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european downstream oil industry safety performance

statistical summary of reported incidents - 1995

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Prepared for the CONCAWE Safety Management Group by

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ABSTRACT

This report is the second by CONCAWE reviewing the safety performance of the downstream oil industry in Western Europe. It includes the results of 22 companies which together represent over 80% of the oil refining capacity in Europe. As such, it should be regarded as a representative sample of the industry rather than a complete picture. To allow for this, and for incomplete data from some companies, most results are quoted as frequencies.

The data covers the year 1995. Overall, the reported hours worked by company staff and contractors combined were about 366 million with an average Lost Workday Injury Frequency (LWIF) of 4.6 which compares with 4.0 in 1994 and 4.7 in 1993. A range of other measures of safety performance are also reported. The responsible management of safety in the oil industry resulted in a low level of accidents despite the intrinsic hazards of the materials handled and the operations carried out.

In general, the safety performance for the companies reporting was similar in 1995 to the performance in 1993 and 1994.

KEYWORDS

Accidents, AIF, CONCAWE, fatality, incidents, injury, LWI, LWIF, marketing, oil industry, refining, RWI, safety, statistics

CONTENTS

SUMMARY

The importance of collecting and analysing accident data to measure safety performance is recognised throughout the oil industry. A number of key statistics have been identified which are measured by the majority of oil companies operating in Western Europe.

This year, twenty-two companies (five more than last time) operating in the downstream oil industry in Western Europe submitted statistics for this CONCAWE report on safety performance. These twenty-two companies represent over 80% of the refining capacity in the area. The data covers the year 1995 and is for both the Manufacturing (Refining) and Marketing sectors of the industry.

Not all companies operate in both the manufacturing and marketing areas, nor do they all collect the full range of data requested. To allow for this fact, nearly all the data is reported in terms of incident frequencies. The figures therefore, provide a reasonably representative measure of downstream industry safety performance

Accident frequencies are now at low levels. Although not quantified in this report, the majority of companies advised for the last report that their safety performance had shown a steady year on year improvement prior to the years sampled. This trend of improvement appeared to continue in 1993 and 1994 but overall, the 1995 performance appears similar to that for the previous two years.

From the data submitted it is apparent that there are considerable variations in the results reported by individual companies. Such variations provide a valuable pointer for member companies to identify areas for improvement.

1. INTRODUCTION

This report represents statistical data relating to safety performance in the downstream oil industry in Western Europe collected by CONCAWE. The purpose of collecting the information was twofold:

- to allow member companies to compare their performance against industry norms (*ie* benchmark) so that they can determine the efficacy of their management systems and highlight any deficiencies so that corrective action can be taken.
- to demonstrate that the responsible management of Safety in the downstream oil industry results in a low level of accidents despite the hazards intrinsic to its operations.

This report is the second annual report on this subject. The first report [1] covered the years 1993 and 1994 and this report covers 1995 performance and compares it with the previous two years. The questionnaire used to collect the data was very similar to that for the previous survey. The main change was the deletion of the question on third party fatalities as very little information was received on this subject.

The definitions of the terms used in the survey and hence reported on were unchanged. Although it was recognised that not all companies use exactly the same methods at present, companies were encouraged to report what information they had available even if the definitions they used were not identical.

Twenty-two member companies responded this time (five more than last time), approximately two thirds of the CONCAWE membership, representing over 80% of the European refining capacity. It was notable that the majority of these were willing for their data to be shared openly with other companies. This free exchange indicates that they felt that they could both learn from the experience of others and help other companies even though they are competitors.

2. RANGE OF STATISTICS COLLECTED

Not all companies measure their safety performance in the same way or collect the same statistics. To take account of the fact that not all companies could supply data in all of the sections the results are expressed in terms of frequencies per hours worked. The safety performance statistics collected (for definitions see **Appendix 1)** were :

- Lost Workday Injury Frequency (LWIF)
- LWI Severity (days lost per accident)
- All Injury Frequency (AIF)
- Road Accident Rate (RAR)
- Fatalities

The data survey provided a detailed breakdown of key safety statistics. These were split between:

- employees
- contractors

and also between:

- manufacturing (refining)
- marketing including all non refining activities including “Head Office” staff.

The request form is shown in **Appendix 3**.

3. FINDINGS

Accident frequencies in the downstream petroleum industry are now at very low levels. Although not quantified in this report, the majority of companies advised CONCAWE that their safety performance had shown a steady year on year improvement prior to 1993, the first year sampled in this series of reports. Although for the industry as a whole the performance appeared better in 1994 than 1993, the overall results for 1995 do not show a similar improvement. However, with the generally low level of incidents, the differences year on year are probably insignificant.

In compiling this years report, an error was found in the data for Company K in Figures 8, 9, 11 and 12 of last years report. The figures have been corrected in the equivalent figures in this years report. The error made very little difference to the aggregated frequencies for the whole industry.

A summary of the 1995 results compared to those from 1993 (corrected) and 1994 is provided in **Table 1**. As there was a significant increase this year in the number of companies reporting, the 1995 results are quoted for both the 17 companies who reported for 1993/4 and for the total 22 companies. Even within these 17 companies, some significant changes in reporting occurred as noted in **Section 3.1**. Overall the safety performance appears little different for 1995 from the two years reported previously. Comparisons for each determinant are given in following sections.

Table 1 Comparison of Representative Data for 1993, 1994 and 1995

	Fatalities	LWIF	LWIS	AIF *		RAR
1993 - 17 companies	18	4.7	25.7	8.1	(8.0)	3.8
1994 - 17 companies	20	4.0	23.2	7.9	(8.6)	3.1
1995 - 17 companies	13	4.5	20.7	10.7	(11.1)	2.4
1995 - 22 companies	13	4.6	22.1	10.8	(11.2)	2.6

***** See explanation in Section 3.4

The aggregated accident data collected from CONCAWE members for 1995 is summarised below for the seventeen companies which reported in1993/4 (**Table 2**) and all twenty-two companies which reported this time (**Table 3**). The range of results expressed in graphical format is shown in **Appendix 2**. It should be noted that in these figures, a zero result usually means that no data was reported for this determinant. However, in a few cases, there were no incidents so that the frequency was actually zero. These cases (for 1995 only) are indicated on the figures.

3.1. HOURS WORKED

In 1995, the total reported hours worked (**Table 2**) by employees and contractors at about 366 million were about 6 million more than in 1994. The five companies reporting for the first time contributed an additional 25 million hours. However, there are significant differences in the individual sectors. In particular, contractor manufacturing hours have increased; this is largely due to one major company reporting in this sector for the first time. On the other hand, reported contractor marketing hours have decreased considerably. A major factor in this decrease was due to one company redefining what they included as contractors in the retail sector with the result that the number of hours they reported in this sector reduced significantly.

Table 2 1995 Aggregated Results for the Seventeen Companies which Reported in 1993/4

Sector	Manufacturing		Marketing		Total		
Work Force	Own Staff	Contractor	Own Staff	Contractor	Own Staff	Contractor	All Workers
Total hours worked	76,783,798	51,866,358	152,341,205	60,578,930	229,125,003	112,445,288	341,570,291
Number of fatalities	1	0	1	11	2	11	13
Number of LWIs	231	384	735	187	966	571	1,537
Total days lost through LWIs	5,618	7,000	15,750	3,504	21,368	10,504	31,872
Number of RWIs	210	109	426	81	636	190	826
Number of MTCs	370	221	541	149	911	370	1,281
AIF	10.6	13.8	11.2	7.1	11.0	10.2	10.7
LWIF	3.0	7.4	4.8	3.1	4.2	5.1	4.5
LWI Severity (Days/LWI)	24.3	18.2	21.4	18.7	22.1	18.4	20.7
Distance travelled (million km)			321	220			541
Number of Road Accidents			1157	160			1317
Road Accident Rate			3.6	0.7			2.4

Table 3 1995 Aggregated Results for All Twenty-two Companies Reporting in 1995

Sector	Manufacturing		Marketing		Total		
Work Force	Own Staff	Contractor	Own Staff	Contractor	Own Staff	Contractor	All Workers
Total hours worked	92,688,817	52,760,100	160,331,200	60,578,930	253,020,017	113,339,030	366,359,047
Number of fatalities	1	0	1	11	2	11	13
Number of LWIs	332	390	791	187	1,123	577	1,700
Total days lost through LWIs	9,564	7,093	17,476	3,504	27,040	10,597	37,637
Number of RWIs	213	111	426	81	639	192	831
Number of MTCs	427	241	578	149	1,005	390	1,395
AIF	10.5	14.1	11.2	7.1	10.9	10.3	10.8
LWIF	3.6	7.4	4.9	3.1	4.4	5.1	4.6
LWI Severity (Days/LWI)	28.8	18.2	22.1	18.7	24.1	18.4	22.1
Distance travelled (million km)			373	220			593
Number of Road Accidents			1455	160			1615
Road Accident Rate			3.9	0.7			2.7

3.2. LOST WORKDAY INJURY FREQUENCY (LWIF)

All companies without exception collect employee Lost Workday Injury Frequency (LWIF) data and this is therefore the most representative statistic of all. In 1995, the LWIF calculated overall was 4.6 compared to 4.7 in 1993 and 4.0 in 1994 (**Table 3**). For those 17 companies that also reported in 1993/4 (**Table 2**), the average was slightly lower at 4.5. The performance of individual companies varied widely as shown in **Figures 2 to 4 and 8 to 10**. The overall figure for contractors (all companies) was slightly higher than for employees (5.1 as against 4.4) but as in previous years, contractors operating in refineries have an LWIF about twice that of employees. This trend is reversed in the case of marketing contractors who recorded a lower LWIF than employees.

3.3. LWI SEVERITY (LWIS)

LWI Severity as measured by the number of days lost per incident has shown a slightly improving trend falling from 25.7 days in 1993 to 23.2 days in 1994 and 22.1 days in 1995 (all companies) and 20.7 for the original 17 companies.

3.4. ALL INJURY FREQUENCY (AIF)

All Injury Frequency becomes a more meaningful measure of safety performance as LWIF declines to the low levels now experienced. AIF enables us to get a better picture of the total safety performance of the industry since it records fatalities, restricted work injuries (RWI) and medical treatment cases (MTC) in addition to lost workday injuries. The AIF reduced slightly from 8.1 to 7.9 between 1993 and 1994 but increased to 10.5 in 1995 (10.7 for the original 17 companies). It should be noted that not all companies operate the restricted work system and restricted working is not allowed in some countries.

These figures were calculated for all companies reporting, whether or not they reported RWI or MTC data. If the AIF is calculated for only those company sectors which did report these data, the figures in brackets in **Table 1** are obtained; i.e. the AIF in 1995 was 11.2 which is little different from figure calculated using all the data. It follows that for companies who do not report RWI or MTC, the AIF in **Figures 5,6,7** and **11,12,13** are the same as the LWIF in the corresponding figures.

3.5. ROAD ACCIDENT RATE (RAR)

Road Accident Rate data was supplied by only seven of the 17 companies who participated in the 1993/4 surveys and by four of the new companies. Very few companies recorded RAR for the manufacturing sector and this is why the data has been dropped from **Tables 2 & 3**. There was a reduction in RAR from 3.9 to 3.2 between 1993 and 1994 and a further reduction in 1995 to 2.7 accidents per million kilometres (marketing data). For the seven of the original 17 companies which reported this time, the improvement was even more significant to 2.4 accidents per million kilometres. However, comparison of these data should be made with caution because of the significant changes in the database. The eleven companies who reported this time recorded that their vehicles (own and contractor) travelled 593 million kilometres in 1995 and were involved in 1615 accidents ranging from minor to major.

3.6. FATALITIES

13 (2 employees, 11 contractor) fatalities occurred in 1995. This was a significant improvement on both 1993 (18 fatalities, 4 employees, 14 contractors) and 1994 (20 fatalities, 16 employees and 4 contractors). It was particularly notable that only one fatality was reported for the refining sector in 1995.

Because of the small numbers, fatalities are not a reliable indicator of safety performance. It should be noted that transport related accidents were a consistent feature in all three years. The increased attention to preventing road accidents will hopefully improve the fatal accident record of the industry.

3.7. COMPARISONS WITH OTHER INDUSTRIES AND AREAS

Comparison of oil industry safety performance with other industries in Europe has proved difficult as in general safety statistics are either not collected or are not available on a Europe-wide basis. E&P Forum do collect a range of statistics for the upstream oil industry, including figures for Western Europe. [2]

Their operations differ considerably from the downstream oil business and comparisons should be made with caution. Nonetheless, downstream safety performance is comparable with exploration and production.

The only other area where comparable downstream data is available is for the US. Annually the API collate data on US occupational injuries, illnesses and fatalities for the petroleum industry. [3] Approximately 180-200 companies submit data to API each year on a voluntary basis. It should be noted that API data is for company employees only and contractor statistics are not recorded.

The CONCAWE statistics are compared with those collected for the USA (by API) and for the upstream industry (by E&P Forum) in **Table 4**. The LWI Severity category reported in the CONCAWE survey is comparable with the severity rate recorded by the API and E&P Forum.

Overall, the CONCAWE figures are similar to both the API and the E&P Forum statistics, particularly if the API figures are compared with the CONCAWE company employee figures. It was noted in last years report that there was a significant difference between AIF rates for Europe and the US. This year, the difference is less marked.

Table 4 Comparison of Accident Statistics with Other Areas - 1995

Sector	Exposure	LWIF	Severity	AIF	Fatalities	FAR
CONCAWE - All Workers						
Manufacturing	145.4	5.0	23.1	11.8	1	0.7
Marketing	220.9	4.4	21.5	10.1	12	5.4
Total	366.4	4.6	22.1	10.8	13	3.5
CONCAWE - Company Employees Only						
Manufacturing	92.7	3.6	28.8	10.5	1	1.1
Marketing	160.3	4.9	22.1	11.2	1	0.6
Total	253.0	4.4	24.1	10.9	2	0.8
API						
Refining	117.7	3.0	27.0	7.2	3	2.5
Marketing	117.8	4.7	18.4	8.9	3	2.5
Total	235.5	3.9	21.7	8.1	6	2.5
E & P Forum						
Europe	201.9	4.0	21.0	12.5	5	2.5
World	840.9	3.2	34.2	12.5	77	9.2

Exposure is number of manhours worked expressed in millions
Severity is the average number of days lost per LWI
FAR (Fatal Accident Rate) is the number of fatalities per 100 million manhours worked
API data are for company employees only
E&P Forum data are for employees and contractors

4. REFERENCES

1. CONCAWE (1996) European Downstream Oil Industry Safety Performance. Report No. 1/96. Brussels: CONCAWE

2. E&P Forum (1996) E&P Forum Accident Data 1995. Report No. 6.57/253 London: E&P Forum

3. API (1996) Summary of US Occupational Injuries, Illnesses and Fatalities in the Petroleum Industry for 1995. Washington: API

APPENDIX 1 EUROPEAN OIL INDUSTRY STATISTICS DEFINITIONS AND GUIDING NOTES

1. Hours worked	Hours worked by employees and contractors. Estimates should be used where contractor data is not available.
2. Fatality	This is a death resulting from a work related injury where the injured person dies within twelve months of the injury.
3. LWI	Lost Workday Injury is a work related injury that causes the injured person to be away from work for at least one normal shift because he is unfit to perform any duties.
4. Total days lost	The number of calendar days lost through LWIs counting from the day after the injury occurred.
5. RWI	Restricted Workday Injury is a work related injury which causes the injured person to be assigned to other work on a temporary basis or to work his normal job less than full time or to work at his normal job without undertaking all the normal duties.
6. MTC	Medical Treatment Case is a work related injury which requires the attention of a medical practitioner. It excludes first aid treatment.
7. AIF	All Injury Frequency which is calculated from the sum of fatalities, LWIs, RWIs and MTCs divided by number of hours worked expressed in millions.
8. LWIF	Lost Workday Injury Frequency is calculated from the number of LWIs divided by the number of hours worked expressed in millions.
9. LWI Severity	The total number of days lost as a result of LWIs divided by the number of LWIs.
10. Distance travelled	This is the distance, expressed in millions of kilometres, covered by company owned delivery vehicles and company cars whether leased or owned. It should also include kilometres travelled in employee's cars when on company business.
11. Road Accidents	Any accident involving any of the vehicles described above.
12. RAR	Road Accident Rate is calculated from the number of accidents divided by the kilometres travelled expressed in millions .

Statistics to be collected under two groupings : Refineries and Marketing.

Marketing includes all non refining activities including "Head Office" personnel.

Where data is not available the best estimate possible should be made.

APPENDIX 2 GRAPHS SHOWING SPREAD OF DATA

Figure 1 Fatalities for All Workers in European Oil Industry (Both Sectors)

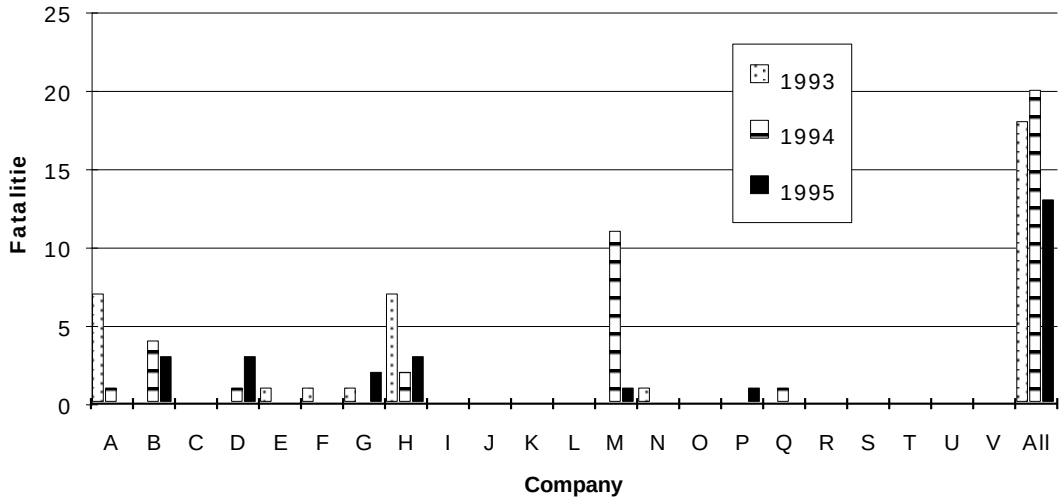


Figure 2 LWIF For Company Employees in European Oil Industry (Both Sectors)

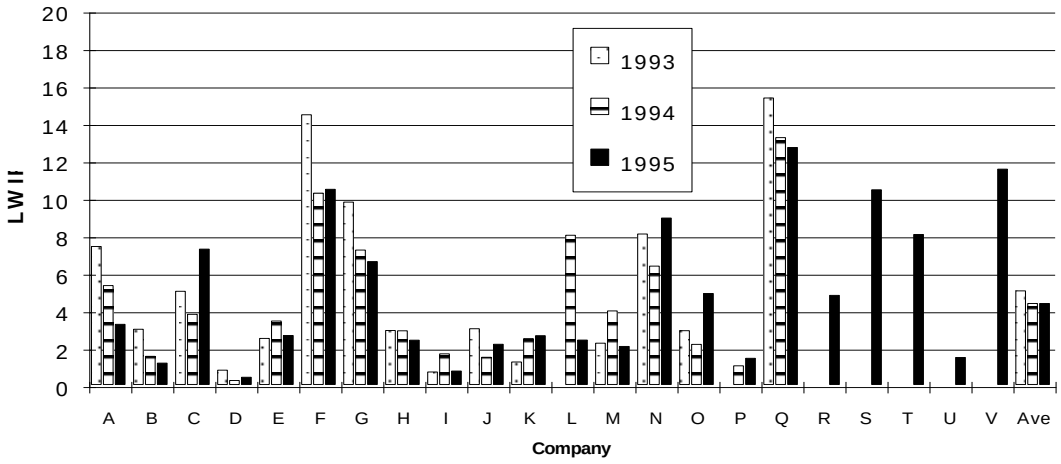


Figure 3 LWIF For Company Employees in European Oil Industry (Manufacturing)

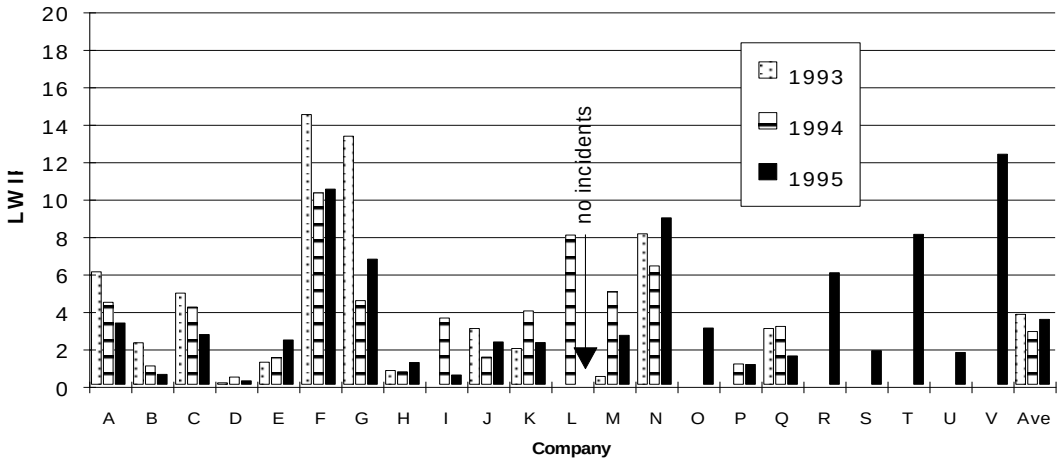


Figure 4 LWIF For Company Employees in European Oil Industry (Marketing)

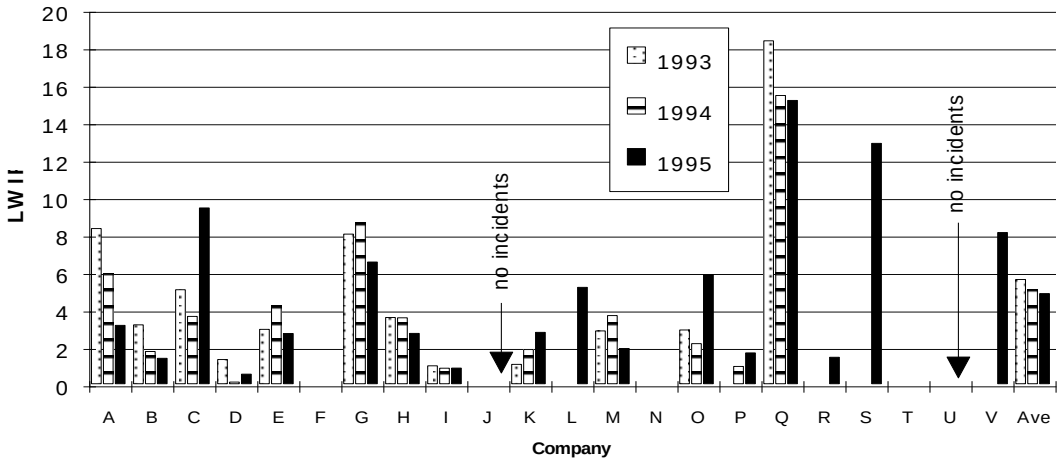


Figure 5 AIF* For Company Employees in European Oil Industry (Both Sectors)

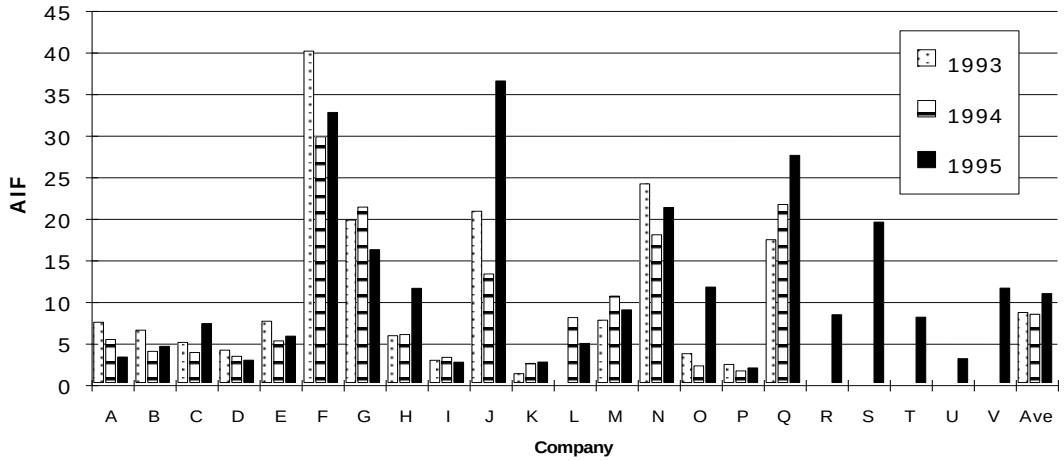


Figure 6 AIF* For Company Employees in European Oil Industry (Manufacturing)

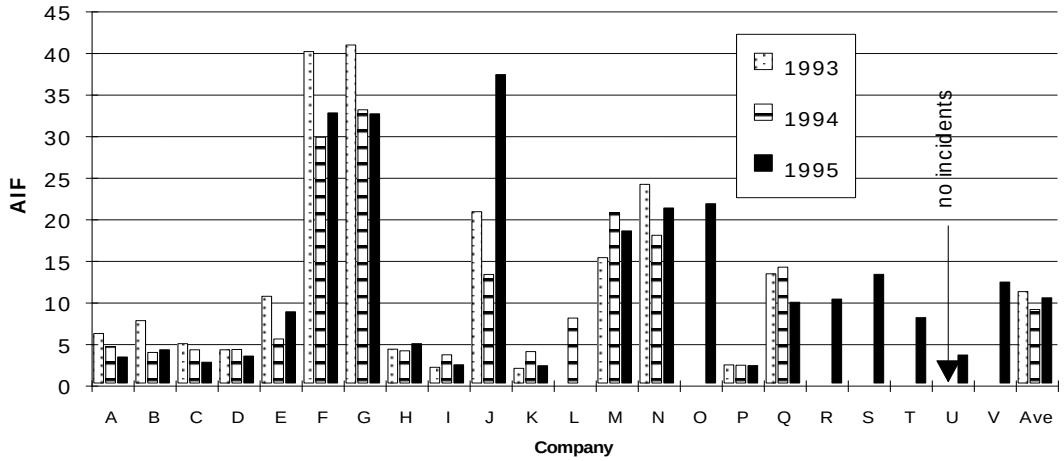
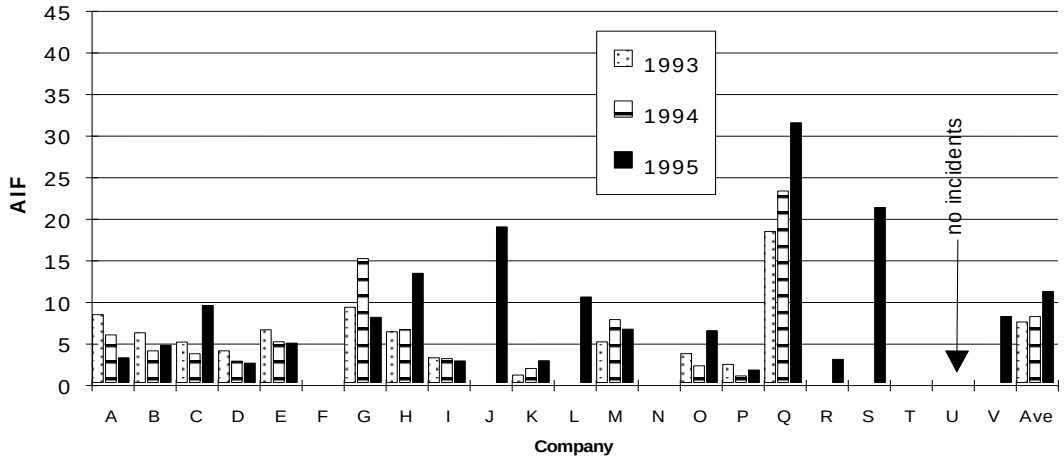


Figure 7 AIF* For Company Employees in European Oil Industry (Marketing)



***** Note that in these figures an AIF is recorded even if the company did not report any RWI or MTC. In these cases, the AIF is the same as the LWIF.

Figure 8 LWIF For Contractors in European Oil Industry (Both Sectors)

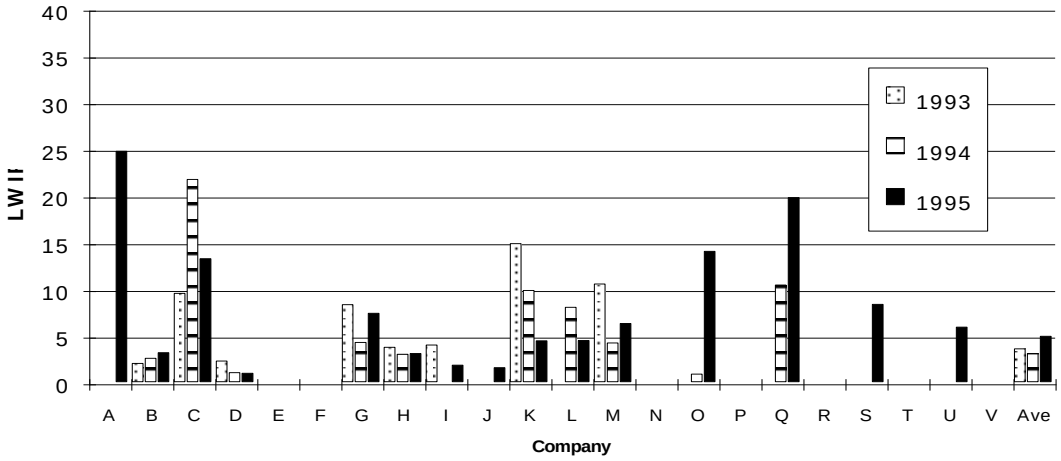


Figure 9 LWIF For Contractors in European Oil Industry (Manufacturing)

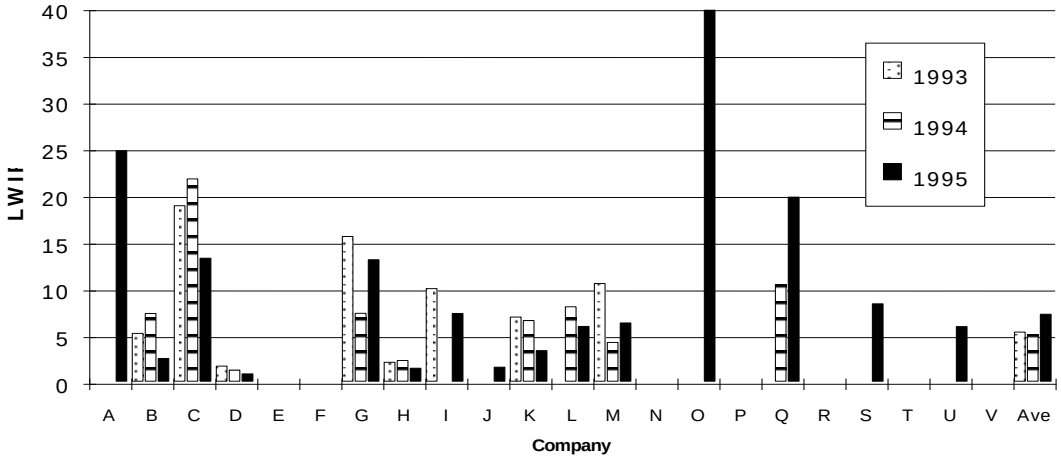


Figure 10 LWIF For Contractors in European Oil Industry (Marketing)

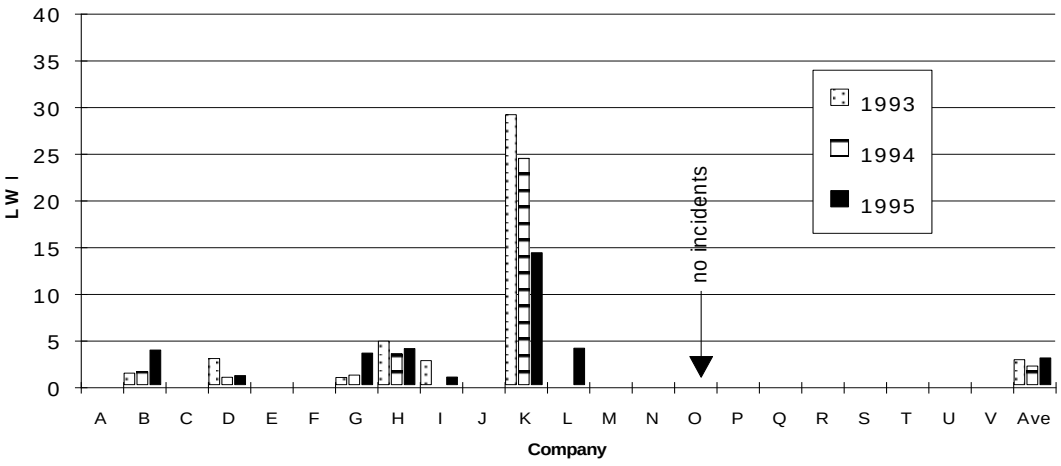


Figure 11 AIF* For Contractors in European Oil Industry (Both Sectors)

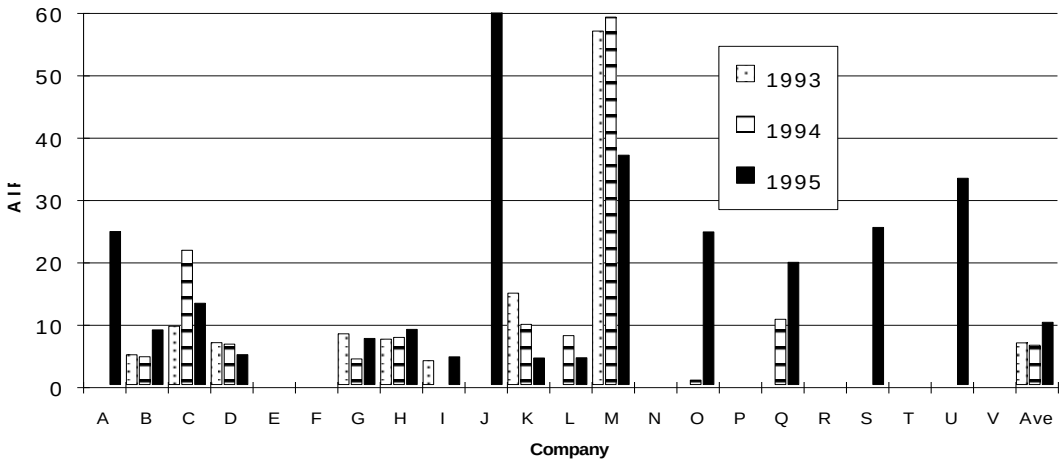


Figure 12 AIF* For Contractors in European Oil Industry (Manufacturing)

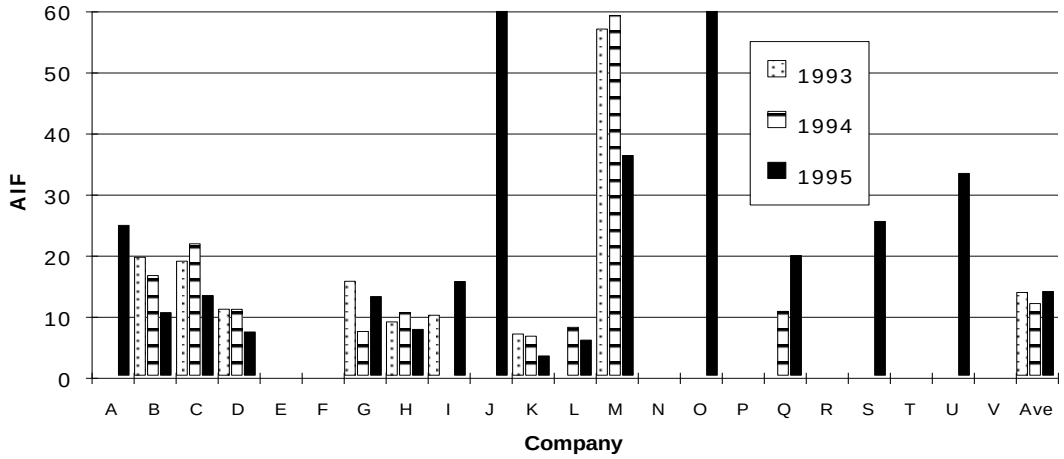
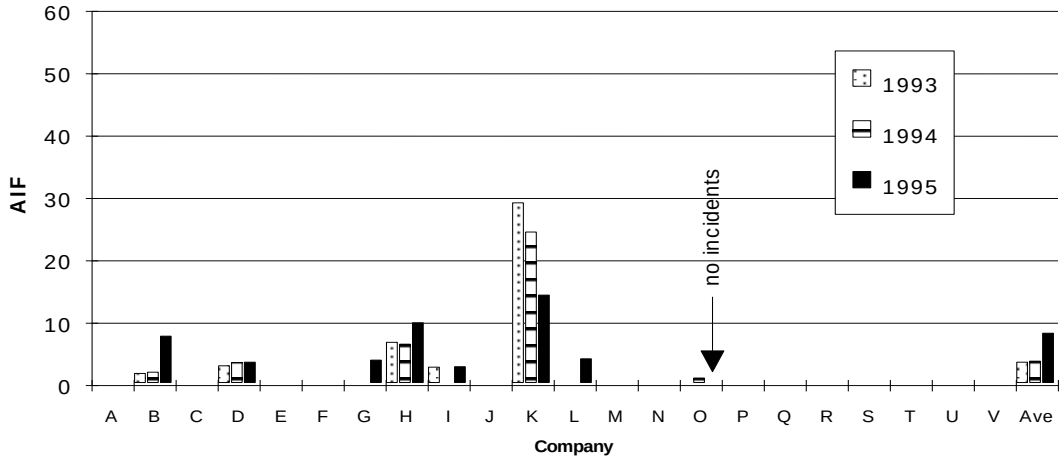


Figure 13 AIF* For Contractors in European Oil Industry (Marketing)



***** Note that in these figures an AIF is recorded even if the company did not report any RWI or MTC. In these cases, the AIF is the same as the LWIF.

Figure 14 LWIS For Employees in European Oil Industry (Both Sectors***)***

(Days Lost per Incident)

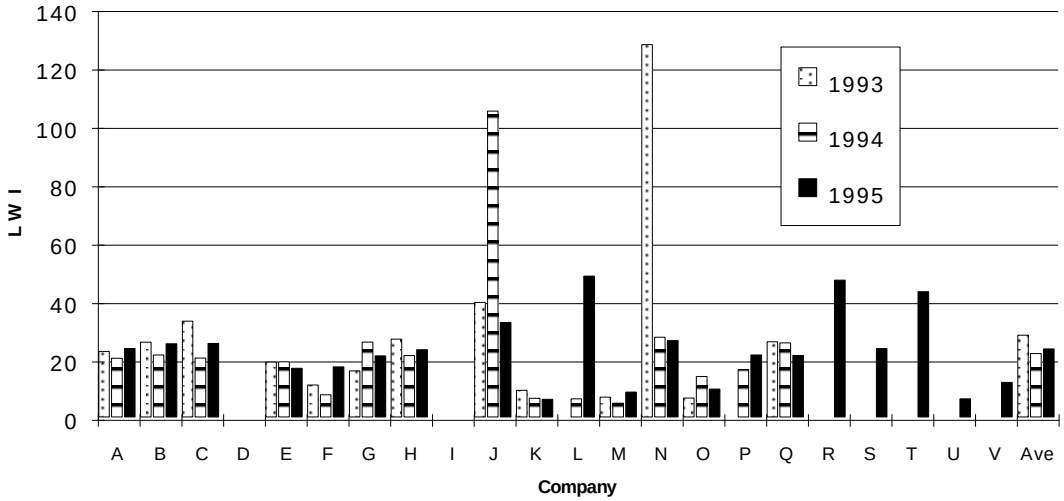
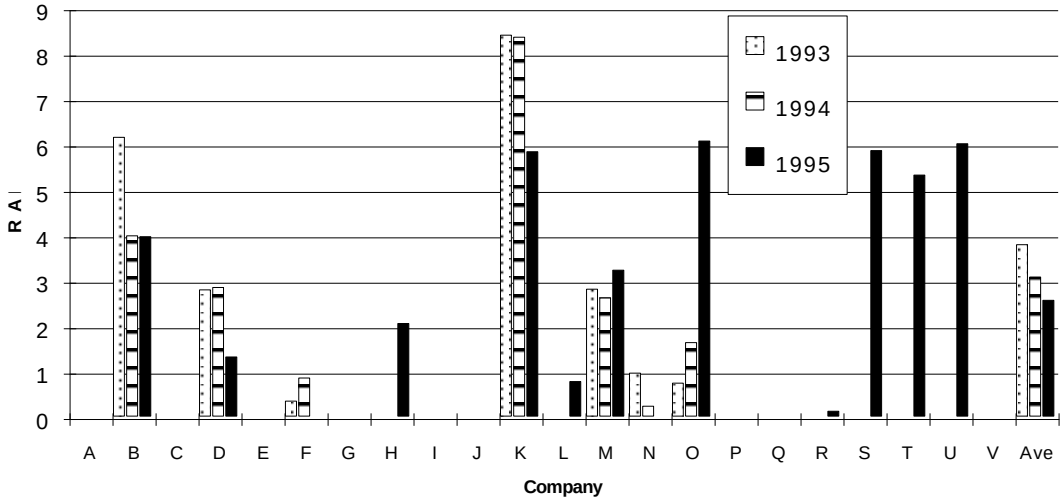


Figure 15 Road Accident Rate

(Accidents per Million Kilometres)



APPENDIX 3 DATA REQUEST FORM

CONCAWE Survey on
European Oil Industry Safety Statistics

Company | Sector: Manufacturing | Year: 1995

		Staff	Contractor
1	Total hours worked		
2	Number of fatalities		
3	Number of LWIs		
4	Total days lost through LWIs		
5	Number of RWIs		
6	Number of MTCs		
7	AIF		
8	LWIF		
9	LWI Severity (Days/LWI)		
10	Distance travelled (million km)		
11	Number of Road Accidents		
12	Road Accident Rate		