

## OCCUPATIONAL ILLNESS IN OECD COUNTRIES

### A. INTRODUCTION

In addition to the sometimes considerable risk of suffering from an occupational injury, health hazards accompany many work processes. Typical health hazards include toxic and carcinogenic chemicals, gases and dusts, ergonomic factors such as strenuous working postures, and physical factors such as noise, vibration and extreme temperatures. The results of the exposure to these hazards can be acute or chronic occupational illness such as respiratory and lung disease, skin conditions, systemic poisoning, occupational cancer, hearing impairment or neurological disorders.

This chapter focuses on the spread and evolution of occupational diseases in OECD countries. It follows on Chapter 4 of the 1989 *Employment Outlook*, which presented an analysis of occupational accidents, and represents the second of a two-part series on occupational safety and health. The analysis in 1989 already pointed to the linkage between labour market conditions and workplace hazards. Some further evidence of this linkage, which has recently become evident, is set out separately (see the accompanying "Further Note on Occupational Accidents").

In Section B, the chapter first considers the availability of and limits to comparative data on occupational illness. This is followed, in Section C, by a discussion of the incidence of fatal and non-fatal occupational diseases as they have evolved since the 1960s, their distribution by industry and their changing composition by illness category. Section D brings together major findings and derives some conclusions.

### B. PROBLEMS OF DEFINITION AND COMPARISON

The term occupational disease is linked to the identification of a specific cause-effect relationship between a harmful agent and the affected human

organism. However, it is not easy — and considerably more difficult than in the case of accidents — to prove that a disease is occupationally conditioned, i.e. caused by conditions at, not outside, work. Due to their different fact-finding and regulatory mechanisms, Member countries define a varying number of diseases as occupationally conditioned. In fact, a country's list of recognised occupational diseases itself reflects a value judgement as to those illnesses for which the workplace is to be held responsible and which are considered eligible for special compensation.

As a rule, the more concretely the cause-effect relationship can be established, the more likely it is that a condition will be recognised as an occupational disease. However, the causal chain between occupational activity, exposure to a hazard, and onset of illness may be elusive for a number of reasons [Hilaski (1981); ILO (1987); WHO (1985)].

First, many occupational diseases are clinically indistinguishable from general chronic diseases resulting from other factors. Workers spend about three-quarters of their productive lives outside the working environment; illness may therefore be the result of harmful exposure both on and off the job, and it is often not possible to assign weights to these factors' respective influence. On the other hand, a worker may be exposed to two or more hazardous agents on the job, in which case the cause-effect relationship can be confused. Furthermore, the sometimes long latency periods of individual diseases impede their timely recognition<sup>1</sup>.

In addition, the lack of medical expertise, i.e. insufficient training in occupational medicine, is often an obstacle to the correct classification of a disease as occupational. If there is no effective health supervision of workers, including systematic periodical examinations by competent company or other doctors, many occupational diseases will escape detection. Finally, the hundreds of chemical substances newly available each year, often without having previously been tested for health effects, make diagnosis difficult. When testing of substances does occur, results are primarily based on animal tests, and are therefore not easily extrapolated to the human organism.

Besides these conceptual and diagnostic difficulties, different reporting and data-gathering procedures and varying degrees of population coverage further distort international comparisons — as has indeed been shown for occupational accidents in the *1989 Employment Outlook*. It will be recalled that statistical coverage of civilian employment varies largely from country to country, as do the classification and coverage of particular industries. In some countries, data on occupational diseases are collected and published via insurance agencies, in others via labour inspectorates, in yet others via statistical offices by means of labour force or establishment surveys. The person required to report the disease may be the victim, the employer, an industrial medical officer or company doctor, a private doctor, or some combination of all of the above. In addition, time limits for reporting diseases differ considerably. Overall, then, international data comparability on occupational diseases is rather poor. This is true even by comparison with the field of occupational accidents.

Compared with workplace accidents, incidence rates of occupational diseases are difficult to establish with any certainty since health hazards can manifest themselves in illness while the worker is no longer at his job. This difficulty applies, in particular, to industrial breakdowns since a disease may be due to exposure during employment in a particular industry division which the worker has long since left. Rates may also be distorted due to drawn-out examinations of reported diseases by medical boards and the subsequent delay of decisions from one calendar year to the next<sup>2</sup>.

Because of the difficulty in proving a disease to be occupational in origin, most countries have produced lists of prescribed occupational diseases. These are generally limited to those diseases where a strong cause-effect relationship has been proven. However, with the number of categories ranging from 50 to 90, national lists vary in terms of those diseases recognised as occupational. Recommended lists developed by the International Labour Office and the European Communities seem to have led only to a limited degree of harmonization<sup>3</sup>. National lists are also constantly changing due to medical discoveries and changing attitudes to health. For example, a number of countries that once recognised only clear cases of total deafness due to occupational exposure for compensation purposes are now prepared to compensate workers for differing degrees of hearing impairment.

In some countries, in addition to the prescribed list, other diseases which are strongly suspected to be work-related may also be recognised and compensated. In another group of countries where no prescribed list has been developed, in principle every disease can be recognised and compensated as occupationally

conditioned; however, in these countries, the burden of proof tends to fall wholly on the claimant and there is a lower level of assurance that his claim will eventually be recognised [Greiner (1986)].

## C. THE EVOLUTION OF OCCUPATIONAL DISEASES

While, as one study observed, it is unlikely that the true extent of work-related illness can ever be accurately assessed [European Foundation (1988)], this section presents data on the evolution of occupational diseases in OECD Member countries as published by national authorities, with data on fatalities due to occupational illness taken up first. It should be kept in mind that the discussion which follows of diseases registered with medical boards or other bodies covers only a portion of the phenomenon of ill health in working life. Regular sickness absenteeism, for example, is much more widespread than absences from work of employees with recognised occupational diseases. Other data sources could throw additional light on the relationship between work and health: for example, survey-based information on workers' perception of physical and organisational stressors such as overload, uncomfortable working postures, mental strain or monotony. However, these issues cannot be considered here [see OECD (1986c, Chapter 11); Nordic Council (1984, Chapter 5)].

### 1. Occupational fatalities due to illness

#### *a) The evolution of occupational fatality rates*

A number of studies have reported that the incidence of deaths from occupational diseases is several times higher than that due to accidents [Ashford (1976); Berman (1978); Barth and Hunt (1980)]. However, this claim has been contested and is, in any event, hard to verify due to the difficulties discussed above in diagnosing occupational illness, and the elusive cause-effect relationship between specific working conditions and resulting deaths.

One of the major causes of differences in mortality statistics is the varying definitions used by Member countries for a disease-related occupational fatality. Some countries count only those deaths that occur relatively quickly after detection of a specific illness — for example, before the end of the year in which the disease was reported, or (as in France and Germany) before a decision on the award of a pension could be made. Others include all deaths of persons for which an

occupational disease has been determined as being the primary causal factor. (In the United Kingdom, for example, all deaths which have been “caused or materially accelerated” by occupational illness are included.) This more comprehensive basis thus includes deaths of pensioners, i.e. of persons who have retired with a (partial or full) disability pension. In view of the long latency period of major diseases such as silicosis or asbestosis, and the often long periods of illness before death occurs, there are good grounds for using this wider basis.

Including pensioners in the statistical count adds to the difficulty of comparing the spread of fatal diseases with that of fatal accidents. Rates or ratios calculated per 1 000 or 100 000 employees are rendered rather imprecise if, contrary to accident statistics, retired persons appear in the numerator, but not in the denominator.

With this caveat, Chart 4.1 presents, for illustrative purposes, the evolution of occupational fatalities both from diseases and from accidents since the 1970s. Relatively consistent time-series data containing both indicators were available for France, Germany, Sweden and the United Kingdom. All deaths resulting from occupational illness, including those of disability pensioners, are included in the statistical count.

For these four countries, the chart shows current ratios of between 0.9 (Sweden) and 6.5 (France) recorded deaths per 100 000 employees due to occupational illness, representing, in absolute numbers, around 1 500 recipients of death benefit in Germany, around 900 in France and the United Kingdom and between 30 and 50 in Sweden. Additional data for the late 1980s from Australia and Canada, with around 140 and 200 yearly cases respectively, show a ratio of 2 to 2.5 fatal occupational diseases per 100 000 employed<sup>4</sup>. Only in Germany has the ratio decreased considerably, while in the other three countries shown in the chart, it increased (Sweden) or remained by and large stagnant (France, United Kingdom).

Compared with fatality rates due to accidents, those due to occupational illness are at about the same level in Germany, much higher in the United Kingdom, somewhat lower in France and considerably lower in Sweden (where the gap between the two ratios has nevertheless greatly decreased over the last decade), Australia and Canada.

While the analysis of fatal accident rates for the four countries shown (as well as for practically all other OECD countries) reveals substantial declines over the last two decades, no such tendency can be observed for fatal diseases. The factors singled out in the *1989 Employment Outlook* as having contributed to the large declines in fatal accidents — medical advances, changes in industry mix, growing awareness of occupational hazards and increasing stress on preventive measures —

seem not to have been equally effective in reducing fatal occupational diseases.

While changes in reporting accuracy and classification systems play a larger role in the area of illness, as compared to occupational injury, it is not likely that they represent the primary cause for the diverging trends. A more probable explanation may be that current deaths to a certain extent reflect exposure to hazards of 10, 20 or 30 years ago. The long latency periods before the onset of some major diseases and the long drawn-out suffering before death occurs, combine to produce this result. Hence, it is to be expected that substantial declines of the number of disease-related fatalities will occur only decades after the declines in fatal accident rates set in — even though the extent of both safety hazards and health hazards may have started to decline simultaneously.

It may also be that the increase in the number of occupationally classified fatalities is at least in part due to the addition of new categories to national lists of prescribed diseases. This is certainly true for diseases resulting from exposure to asbestos, which were added relatively late and have, since then, considerably increased their share among all fatalities. However, other diseases, added since the 1980s, account for only a small proportion of fatalities.

#### *b) Occupational fatalities by industry*

The picture conveyed by aggregate fatality rates due to occupational illness conceals important differences across industries. Chart 4.2 shows, for five countries, the ratios of fatality rates in major industry divisions to the respective overall national fatality rate (taken as 100).

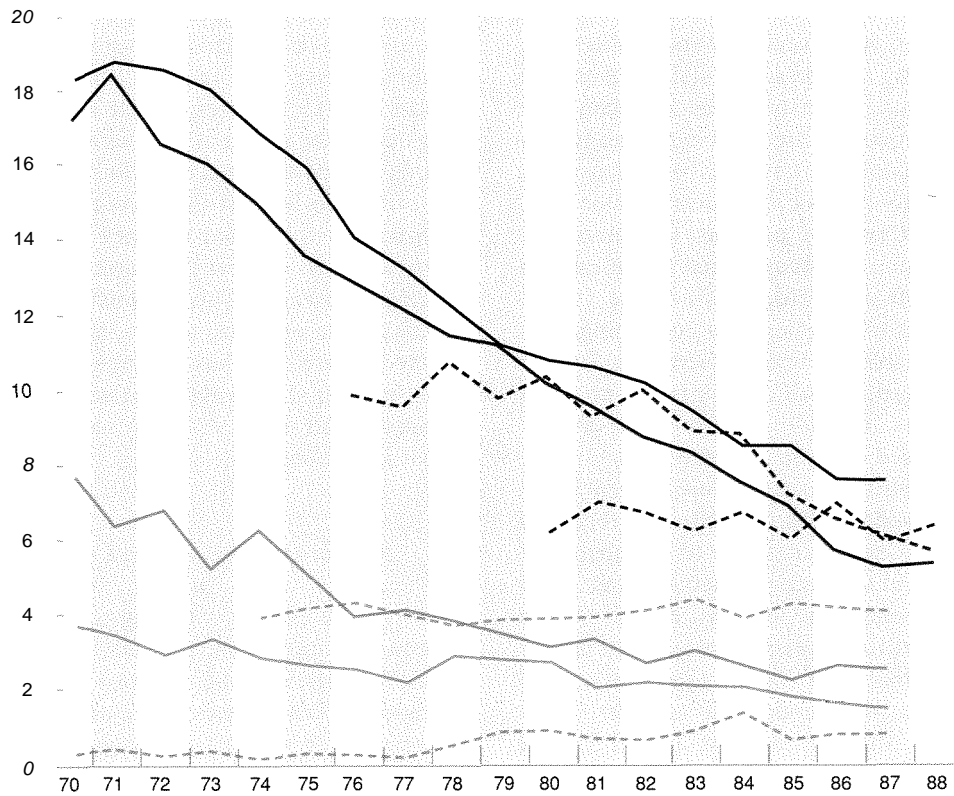
Due to data constraints, the chart presents, for France and Germany, only those fatalities that resulted before the attribution of a pension. In the other three countries, all deaths due to occupational illness, including deaths of invalidity pensioners for which the disease was the primary causative factor, have been included. Due to the sometimes low numbers involved, data from two recent years have been combined to even out sometimes considerable year-to-year fluctuations.

At this level of disaggregation, it is workers in mining who are most likely to be killed by their jobs. Chart 4.2 shows, for all countries, fatal illness rates that are many times the national average: from 5 times in Sweden to 35 times in the United Kingdom. These ratios are even higher than those for mining *accidents* which were found to be between three and eleven times the national average [OECD (1989a), Chapter 4]. In the United Kingdom, for example, the ratio of 135 deaths per 100 000 workers in mining and quarrying during 1986 is about 35 times higher than the national rate of around

Chart 4.1

OCCUPATIONAL FATALITY RATES<sup>a</sup>

Rates per 100 000 employed



Fatal accidents

Fatal diseases

— FRANCE  
 — GERMANY  
 ..... SWEDEN  
 - . - . UNITED KINGDOM

- - - - FRANCE  
 - - - - GERMANY  
 ..... SWEDEN  
 - . - . UNITED KINGDOM

a. Rates refer to all deaths for which a particular occupational disease was considered the primary causative factor. The data include all employees in Sweden and the United Kingdom, and all employees outside public service in France. In Germany, where rates are calculated on the basis of "full-time equivalent" workers, fatality rates due to accidents refer to all civilian employment, while those due to occupational illness refer to civilian employment in private industry.

Sources: France: Caisse nationale de l'assurance maladie des travailleurs salariés. *Statistiques nationales d'accidents du travail*, various years, Paris:

Caisse autonome nationale de la sécurité sociale dans les mines, unpublished tabulations.

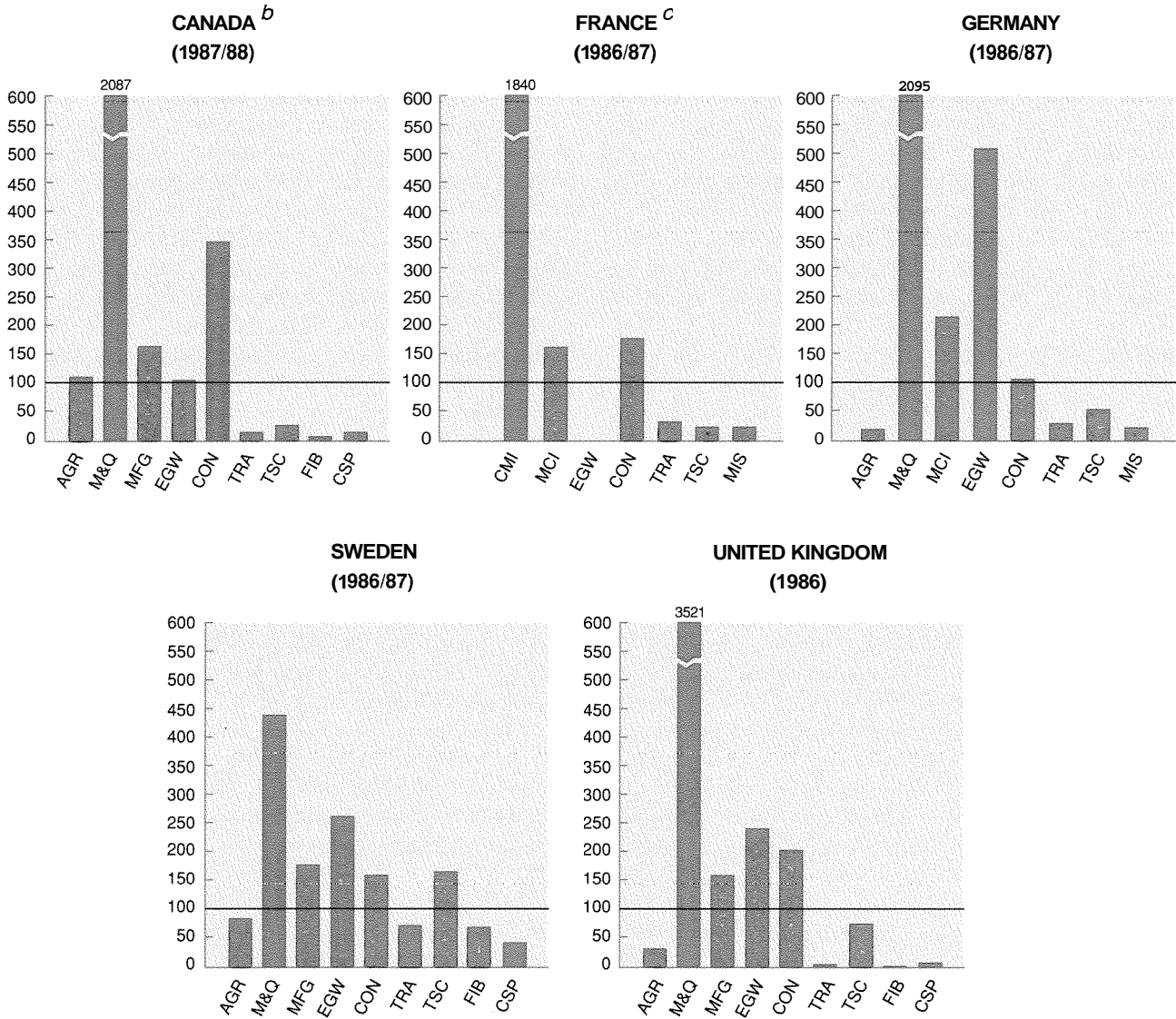
Germany: Bundesminister für Arbeit und Sozialordnung, *Arbeitssicherheit '88* (and previous years), Bonn.

Sweden: Arbetskyddsstyrelsen, *Arbetskadorna 1987* (and previous years), Stockholm.

United Kingdom: Health and Safety Executive, *Health and Safety Statistics* (various years) and unpublished tabulations.

Chart 4.2

RELATIVE FATALITY RATES BY INDUSTRY <sup>a</sup>



AGR = Agriculture, hunting, forestry and fishing  
M&Q = Mining and quarrying  
CMI = Coal mining  
MFG = Manufacturing  
MCI = Metal and chemical industry  
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

b. Excludes fatalities occurring in the province of Quebec.

c. For France, data on disease-related fatalities in agriculture were not available.

Sources:

Canada: Labour Canada, unpublished tabulations.

France: Caisse nationale de l'assurance maladie des travailleurs salariés, *Statistiques nationales d'accidents du travail (1985-86-87)*, Paris, 1989.

Germany: Bundesminister für Arbeit und Sozialordnung, *Arbeitsicherheit '87*, Bonn, 1988.

Sweden: Arbetskyddsstyrelsen, unpublished tabulations.

United Kingdom: Health and Safety Executive, unpublished tabulations

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

4 per 100 000 employees (shown in Chart 4.1). In view of the considerable latency periods for pneumoconioses (the main disease category for miners) the ratio arguably should be calculated on the basis of total employees in mining, say, 20 years ago. While this would reduce the industry ratio by about 60 per cent, it would remain by far the highest, compared with the national average. This is confirmed by the data for France where, due to the large contraction of the coal mining industry over the last two decades, the same method of calculation would result in a considerably lower (although still higher than all others) mining industry ratio. In Canada, where employment in mining and quarrying has increased since the early 1970s, the opposite would be true.

Risk levels in mining are dependent on, *inter alia*, the nature of the ore and the techniques for extracting it. They will be influenced, for example, by the extent of employment in underground compared with surface mining and by the mixture of activities between coal mining, anthracite and metal mining, and relatively low-risk oil and gas extraction. In most cases, it is underground coal mining that carries the highest risk to workers' health. It is especially the inhalation and retention of excessive amounts of airborne dusts that cause miners' occupational disease, mostly silicosis and other forms of pneumoconiosis. During 1986/87, in both France and Germany, these respiratory ailments were responsible for around 98 per cent of all miners' deaths that were due to an occupational illness<sup>5</sup>.

With the exception of Canada, industry ratios in agriculture, where available, are below the national average fatality rate. This is surprising, since farming — in terms of health as well as safety — is often singled out as a high-risk occupation, due, *inter alia*, to the use of pesticides, fertilisers and other agricultural chemicals, and due to the close contact with animals [Clerc (1985)]. Possibly, many occupational diseases among farmers and farm workers go undetected due to the transient nature of much employment in the industry, the often small establishment size and to the resulting lack of effective health supervision. Relatively low levels of insurance coverage may also have an effect.

Next, fatality rates in all of industry ("manufacturing", "electricity, gas and water", and "construction") are, almost without exception, higher than national averages: between one-and-a-half and two times in manufacturing, up to 4 times in construction and up to 5 times in electricity, gas and water. Breakdowns of deaths by industry division *and* disease category show that in manufacturing they are, in large part, due to a mixture of silicosis and asbestosis cases, while in construction, asbestoses and mesothelioma resulting from exposure to asbestos are almost entirely responsible.

With the exception of transport and communications in Sweden. the rates for industries in the service sector

are only about 10 per cent of the national average. The picture conveyed by the service sector thus resembles closely the situation concerning fatal occupational accidents, with the major exception of transport which is characterised by high accident rates due to its reliance on motor vehicles [OECD (1989a, Chapter 4)].

Table 4.1 shows *shares* in fatalities due to occupational illness by industry. Where possible, information for the last available year(s) was supplemented by data on previous years to show shifts over time.

The data for Germany contained in Table 4.1 are particularly interesting because they provide information both on deaths that occurred relatively quickly after reporting (i.e. before decision on the award of a pension) and on all deaths due to an occupational disease, including those of disability pensioners. The French data also refer to deaths occurring before attribution of a pension, while the other three countries list all deaths for which a particular occupational disease was considered the primary causative factor.

Important differences in the distribution of fatalities are apparent for Germany, both over time and as regards the two fatality categories. Consider first the breakdown of all fatalities, including pensioners, by industry. Despite an extremely low employment share of less than 2 per cent in private industry, mining and quarrying absolutely dominates the field. While its share among fatalities has decreased since the mid-1970s, today almost two-thirds of all recorded deaths due to occupational illness still occur among persons currently or previously employed in the mining industry. This figure reflects the still very high number of people dying from coalworkers' pneumoconioses who contracted the disease a considerable time ago. Manufacturing, on the other hand, increased its share from 3 to almost 30 per cent during the period shown.

The relation between these two industry divisions is reversed when it comes to deaths that occurred before award of pension, with manufacturing now having a share of over half and mining of less than a quarter. On both counts, all service industries' shares are considerably below their specific employment shares.

In France, where the statistics gathered by insurance agencies do not permit the complete breakdown of *all* fatalities by detailed industry, data available to the Secretariat nevertheless show that three out of four such deaths occur among miners. On the other hand, manufacturing has the greatest share among deaths before award of pension. This is also true for all deaths in Sweden, while mining is still dominant in Canada and the United Kingdom. Sweden, with a low share of fatalities in mining (but an above average incidence rate, see Chart 4.2), is the exception in this respect, due both to an extremely low employment share of the industry and a preponderance of the relatively less hazardous

Table 4.1. Shares of industries in fatalities due to occupational illness<sup>a</sup>

Percentages

	Rapidly occurring deaths		All deaths		France		Canada		Sweden		United Kingdom
	1970/71	1987/88	1976	1988	1979/80	1986/87	1984	1987/88	1979/80	1986/87	1986
Agriculture	8.8	0.5	..	..			2.2	2.4	4.2	1.3	0.5
Mining/quarrying	52.2	21.6	96.7	64.9	17.9	10.3	40.3	34.0	8.3	1.3	39.7
Manufacturing	22.0	59.3	2.9	29.2	44.2	45.3	29.9	30.8	45.8	41.3	38.9
Electricity, gas and water	0.5	1.4	—	0.5	—	—	1.5	1.2	—	2.7	3.3
Construction	3.4	7.5	0.3	2.3	16.8	15.4	14.2	19.0	14.6	9.3	9.4
Trade	3.1	5.4	0.2	2.1	6.3	3.4	2.2	4.0	6.3	9.3	0.5
Transport	3.6	1.1	—	0.2	1.1	0.9	6.0	2.0	2.1	12.0	4.7
FIREB <sup>b</sup>	} <b>6.5</b>	3.2	—	} <b>0.8</b>	} 9.5	8.5	—	1.2	4.2	5.3	0.1
Other services			—				—	4.4	<b>5.5</b>	8.3	16.0
Unclassified	—	—	—	—	4.2	16.2	—	—	6.3	1.3	—

surface mining. Industries with fatality shares of above 10 per cent are construction in France and Canada, and transport and other services in Sweden. With the latter exception, all service industries show only modest fatality shares.

### c) *Occupational fatalities by category of disease*

What is the nature of the occupational diseases responsible for these deaths? Comparison between countries is hindered by the varying number of diseases contained in national lists and by the varying classification of individual diseases in major groupings. Recognising the need for bringing into line the criteria used for the compensation of occupational illness on the international level, the ILO has developed an international list which currently contains 29 groups of occupational diseases.

Judging from the ILO list and some national classification systems, occupational diseases may be categorised as:

- lung and respiratory diseases;
- skin diseases, including skin cancer;
- diseases caused by physical factors;
- diseases caused by chemical factors;
- diseases due to infection.

The boundaries drawn between the various types of illness are, however, not always identical. For example, exposure to chemical substances can cause skin diseases and may be classified either way.

With this caveat, Table 4.2 provides a breakdown of fatal occupational diseases by category of disease. Consider first all recorded deaths due to occupational illness. In all countries and all years, respiratory and lung diseases represent by far the largest disease category, with shares of around or above 90 per cent (disregarding Italy in 1984/85, where all diseases had not yet been classified). These are mainly diseases resulting from inhalation of hazardous dusts, such as the traditional miners' disease of silicosis. In addition, as the data from Italy and the United Kingdom and additional data collected for the Australian Mesothelioma Register since the early 1980s show, asbestoses and mesothelioma due to exposure to asbestos — which occur mainly among employees in metal manufacturing, the chemical industry and construction — seem to be on the increase [National Institute of Occupational Health and Safety (1989)].

The latter trend is confirmed, for France and Germany, by the data showing deaths resulting before award of pension, i.e. relatively quickly after detection. In Germany, three out of five such fatalities are currently

due to asbestoses and mesothelioma, whereas in 1960 not one such case had been registered. In France as well, the two diseases increased their share from a quarter to over a third during the 1980s. In both countries, the share of the overall category "respiratory and lung disease" among all fatalities is still on the rise<sup>6</sup>.

The other disease categories are characterised by rather low, and mostly decreasing, shares, with diseases due to chemical factors (such as papilloma of the bladder and poisoning from benzene or arsenic) being the most prominent. Deaths due to infection among workers in hospitals and laboratories have become relatively rare, compared with just a few decades ago.

## 2. Occupational diseases

### a) *The evolution of occupational illness rates*

This subsection considers the evolution of overall reported and compensated occupational diseases in Member countries. Among the 16 countries for which data were available, 11 publish only the annual number of reported cases. On the other hand, the United Kingdom provides data on cases that were recognised as occupationally conditioned and subsequently compensated. Furthermore, four countries — Austria, France, Germany and Switzerland — record (but do not necessarily publish) both sets of data simultaneously.

Chart 4.3, showing the evolution of illness rates since the mid-1960s, is broken down into three separate diagrams, of which one contains the latter group of countries (with both reported and compensated cases) together with the United Kingdom, while the others provide information on rates of reported cases. Consider first the information on reported cases, which is available for 15 countries in all. In the countries shown in Chart 4.3 currently between 3 and 110 cases of occupational illness per 10 000 employees are reported annually to insurance agencies or other national authorities<sup>7</sup>. The majority of these countries today report roughly 10 to 50 such cases per 10 000 employees — a number considerably lower than that for reported time-loss accidents (between 300 and 700 in most OECD countries).

In the countries shown, a downward movement of occupational illness rates is apparent only for Japan (by one-half since 1979), France (by one-third since the peak year of 1982) and Spain (by one-fourth since 1977). By contrast, numerous countries show a strongly increasing trend, most notably Denmark, Norway and Sweden, but also Austria, Finland, Luxembourg, Germany (since 1984), and the United States (since 1986). With 110 cases of newly reported occupational diseases per 10 000 employees, Sweden is also the country whose

Table 4.2. **Distribution of occupational fatalities by category of illness<sup>a</sup>**

Percentages

	Germany			United Kingdom <sup>b</sup>		Italy		France		
	All deaths 1987	Rapidly occurring deaths		All deaths		All deaths		All deaths	Rapidly occurring deaths	
		1960	1987	1974	1986	1980/81	1984/85	1987	1980	1987
Respiratory and lung disease	91.4	69.7	86.6	96.9	97.8	88.9	61.9	95.6	55.6	75.9
<i>of which:</i>										
Silicosis and silico-tuberculosis	72.7	69.3	25.3	..	..	75.0	42.2	85.8	25.9	20.7
Asbestosis	5.3	—	13.8	11.3	12.0	} 12.5	17.7	) 7.5	} 25.9	36.2
Asbestos-related mesothelioma	11.6	—	44.8	6.4	35.0					
Other	1.8	0.4	2.7	..	..	1.4	2.0	2.3	3.7	19.0
Skin disease	0.7	0.4	—	} 3.1	2.2	4.2	—	—	—	—
Physical factors	1.1	1.0	0.8			1.4	2.9	1.1	11.1	10.3
Chemical factors	3.6	17.6	9.2			5.6	7.8	1.4	25.9	13.8
Infection	3.3	11.4	3.5	—	—	—	—	0.4	7.4	—
Unclassified	—	—	—	—	—	—	21.5	1.3	—	—
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

a), With the exception of Germany, data refer to employees only. Data for France and Italy refer to private industry.

b) Data refer to Industrial Injuries Scheme only.

Sources: *France, United Kingdom:* See Table 4.1.

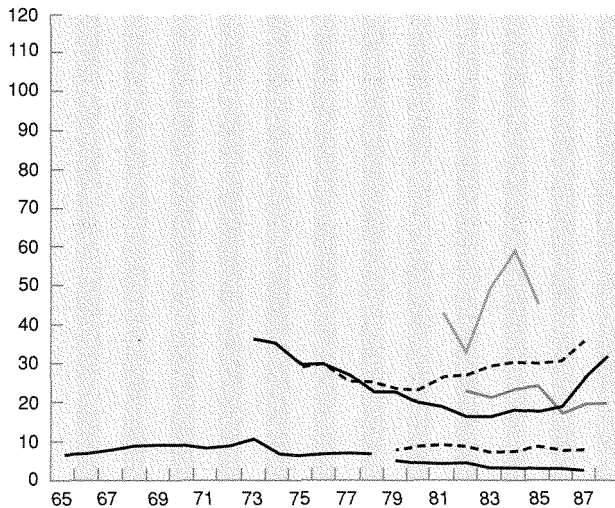
*Germany:* Bundesminister für Arbeit und Sozialordnung, *Die gesetzliche Unfallversicherung in der Bundesrepublik Deutschland, Statistischer und finanzieller Bericht*, various years, Bonn.

*Italy:* Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro, unpublished tabulations.

Chart 4.3

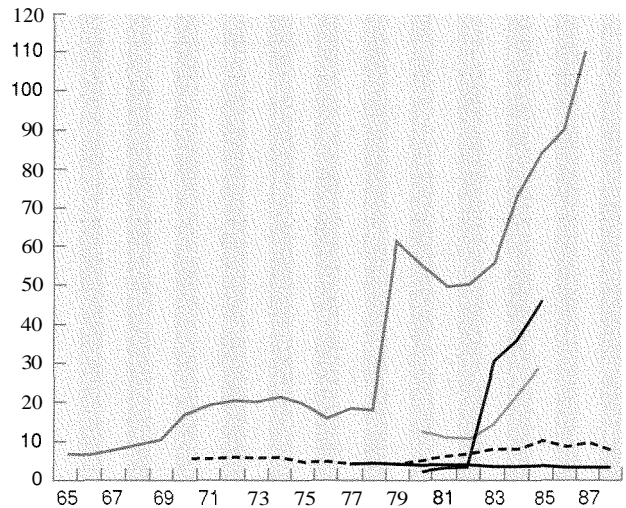
RATES OF OCCUPATIONAL DISEASES<sup>a</sup>

Rates per 10000 employed



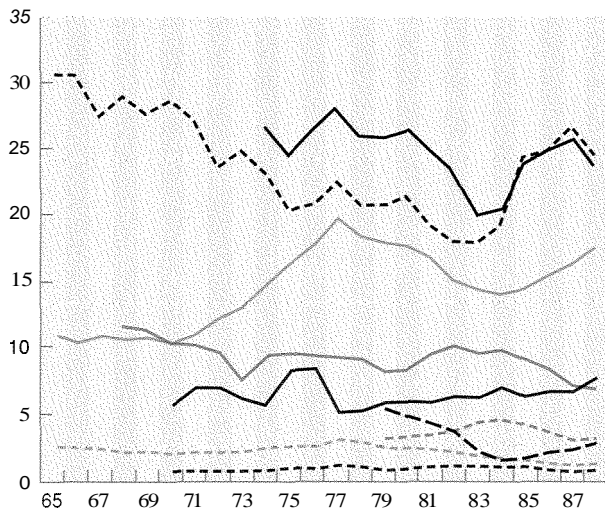
Reported diseases

.....	ICELAND	————	CANADA
-----	FINLAND	-----	BELGIUM
————	UNITED STATES	————	JAPAN



Reported diseases

————	SWEDEN	-----	LUXEMBOURG
————	DENMARK	-----	SPAIN
.....	NORWAY		



.....	Compensated diseases	————	Reported diseases
-----	AUSTRIA	————	AUSTRIA
-----	FRANCE	————	FRANCE
-----	GERMANY	-----	GERMANY
-----	SWITZERLAND	————	SWITZERLAND
-----	UNITED KINGDOM		

a. Data refer to employees only, with the exception of Austria, Germany and Canada, where varying proportions of the self-employed are contained in national statistics. In France, Switzerland and the United States, the data exclude all government employees. In Germany and the United States, rates are calculated on the basis of "full-time equivalent" workers.

Sources:

France, Germany, Sweden, United Kingdom: See Chart 4.1

Austria: *Handbuch der osterreichischen Sozialversicherungsträger*, various years, Vienna.

Belgium: *Statistiques des Accidents du Travail et des Maladies Professionnelles 1967, 1968*, ANPAT, Bruxelles.

Canada: Statistics Canada, unpublished tabulations.

Denmark, Iceland, Norway: Nordisk Ministerråd, *Anmälda Arbetssjukdomar i Norden 1985*, Copenhagen, 1989.

Finland: Data communicated by the Institute of Occupational Health, Helsinki.

Japan: Japan Industrial Safety and Health Association, *Safety and Health Data Book in Japan*, various years.

Luxembourg: Association d'Assurance contre les Accidents, *Compte Rendu de l'Exercice 1987, 1988*.

Spain: Ministerio de Trabajo y Seguridad Social, *Boletín de Estadísticas Laborales*, various editions, Madrid.

Switzerland: Data communicated by the Caisse Nationale Suisse d'Assurance en cas d'Accidents, Lucerne.

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

occupational illness rate comes closest to the reported rate of time-loss accidents (around 240 per 10 000).

Of the five countries which record *compensated* occupational diseases, a considerable decline is apparent for Germany, with the Austrian and French rates stagnant over the long term. The rates in Switzerland and in the United Kingdom, after considerable declines up to the mid-1980s, have since begun to rise. In the United Kingdom, reasons for the increase are said to include the addition of new conditions to the prescribed disease list (such as vibration white finger) and the extension of the rules relating to occupational deafness.

The majority of countries registering compensated cases currently show rates of between 1 and 4 per 10 000 employees. The atypically high rate for Switzerland is probably, at least in part, due to the fact that Swiss insurance does not cover most employees in the relatively less hazardous service sector.

Overall, it seems that the strong tendency for reported cases to rise is not paralleled by a similarly strong tendency for compensated cases. It could be hypothesised that numbers of reported cases have risen because it has been made easier to file a claim, because certain relaxations in requirements have been widely publicised or because attainable benefits have increased in value, but that examinations by medical boards remain comparatively rigid. However, judging from the countries which register both reported and compensated cases, the evidence remains inconclusive. Only in Germany has the relation between both categories changed greatly: while in 1965 about 25 out of 100 claims were recognised and subsequently compensated (due to a disability rating of 20 per cent or more), in 1987 this proportion had gone down to 8 of 100. Switzerland represents a special case in this respect, in so far as almost all claims seem to be recognised\*.

*b) Occupational diseases by industry and category of disease*

Chart 4.4 shows, for 11 countries, relative occupational illness rates by industry, with national averages taken as 100. The mining industry shows, again, the greatest variation, with the rates in 10 countries exceeding national averages. While Japan's relative rate of reported cases in mining is 37 times the national average, in those countries where data are available for compensated diseases, mining also shows extremely high relative illness rates (30 and 26 times the national averages in France and Germany, respectively).

That this is probably no coincidence is demonstrated by a comparison of the ratios for compensated and for reported cases in Germany (the only country where readily accessible data allow such comparison by industry). As is evident from the chart, while the rate for

compensated cases is 26 times higher, the one for reported cases is only 9 times higher than the national average. This, coupled with the information given above that only 8 of 100 claims are compensated by the German insurance system, suggests that the success rate of claims filed by miners is considerably (around 3 times) higher than average.

At the other end of the spectrum, Norway shows a below-average rate in mining (while Iceland records no cases due to the virtual absence of employment in this industry). Also, Denmark and the United States show, somewhat surprisingly, rates that do not significantly exceed national averages. For these countries, the overall rate for mining and quarrying is deflated by relatively large employment shares in oil and gas extraction (which is less risky in terms of health, but not safety). In the United States, for example, bituminous coal and lignite mining would show a rate around three times higher than that for the ISIC industry as a whole. That this is still comparatively low may be due to the fact that United States statistics are based on a yearly employer survey; diseases that are detected after the affected employee has left employment, therefore, usually remain unrecorded.

Data on occupational illness in mining by disease category show a large part of miners' diseases to, again, result from the inhalation of airborne dusts, with this category closely followed by meniscus damages and hearing impairment.

Data for industry rates in agriculture show a wide variety, from one-fifth (Norway) to almost 4 times (Japan) the national average. That in 6 of 11 countries the rate is below average confirms the information on fatalities from Chart 4.2, but is nevertheless surprising. Further study may be needed as to whether this is indeed a true picture or a statistical artefact.

Next, illness rates in manufacturing are everywhere higher than, although in most cases less than twice, the national average<sup>9</sup>. With some exceptions, the same is true for the construction industry. For both these industries, breakdowns by disease category show a much larger spread as was the case for fatalities, with large proportions of skin diseases, hearing impairment, meniscus damages and inflammation of tendons (tenosynovitis), in addition to silicosis and asbestosis.

With the exception of transport in Japan, service sector industries consistently show rates below (often considerably below) the national averages.

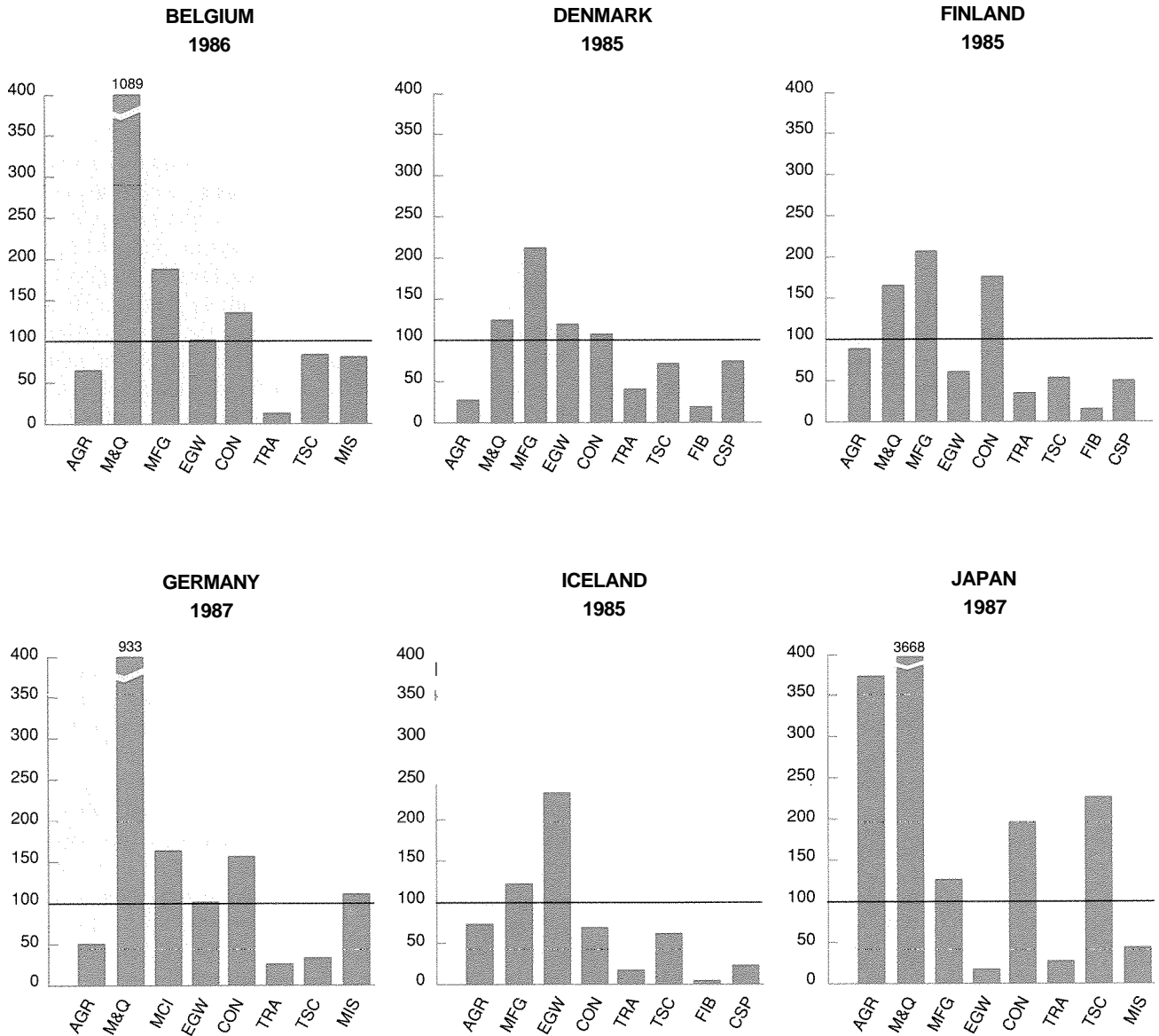
Table 4.3 gives an indication of which specific industries show the greatest *shares* among all registered occupational diseases, presenting data for different points in time, where available. Again, there is a separate presentation of those countries that use compensated cases, and those that use reported cases for their statistics.

In a number of respects, the distribution of recorded diseases by industry differs from the distribution of

Chart 4.4

RELATIVE RATES OF OCCUPATIONAL ILLNESS BY INDUSTRY<sup>a</sup>

Reported cases

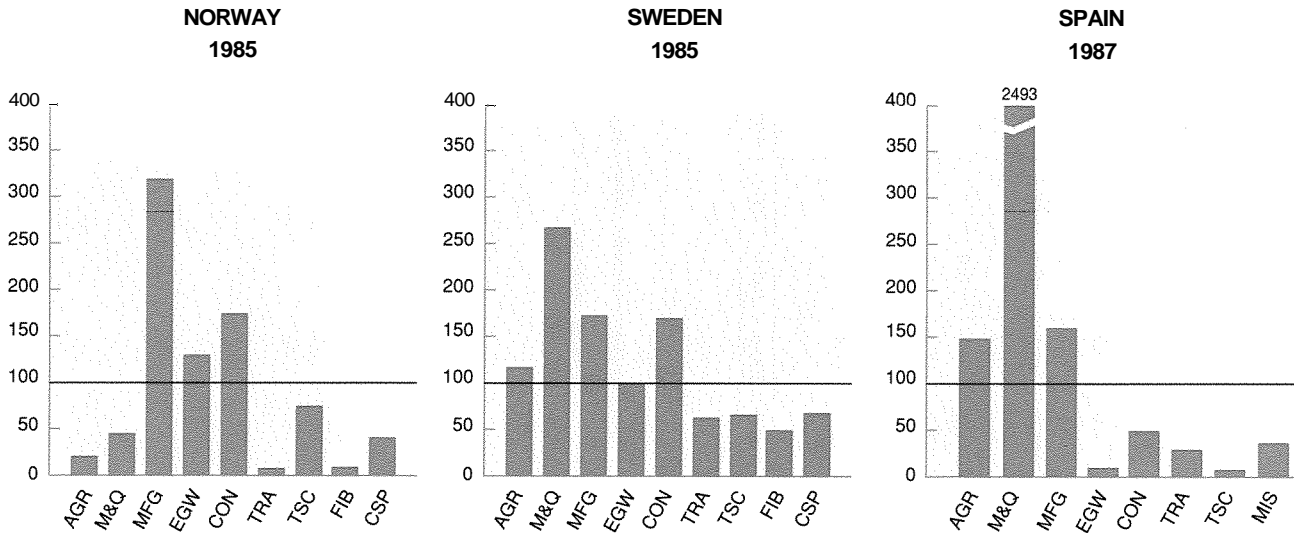


AGR = Agriculture, hunting, forestry and fishing  
M&Q = Mining and quarrying  
MCI = Coal mining  
MFG = Manufacturing  
MCI = Metal and chemical industry  
EGW = Electricity, gas and water  
CON = Construction

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

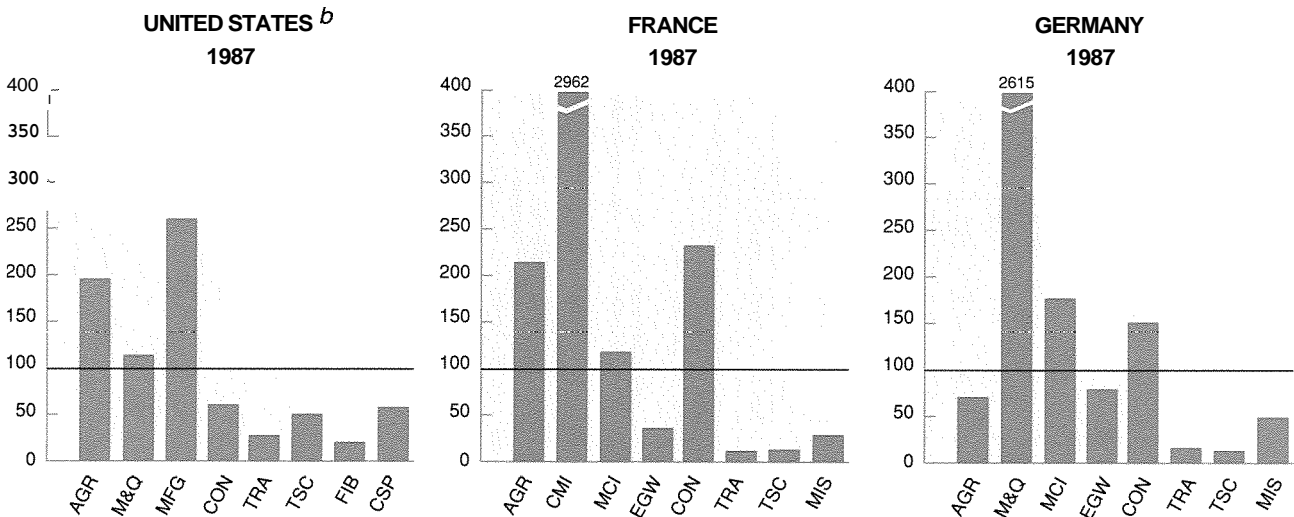
Chart 4.4 (continued)

Reported cases



Reported cases

Compensated cases



a Ratios of individual industries to all-industry averages which are shown as 100. Ratios are given for employees only, with the exception of Germany where they contain the self-employed. In Belgium, France and the United States, the data exclude government employees. In Germany and the United States, rates are calculated on the basis of "full-time equivalent" workers.

b. In the United States, "electricity, gas and water" is contained in the industry "transport, storage and communication".

Sources:

France, Germany: See Chart 4.2.  
 Belgium, Denmark, Iceland, Norway, Finland: See Chart 4.3.  
 Japan: Japan Industrial Safety and Health Association, *Safety and Health Data Book in Japan, 1988*.  
 Spain: Data communicated to the OECD by the Ministerio de Trabajo y Seguridad Social, Madrid.  
 Sweden: Arbetsarkyddsstyrelsen, *Arbetsjukdomar 1985*, Stockholm.  
 United States: U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Injuries and Illnesses in the United States by Industry, 1987*, Washington, D.C.

Table 4.3. Shares of industries in occupational diseases"

Percentages

	Concentrated cases									Reported cases								
	France		Germany			Japan <sup>b</sup>			Germany			United States <sup>e</sup>		Sweden		Denmark	Norway	Spain
	1979	1987	1950	1970	1987	1955	1970	1987	1950	1970	1987	1980	1987	1979	1985	1985	1985	1987
Agriculture	9.5	9.6	..	1.7	4.9	..	..	3.8	..	2.0	3.3	3.2	2.4	2.7	2.3	1.9	1.3	10.0
Mining and quarrying	11.5	15.2	85.3	47.5	29.6	14.5	6.6	6.7	71.7	30.6	10.7	1.2	1.2	0.8	1.0	0.2	1.3	24.5
Manufacturing	28.5	33.9	7.8	20.1	39.8	54.7	43.5	35.2	18.1	31.9	42.6	58.4	65.8	45.5	42.3	41.6	59.6	45.4
Electricity, gas and water	0.0	0.2	0.0	0.1	0.3	..	..	0.1	0.3	0.2	0.2	..	..	1.2	1.0	0.8	1.4	0.1
Construction	22.7	20.4	2.0	7.9	10.2	15.8	18.6	18.5	2.6	9.4	10.4	6.0	3.7	12.7	11.4	7.1	13.2	4.2
Trade	2.6	2.7	0.5	2.9	4.7	..	..	..	0.6	4.2	11.4	9.4	7.5	9.0	9.0	7.3	1.7	4.3
Transport	0.5	0.6	0.0	0.3	0.5	11.1	19.0	17.0	2.1	0.5	1.0	6.1	3.5	5.2	5.0	5.2	6.5	0.4
<b>FIREB<sup>d</sup></b>	} 17.5	9.8	} 4.5	19.4	10.0	} 3.8	12.2	18.7	} 5.0	21.3	21.4	1.2	1.6	3.3	4.2	1.6	<b>0.6</b>	} 11.2
Other services												14.6	14.2	19.3	23.7	27.4	13.4	
Unclassified	7.2	7.4	..	..	..	..	..	..	..	..	..	..	..	1.2	0.1	6.9	1.6	..
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a) With the exception of Germany, data refer to employees only. In France and the United States, data exclude government employees.

b) In Japan, wholesale and retail trade is contained in services.

c) In the United States, electricity, gas and water is contained in the transport industry.

d) Finance, insurance, real estate and business services.

Sources: Denmark, Norway: Nordisk Ministerråd, *Anmeldte Arbejdsjukdomar i Norden 1985*, Copenhagen, 1989.

France: Caisse nationale de l'assurance maladie des travailleurs salariés, *Statistiques nationales d'accidents du travail*, various years, Paris; Caisse autonome nationale de la sécurité sociale dans les mines, and Mutualité sociale agricole, unpublished tabulations.

Germany: Bundesminister für Arbeit und Sozialordnung, *Arbeitsicherheit '87* (and previous years), Bonn; Hauptverband der gewerblichen Berufsgenossenschaften, *Geschäfts- und Rechnungsergebnisse 1988*, Sankt Augustin, 1989.

Japan: Japan Industrial Safety and Health Association, *Safety and Health Data Book in Japan*, various years.

Spain: Data communicated to the OECD by the Ministerio de Trabajo y Seguridad Social, Madrid.

Sweden: Arbetskyddsstyrelsen, *Arbetsjukdomar 1985*, Stockholm, and additional data communicated to the OECD.

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

fatalities. First, with between one- and two-thirds of all recorded illnesses, manufacturing everywhere has the greatest share. In France, Germany and the United States, in spite of the decline in the employment share of manufacturing, its share is still on the increase. However, this is not the case in Japan (where, ironically, its employment share has declined less than in the other countries shown), and in Sweden. Next, despite extremely low employment shares, the mining industry's share comes second in Spain and for compensated cases in Germany, and third in France, while it is rather insignificant in the United States and the Nordic countries.

In all likelihood, agriculture's share would be larger in most countries if the data included the self-employed or if they did not exclude agricultural establishments below a certain size, such as in the United States. Finally, the share of service workers (ISIC divisions 8 and 9) in registered diseases seem to be considerably larger than their share in fatalities. Germany and Japan show a definite increase of this category since the 1950s, although the data for the 1980s in France and the United States do not confirm this to be a general trend.

Data for Germany are, again, especially revealing since they allow a comparison of *reported* and *compensated* diseases by industry. The most notable findings concern mining and quarrying on the one hand, and trade and services on the other. While the mining industry's share in compensated cases is almost three times higher than that in all reported cases, the share of trade and services, taken together, among compensated cases is about two-and-a-half times lower. This reflects, of course, variations by industry in the likelihood for reported cases to be recognised and eventually compensated. Reported cases in the service industries, for example, are dominated by skin diseases which have a disproportionately low probability of being recognised and compensated.

As was outlined earlier, it is difficult to bring in line the different classification systems for occupational diseases that are in use. A cautious look at the data in France, Germany and Sweden allow nevertheless some conclusions as to the distribution of all recorded diseases by major category. The emerging picture is rather different from that concerning fatalities in that most diseases seem to be due to physical factors. These are mainly deafness and hearing impairment and diseases due to vibration and strenuous working postures, such as meniscus and tendon damages. For example, while in the early 1970s less than 4 per cent of all compensated cases in France were due to hearing impairment, today more than a quarter are [CNAM (1989); Hauptverband (1989); Arbetarskyddsstyrelsen(1989)].

These physically caused diseases are followed by lung and respiratory diseases, among which silicosis usually

has a declining share and asbestosis (and mesothelioma due to exposure to asbestos) a rising share. Skin diseases, illness following exposure to such chemicals as lead, chromium and organic solvents, and infectious diseases come next.

## D. SUMMARY AND CONCLUSIONS

This chapter, which complements one on occupational accidents which appeared in the *1989 Employment Outlook*, examined available data on the evolution of occupational diseases in OECD countries. The information available from Member countries suffers from considerable limits due to comparability. Chief among these is the difficulty in proving that a particular disease is occupational in origin. In fact, Member countries' lists of prescribed diseases, which form the basis for compensation, contain varying numbers of diseases recognised as occupationally conditioned. In addition, registered occupational diseases cover only a portion of the phenomenon of ill health resulting from conditions at work, so that a broader approach to the assessment of work-related health hazards would be needed to cover all aspects of the issue.

The chapter presented data on fatalities due to occupational illness first. Taking all deaths of persons for which a particular occupational disease has been determined as the primary cause, data for four countries for which time-series data were available (France, Germany, Sweden and the United Kingdom) show that the overall number of fatalities is roughly comparable to those resulting from accidents. Unlike the rate of occupational accidents, however, there has been no general tendency for disease-related fatalities to decline over the last two decades. An explanation may be found in the long latency periods of some major diseases, as a result of which today's occupational illness and death reflect exposure to hazards of up to several decades ago.

A comparison of fatality rates by industry shows that workers in mining are most likely to be killed by a work-related disease, their fatal illness rates being from 5 to 35 times the national average. Miners' deaths, mostly from silicoses and other pneumoconioses, are, in large part, due to the inhalation of hazardous dusts. Fatality rates in manufacturing and construction are also above average, due in particular to the widespread occurrence of asbestosis and again silicosis.

Turning to the evolution of overall occupational diseases, the data show, for many OECD countries, a strongly increasing trend. This may, to a certain extent, be attributable to changes in definition, relaxed requirements for filing claims and a generally raised

public consciousness in health matters. Nonetheless, this trend is disquieting — not the least because it shows that officially registered occupational diseases may be only the tip of the iceberg with regard to workplace illness. However, it remains true that the majority of countries record a much lower number of diseases yearly (from 1 to 5 reported cases per 1 000 employees) than of time-loss injuries (between 30 and 70). When illnesses are analysed by industry, mining and quarrying shows, in almost all countries, the highest illness rates, but falls behind manufacturing when the total number of illnesses is counted.

The analysis of accidents in last year's *Employment Outlook* revealed a figure of around 16 000 fatalities and over 10 million occupational injuries throughout the OECD area. Such estimates are much harder to come by in the case of occupational disease and fatalities due to illness. Even if Chart 4.1 suggests a roughly comparable aggregate amount of deaths from both causes, it would not be correct to extrapolate this finding to all OECD countries. For the United States, for example, Barth and Hunt (1980) report estimates that range from 10 000 to 210 000 deaths due to occupational illness, while the

Bureau of Labor Statistics lists only between 3 000 and 4 000 deaths annually due to injury and illness combined. Similar discrepancies emerge in some countries as to the overall amount of occupational diseases.

Occupational disease and injury are part of the human and social costs of production. Combining loss of output due to injury and illness with expenditure on treatment and administrative costs of public bodies, some major studies have given estimates of total costs of occupational injury, disease and death in the range of about 1 per cent to almost 4 per cent of GDP. Against this background, but also as part of a drive to “humanise the workplace”, many OECD countries have, during the 1970s and 1980s, enacted new laws on occupational health and safety. These have emphasized a preventive orientation, strengthened employer obligations for the provision of hazard-free working conditions and institutionalised various forms of employee involvement. While there is widespread agreement on the need for public intervention in this area, major efforts by governments and the social partners are undoubtedly still required to keep both health hazards and accident risks under control.

## FURTHER NOTE ON OCCUPATIONAL ACCIDENTS

The chapter on Occupational Accidents published in the *1989 Employment Outlook* found a levelling-out of declines in non-fatal accident rates in a number of countries and increasing trends in Canada and the United States (since 1983), Portugal (since 1986) and Spain (since 1985). Recent information indicates that the increase continued for 1988 in the United States, and for both 1988 and 1989 in Spain. In addition, recent analysis undertaken by the French authorities shows that, for the first time in over a decade, the accident rate in France has been on the increase in 1988 and 1989.

During 1988, while overall French employment increased by around 1 per cent, the number of occupational injuries registered with insurance agencies for private industry increased by 4 per cent, and the number of fatal accidents by 7 per cent. In the first 11 months of 1989, the number of injuries continued to rise, this time even by 9 per cent, a rate much higher than the growth in employment and working hours experienced during that period [Liaisons Sociales (1990)].

This increase could be associated with the current phase of the business cycle. Previous studies have argued that injury rates may rise in periods of economic expansion because of the increased hiring of new and inexperienced workers [Robinson (1988); Travail et Sécurité (1988)]. Short tenure and high labour turnover are generally believed to contribute greatly to the overall number of workplace injuries. An analysis of workers' compensation data in the United States, for example, showed that in the late 1970s, around 40 per cent of all registered injuries occurred during the first year of employment. Similarly, a more recent study of accidents suffered by nursing aides working in nursing homes showed that more than half of the injured had worked less than one year in the nursing facility [Root and Hoefer (1979); Personick (1990)].

Following a related line of investigation, a recent study undertaken by the French health insurance fund focuses on the increase in precarious forms of employment as a main cause for the observed increase in occupational accidents. In France, during 1989, the approximately 600 000 employees under fixed-term contracts and the 280 000 temporary workers under contract with employment agencies represented approximately 7 per cent of all wage- and salary-earners, i.e. twice the amount of just four years ago.

This increase in labour market flexibility seems to have negative effects on occupational health and safety. The study found that temporary employees in France suffer from occupational accidents at a rate two and a half times higher than regular employees. Blue-collar workers above the age of 40 are most affected. If one controls for the fact that temporary workers are more often male, young and employed in manufacturing or construction — i.e. categories with a greater exposure to occupational risks — there remains a considerably (by around 50 per cent) higher probability for temporary workers to undergo an occupational accident [Liaisons Sociales (1990)]. The French analysis attributes this phenomenon to a general lack of safety precautions taken for temporary and other contingent workers. Temporary employment agencies do not always verify the exact qualifications of those workers they contract out to enterprises. Second, the period of initiation for a new hire — or succession of new hires that stay only for a limited duration — to his or her workplace is often substantially shortened. The temporary staff, moreover, could be assigned to unpleasant and potentially hazardous work which the core workforce might be hesitant to take on. Finally, the user enterprise may not always hand out to such workers the necessary safety equipment.

A further problem is posed by the increasing use of subcontractors to perform jobs formerly done by dependent employees. Here, too, the user enterprise may feel exempt from the strict safety requirements imposed by law or collective agreement.

## NOTES

1. Epidemiology provides a basis for identifying various causal factors, and evaluating their contributions to the occurrence of a disease. In combination with data on the amount of the disease occurring at a given time, and knowledge of the usual time interval between exposure to a risk factor and occurrence of the disease, the contribution to the disease of an occupation at a relevant time in the past can be estimated. Furthermore, if the occupational causal factor is well defined, measurement of numbers of persons exposed, and of levels of exposure may enable the prediction of the contribution of occupational factors to the future occurrence of the disease, and modelling of the effects on disease of possible levels of exposure control.
2. Furthermore, it may, in some instances, even be difficult to clearly separate out accidents from diseases. Thus, acute poisoning due to some obvious incident is usually recorded as an occupational accident. However, poisoning symptoms may also be due to long-term exposure and continuous build-up of poisons in the body; the particular incident may have added only a fraction to the overall poisoning level.
3. The ILO list which was first established in 1925 has, since then, expanded from 3 to 29 recognised occupational diseases.
4. However, both Labour Canada and the Australian Occupational Health and Safety Commission have indicated to the OECD Secretariat that they consider these figures unrealistically low.
5. It is therefore important that companies continue efforts to minimise dust emissions and that national laws and regulations specify maximum allowable dust concentrations [ILO (1986); Rogan and McIntock (1983)].
6. Current cases of asbestosis and mesothelioma reflect, to a large extent, exposure to asbestos from the 1950s and 1960s. For example, female workers from Nottingham (United Kingdom) who, during World War Two, had produced filters for gas masks using asbestos material, often showed the first symptoms of mesothelioma only in the late 1970s. Since the use of asbestos in the industrialised countries reached its peak between 1965 and 1975, the number of cases of asbestosis and mesothelioma may continue to increase.
7. For the reasons discussed in Section **B**, comparisons of rate levels reflect national reporting practices as much as differences in actual rates of occupational illness.
8. In some years, more cases are even recognised than new ones reported. This is mainly due to the fact that occupational injuries reported by enterprises may subsequently be reclassified as occupational diseases.
9. At the 2-digit level, data from the United States show incidence rates in food products and transportation equipment to be especially high. In Sweden, the highest incidence rates are found in basic metal industries; manufacture of non-metallic mineral products; and food products (in that order).