and a fourth of the male rate. These relative

injury rates is the concentration of women in less hazardous industries and occupations, above all in the service sector. A study undertaken by the U.S. Bureau of Labor Statistics, for example, found that women in traditionally male-dominated jobs suffer from injuries with roughly the same relative frequency as their male counterparts. This was also true for men in traditionally female-dominated occupations [Root and Daley (1980)].

Consider next relative injury rates by age group. As noted, *infernalia*, by Root (1981), findings from studies on the relationship between work injury and age have led to controversy over whether younger or older workers are more likely to suffer from work injury. Data contained in Table 4.4 show that work injury rates generally decline with age in Canada, Germany and France, while the evidence is less clear for the United Kingdom and for workers above the age of 24 in Sweden.

Marked differences in age-specific injury rates by sex are apparent in Canada, Germany, Sweden and the United Kingdom, for which such detailed information is available. Injury rates for men 20 years and over substantially decline with age everywhere. In all countries shown in Table 4.4, the average age of men suffering from work injury is substantially lower than

Age group	Canada			Germany			United Kingdom			Sweden			France		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
15-19	1.04	0.32	0.70	2.28	0.75	1.60	1.16	0.26	0.72	2.21	0.62	1.41	::	::	2.44
20-24	1.89	0.47	1.21	2.13	0.58	1.42	1.71	0.35	1.09	2.21	0.62	1.41	::	::	1.32
25-34	1.72	0.44	1.14	1.43	0.33	1.00	1.65	0.29	1.11	1.63	0.40	1.04	..	..	0.93
35-44	1.30	0.47	0.91	1.09	0.33	0.80	1.40	0.35	0.94	1.25	0.39	0.85	..	..	0.86
45-54	1.21	0.56	0.93	1.11	0.43	0.87	1.44	0.54	1.04	1.32	0.56	0.96	..	..	0.75
55-64	1.10	0.54	0.89	0.94	0.55	0.81	1.18	0.52	0.94	1.22	0.65	0.96	..	..	0.23
65 and over	0.54	0.21	0.42	..	..	..	1.18	0.52	0.94	0.17	0.15	0.16	..	..	0.21
Total	1.42	0.43	1.00	1.35	0.45	1.00	1.46	0.39	1.00	1.45	0.49	1.00	1.45	0.37	1.00

a) Ratios of time-loss injury rates by sex and age group to the overall injury rate (taken as 1.00). Data refer to 1987 for Germany, to 1986 for Canada and France, to 1984 for Sweden and to the period from April 1986 to March 1987 for the United Kingdom. In the main, data refer to employees only, with the exception of Germany and Canada, where they include some self-employed.

6) Rates for France refer to the following age groups: 15-19; 20-29; 30-39; 40-49; 50-59; 60-64; 65 and over.

Sources : See Annex 4.A.

incidence rates reflect a very unequal distribution of occupational injury across the sexes : whereas women's employment shares are almost everywhere gradually approaching 50 per cent, their shares in occupational injuries vary from only 15 to 23 per cent in the countries shown.

Are women, therefore, "safer workers" than men ? A more likely explanation for the discrepancies in

that of all employed males. In contrast, rates for women, as a rule, do not decline with age ; for example, in both Canada and the United Kingdom, women aged 45 to 54 had the highest injury rate of all age groups. Rates for women aged 25 to 34 were among the lowest in all countries shown, while the corresponding male rates for this age group were everywhere above the male average²¹.

D. SUMMARY AND CONCLUSIONS

Summary

This chapter, which is the first of two on the subject of occupational safety and health, has examined available data on the evolution of non-fatal and fatal occupational injuries in OECD countries, and includes an analysis of injury rates by industry, severity, sex and age²².

The data available from Member countries show a lack of standardization of data-gathering and reporting procedures, of concepts, and of classifications. Statistical comparability is hindered by, *inter alia*, the different extent to which employed persons are covered, by differing classifications of accidents according to the amount of time lost, and in some countries by inconsistent breakdowns by industry division. Caution should therefore be observed in making country comparisons of accident rates. With this caveat, several important features in the evolution of fatal and non-fatal accidents stand out.

One of the most notable trends emerging from cross-country analysis has been the substantial declines in fatal accident rates since the mid-1960s. In a majority of countries for which time-series data reaching back to 1965 are available, fatality rates are seen to have declined by more than half during this period. While for some, stagnating trends are currently observed, countries such as Canada, Japan, Germany and France continue to show vigorous declines. Today, in most countries, fewer than 1 in 10 000 workers gets killed on the job in a given year.

A comparison of fatal accident rates by industry shows four of the nine ISIC industries to be high-risk industries almost everywhere. These are, in varying order, the mining, construction, agriculture and transport industries. Rates in manufacturing are close to national averages, while rates in the service industries — outside transport — are considerably lower. The shift in composition of employment towards the tertiary sector (see Chapter 5) is responsible for only a minor part of the declining fatal injury rates, most of the past improvements being due to falls in rates within industries. However, even if industry-specific rates were now stagnant, secular changes in employment patterns make further falls in aggregate fatality rates likely.

Concerning occupational injuries requiring absence from work, most countries currently report rates of between 30 and 70 per 1 000 workers. Declines since the mid-1960s have, however, not been as substantial as for fatalities; in fact, during the 1980s half of the countries analysed have experienced either stagnation

or increases in overall injury rates. It may well be that safety precautions and improved medical care and speed of intervention have had a larger impact on the number of fatal than on non-fatal injuries. Increases in reporting accuracy may also have been greater for non-fatal than for fatal injuries.

Analysis of total injuries by industry reveals a lower degree of inter-industry variation than for fatal accidents. Differences in relation to national averages are greatest in mining and construction. In addition, injury rates in manufacturing are in all cases above average.

Data on the evolution of accident severity are ambiguous. There has been a substantial decline in the number of permanent disabilities and no increase in their incidence as a proportion of all injuries. However, there has been an increase in the number of working days lost per accident, which could indicate either a tendency towards increasing severity or greater care of and attention to individual well-being. Finally, a discussion of occupational injury by sex and age shows, first, a rather unequal distribution of risk between the sexes: in five countries where data were available men experienced between 77 and 85 per cent of all injuries. Second, male workers between the age of 20 and 34 were everywhere considerably over-represented.

Concluding remarks

Sixteen thousand workplace fatalities, and over 10 million injuries yearly in OECD countries, are a strong reminder that numerous safety hazards continue to accompany modern work processes. Efforts at enterprise and public policy levels are undoubtedly still required to lower accident levels further. Besides a continuing emphasis on technological and engineering controls, behavioural approaches such as training and employee motivation and worker-management co-operation should not be overlooked as important features of a successful hazard-control policy [Sulzer-Azaroff (1987)]. In addition, increasing importance is being put by safety professionals on an efficient accident analysis that traces back to its origin **the chain** of dysfunctions which have resulted in injury or death, including information on “near misses” [Monteau (1983); Chhokar (1987)].

Over the next decades, new technology will, in all likelihood, continue to reduce the number of traditional jobs in manufacturing; in addition, employment shifts away from such “high-risk” industries as agriculture and mining will continue. However, new hazards emerge with new technologies and methods of working, such as robots and automated manufacturing systems²³. The increased volume of storage and

transport of hazardous material points to the increasing tendency towards a merging of occupational and environmental safety issues; the repeated occurrence of major disasters involving both occupational deaths and environmental damage has, at least since the 1970s, sharpened interest in occupational safety hazards, especially those involving manufacturing, shipping and over-land transportation [ILO (1987a)].

The analysis has pointed to the need for comparable data in the area of occupational safety as an important basis for preventive action. Recommendations by the International Labour Office and the less far-reaching

guidelines developed by the OECD Social Indicators Programme are too often not followed. Among the prerequisites for comparability are :

- coverage of all paid employment and **all** sectors of economic activity;
- common industry definitions and occupational classifications in occupational injury reporting;
- an **agreed** minimum level of severity and/or **minimum** length of time lost for recording an injury;
- agreement concerning the period after an accident during which subsequent death is to be attributed to the accident.

NOTES

1. A recent estimate gave the number of 110 million occupational injuries as the world-wide total [ILO (1987a)].
2. This chapter's focus is on occupational injuries, i.e. on personal injuries resulting from accidents arising out of or in the context of employment. Accidents causing only material damage and commuting accidents are not included in this definition.
3. See, *inter alia*, the respective provisions in the Swedish Work Environment Act of 1978, the German Work Security Act of 1973 and the British Health and Safety at Work Act of 1974.
4. Before 1967 the Netherlands, for example, was characterised by an insurance system, where absenteeism due to occupational injuries was compensated more generously than was absenteeism due to sickness. The subsequent change of this system had a considerable impact on the number of reported injuries [Prins (1983)].
5. In the United States, all occupational fatalities, illnesses and injuries which result in one or more of the following need to be reported : loss of consciousness; restriction of work or motion; and transfer to another job or medical treatment (other than first aid). See definitions in [U.S. Department of Labor (1988)].
6. Such a measure requires, for completeness, that fatalities be allocated a specific "charge" per case (often 6 000 days) and that the same be done for different degrees of permanent disability.
7. For the United States, the National Safety Council estimates that three out of four accidental deaths suffered by workers occur off-the-job [National Safety Council (1987)]. For France, as pointed out by Wisniewski (1983), occupational fatalities represent less than 10 per cent of all fatal accidents (and, for example, only half of the number of suicides). In general, both fatal road accidents and home accidents have been found to be more numerous than workplace fatalities.
8. The National Safety Council, which consistently records a much higher number of occupational fatalities than does the Bureau of Labor Statistics, reports a decline of about one third over this period, (i.e. from around 14 000 to just above 10 000 [National Safety Council (1987)]).
9. For New Zealand, fatal injury data were available for the period from 1981 to 1987, for Australia (not shown in Chart 4.1) only for 1982-84. In both countries fatality rates are between 6 and 8 per 100 000 employed. See Annex 4.A for sources.
10. New, especially automated technology may also, of course, give rise to new occupational hazards, as has been pointed out by a variety of safety experts [ILO (1984); Linsenmayer (1985)].
11. This is not, of course, to say that new forms of work organisation, such as semi-autonomous workteams, job rotation, etc., necessarily reduce occupational accidents. As several studies have pointed out, factors such as peer group pressure may lead to increased work speed, occupational stress and, therefore, safety hazards, even in a "de-taylorised" working environment [Enqvist (1984); Berggren (1983); Dohse, Jurgens and Malsch (1984)].
12. Since these data are for one year only, those for small countries may reflect year-to-year random fluctuations.

13. In order to combat hazardous working conditions in mines, the International Labour Organisation recently drew up a 160-page Code of Practice for the mining industry [ILO (1986)].
14. They are in fact between 15 and 25 per cent lower than all-industry averages in Canada, Portugal, the United States, France and Germany (referring to metal manufacturing in the latter two countries). Table 4.1 shows the fatality rate in metal manufacturing in Italy to be only a quarter of the national average (which, however, is artificially high due to the absence of the bulk of the tertiary sector).
15. In Germany, for example, where self-employed farmers and unpaid family workers are included in the statistical data base, they account for 78 per cent of all insured persons in agriculture. Were the self-employed included everywhere, industry shares of construction and transport might also be higher.
16. In addition to transport by land, water transport has a quite considerable share of fatalities in Norway.
17. Statistics on personal injury without time-loss are often not available, although such "minor" injuries are considered to be equally important for the study of accident causation and the development of preventive measures. The same applies to accidents that cause only material damage, but could well have caused bodily harm [Prins (1983); Bamber (1981)]. Some countries keep separate records of both time-loss and other accidents. In these countries, the number of injuries not requiring any absence from work may be considerably higher than the number of time-loss injuries. The ratio of lost-workday cases to total reported cases is given at between 46 per cent in the United States, 80 per cent in Spain, Italy and Sweden, and 94 per cent in Turkey. In Canada, for example, this ratio increased from one third in 1960 to around one half in the late 1980s.
18. Two time-series were used for the United Kingdom. The data in the first diagram refer to claims for injury benefits made to the Department of Health and Social Services from 1961 to 1982. The rates shown in the third diagram refer to "major injuries" under the NADOR classification only, i.e. in the main to injuries causing fractures, amputation, loss of eyesight or requiring hospitalisation for more than 24 hours. As noted by the Health and Safety Executive, the increasing number of occupational injuries in the United Kingdom during the 1980s may be due to decreased investment in new machinery and declining maintenance standards. The increases tended to be concentrated in the more traditional industries, often those contracting in size [Health and Safety Executive (1987, p. 38)]; (see Annex 4.A).
19. It has been suggested on the basis of some sectoral analyses from France and the United States, that injury rates may rise in periods of economic expansion because of increasing rates of new (and inexperienced) hires [Robinson (1988); Travail et Sécurité (1988)]. However, no consistent cyclical effects on injury rates can be derived from Chart 4.4.
20. This does not necessarily imply the absence of occupational risk in the service industries, since a relatively low incidence of occupational injury could be offset by high rates of occupational disease.
21. Why are the young, especially young males, over-represented among accident victims? Do they actively search out hazardous situations or does management entrust them with the most dangerous tasks? Is the relative absence of on-the-job training responsible? Different kinds of remedial action would follow from each of these hypotheses. Whatever the reason, the fact that smaller youth cohorts are entering labour markets in the late 1980s should be expected to have a decisive influence on the evolution of injury rates. Finally, a discussion of occupational injury by age would not be complete without a brief mention of age-specific accident severity. On this issue, data from several countries indicate that the proportion of serious injuries resulting in permanent disability or death generally increases with age. In private industry in Germany, for example, in 1985 of 1000 reported occupational injuries among workers aged 40 to 59, 50 led to permanent disability or death, while the corresponding figure for workers under the age of 30 was 18 [Hoffmann (1987)]. For further discussion of age/sex differences, see Mitchell (1988); Haggard-Guénette (1988); Health and Safety Executive (1987); Root (1981); and Root and Daley (1980).
22. The preceding discussion has been necessarily selective; it has not been possible to take up such important issues of accident analysis as differences according to establishment size, the timing of accidents (day of the week or hour of the day), causal agents, nature of injury and part of body affected.
23. See the special issue on Safety of Robots and the Automated Manufacturing Systems in the Journal of Occupational Accidents, 1986, June.

Annex 4.A

SOURCES AND DEFINITIONS OF OCCUPATIONAL INJURY STATISTICS

Australia

Occupational illness and accident statistics in Australia are collected in each of the eight states and territories as a by-product of the administration of workers' compensation systems. Each jurisdiction is now implementing a standard national system comprising specified data items and definitions. As a result, consistent national data on injury and fatality rates will be available for the first time for the 1989-90 financial year.

Sources :

National Occupational Health and Safety Commission, *Annual Report 1987-88*, Canberra.

Harrison, James, E. ; Frommer, Michael, S. ; Ruck, Elizabeth, A. and Blyth, Fiona, M., "Deaths as a result of work-related injury in Australia, 1982-1984", *The Medical Journal of Australia*, Vol. 150, February 1989.

Austria

Data on fatal and non-fatal occupational injuries are based on annual reports by the Association of Austrian Social Insurance Agencies and data supplied to the Secretariat by that Association. Statistics cover all civilian employment ; they are, in part, kept separately for employers and the self-employed. Breakdowns by industry are based on the historic classifications used for Austrian accident insurance (26 branches), and thus are only partly compatible with ISIC.

Occupational fatality and injury incidence rates were calculated by national authorities. Accidents are recorded as fatal if death occurs within the calendar year.

Sources :

Hauptverband der osterreichischen Sozialversicherungstrager, *Handbuch der osterreichischen Sozialversicherung*, various years, Vienna.

Bundesminister fur Arbeit und Soziales, *Die Tätigkeit der Arbeitsinspektion im Jahre 1987* (and various other years), Vienna.

Belgium

Data on fatal and non-fatal occupational injuries are based on annual reports by the Association Nationale pour

la Prevention des Accidents du Travail (ANPAT). Statistics cover around 60 per cent of civilian employment. Breakdowns by industry are based on the general industrial classification of economic activities within the European Communities (NACE — Nomenclature générale des activités économiques dans la Communauté européenne).

Occupational fatality and injury rates, expressed as frequency rates per 1 million man-hours, were taken from ANPAT reports. Injury rates refer to time-loss injuries requiring an absence from work of one day or more.

Sources :

Association Nationale pour la Prévention des Accidents du Travail, *Statistiques des accidents du travail et des maladies professionnelles*, Statistiques ANPAT, various years, Bruxelles.

Institut National de Statistique, *Statistique des Accidents du Travail, Exercice 1983*, Bruxelles, 1988.

Canada

Data on fatal and non-fatal occupational injuries were taken from various publications of Labour Canada and Statistics Canada. Presently the most detailed set of data is gathered by the National Work Injuries Statistics Program, coordinated by Statistics Canada's Labour Division in cooperation with workers' compensation boards.

Statistics cover all insured persons, i.e. the large majority of wage- and salary-earners, as well as some self-employed ; in some provinces, employees in agriculture and in business, community and personal services are exempt from compulsory coverage. Breakdowns by industry are based upon the 1970 Standard Industrial Classification and conform closely to ISIC (Industrial Standard Classification of Industries).

Occupational fatality incidence rates which include some deaths resulting from occupational disease, were taken from publications by Labour Canada. Occupational injury incidence rates were calculated by dividing absolute numbers of workers' compensation claims by the number of wage- and salary-earners recorded in OECD, *Labour Force Statistics*. These rates are estimated to be somewhat lower than actual rates due to the fact that a certain number of wage- and salary-earners are not insured. Injury rates refer to time-loss injuries requiring absence from work of one day or more.

Sources :

Labour Canada, *Work Injuries Canada 1960-1985*, Ottawa, September 1986.

Labour Canada, *Employment Injuries and Occupational Illnesses 1972-1981*, Ottawa, March 1984.

Statistics Canada, *Work Injuries 1984-1986*, Ottawa, January 1988.

Haggar-Guénette, C., "Work Injuries in Canada, 1982 to 1986", in : Statistics Canada, *The Labour Force*, March 1988.

Finland

Data on fatal and non-fatal occupational injuries were obtained from annual reports by the National Board of Labour Protection (Tyosuojeluhallitus) which are based on accident insurance records. Statistics cover mainly wage- and salary-earners. Breakdowns by industry are based on ISIC.

Occupational fatality and injury incidence rates were taken from published reports. Injury rates refer to time-loss injuries that require an absence from work of 3 days or more.

Sources :

Tyosuojeluhallitus, *Tyotapaturmat*, various years, Tampere.

France

Data on fatal and non-fatal occupational injuries were obtained from the Caisse Nationale de l'Assurance Maladie des Travailleurs Salaries and other insurance agencies. The statistics cover all wage- and salary-earners, with the exception of most government employees. Breakdowns by industry are, in large part, not compatible with ISIC, but are based on the historic jurisdictions of French health insurance (15 branches of the "régime général" and 9 other regimes).

Occupational fatality and injury incidence rates were calculated by combining, as far as possible, the information given by the various insurance agencies on yearly numbers of insured and of injured persons. Injury rates refer to time-loss injuries leading to absence from work of one day or more. Fatalities are defined as those accidents that result in death before a disability pension has been awarded.

Sources :

CNAM (Caisse Nationale de l'Assurance Maladie), *Statistiques Nationales d'Accidents du Travail*, various years, Paris.

CNAM, *Statistiques Technologiques d'Accidents du Travail*, various years, Paris. "Les Accidents du Travail en 1986", in : *Travail et Santé*, November 1988, pp. 559-574.

Germany

Data on fatal and non-fatal occupational injuries were

obtained from annual reports by the Federal Ministry of Labour and by various insurance agencies for private industry, agriculture and public enterprises. Statistics cover all wage- and salary-earners, with the exception of civil servants, as well as a considerable number of the self-employed, including all agricultural workers. Breakdowns by industry are, in large part, not compatible with ISIC, but are based on the historic jurisdictions of German accident insurance (over 50 *Berufsgenossenschaften* in private industry, agriculture and public enterprises).

Occupational fatality and injury incidence rates were taken from published reports. They are calculated on the basis of "full-time equivalent workers" (1 worker = currently 1620 hours yearly). Injury rates refer to time-loss injuries that require an absence from work of three days or more. Fatalities are defined as those accidents that result in death before a disability pension has been awarded.

Sources :

Bundesminister für Arbeits- und Sozialordnung, *Arbeitssicherheit '88, Unfallverhütungsbericht*, Bonn 1989.

Bundesminister für Arbeits- und Sozialordnung, *Die gesetzliche Unfallversicherung in der Bundesrepublik im Jahre 1987, Statistischer und finanzieller Bericht*, Bonn 1989.

Hauptverband der gewerblichen Berufsgenossenschaften, *Geschäfts- und Rechnungsergebnisse der gewerblichen Berufsgenossenschaften im Jahre 1987*, Sankt Augustin 1988.

Greece

Data on fatal and non-fatal occupational injuries are based on records kept by the Social Insurance Organisation (IKA). Occupational fatality and injury incidence rates were calculated by dividing absolute numbers of reported injuries by the number of insured, as communicated to the OECD by the Greek Ministry of Labour.

Italy

Data on fatal and non-fatal occupational injuries were obtained from the main accident insurance agency INAIL (Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro). Statistics cover the employed and self-employed in agriculture as well as wage- and salary-earners in the secondary industry. With the major exception of transport, workers in the tertiary sector are largely excluded from the statistics. Breakdowns by industry are, in large part, not compatible with ISIC, but are based on the historic jurisdictions of Italian accident insurance (agriculture and 10 large groupings in private industry).

Occupational fatality and injury incidence rates were calculated by combining the information given separately for agriculture and private industry in INAIL reports. For private industry, rates are published on the basis of "year-round, full-time workers". Injury rates refer to time-loss injuries that require an absence from work of three days or more.

Sources :

INAIL (Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro) *Centenario INAIL 1883-1983*, Milan.

INAIL, *Statistiche per la prevenzione, serie dati globali 1984*, vol. 1-11, Rome.

Japan

Data on fatal and non-fatal occupational injuries were taken from annual reports by the Japan Industrial Safety and Health Association. These are based partly on employer reports to Labour Inspection Offices and partly on special surveys, undertaken by the Policy Planning and Research Department, Ministry of Labour, of about 14 000 establishments with 100 or more employees.

Survey-based occupational injury rates, expressed as frequency rates per 1 million working hours were obtained from published reports cited below. They refer to wage- and salary-earners mainly in private industry and include only those time-loss injuries that require an absence from work of one day or more. Occupational fatality incidence rates were calculated by dividing absolute numbers of reported fatalities by the number of wage- and salary-earners recorded in OECD, *Labour Force Statistics*. Fatalities are recorded in the year they occur, regardless of the time elapsed between injury and death.

Sources :

JISHA (Japan Industrial Safety and Health Association), *Annual Report*, various years, Tokyo.

JISHA, *General Guidebook on Industrial Safety*, 1986, Tokyo.

Luxembourg

Data on fatal and non-fatal occupational injuries are based on yearly reports by the Inspection Générale de la Sécurité Sociale and additional information supplied to the Secretariat by that agency. Statistics cover a large majority of wage- and salary-earners, with the major exception of government employees.

Occupational fatality and injury incidence rates were calculated by the Secretariat. Injury rates refer to all injuries, irrespective of time loss.

Source :

Inspection Générale de la Sécurité Sociale, *Rapport Général sur la Sécurité Sociale au Grand-Duché de Luxembourg*, various years, Luxembourg.

New Zealand

Data on fatal and non-fatal occupational injuries were obtained from annual reports by the Accident Compensation Corporation. Statistics cover all civilian employment

and are confined to compensated claims for occupational injury benefits. Breakdowns by industry are those of the New Zealand Standard Industrial Classification, based on ISIC.

Occupational fatality and injury incidence rates were obtained by dividing absolute numbers of compensated injuries by civilian employment recorded in OECD, *Labour Force Statistics*. Injury statistics include only those injuries requiring an absence from work of six days or more. Fatalities are recorded in the year they occur, regardless of the time elapsed between injury and death.

Source :

Accident Compensation Corporation, "Compensated Accidents", various years, Wellington (mimeo).

Norway

Data on fatal and non-fatal occupational injuries were supplied to the OECD by the National Labour Inspectorate. Statistics cover the large majority of wage- and salary-earners. Breakdowns by industry conform closely to ISIC.

Occupational fatality incidence rates were calculated by dividing absolute numbers of reported fatalities by the number of wage- and salary-earners recorded in OECD, *Labour Force Statistics*.

Portugal

Data on fatal and non-fatal occupational injuries were obtained from publications by the National Statistical Office which are based on a mandatory reporting system for work accidents. Statistics cover the large majority of wage- and salary-earners, as well as an unspecified number of self-employed. Breakdowns by industry conform closely to ISIC.

Unless rates were given by national publications, occupational fatality and injury incidence rates were calculated by dividing absolute numbers of reported fatalities by the number of wage- and salary-earners recorded in OECD, *Labour Force Statistics*. Injury rates refer to time-loss injuries which require an absence from work of one day or more. Accidents are recorded as fatal if death occurs on the spot.

Source :

Instituto Nacional de Estatística, "Accidentes de Trabalho", Serie Divulgação, various issues, Lisbon.

Spain

Data on fatal and non-fatal occupational injuries were obtained from publications by the Office for Information and Statistics, Department of Labour and Social Security. Statistics cover the large majority of wage- and salary-earners. Breakdowns by industry conform closely to ISIC.

Occupational fatality and injury incidence rates were calculated by dividing absolute numbers of reported injuries by the number of wage- and salary-earners recorded in OECD, *Labour Force Statistics*. Injury rates refer to time-loss injuries requiring an absence from work of one day or more.

Sources :

Ministerio de Trabajo y Seguridad Social, *Boletín de Estadísticas Laborales*, various issues, Madrid.

Ministerio de Trabajo y Seguridad Social, "Siniestralidad Laboral 1977-1987", in : *Coyuntura Laboral*, No. 26, May 1988.

Sweden

Data on fatal and non-fatal occupational injuries were taken from Annual Reports by the National Board of Occupational Safety and Health (*Arbetskyddsstyrelsen*) which are based on records kept at the National Social Insurance Board. All economically active persons are compulsorily insured for occupational injuries; statistics are kept separately for employees and the self-employed. Breakdowns by industry are according to the Swedish Standard Industrial Classification of Economic Activities (*SNI*) which is based on ISIC.

Occupational fatality and injury incidence rates were taken from Annual Reports cited below which also, in part, publish frequency rates. Injury rates refer to time-loss injuries which require an absence from work of one day or more.

Sources :

Arbetskyddsstyrelsen/Statistiska Centralbyrån, *Arbets-skador 1984*, Stockholm 1987.

Arbetskyddsstyrelsen/Statistiska Centralbyrån, *Arbets-skador 1986, Preliminära uppgifter*, Stockholm 1988.

Switzerland

Data on fatal and non-fatal occupational injuries were obtained from published reports by the National Swiss Accident Insurance Fund. Statistics cover about two-thirds of civilian employment. Breakdowns by industry are based on the historic classification used for Swiss accident insurance (17 branches).

Occupational fatality and injury incidence rates, which are calculated on the basis of full-time equivalent workers, were taken from published reports. Injury rates refer to time-loss injuries which require an absence from work of one day or more.

Sources :

Caisse Nationale Suisse d'Assurance en Cas d'Accidents, *68^e-71^e rapport annuel*, Lucerne, various years.

Caisse Nationale Suisse d'Assurance en Cas d'Accidents,

Résultats de la statistique des accidents, 1978-1982; 1973-1977; 1968-1972, Lucerne.

Turkey

Data on fatal and non-fatal occupational injuries, in particular the occupational injury incidence rates used in Chart 4.4, were supplied to the OECD by the Turkish Ministry of Labour and Social Security. Statistics cover around half of wage- and salary-earners.

United Kingdom

Data on fatal and non-fatal occupational injuries are based on annual reports by the Health and Safety Executive, and additional data supplied to the Secretariat by that agency. Statistics cover all civilian employment; they are, in part, kept separately for employees, the self-employed and the non-employed, but are mostly available for employees only. Breakdowns by industry are, since the early 1980s, according to the 1980 Standard Industrial Classification, based on NACE. All information refers to Great Britain only.

Occupational fatality incidence rates since 1961 were communicated by the Health and Safety Executive (HSE). Two time-series were used for the injury incidence rates given in Chart 4.4. While the rates from 1961 to 1982 given in the first diagram refer to insurance claims, rates in the third diagram refer to "major injuries" under the NADOR (Notification of Accidents and Dangerous Occurrences Regulations) classification from 1981 to 1985, as reported to HSE. This was superseded in March 1986 by the RID-DOR (Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations) reporting system, using different definitions. Due to these major changes in data-gathering and reporting requirements, consistent time-series for occupational injuries from the 1960s to the present are not available.

Sources :

Health and Safety Executive, *Health and Safety Statistics*, various years, London.

Goddard, G., "Occupational accident statistics 1981-85", in : *Employment Gazette*, January 1988.

United States

Data on non-fatal and fatal occupational injuries are based on yearly surveys, undertaken by the Bureau of Labor Statistics, of around 300 000 establishments. The survey excludes the self-employed, farmers with fewer than 11 employees and all government employees. In addition, data concerning fatalities exclude all establishments with 10 employees or less. Breakdowns by industry are based on the 1972 edition of the Standard Industrial Classification Manual.

Occupational fatality and injury incidence rates were taken from published reports by the U.S. Department of

Labor, Bureau of Labor Statistics. They are calculated on the basis of full-time workers (working 40 hours per week, 50 weeks per year). Injury rates refer to time-loss injuries that lead to absence from work or restricted work activity of one day or more. Fatalities are recorded regardless of the time elapsed between injury and death ; fatality rates include a small proportion of deaths resulting from occupational diseases.

Sources :

U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Injuries and Illnesses in the United States*, various years, Washington.

U.S. Department of Labor, Bureau of Labor Statistics, *Recordkeeping Guidelines for Occupational Injuries and Illnesses*, Washington, September 1986.

