

LONDON LIFE 1982 OCCUPATION STUDY

BY

GUY ENGELS, F.C.I.A.

TABLE OF CONTENTS

	Page
Abstract	1
Introduction	2
Canadian Occupational Injury Experience	3
Provincial Workers' Compensation Boards' Occupational Experience	12
1. Ontario's Accident Experience by Occupational Group	12
2. Quebec Occupational Deaths	12
3. Alberta Fatal Claims by Occupational Group	13
4. Saskatchewan's Accident Experience by Occupational Group	13
Intercompany Individual Occupational Mortality	24
Intercompany Group Life Insurance Occupational Mortality	28
London Life's Occupational Mortality Experience	31
London Life's Occupational Rating Issue Statistics	31
London Life's Occupational Disability Experience	33
London Life's Existing Individual Occupational Ratings	33
Occupational Safety Regulations	34
London Life's Revised Occupation Schedule	35
References	43

LONDON LIFE 1982 OCCUPATION STUDY

ABSTRACT

An indepth review of Canadian occupational mortality and morbidity experience was made to generate a revised occupation schedule for Individual underwriting. Although numerous occupational groups had ratings removed or reduced, several other occupational groups required a strengthening of the ratings to properly reflect the experience that was documented.

The report begins with a presentation of Canadian occupational injury experience compiled by Labour Canada covering the years 1969 to 1978. A broad understanding of the incidence of occupational mortality and morbidity risks is reaped from this review. Valuable information on occupational experience was collected from the various Workers' Compensation Boards from across Canada. The table of rates for the Workers' Compensation Boards of the provinces of British Columbia, Alberta, Saskatchewan, Ontario and New Brunswick were analyzed. Each province has a table of rates which is updated periodically reflecting the disability and fatality experience of that particular province for the previous years. These tables proved quite useful since they provide very detailed ratings on each specific type of occupation.

The latest Intercompany studies for Individual and also for Group life insurance occupational mortality were analyzed. Unfortunately, the latest Individual Intercompany study was the 1967 Study which is no longer felt to be appropriate for a modern occupation schedule. On the other hand, the Group Intercompany Study was just completed and covers the experience between the years 1975 and 1979. This study proved to be quite useful in collaborating the relative incidence of risk between occupations.

London Life's own occupational experience was also carefully studied. London Life's occupational mortality experience for the years 1975 to 1980 reflects the underwriting of past years. All of London Life's 1981 accidental death claims resulting from occupational causes were individually reviewed. This provided a direct indication of hazardous occupations for life insurance coverage. An understanding of the significance of occupational ratings to our underwriting operation was gathered by reviewing the volume and distribution of cases rated for occupational hazards during 1980. The majority of 1981 London Life disability claims which were the result of an accident at a workplace were individually analyzed. Similarly to the death claims, these claims openly recognized hazardous occupational disability risks. London Life's existing occupation schedule is summarized with respect to life insurance, disability benefit, and accidental death benefit ratings.

An overview of current Canadian legislative occupational health and safety regulations is given. The direction of various organized movements for occupational safety is brought up-to-date.

The revised occupation schedule which London Life adopted as a result of this study is presented. Although competition position influenced the design of the new schedule it primarily evolved from documented experience of occupational hazards and future outlook for the same.

LONDON LIFE 1982 OCCUPATION STUDY

INTRODUCTION

Occupational risk assessment continues to be an important aspect of underwriting at London Life. A major segment of our marketing sales includes the lower socioeconomic strata within Canada. A large number of our applicants are engaged in occupations which involve additional occupational mortality or morbidity hazards. This is why we have an incentive for up-to-date detailed knowledge on the incidence of occupational risks. Our interest may be more so than many of our competitors who sell in markets which do not expose them to the same degree to these types of risks. In particular, since we continue to sell the Individual income disability rider benefit with its associated potential costly claims, occupational disability risk assessment is more pertinent than if we were just in the Individual waiver disability rider benefit market like many other insurance companies.

London Life has continued to sell only in the Canadian market. Therefore, it is most important that any unique risks associated with in Canada's environment be recognized in underwriting ratings which are established. The occupation rating schedule which was developed may not be totally comparable to other occupation schedules which are meant to apply to Canada and the United States. The revised schedule reflects the latest documented experience for Canada to every extent possible.

All fields of occupational risks were analyzed within this study except those pertaining to professional sports or aviation hazards. These two special categories have rating schedules unique to themselves and were not dealt with within this study.

Traditionally, occupational risks which have been recognized in underwriting life insurance coverage have pertained to the additional hazards of peoples' working environments which subject them to greater probabilities of accidental death or death due to environmental illnesses. The emphasis in the past, however, has been on additional accidental death elements. Workers primarily in the high accidental death environments of mining, lumbering, fishing, and construction have been the ones which the insurance industry has been underwriting for occupational hazards. The impact of industrial safety regulations has significantly diminished the relative magnitude of accidental occupational deaths. There is emerging a growing awareness of the additional hazards presented by industrial diseases. Occupational underwriting in the future must change to emphasize scrutiny of environments containing exposures to carcinogens, toxic substances, and dusts. This has been done to a very limited extent in the past but must be dramatically expanded if occupational factors are to be a viable consideration in life coverage risk assessment.

Stress elements of an occupation are not presently recognized in individual insurance underwriting. If methods of discrimination by occupational stress levels could be developed from mortality experience this may prove a valuable tool in appropriate risk assessment. The individuals to which stress hazards apply are those in the higher socioeconomic strata. Insurance underwriting today does not ignore the impact of improperly managed stress of their applicants if medical health has been impaired as a result. If for example, high blood pressure or alcohol abuse, which may result from the presence of stress, are present at the time of application for insurance, adverse underwriting action would be considered. The insurance industry should be anticipating the potential risk before the impact on health has taken place. Occupational stress hazards were not researched within this study but is an area of great potential interest.

CANADIAN OCCUPATIONAL INJURY EXPERIENCE

Labour Canada has for the first time put together work injury statistics for Canada covering the years 1969 to 1978¹. They collected their information from the various Workers' Compensation Boards across Canada.

Shown in Table 1.1 is year by year number of non-fatal and fatal injuries, the number of people employed, and the injuries per 100 workers. In Canada the disabling injury incidence rates have been increasing more quickly than the non-disabling injury rates. In fact, the non-disabling injury rates have decreased over the past ten years. This is shown in Chart 1.

The fatality incidence rates in Canada increase when there is an expansion in the Canadian economy. This can be seen quite clearly in Chart 2 where we see a large hump in 1973 and 1974 in the number of occupational deaths corresponding to the expansion of the Canadian economy in those years. Also, since 1974, there has been more of a shift to service vs goods-producing sector employment and this has contributed to the decrease in fatality rates. This goes hand in hand with the increase in the number of women in the work force again contributing to lower fatality rates.

In Table 1.2 is shown the average annual number of fatalities that have occurred within each industry in Canada between the years 1969 and 1978. In addition is shown the fatality rate per thousand individuals. The greatest number of individuals die in manufacturing, transport, construction, mining, and forestry. On the other hand, the greatest risk of death occurs in fishing, forestry, mining, construction, and transport. On the average 1,134 Canadians have died each year as a result of their occupations.

Table 1.3 outlines the fatalities in Canada by occupation. The greatest number of deaths occurred in transport equipment operation, construction trades, mining and quarrying, service, processing, and forestry and logging. In Table 1.4 there is a correlation made between industries and occupations.

Fatalities in Canadian industry subdivided by injury and illness for the years 1975 to 1978 are illustrated in Table 1.5. The startling statistic appears that 48% of individuals dying in mining-related industries die because of an illness related to the occupation. The corresponding percentage for manufacturing is also quite high at 21%. The next highest industry is the construction industry at 4%.

Work injury experience for industries under Federal jurisdiction was also studied separately in the report. About 3,500 employers under Federal jurisdiction are registered with the Occupational Safety & Health Branch as being covered by the Canada Labour Code. In Table 1.6 are tabulated the fatalities for the years 1973 to 1978. More than 33% of the fatalities involved rail and road transport. A significant number of deaths also occurred in grain elevators, feed flour and seed, water transport, and mining.

Labour Canada also displayed information separately for Federal Public Service Departments and Crown Corporations and Agencies. The total number of employees covered as of the end of 1979 was approximately 350,000. During the period 1970 to 1978, 147 fatalities in the Federal Departments and 76 in Crown Corporations and Agencies were reported. In 1979 the greatest number of fatalities in the Federal Crown Corporations and Agencies was reported of which 12 were from the Cape Breton Development Corporation. This large number of deaths resulted from a coal mine explosion. However, the total number of fatal accidents in this Corporation over the ten year period still accounts for more than 50% of all fatal claims reported by Federal Corporations and Agencies. Approximately 60%

of the total fatalities reported over the ten year period in Federal departments were in Indian Affairs and Northern Development (25), Marine Transport (18), National Defence (17), Post Office (10), Air Transport (9), and Canadian Penitentiary Service (8). In Table 1.7 is illustrated the experience for the Federal Public Service Departments for the fiscal year 1978-79. In Table 1.8 is shown the experience for the Federal Crown Corporations and Agencies not subject to the Treasury Board occupation and safety policy for the 1979 fiscal year.

TABLE 1.1

WORK INJURY EXPERIENCE IN CANADA 1969-78¹

<u>Year</u>	<u>Non-Fatal Disabling Claims</u>	<u>Fatal Injury Claims</u>	<u>Employment</u>	<u>Disabling Injuries Per 100 Workers*</u>
1969	289,819	1,001	6,590,700	4.41
1970	301,653	918	6,691,800	4.52
1971	312,302	924	6,849,700	4.57
1972	390,612	1,078	7,108,500	5.51
1973	437,260	1,124	7,491,400	5.85
1974	472,270	1,456	7,861,400	6.03
1975	440,051	957	7,981,200	5.53
1976	472,240	936	8,120,800	5.83
1977	454,507	831	8,339,600	5.46
1978	490,264	828	8,491,000	5.78

* Rates are understated by perhaps 20% because not all persons employed in Canada are covered by Workers' Compensation

CHART 1

OCCUPATIONAL INJURY INCIDENCE RATES IN CANADA¹

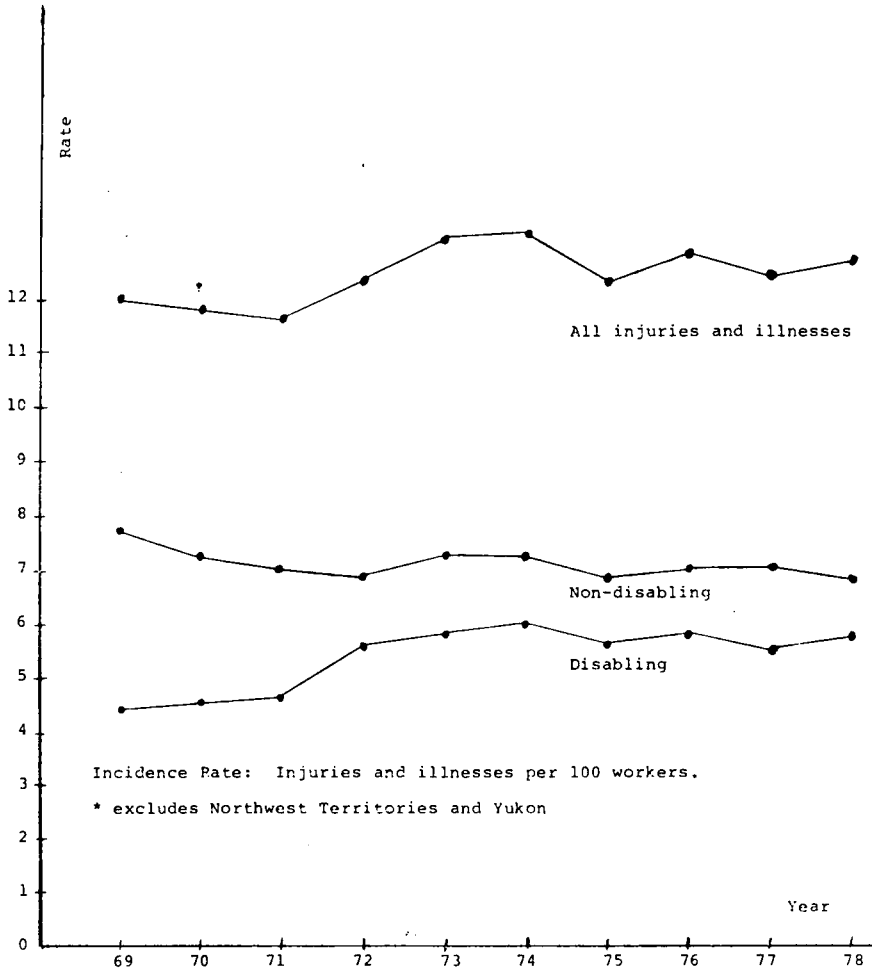


CHART 2

OCCUPATIONAL DEATHS AND EXPOSURE IN CANADA¹

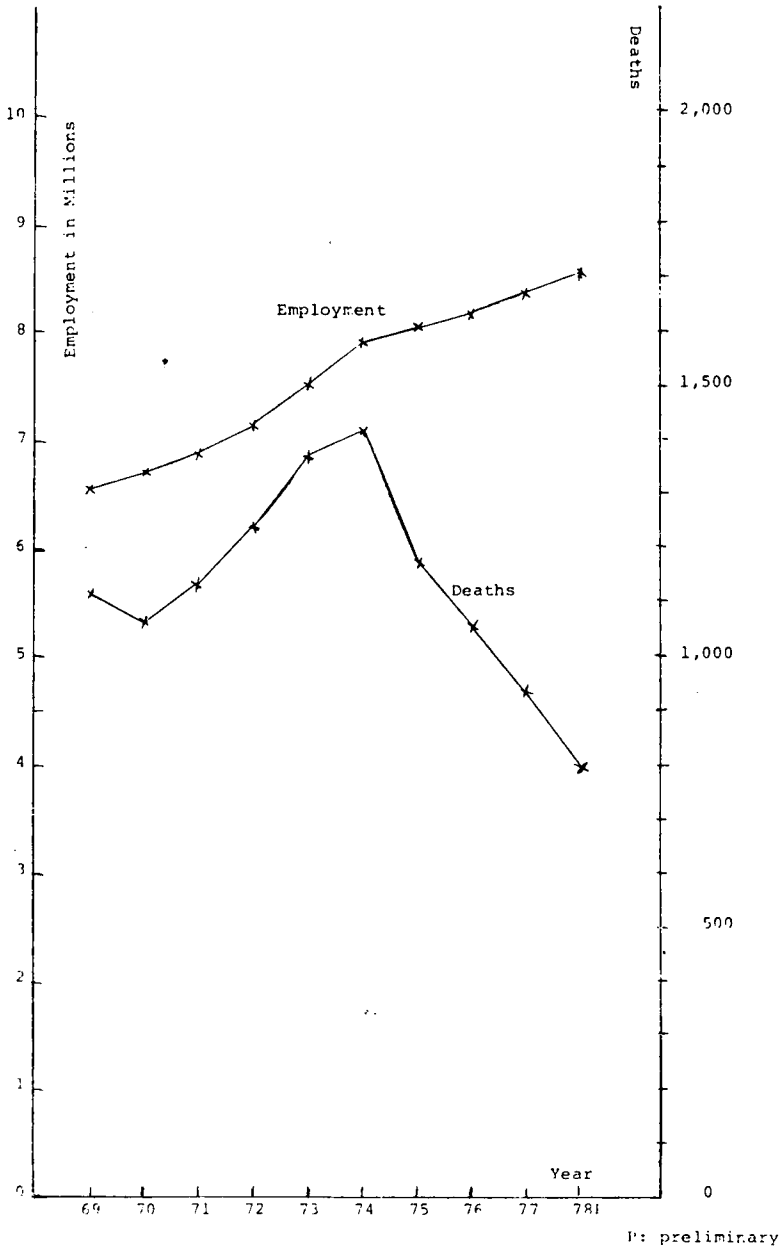


TABLE 1.2

OCCUPATIONAL FATALITIES BY INDUSTRY, CANADA 1969-78

<u>Industry</u>	<u>Average Annual Number of Fatalities</u>	<u>Percentage</u>	<u>Fatality Rate/M</u>
Agriculture	21	2%	0.2
Forestry	80	7	1.3
Fishing	17	1	2.1
Mining	160	14	1.2
Manufacturing	215	19	0.1
Construction	204	18	0.5
Transport	213	19	0.3
Trade	74	6	0.1
Finance	6	1	0.0
Service	75	7	0.0
Public Administration	69	6	0.1
	<u>1,134</u>	<u>100</u>	<u>0.2</u>

TABLE 1.3

FATALITIES IN CANADA BY OCCUPATION 1970-78

	<u>Average Annual Fatalities</u>	<u>% of Total</u>
Agriculture	19	2
Forestry and Logging	62	6
Fishing, Hunting, Trapping	18	2
Mining and Quarrying	125	11
Processing	63	6
Machining	45	4
Product, Fabricating, Repairing, Assembling	54	5
Construction Trades	158	14
Materials Handling	48	4
Transport Equipment Operation	194	17
Other Crafts and Equipment Operating	6	1
Managerial Administrative	54	5
Professional	43	4
Clerical	19	2
Sales	28	3
Service	71	6
Other	128	11
Total	1,134	100

TABLE 1.4

FATALITIES BY INDUSTRY AND BY OCCUPATION, 1978¹

Occupation	Public											Totals
	Agriculture	Forestry	Fishing	Mining	Manufacturing	Construction	Transport	Trade	Finance	Service	Administration	
Managerial, Professional	2	3	-	7	12	3	7	5	-	8	11	58
Clerical	-	-	-	-	4	-	2	4	-	1	1	12
Sales	-	-	-	-	3	-	-	14	1	-	-	18
Service	-	-	-	-	3	3	8	1	1	18	27	61
Primary Occupation	4	51	9	73	11	7	2	-	-	1	-	158
Processing	-	1	-	3	60	6	7	12	-	1	1	91
Construction Trades	-	2	-	2	8	82	17	-	1	-	5	117
Transportation	-	6	4	2	9	2	104	7	-	6	1	141
Materials Handling and Other Crafts	-	2	-	9	9	23	14	3	-	1	3	64
Not Elsewhere Classified	-	6	1	4	23	7	11	5	1	5	11	74
Total	6	71	14	100	142	133	172	51	4	41	60	794

TABLE 1.5

FATALITIES IN CANADIAN INDUSTRY BY OCCUPATIONAL INJURY AND ILLNESSES, 1975-78

	Cause of Occupational Fatalities			Percentage of Fatalities Caused by Illnesses
	Injuries	Illnesses	Total	
Agriculture	53	0	53	0%
Forestry	265	0	265	0
Fishing	86	0	86	0
Mining	285	262	547	48
Manufacturing	583	157	740	21
Construction	682	27	709	4
Transport	772	10	782	1
Trade	257	4	261	2
Finance	26	0	26	0
Service	247	3	250	1
Public Administration	243	5	248	2
Total	3,499	468	3,967	12%

TABLE 1.6

Fatalities by Industries Under Federal Jurisdiction, 1973-1978¹

Industry	1973	1974	1975	1976	1977	1978	Total
Air Transport	0	0	6	8	1	0	15
Banking	0	0	0	0	1	0	1
Bridges and Tunnels	0	0	0	0	0	0	0
Broadcasting	0	0	0	0	1	0	1
Communication	0	1	1	0	0	0	2
Crown Corporations	2	1	1	0	0	0	4
Feed, Flour, Seed	0	3	4	7	0	3	17
Grain Elevators	3	3	7	1	5	0	19
Longshoring	1	2	2	1	4	2	12
Mining	2	1	0	4	5	2	14
Pipelines	0	0	1	4	0	0	5
Postal Contractors	0	0	0	1	0	0	1
Railways	5	3	5	3	7	3	26
Road Transport	5	10	5	9	7	2	38
Water Transport	2	1	7	1	2	2	15
Total	20	25	39	39	33	14	170

TABLE 1.7
INJURY EXPERIENCE OF FEDERAL PUBLIC SERVICE DEPARTMENTS¹
1978/79 FISCAL YEAR

<u>Department</u>	<u>Person- Years</u>	<u>Injuries per 100 Employs.</u>	<u>Disabling Injury Frequency Rate*</u>
Post Office	62,167	18.62	62.12
Transport (Marine)	5,736	15.41	29.55
National Defence	40,425	13.34	33.87
Canadian Penitentiary Services	10,473	13.05	34.33
Canadian Grain Commission	1,080	12.31	33.33
National Capital Commission	1,012	11.76	24.70
Solicitor General	232	9.91	17.24
Public Works	9,967	6.50	16.65
Agriculture	10,273	6.30	13.92
Transport (Air)	13,593	6.08	15.12
Indian Affairs and Northern Development	12,743	5.96	13.58
Parliament	3,282	5.36	8.38
Environment	12,187	5.25	8.74
Veteran Affairs	7,126	4.93	15.09
Regional Economic Expansion	2,087	4.79	11.98
Public Archives	721	4.44	12.48
Canadian Livestock Feed Board	24	4.17	20.83
Canadian Government Printing Bureau	1,651	4.06	12.42
Royal Canadian Mountain Police	3,236	3.99	8.03
National Museums of Canada	1,005	3.78	5.97
Energy Mines and Resources	3,904	3.07	3.97
Finance	714	2.94	4.90
National Health and Welfare	10,494	2.77	6.15
Customs and Excise	9,892	2.73	6.07
Labour	764	2.49	4.58
Government House	89	2.25	5.62
Chief Electoral Officer	15	2.22	0.00
Supply and Services	9,136	2.04	4.98
Consumer and Corporate Affairs	2,676	1.98	4.48
Transport (Administration)	1,703	1.88	4.40
Supreme Court of Canada	223	1.79	4.48
Taxation	16,194	1.77	3.64
National Library	494	1.62	5.06
Statistics Canada	5,111	1.57	3.72
Communications	2,171	1.43	3.68
Loto Canada	140	1.43	7.14
Auditor General	506	1.38	4.94
Employment and Immigration	24,695	1.13	2.49
Insurance	203	0.99	2.46
National Energy Board	362	0.83	1.38
Public Service Commission	3,409	0.73	1.47
Canadian Transport Commission	878	0.68	2.28
Secretary of State	3,441	0.64	1.74
Canadian International Development Agency	969	0.62	0.52
Canadian Radio-Television Commission	492	0.61	0.00
Science and Technology	168	0.60	0.00
Industry Trade and Commerce	2,890	0.59	0.69
Urban Affairs and Housing	185	0.54	2.70
External Affairs	5,666	0.49	0.97
Treasury Board	867	0.46	0.00
Justice	1,164	0.34	0.43
Anti-Inflation Board	635	0.31	0.79
Canada Labour Relations Board	103	0.00	0.00
Commissioner of Official Languages	98	0.00	0.00
Immigration Appeal Board	80	0.00	0.00
International Joint Commission	47	0.00	0.00
Law Reform Commission	87	0.00	0.00
Privy Council Office	537	0.00	0.00
Representation Commissioner	6	0.00	0.00
Tariff Board	41	0.00	0.00
Tax Review Board	38	0.00	0.00

*Calculated on the basis of 2,000 person-hours per person-year (employee).

TABLE 1.8

INJURY EXPERIENCE OF FEDERAL CROWN CORPORATIONS & AGENCIES
NOT UNDER TREASURY BOARD OCCUPATIONAL SAFETY POLICY¹

Agency	Person-	Injuries per	Disabling Injury
	Years	100 Employs.	Frequency Rate*
	Fiscal	Year 1978/1979	(preliminary)
Freshwater Fish Marketing Corp.	195	90.77	202.56
Cape Breton Development Corp	3,553	73.91	281.45
Eldorado Nuclear Ltd	1,462	26.74	60.88
Electoral Boundaries Commission	4	25.00	0.00
Northern Transportation Company	368	23.64	35.33
Eldorado Aviation Ltd.	53	22.64	28.30
National Harbours Board	2,130	15.59	46.48
Atlantic Pilotage Authority	99	14.14	35.35
Northern Canada Power Commission	334	13.77	32.93
St. Lawrence Seaway Authority	1,314	13.47	35.39
Royal Canadian Mint	667	12.29	36.73
Canadian Arsenals Ltd.	435	11.95	47.13
International Pacific Salmon Fisheries	70	10.00	0.00
Seaway International Bridge Corp. Ltd.	21	4.76	23.81
National Research Council	3,158	4.05	9.18
Atomic Energy of Canada	6,218	3.83	7.08
Central Mortgage and Housing Corp.	3,761	3.83	9.04
Great Lakes Pilotage Authority	138	3.62	18.12
National Art Centre Corp.	405	3.46	7.41
Canadian Saltfish Corp.	30	3.33	16.67
Canadian Broadcasting Corp.	12,487	3.19	5.65
Petro Canada	817	3.18	4.90
Bank of Canada	2,047	2.54	2.69
Laurentian Pilotage Authority	88	2.27	11.36
National Film Board	1,017	2.06	5.41
Teleglobe Canada	1,178	2.04	6.79
Pacific Pilotage Authority	56	1.79	0.00
Public Service Staff Relations Board	180	1.67	0.00
Defence Construction Ltd.	263	1.52	3.80
Atomic Energy Control Board	180	1.11	2.78
Economic Council of Canada	133	0.75	3.76
Export Development Corporation	361	0.55	0.00
Farm Credit Corp.	720	0.42	0.69
Canada Depost Insurance Corp.	4	0.00	0.00
Canadian Council of Resource Ministers	3	0.00	0.00
Canadian Film Development Corp.	22	0.00	0.00
Crown Assets Disposal Corp.	67	0.00	0.00
International Development Research Centre	355	0.00	0.00
International Northwest Atlantic Fisheries	14	0.00	0.00
International Pacific Halibut Fisheries	3	0.00	0.00
Jacques Cartier and Champlain Bridge Inc.	27	0.00	0.00
Medical Research Council	40	0.00	0.00
Northern Pipeline	37	0.00	0.00
Science Council of Canada	63	0.00	0.00
Standards Council of Canada	53	0.00	0.00

*Calculated on the basis of 2,000 person-hours per person-year (employee).

PROVINCIAL WORKERS' COMPENSATION BOARDS OCCUPATIONAL EXPERIENCE

One valuable source of occupational mortality and morbidity experience was information collected from the various Workers' Compensation Boards from across Canada. Each province has a table of rates which is updated yearly reflecting the disability and fatality experience for the previous years. The table of rates are quite detailed for each type of occupation. The rates primarily reflect disability experience more so than the mortality experience of the various occupations. The relative analysis of the various rates was used to determine the relative risks of the occupations involved with respect to long term disability. One assumption that was made which was felt to be valid was the proportion of shorter term disabilities in the various occupations would also be indicative of the proportion of long term disabilities within the various occupations. The table of rates were analyzed for the provinces of British Columbia, Alberta, Saskatchewan, Ontario, and New Brunswick.

The various Workers' Compensation Boards also sent me additional information to analyze the mortality rates of the various occupations as well as to give me a better handle on the disability incidence rates. The specific data by province which I was able to compile are described below.

1. Ontario's Accident Experience by Occupational Group

Summarized in Table 2.0 is Ontario's Accident Experience by occupational group for the years 1976 to 1980. I have only shown the occupational groups where the accident frequency index is at least 1.5. The accident frequency index is the ratio of the rate of disability of a particular occupational group to the overall rate of disability of all occupational groups. Thus, the accident frequency index is a measure of the relative disability risk between various occupational groups. Shown for each group is the annual life years of exposure on which the experience is based, the accident frequency index, the number of fatalities, and the fatality rate. When looking at the fatality rate it should be remembered that the average accidental death rate for insured populations is around .4 per thousand. Thus, even when the fatality rate is one per thousand this may indicate an accidental death rate which is two and a half times normal.

In mining, reduction, smelting, and treatment, the high fatality rate for gold was due primarily to a high death rate from silicosis. Occupations involved with cross-cutting, drifting or shaft-sinking in or for mines had very poor experience for both disability and life. Workers in foundries also experience a high disability rate. Occupations in ship building or repairing, car shops, and the manufacture of mineral waters or soda water also experience a high disability rate. The highest number of fatalities in any one occupation group was for truckers and warehousing. Stevedores and junk dealers had poor disability experience. Disability experience for occupations in tunnelling, erection of prefabricated structural steel, high tower work, construction of breakwaters, canals, dams, etc., was quite poor. Generally construction workers in Ontario experienced a disability rate about twice normal. The highest disability and fatality rates were experienced in the occupational group of building wreckers.

2. Quebec Occupational Deaths

Summarized in Table 2.1 are the occupational deaths which occurred in Quebec during the years 1978 and 1979. Unfortunately, the exposure is unavailable but the deaths do indicate the areas in which the major fatalities occurred. I did not display any category where the number of deaths involved were less than two.

The statistics show that more fire fighters than police died. A significant

number of people died in timber cutting and related occupations. Also a large number of deaths occurred of construction electricians and repairmen and electrical power linesmen and related occupations. The largest number of deaths occurred for truck drivers.

3. Alberta Fatal Claims by Occupational Group

Shown in Table 2.2(a) are Alberta's Fatal Occupational Claims for the years 1977 to 1980. The largest number of deaths occurred in the transport equipment operating group followed fairly closely by construction trades. Next in significance were the fatalities in mining and quarrying. Shown in Table 2.2(b) are the individual deaths that occurred in mining and quarrying occupational groups. The majority were as a result of drilling oil and gas wells.

4. Saskatchewan's Accident Experience by Occupational Group

Table 2.3 illustrates the long term disability experience for the worst occupational groups in Saskatchewan during the years 1979-1980. Again the accident frequency index indicates the relative frequency of long term disability compared to the overall long term disability rates for all occupations.

The worst experience was in the category of oil and gas drilling and service rigs. The experience was also very poor for hardrock mining, shaft sinking and cross cutting. The experience for metal foundries and mills was also quite bad.

TABLE 2.0

ONTARIO'S ACCIDENT EXPERIENCE
BY OCCUPATIONAL GROUP
1976-1980

<u>Occupational Group</u>	<u>Annual Life-Years Exposure</u>	<u>Accident Frequency Index</u>	<u>1976-1980 Fatalities</u>	<u>Fatality Rate</u>
Lumbering, logging, bark-peeling, booming, cordwood cutting, rafting, river-driving; woods operations, including construction and repair of dams, camps, buildings and roads; hauling or loading logs on cars, trucks or vessels; and catering in connection with the logging industry	10,000	2.7	57	1.1
Operation of lath-mills, sawmills, shingle mills, manufacturing of basket-bottoms, cooperage-stock, headings, spokes, staves; rossing	5,700	2.2	7	0.2
Manufacture of excelsior, hardwood flooring, wood boxes, lumber yards in connection with planing mills or sash and door factories, planing or moulding mills	6,000	2.9	-	-
Mining, Reduction, Smelting, Treatment				
- Gold	2,500	2.1	66	5.3
- Nickel, Copper	17,000	2.5	68	0.8
- Uranium	3,600	1.5	34	1.9
- All other	5,900	-	8	0.3
Diamond drilling as a business	600	3.0	1	0.5
Cross-cutting, drifting or shaft-sinking in or for mines, as a business	600	3.4	11	3.7

TABLE 2 (Cont'd)

<u>Occupational Group</u>	<u>Annual Life-Years Exposure</u>	<u>Accident Frequency Index</u>	<u>Fatalities</u>	<u>Fatality Rate</u>
Manufacture of artificial brick and stone, brick, cement blocks or tile, coal briquettes, fire-proofing, foundry-facings, peat-fuel, plaster board, plaster blocks or plaster casts, porcellan, roof tile, sewer-pipe, slate, stone or artificial paving blocks, terra-cotta, tile; Milling of gypsum, lime, limestone or other stone	9,100	2.0	44	1.0
Manufacture of abrasives, abrasive articles, artificial abrasives, alundum, carborundum	1,500	2.0	2	0.5
Foundries (malleable iron or brass or aluminum); lead works; Manufacture of babbitt metal, cast hot-water boilers and cast radiators, metal bedsteads, metal sanitary ware, metal water fixtures, pipe-fittings, wrought iron pipe or tubing	6,300	3.8	18	0.6
Fabrication of structural iron, metal, or steel	4,400	2.7	7	0.2
Ship-building or ship-repairing; operation of dry docks	900	5.0	4	0.7
Manufacture of agricultural implements, carriages, farm tractors, motor-truck bodies, sleighs, threshing machines, vehicles, other than self-propelled vehicles	17,400	2.1	4	0.0
Car shops; Manufacture of gun carriages	800	4.3	2	0.8
Well boring and drilling	400	2.9	3	1.5
Abattoirs, butchering, packing houses; Manufacture of glue, meat products; Preparation of meats	14,200	2.7	5	0.0
Manufacture of mineral waters, soda water	4,400	4.0	0	0.0

TABLE 2.0 (Cont'd)

<u>Occupational Group</u>	<u>Annual Life-Years Exposure</u>	<u>Accident Frequency Index</u>	<u>Fatalities</u>	<u>Fatality Rate</u>
Business of supplying truck drivers to industry, carting, teaming, and trucking; Operations of forwarding companies or persons engaged in the business of transportation by canoes, scows or sleighs; Sanding streets; Scavengering, Street-cleaning or removal of snow; Warehousing or storage (with carting, teaming or trucking)	45,100	2.5	91	0.4
Operation of airplanes, airships, other flying machines	1,800	0.8	22	2.3
Loading or unloading cars or other vehicles; Stevedoring; Operation of or work upon wharves	210	4.2	3	2.8
Buying and selling, with handling of second-hand materials including scrap metals; Wrecking automobiles	1,800	4.5	5	0.4
Buying and selling, with handling, of second-hand materials other than metals	300	3.5	1	0.0
Construction of airports, culverts, small bridges	9,100	1.7	30	.8
Manufacture of asphalt, paving material Construction of sidewalks	1,100	1.8	0	0.0
Blasting as a business; Construction of bridges; Bulldozer operations, landing clearing; High-rise concrete forming; laying of mains and connections; construction of pipe line; Rental and operation of construction equipment; Construction of sewers; Installation or erection of reinforcing steel; Shaft-sinking; Subway construction; Trenching; Construction, operation and maintenance of waterworks systems; Well digging; Excavating; Test boring and earth sampling	14,100	2.0	48	0.7

TABLE 2.0 (Cont'd)

<u>Occupational Group</u>	<u>Annual Life-Years Exposure</u>	<u>Accident Frequency Index</u>	<u>Fatalities</u>	<u>Fatality Rate</u>
Tunnelling	300	3.0	1	0.6
Erection of prefabricated structural steel or concrete, steel bridges	900	4.0	6	1.3
Erection, installation and repair of chimneys, fire-escapes, stacks (high metal), standpipes, water towers, windmills; wrecking of machinery; erection, installation, and repair of boilers, elevators, engines, heavy machinery, iron stairs, ornamental metal work on buildings, tanks. Electric or gas welding as a business	3,200	3.3	10	0.6
Construction of breakwaters, canals, dams, dry-docks, harbour improvements, piers, railways, wharves; Canal or dam maintenance; Diving, dredging; Caisson-work, pile-driving; Railways; Sand-sucking; Subaqueous construction	600	3.0	8	2.7
Fishery		2.5		0
Bricklaying, cement or concrete work, construction of buildings; Construction or erection of blast furnaces, chimney stacks, coke ovens, filtration plants, grain elevators, power plants, pulp mills, pumping stations, sewage disposal plants, and other high structures; Moving of houses or other buildings, lathing, mason-work, plastering, painting, roofing, sand-blasting, steam-cleaning of buildings, stone setting, structural carpentry, supplying of labour, window-cleaning	61,000	2.4	79	0.2

TABLE 2.0 (Cont'd)

<u>Occupational Group</u>	<u>Annual Life-Years Exposure</u>	<u>Accident Frequency Index</u>	<u>Fatalities</u>	<u>Fatality Rate</u>
Business of supplying labour for wrecking buildings; wrecking buildings	300	7.5	5	3.3
Electric wiring of buildings; Erection of radio and TV aerials, lightning rods; Floor laying; Gas or steam-fitting; Inspection or testing of construction projects and operating installations; Inspection of radiation devices; Installation including sale of air conditioning, commercial refrigeration, furnaces, oil-burners, and other heating appliances, metal ceiling, metal siding, other metal sheets, metal awnings, metal doors, metal screens, metal window frames; Installation of lighting fixtures, marble, mosaic, or tile. Pipe-covering; Plumbing, heating or sanitary engineering; sheet metal work	39,100	1.9	47	0.2
Caulking, decorating, glazing or installation of glass (plate or leaded), insulating, painting, steeple-jack work, weather-stripping	6,000	1.8	13	0.4

TABLE 2 .1

QUEBEC OCCUPATIONAL DEATHS*1978-79

<u>Occupation</u>	<u>Number</u>
<u>Service</u>	
Fire Fighting	8
Police & Detectives, Government	2
Police & Investigators, Private	2
Guards & Watchmen	4
Janitors, Charworkers, and Cleaners	3
<u>Forestry</u>	
Timber: Cutting and Related occupations	13
Log hoisting, sorting, moving and related occupations	4
Labouring in forestry and logging	2
<u>Mining</u>	
Rotary Well Drilling and related occupations	2
Blasting occupations	3
Mining and Quarrying: cutting, handling & loading operations	2
Labouring in mining and quarrying (including oil & gas)	3
<u>Processing</u>	
Foremen: Metal Processing and related occupations	4
Foremen: Chemicals, Petroleum, Rubber, Plastic, and related processing	2
<u>Machining</u>	
Welding and Flame cutting operations	2
Boilermakers, Platers, and Structural Metal Workers	3
Wood sawing and related occupations, except sawmill	2
<u>Product Fabricating, Assembling, Repairing</u>	
Motor Vehicle mechanics and repairmen	3
Industrial, Farm, and Construction machinery mechanics and repairmen	3
Mechanics and repairmen (except electrical) n.e.c.	5

TABLE 2.1 (Cont'd)

<u>Occupation</u>	<u>Number</u>
<u>Construction</u>	
Labouring: excavating, grading, paving	3
Excavating, Grading, Paving, n.e.c.	2
Foremen: Electrical power, lighting & wire communications	
- Equipment installing & repairing	2
Electrical Power Linemen and related occupations	9
Construction electricians and repairmen	10
Wire communications equipment installing and repairing	2
Electrical Power, lighting, & wire communication	
- Equipment installing and repairing n.e.c.	2
Carpenters and related occupations	6
Painters, paperhangers, and related occupations	2
Structural metal erectors	3
Occupations in Labouring, other construction trades	3
<u>Transport</u>	
Air pilots, navigators, flight engineers	5
Engineering officers - ship	3
Deck crew - ship	3
Truck Drivers	47
<u>Materials Handling</u>	
Hoisting operations, n.e.c.	4
Longshoremen, stevedores, freight handlers	4
Occupations labouring and materials handling	7
<u>Labouring - n.e.c.</u>	23

* Occupations with at least 2 deaths in 1978-79

TABLE 2.2(a)

ALBERTA: FATAL CLAIMS BY OCCUPATIONAL GROUP

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Forestry & Logging	3	1	5	3
Mining & Quarrying Including Oil & Gas Field	7	12	29	16
Processing	2	2	3	1
Machining & Related	6	1	4	4
Product Fabricating, Assembling & Repairing	3	4	7	3
Construction Trades	30	26	27	20
Transport Equipment Operating	40	39	46	26
Materials Handling & Related	1	5	9	3
Others	<u>68</u>	<u>63</u>	<u>52</u>	<u>31</u>
	160	153	181	97

TABLE 2.2(b)

ALBERTA

New Fatal Claims (1980) Mining & Quarrying, including oil & gasfield

<u>Injury Source</u>	<u>Nature of Injury</u>	<u>Industry</u>
Hydrogen Sulphide	Systemic Poisoning	Operation of battery tanks
Derrick floor or ramp	Multiple injuries	Drilling of oil & gas wells
Radium	Radiation effects	Federal Government
Drilling pipe	Multiple injuries	Drilling of oil & gas wells
Material from mine shafts, drifts etc.	Fracture	Underground Coal Mining
Material from mine shafts, drifts etc.	Multiple injuries	Underground Coal Mining
Material from mine shafts, drifts etc.	Fracture	Underground Coal Mining
Material from mine shafts, drifts etc.	Fracture	Underground Coal Mining
Highway vehicles, powered	Multiple injuries	Cement & Chemical treatment of Wells
Pressure lines	Multiple injuries	Drilling of oil & gas wells
Transportation pipe (oil, gas)	Multiple injuries	Cement & Chemical treatment of Wells
Miscellaneous (lighting, sports, etc.)	Multiple injuries	Drilling of oil & gas wells
Buildings or Structures	Multiple injuries	Drilling of oil & gas wells
Drilling pipe	Multiple injuries	Drilling of oil & gas wells
Derrick floor or ramp	Multiple injuries	Drilling of oil & gas wells

TABLE 2.3

SASKATCHEWAN'S ACCIDENT EXPERIENCE
BY OCCUPATIONAL GROUP

<u>Industry Description</u>	<u>Accident Frequency Index</u>	
	<u>1979</u>	<u>1980</u>
Grain elevators and inland terminals	3.2	2.7
Building construction and related trades	2.3	2.1
Conventional and solution potash mining and refining	1.9	1.8
Oilwell maintenance, water well drilling	0.9	2.6
Oil and gas drilling and service rigs	7.4	4.3
Hardrock mining, shaft sinking and cross cutting	6.3	4.1
Logging of saw timber, pulpwood, ties, poles, posts	2.3	4.2
Sawing, planing, stud and chip mills, peeling, preserving, creosoting	3.1	1.0
Pulp and Paper mills	2.2	1.0
Veneer-plywood and hardboard manufacture	3.0	1.0
Processing meat, poultry, fish	3.7	2.7
Metal manufacturing, machine shop, concrete block and ready-mix	2.2	2.1
Metal foundries and mills	3.8	3.6
Road construction, earthwork, sewer and water and tunnelling	3.0	2.9
Commercial trucking, warehousing	1.6	1.8
Railway	1.7	2.0

INTERCOMPANY INDIVIDUAL OCCUPATIONAL MORTALITY

The most recent intercompany study of Occupational Mortality was the 1967 Occupation Study². This report covered the issues of 1949 to 1963 exposed in anniversaries 1954 and 1964. Therefore, the appropriateness of the information may be questioned because of the length of time since the study has been performed. This study was limited to policies issued substandard for occupation and to standard policies where prior experience for the occupation had indicated that mortality above the standard level might be expected.

A summary of the results of the 1967 Occupation Study is shown in Table 3.0. Only those occupations with the highest mortality rates are displayed. London Life's current occupational ratings are based to a large extent on the results of this study. The study did show vast improvement in many occupations over the previous intercompany individual study.

An important observation from this study was that the sedentary nature of certain occupations, combined with lifestyle, eating and drinking habits, smoking, lack of health awareness, etc., may have at least as great an influence on the overall mortality of blue collar workers as the accident and health hazards directly associated with occupation. For example, among occupations with mortality in excess of 1.5 extra deaths per thousand, those with a high accidental death rate except B.C. lumbermen, generally did not experience any higher total mortality than those with a low accidental death rate. Apparently, the more strenuous physical activity and other forces made them less susceptible to the health problems experienced by those with more sedentary occupations.

TABLE 3.0
INTERCOMPANY 1967 OCCUPATION STUDY
OCCUPATION WITH HIGHEST MORTALITY RATES

<u>Occupation</u>	<u>Deaths</u>	<u>Extra Deaths Per M</u>	<u>Mortality Ratio</u>	<u>Acc. Death Per M</u>
Fishing:				
Deep sea and Great Lakes	23	2.71	181	1.06
Forestry, Lumbering, Logging:				
Lumberman - Pacific area	39	5.80	414	.81
Lumberman - area not specified	29	2.01	201	2.62
Underground Mining - No Underground Duties:				
Other - operative & laborers	12	2.44	223	1.84
Underground Mining - Working Underground:				
Machinists & mechanics	37	2.92	203	1.56
Coal miners: Pennsylvania	50	1.82	161	1.16
Coal miners: Other areas	131	2.15	178	1.92
Coal miners: Area not specified	34	2.27	167	1.82
Non-metal miners	43	2.51	259	2.29
Other Extraction of Minerals:				
Open pit miners	34	2.12	182	1.39
Manufacturing - Chemical and Explosives:				
Explosives - skilled workers	9	2.70	200	-
Explosives - laborers	10	4.56	370	-
Manufacturing - Metals:				
Boilermakers	30	2.30	180	.86
Furnacemen - foundries	14	2.18	183	-
Electrical and Telecommunications:				
Construction workers	27	3.44	306	2.46
Construction:				
House painters (S.S.)	8	4.55	212	-
Cranemen, derrickmen, hoistmen (S.S.)	82	2.35	173	.55
Road and street operatives	24	.69	129	-
Structural iron working supervisors, painters, operatives	103	2.10	210	1.71

<u>Occupation</u>	<u>Deaths</u>	<u>Extra Deaths Per M</u>	<u>Mortality Ratio</u>	<u>Acc. Death Per M</u>
Railroads:				
Brakemen (S.)	15	2.23	197	.91
Conductors (S.S.)	94	2.38	150	.76
Engineers (S.)	23	2.47	179	.73
Engineers (S.S.)	147	3.49	159	.51
Firemen (S.)	15	1.93	231	1.61
Road & Street:				
Taxi drivers (S.S.)	54	2.18	152	.35
Truck drivers (S.S.)	49	2.48	193	.63
Marine:				
Captains, mates, engineers (S.S.)	77	2.38	167	1.39
Trade; Other:				
Hucksters & Peddlers	9	3.57	184	-
Protective Service:				
Guards and watchmen - penal	39	2.60	184	1.02
Guards and watchmen - other (S.S.)	138	4.49	180	.36
Special officers & guards in banks, etc.	20	5.21	227	-
Police:				
Marshals, sheriffs, constables	23	2.60	179	.77
State police	26	3.28	255	1.04
Building and Personal Service:				
Porters (except stores & rr)	52	2.22	151	-
Elevator tenders (S.)	14	3.35	202	-
Liquor:				
Wholesale warehouse trade - mgrs & dealers	12	4.95	244	-
Retail dealers (S.S.)	9	5.72	227	-
Salesmen (S.S.)	58	2.34	164	-
Drivers	32	2.19	177	.47
Deliverymen	57	2.01	183	.70

TABLE 3.0 Cont'd

<u>Occupation</u>	<u>Deaths</u>	<u>Extra Deaths Per M</u>	<u>Mortality Ratio</u>	<u>Acc. Death Per M</u>
Hotels, Restaurants, Bars:				
Keepers & Managers (no liquor sold) (S.S.)	15	4.00	189	1.70
Waiters	123	2.37	170	.94
Saloon keepers (S.S.)	339	2.05	162	.43

INTERCOMPANY GROUP LIFE INSURANCE OCCUPATIONAL MORTALITY

The latest published data on Group Life Insurance Mortality provides a good source of experience for occupational mortality between the years 1975 and 1979³. This group experience reflects experience for both the United States and Canada. For ages under 65 specific illustration is made of accidental death claims as well as all other death claims, while for ages over 65, all death claims are analyzed in one group. I have extracted the most significant data and summarized it on Table 3.1. The experience is illustrated only for industries where the accidental death claim index was at least 1.3 under age 65 or the mortality ratio was greater than 120% for any age. By the accidental death claim index I mean the ratio of the accidental death claim rate for that particular industry compared to the overall accidental death claim rate which was .39 per thousand. This accidental death claim rate overall compares almost exactly with what London Life has been experiencing on its individual business.

The first broad category analyzed is agriculture, forestry, and fishing. The accidental death claim rate for agricultural production of crops was about 50% higher than average while the overall death claim rate was about 15% less than the composite. The overall forestry experience was quite acceptable. The accidental death claim experience for fishing, hunting, and trapping was quite high at 3.6 times the regular experience.

For mining occupations, the accidental death rate was high for all categories, but especially so for metal mining, and oil and gas extraction. As well, the overall mortality rates for metal mining was extremely high.

Construction presented high accidental death rates, but overall mortality rates were generally quite acceptable.

The various manufacturing industries presented additional mortality risks. The highest accidental death rates were experienced in the lumber and wood products industry, petroleum refining and related industries, iron and steel foundries, fabricated structural metal product industries, construction and heavy machinery manufacturing. The highest overall mortality rates were experienced by tobacco manufacturers, leather products manufacturers, miscellaneous non-metallic mineral products manufacturers, blast furnace and basic steel products manufacturing, and ordnance and accessories manufacturing.

In the transportation, communication, and public utilities occupations, the railway transportation, water transportation, and pipeline transportation jobs presented very high accidental death rates. Overall high mortality rates were experienced in the local and interurban passenger transit occupations, pipeline transportation occupations, and gas production and distribution occupations.

In the retail trade area, small merchandise stores presented extremely high overall mortality rates which may be reflected by a very high average age of these small businessmen.

In the services industries, the automotive repair jobs reflected a high accidental death rate.

TABLE 3.1

INTERCOMPANY GROUP LIFE INSURANCE MORTALITY*³

1975-1979

Industry	Under Age 65					Over Age 65	
	All Claims			All Claims		All Claims	
	#	Rate	Index	#	M.R.	#	M.R.
A. Agriculture, Forestry, and Fishing							
Agricultural production - crops	74	.57	1.5	423	86%	274	86%
Fishing, hunting, trapping	3	1.42	3.6	10	90	9	119
B. Mining							
Metal mining	42	1.91	2.6	242	146%	25	188%
Anthracite mining	2	.62	1.6	15	98	5	66
Bituminous coal and lignite mining	37	.94	2.4	175	116	92	100
Oil and gas extraction	122	1.14	2.9	609	104	448	112
Non-metallic minerals, except fuels	70	.64	1.6	506	108	457	113
C. Construction							
General building contractors	65	.77	2.0	333	83	90	81
Heavy construction contractors	132	1.05	2.7	682	107	178	99
Special trade contractors	251	.67	1.7	2,022	111	986	110
D. Manufacturing							
Tobacco manufacturers	30	.43	1.1	281	126%	158	138%
Lumber and wood products	137	.97	2.5	651	110	181	97
Furniture and fixtures	70	.54	1.4	505	95	140	77
Paper and allied products (other)	125	.51	1.3	1,258	119	377	111
Commercial printing	30	.28	.7	468	97	295	135
Petroleum refining and related industries	45	.69	1.8	317	102	113	97
Miscellaneous plastic products	66	.54	1.4	445	114	79	139
Leather products (except footwear)	13	.36	.9	194	125	95	109
Misc. non-metallic mineral products	80	.59	1.5	878	163	153	106
Other stone, clay, glass, and concrete products	141	.55	1.4	1,524	113	876	100
Blast furnace and basic steel products	46	.39	1.0	850	127	284	123
Iron and Steel Foundries	140	.98	2.5	932	136	500	139
Other primary metal industries	106	.60	1.5	1,071	114	736	108
Fabricated structural metal products	124	.74	1.9	949	119	354	107

TABLE 3.1 CONT'd

Industry	Under Age 65					Over Age 65	
	AD Claims			All Claims		All Claims	
	#	Rate	Index	#	M.R.	#	M.R.
D. Manufacturing Cont'd							
Ordnance and accessories	34	.27	.7	758	122	152	190
Misc. fabricated metal products	65	.52	1.3	635	113	265	103
Construction and related machinery	89	.72	1.8	521	105	282	127
Service industry machines	65	.60	1.5	493	116	146	120
Motor vehicles and equipment	130	.62	1.6	1,094	125	333	108
Aircraft and parts	155	.44	1.1	2,571	95	1,075	120
Other transportation equipment	51	.73	1.8	266	97	75	89
E. Transportation, Communication, and Public Utilities							
Railroad transportation	10	1.20	3.1	61	89%	119	89%
Local and interurban passenger transit	28	.35	.9	687	128	865	118
Trucking, local and long distance	98	.59	1.5	981	119	230	102
Water transportation	51	1.02	2.6	293	119	141	100
Pipeline transportation	3	1.25	3.2	13	122	2	98
Transportation services	28	.58	1.5	196	88	147	81
Sanitary services	73	.63	1.6	563	98	519	96
Gas production and dist.	39	.28	.7	883	129	438	106
G. Retail Trade							
Building supplies and materials	32	.60	1.5	217	85	98	80%
Small general merchandise stores	9	.19	.5	229	91	107	351
New and used car dealers	110	.55	1.4	913	94	247	90
Other automotive dealers and service stations	24	.54	1.4	172	83	39	80
Eating and drinking places (other)	5	.95	2.4	16	114	4	82
H. Finance, Insurance, Real Estate							
Insurance carriers, n.e.c.	61	.60	1.5	475	125	122	93%
Holding offices	38	.37	.9	526	122	378	128
I. Services							
Automotive repair, services, garages	23	.71	1.8	128	107	33	92%
Amusement and recreation services	30	.60	1.5	216	86	149	90
Private households	12	.95	2.4	35	68	5	36

* Where AD claim index is at least 1.3 under age 65 or M.R. is greater than or equal to 120%

LONDON LIFE'S OCCUPATIONAL MORTALITY EXPERIENCE

A review was made of London Life's mortality experience for cases on which an occupational rating was placed. The latest annual mortality study covers the years of exposure 1975 to 1980 and includes issues until the year 1979. In addition I made a review of the accidental death claims in 1981 which were related to occupation.

Illustrated in Table 4.0 is London Life's male mortality experience on policies issued with an occupational rating. A great deal of exposure is still on those policies with a \$2 occupational rating which we stopped imposing in 1977. One overall observation that can be made is that the experience by amount is significantly better than the experience by number. Thus we may state that the average size policy of those individuals with an occupational risk is smaller than average. For policies with a \$2 occupation rating experience shows 2.5 excess deaths per thousand which would seem to indicate that we should not have eliminated ratings on many of those previous occupations that we rated \$2 but we should have increased the rating to \$3. The experience for policies rated \$3 per thousand is relatively good in being approximately 2.1 extra deaths per thousand. Again, by amount, the excess deaths are only about one per thousand for this group. Experience beyond the \$3 per thousand grouping is quite limited and no significant analysis can be done.

A special investigation was made of all accidental death claims during 1981 due to occupational injury. Of the 33 such deaths, only four had an occupation rating applied to their policies. There was only one mining death but since the analysis did not include occupational deaths due to illnesses this is understandable. The greatest number of deaths for any single occupation was seven for truck drivers. There were four deaths in each of processing industries, farming, and construction. Also, two fishermen, three firemen, one linesman trainee, and one taxi driver died. There were also three aviation related deaths.

London Life's Occupational Rating Issue Statistics

In 1980 London Life issued 172 policies with an occupational rating. Most of the occupational ratings (94%) are for \$3 extra per thousand of insurance but some are for up to \$10 extra per thousand of insurance. The individuals who we rate for occupation are diminishing in numbers. Approximately five years ago we rated about three times this number of individuals for occupation.

Our largest number of occupation ratings are for miners. Mining related occupational ratings accounted for 47% of all our occupation ratings in 1980. The next largest category was bartenders which constituted 20% of our occupational ratings. Third and fourth in significance were structural iron workers and lumbermen. Occupational ratings compose approximately 7% of all substandard ratings of issued contracts.

The above discussion is related to life insurance ratings. A large volume of disability benefits are rated because of the occupation as well. In addition there is accidental death benefit ratings. Currently we do not have an analysis available of these other types of occupation-related ratings.

TABLE 4.0

LONDON LIFE'S MALE MORTALITY EXPERIENCE ON POLICIES RATED RE OCCUPATION

Issues: 1874-1979

Expected Table: LL Male 61-66 Combined

Exposure: 1975-1980

Occupational Extra	Durations	By Number				By Amount			
		Exposure	Actual Deaths	Excess Deaths /M	Mortality Ratio	Exposure (000,000's)	Actual Deaths	Excess Deaths /M	Mortality Ratio
\$2/M*	1-5	2,756	10	2.5	309	33	86,543	1.6	250
	6+	6,142	44	2.5	153	31	169,049	1.7	145
		8,898	54	2.5	169	64	255,592	1.7	169
\$3/M	1-5	3,568	9	1.4	221	44	65,000	0.4	144
	6+	7,850	57	2.5	153	38	210,706	1.7	142
		11,418	66	2.1	159	82	275,706	1.0	144
\$5/M	1-5	185	1	5.3	5,000	2	10,000	2.8	423
	6+	32	1	29.4	1,667	0	10,000	38.0	1,957
		217	2	8.8	2,500	3	20,000	5.7	695
\$7/M	1-5	32	0	0	0	1	0	0	0
	6+	45	0	0	0	0	0	0	0
		77	0	0	0	1	0	0	0

* \$2/M Occupational Ratings were eliminated in 1977

LONDON LIFE'S OCCUPATIONAL DISABILITY EXPERIENCE

The latest London Life disability study indicates that for 1976 to 1980 occupational disability claims due to accidents constitute 25% of all disability claims. Disability claims that resulted from occupational illnesses were not segregated.

A major portion of the disability claims caused by occupational accidents for 1981 were individually reviewed. The occupation with the greatest number of disability accident claims was truck drivers. Large numbers of claims were incurred in occupations related to processing industries, construction and trades, and mining. A smaller number of claims were experienced in farming, packing houses, post office, car shops, and lumbering industries.

It must be remembered that for the most hazardous disability risk occupations no disability coverage was allowed according to the existing occupation schedule. These occupations included steeplejack and flagpole workmen, caisson workers, bartenders, oil shooters, and trappers for waiver coverage. The income disability benefit is not available to lead burners, sandblasters, guides, farm hands, lumbermen, underground miners, and blasters in addition to the aforementioned occupations.

LONDON LIFE'S EXISTING INDIVIDUAL OCCUPATIONAL RATINGS

At the time of the occupation study the existing occupation schedule for London Life was a very comprehensive listing of ratings for life coverage, disability coverage, and accidental death benefit coverage. London Life's sales efforts are concentrated primarily at a market which is at the bottom half of the socioeconomic scale. It is thus important for London Life to appropriately recognize occupational mortality and morbidity risks carefully. A larger portion of our applicants are engaged in occupations with additional risks than many of our competitors whose markets target towards higher levels of socioeconomic markets which are not subject to high accidental death risks or high disability risks due to environmental exposures. This is not to say, however, that the "professional" does not have other additional occupational risk factors resulting from high stress. Stress elements of an occupation are not presently recognized in insurance underwriting as of yet. We recognize the effects of stress such as high blood pressure or alcoholism after the fact only.

Most occupations today are not rated for life insurance coverage. Disability coverage is ratable for occupation much more often than life coverage. London Life's existing ratings were primarily based on the results of the 1967 Occupation Study. Occupations which were ratable for life coverage were lead burners, sandblasters, steeplejack and flagpole workmen, smokestack and transmission antennae workmen, caisson workers, outside structural iron workmen, blasters, bartenders, lumbermen, underground miners, salvage and wrecking boat workers, uranium and radium grinders and shippers, stunt performers and guides. Professional sports and aviation related occupations are not included in this schedule.

OCCUPATIONAL SAFETY REGULATIONS

Occupational hazards have been greatly diminished through legislative safety regulations. Fatalities caused by injuries at the work place are closely scrutinized by the public at large in today's world. One prime example which is immediately brought to mind is the recent sinking of the Ocean Ranger oil rig off the coast of Newfoundland in which eighty-four lives were lost. Immediately, all off-shore oil and gas drilling operations were terminated and within a few days a joint Federal-Newfoundland Inquiry was instigated to investigate the disaster and recommend safety improvements.

Although occupational fatalities caused by injury are fairly well under control, industrial diseases are becoming more of a concern. Cancer is the most terrifying of the new industrial diseases not only because of its often fatal consequences, but because so little is known about it. It is difficult to assess what portion of a disease is caused by exposure to materials in the workplace and how much is actually related to lifestyle. For example, it is not known whether when a person smokes the individual's chances of contacting more industrial diseases is increased. There is a serious shortage of industrial hygienists to advise industrial managers who use 25,000 toxic substances in various manufacturing operations with 500 new substances added each year. In 1980 there were only 27 certified industrial hygienists. Increasingly, workers are looking for a connection between their illnesses and their place of work. For example, a Vancouver lawyer is trying to establish that his forty-two-year-old client became an alcoholic as a result of his years working in the hardrock mining industry. Certainly, however, there are many illnesses which are caused by the work environment. A recent special study has shown that the cancer death rates among former sintering plant workers of Inco were well above normal. Specifically, for lung cancer and nasal cancer, the rates were three to four times above average.

Safety legislation continues to be passed. In 1981, Ontario, for the first time, passed a regulation on the safe emission of lead. More legislation is pending governing silica, noise, iso-cyanates, mercury, coke emissions, and asbestos.

In the wake of an exceptionally sharp rise in the number of oil well drilling and servicing work-related deaths in 1979 (17 vs 4 the previous year), the Alberta Occupational Health and Safety Department conducted a study which resulted in 54 recommendations to improve safety procedures. Four committees were established to focus on training, work site safety, working practices, and procedures. In the oil and gas industry, as soon as there is a boom, accidents go up. The annual turnover rate is 300% to 400%. In 1980, 6,833 workers were injured out of a total work force of about 14,000. That is, the chance of becoming injured was about 50%.

Recently about 400 union members from across the country marched on Canada's parliament for an overhaul of Federal Occupational Health and Safety legislation. They wanted a less restricted right than they now have to refuse dangerous work, creation of a mandatory Employer-Employee Health and Safety Committee, extra protection for pregnant workers, authorization for the union to shut down dangerous machinery, stop work in dangerous conditions and investigate accidents. The Labor Department officials stated that new Health and Safety Legislation was being drafted that would strengthen the right to refuse dangerous work and make joint Health and Safety Committees mandatory for Federal industries where there were at least twenty employees.

LONDON LIFE'S REVISED OCCUPATION SCHEDULE

As a result of this occupation study, London Life's ratings for occupational risks were completely restructured. The new schedule is subdivided into six units relating to mining, processing, lumbering, fishing, farming, construction and trades, and followed by miscellaneous occupations not classified elsewhere. Only occupations with ratable life, disability, or accidental death benefit coverage are shown.

In conjunction with this new schedule, individuals engaged in occupations involving exposure to dust or carcinogens will be underwritten carefully to ensure that they do not have a form of pneumoconiosis, lung cancer or poisoning. Individuals working in areas where liquor is accessible will be watched to ensure that alcohol abuse is not occurring. As new fields of occupations develop, caution will be exercised to ensure that there is not an additional mortality or morbidity risk. An example might be the occupations related to the emerging biotechnology industry.

The definition of the word "worker" in the schedule is meant to include those individuals directly engaged in the activities described. In general, office staff, inspectors, professionals and supervisory foremen are not ratable unless specifically indicated.

The new schedule is displayed in Table 5.0. The "LIFE" column indicates the additional premium per \$1,000 of life insurance coverage to cover the additional risk associated with the occupation. If no additional "LIFE" premium is applicable a standard (STD) rating is indicated. For both disability coverage and accidental death benefit coverage the premium is indicated as a multiple of the usual standard premium rate. Thus if a disability rate of "3" is shown, the disability premium rate applicable would be three times the usual disability premium for the age involved. If a "NO" is indicated the disability or ADB coverage is not available because the additional occupational risk is far too great to properly assess. If a "1" is indicated the usual standard premium rates apply. Each section of the schedule is now discussed in greater detail.

1. Mining and Quarrying including Oil and Gas Field Operations

Occupational mortality and morbidity is still quite poor for individuals engaged in the mining industry. For underground miners a distinction is made between well established nickel, nickel-copper and iron mines and other mines. Experience shows for Ontario where most of these nickel mines are located that the additional mortality risk does not warrant a life rating. Other underground mines still require a \$3 life rating. The previous \$3 rating for blasters on surface has been eliminated because of no supportive current experience.

Recently workers in oil and natural gas drilling operations have had quite poor mortality and morbidity experience. Because of extremely poor disability experience, this benefit will not be available to drilling rig workers.

2. Mineral and Metal Processing and Related Industries

The \$3 life rating for Uranium, Radium, Lead, and Gold ore treatment workers arose primarily because of the numerous occupational deaths due to illness. For instance, between 1976 and 1980, 56 individuals were reported to have died because of silicosis in the gold mining industry in Ontario alone.

Workers in foundries have had very poor disability and accidental death experience and the ratings were increased from the previous schedule.

Similarly, to a lesser extent, workers in mica, granite, marble and sandstone mills and yards have been experiencing higher disability and accidental death rates from occupational illnesses and the ratings were increased.

3. Lumbering and Related Industries

The ratings for logging are similar to those in the previous schedule. Workers in milling, sawing and machining operations have been experiencing higher disability and accidental death rates which have been reflected in the new schedule.

4. Fishing, Marine, and Related Occupations

Experience indicated that as a group these occupations had the most additional mortality and morbidity risks. We will now charge a life rating to overnight Gulf and Bank fishermen. Life coverage will also be rated for occupations related to dredging and marine salvage and waterfront workers. Experience with these water related jobs will be watched closely to see whether much needed improvement occurs.

5. Farming and Related Industries

The disability rating for farm workers is twice standard because of additional risk documented throughout Canada. The additional disability rating for grain elevator workers results from the additional disabling illnesses these individuals experience. The ratings for individuals employed in slaughter houses and packing plants are consistent with the previous schedule's ratings.

6. Construction and Trades

The previous \$10 life rating for steeplejack and flagpole workmen has been eliminated in the new schedule. In general it seems that the safety standards set by the various Provincial Construction Associations are alleviating many of the additional risks that previously existed. Significant additional mortality risks are experienced however for building demolition workers, railway construction workers, marine construction workers, and workers under compressed air.

7. Miscellaneous Occupations (not classified elsewhere)

These ratings apply to any occupations which are not explicitly included in the initial six parts of the schedule.

Truck drivers will all be rated twice for disability. Experience for railway workers continues to be poor and ratings have been increased moderately from previous ones. Firemen ratings for disability will now exceed that for policemen.

Ratings for bartenders have been liberalized. Although the \$3 life rating has been eliminated, care will be taken on each case to ensure that alcohol abuse is not a problem.

Labour Canada statistics indicate that disability experience for Canada's 65,000 Post Office employees has been extremely poor. The additional disability rating of 1½ is probably not as severe as it should be. If experience continues to be poor, the rating will be increased further.

TABLE 5.0

NEW LONDON LIFE OCCUPATION SCHEDULE

1. Mining and Quarrying Including Oil and Gas Field Operations

	<u>Life</u>	<u>Dis</u>	<u>ADB</u>
Underground Mining			
- Workers engaged in cross-cutting, drifting, shaft-sinking, handling, loading (includes miners, drillers, blasters, drifters, shaftmen, loaders, labourers)			
Nickel, Nickel-Copper & Iron well established mines	STD	3	2
Other Mineral mines	\$3	No	3
- Other underground workers (includes foremen, diamond drillers, other tradesmen)			
Nickel, Nickel-Copper & Iron well established mines	STD	2	2
Other Mineral mines	STD	2	3
- Inspectors and surveyors usually underground	STD	1½	2
- Surface workers and foremen around underground mines	STD	2	2
Open Pit Mining and Quarrying			
- Workers and foremen engaged in mining coal, asbestos, clay, gravel, stone, sand, shale, etc. (includes quarrymen, blasters, drillers, cobbers, yardmen, firemen, equipment operators, labourers)	STD	2	2
Oil and Natural Gas Drilling			
- Workers engaged in drilling oil and gas wells, servicing wells by service rigs, or blasting (includes drillers, derrickmen, roustabouts, power tong operators, well pullers, perforators, shooters, labourers, foremen)	STD	No	3
- Workers engaged in special operations and services for oil and gas wells (includes cementers, acidizers, cleaners, servicing of battery tanks, chemical treatment, sump treatment, helpers, labourers, foremen)	STD	2	2
Prospecting, Exploration, and Development			
- Workers engaged in blasting	STD	2	3
- Other individuals (includes diamond drillers, geophysical and geological workers, line cutters)	STD	2	2

TABLE 5.0 (Cont'd)

2. Mineral and Metal Processing and Related Industries

	<u>Life</u>	<u>Dis</u>	ADB
Mineral Ore Treatment (Concentrating and Roasting)			
- Workers engaged in crushing, grinding, mixing, filtering, flotation, sintering, screening, melting, roasting			
Uranium, Radium Lead, Gold ores	\$3	2	2
Other Mineral ores	STD	2	2
- Foremen related to above workers	STD	1½	1
Metal Smelting, Converting, and Refining Furnace Workers			
- Workers operating and tending furnaces used in the process of converting and refining metal, melting metal for casting, and heating metal for rolling, forging, and pressing			
Lead	\$3	2	1
Iron	STD	1½	1
Other metals	STD	2	1
Metal Rolling and Drawing			
- Workers engaged in metal rolling	STD	1½	1
- Workers operating or tending machines that draw and extrude metal into wire, tube, bars	STD	1½	1
- Workers engaged in heat treating metals to anneal, harden and temper	STD	1½	1
Foundries			
- Workers engaged in moulding, coremaking and pouring or pressing molten or powdered metal into moulds to form metal ingots, castings, or die castings	STD	3	2
- Foremen related to above workers	STD	2	1
Clay, Glass and Stone Processing and Forming			
- Workers in granite, mica, lime, limestone, marble, sandstone, etc., mills and yards engaged in separating, crushing, grinding, mixing, forming	STD	2	2
- Foremen related to above workers	STD	1½	1
- Stone monument dealers	STD	2	1
Metal Product Fabricating and Assembling			
- Workers fabricating structural iron, metal, steel	STD	2	1
- Workers fabricating and assembling industrial, farm, or construction equipment and machinery performing such operations as aligning, fitting fastening, bolting, riveting, welding, assembling, labouring	STD	2	1
Clay, Glass, Stone & Asbestos Products Manufacturing			
- Workers engaged in the manufacture of stone, clay, asbestos, glass, slate, and concrete products	STD	2	1
- Workers engaged in the manufacture of asphalt and paving material	STD	2	1

TABLE 5.0 (Cont'd)

3. Lumbering and Related Industries

	<u>Life</u>	<u>Dis</u>
Logging		
- Workers engaged in cutting, moving, hoisting, rafting, skidding, hauling and loading logs, decking, cordwood cutting, log salvage, tree spacing, tree thinning, road-making		
British Columbia	\$3	No
Other areas	STD	3
- Workers engaged in log inspecting, grading, scaling, timber cruising, surveying, catering	STD	2
Milling, Sawing, and Machining Operations		
- Workers in sawmills, stud and chip mills, lath-mills, shingle mills, shake mills, planing and moulding mills	STD	2
- Workers in lumber yards in connection with sawmills or planing mills	STD	2
- Log pile workers, pondmen and similar yard employees in pulp and paper mills	STD	2
Wood Treating Operations		
- Workers involved with wood peeling, preserving, creosoting, kiln operations	STD	2
Wood Product Manufacturing Workers		
- Manufacture of excelsior, hardwood flooring, wood boxes, cooperage-stock, baskets, barrels, pallets, grain doors; sash & door factories	STD	2

TABLE 5.0 (Cont'd)

4. Fishing, Marine, and Related Occupations

	<u>Life</u>	<u>Dis</u>	<u>ADB</u>
Overnight, Ocean, Gulf, and Bank Fishing			
- Fishermen, deckhands, mates, boatswains	\$3	3	3
- Officers on large vessels supervising only	STD	2	2
Inland Fishing - All workers and officers	STD	2	2
Ships, Boats, Ferries, Tugboats			
- Deckhands, seamen, sailors, mates, boatswains, oilers, firemen, watchmen, electricians, equipment operators, cooks	STD	2	2
Dredging and Marine Salvage			
- Deckhands, Mates, boatswains, oilers, firemen, equipment operators	\$3	3	3
- Officers on large vessels supervising only	STD	2	2
Waterfront Workers			
- Workers loading and unloading ships, barges, trucks, rail cars (includes stevedores, longshoremen, labourers, loaders, beltmen)	\$3	No	3

5. Farming and Related Industries

Farming and Ranching			
- Workers on grain, dairy, livestock, mixed, vegetable, truck and commercial fish farms; haying, ranching, and operation of feed lots (includes farmers, field crop workers, labourers)	STD	2	1
Grain Elevators and Inland Terminals			
- Includes grain receivers, car-dumper tenders, loaders, dumpers	STD	2	1
Slaughter Houses and Packing Plants			
- Workers engaged in slaughtering animals and poultry; preparing, preserving and packing meats and processing byproducts	STD	2	1

TABLE 5.0 (Cont'd)

6. Construction and Trades

	<u>Life</u>	<u>Dis</u>	<u>ADB</u>
General Building and Trades (Outside shops)			
- Brick-layers, carpenters, concrete workers, plasterers, painters, plumbers	STD	2	1
- Sheet metal workers, insulators, air conditioning installers, labourers (not classified elsewhere)	STD	2	1
- Installation of glass, weather stripping	STD	2	1
- Sandblasters, drillers, blasters, welders	STD	3	2
- Steeple-jack workers, flagpole workers, steam cleaners of buildings, roofers	STD	3	2
- Erection and repair of chimneys, fire escapes, stacks, grain elevators, water towers, blast furnaces, elevators, water-works, heavy machinery	STD	3	2
Structural Steel and Precast Workers			
- Erection of prefabricated structural steel or concrete	STD	No	3
Tunnel, Subway, Sewer, and Pipeline Construction			
- Workers excavating, land clearing, tunnelling, trenching, blasting, drilling, well digging, operating heavy equipment	STD	3	2
- Workers and foremen under compressed air	\$3	3	3
Building Demolition Workers			
- Including wrecking and demolition of buildings, storage tanks, levelling of oil and gas rigs, removal of power lines and telephone lines	\$3	No	3
Building Movers	STD	3	2
Electrical and Telecommunication Workers			
- Construction electricians, repairmen and other workers	STD	No	3
- Electrical power linemen, cable splicers, troublemen, and related occupations	STD	No	3
Railway Construction Workers	\$3	3	3
Marine Construction Workers			
- Construction of breakwaters, dams, drydocks, piers, wharves, oil rigs; caisson work, pile-driving, sand sucking, subaqueous construction	\$3	3	3
Ship Building and Drydocks			
- Loftsmen, shipwrights, shipfitters, riggers, pipe fitters, engine fitters, machine operators, dockmen, boatmakers, boat builders, assemblers	STD	3	2

TABLE 5.0 (Cont'd)

7. Miscellaneous Occupations (not classified elsewhere)

	<u>Life</u>	<u>Dis</u>	<u>ADB</u>
Labourers	STD	2	1
Trucking and Warehousing			
- Workers and drivers involved with trucking, carting, teaming, or storage	STD	2	1
Railway and Subway Workers			
- Sectionmen, trackmen, repairmen, and other equipment operators	STD	2	2
- Train employees including locomotive engineers	STD	2	1
Garbage Collection and Disposal Workers	STD	2	1
Guards and Watchmen	STD	1½	1
Scrap Metal and Junk Dealers			
- Includes automobile wreckers, sorting room employees, yardmen, cranimen	STD	2½	1
Firemen (non supervisory)	STD	2	1
Policemen (non supervisory)	STD	1½	1
Bartenders			
- Bartenders and others in establishments which are not first class	STD	2	1
Post Office Workers	STD	1½	1
Atomic Energy			
- Individuals engaged in experimental work	\$3+	No	No
Hunters, Trappers, Guides			
- Pack trains, guides and outfitters in controlled areas	STD	2	1
- Otherwise	\$3	No	3
Travelling Carnivals, Amusement, and Recreational Services			
- Performers of stunts, aerobatics, etc		Decline	
- Other individuals	STD	2	1

REFERENCES

1. Canadian Employment Injuries and Occupational Illnesses, 1979 Edition; available from Occupational Safety and Health Branch, Labour Canada, Ottawa; Cat. No. L36-31/1979E.
2. 1967 Occupation Study; published by Society of Actuaries, 208 South LaSalle Street; Chicago, Illinois 60604; December 1967.
3. "Group Life Insurance Mortality", Transactions, Society of Actuaries, 1980 Reports Number; published by Society of Actuaries, 208 South LaSalle Street, Chicago, Illinois 60604, 1981.
4. Ontario's "Table of Rates 1980", available from The Workmen's Compensation Board, 2 Bloor St., E. Toronto.
5. Alberta's "Classification of Industries and Provisional Assessment Rates, Effective January 1, 1981"; available from The Workers' Compensation Board, Alberta, P.O. Box 2415, Edmonton.
6. Saskatchewan's "Rate Classification of Industries 1981, Effective January 1, 1981"; available from Saskatchewan Workers' Compensation Board, 1840 Lorne St., Regina.
7. Annual Report 1979 and 1980, Saskatchewan Workers' Compensation Board, 1840 Lorne St., Regina.
8. Classification and Rate List 1981, Workers' Compensation Board of British Columbia, 5255 Heather St., Vancouver.
9. Province of New Brunswick Table of Rates, Workmen's Compensation Board, P.O. Box 160, Saint John.