

SAFETY INCIDENT INVESTIGATION REPORT 2007-2010

Executive Summary

The Australian 2007-2010 results appear to follow quite closely to those recorded in Europe in the same industry sector but with a few notable exceptions.

It needs to be noted and action taken by the Executives of the piling & foundation industry, that there has been a significant decline in the reported data, by member companies.

The introduction of a web based reporting system will make it easier for all members to provide their complete incident data to the PSFS.

The following specific observations from the data are provided below and it is suggested that they be used as discussion points within individual members' organisations.

Individual members are encouraged to respond to this report with their comments on the findings and the relevancy that they attach to them considering their own in house experiences:

- *In the 3 year period of this study one in 8 incidents reported resulted in a lost time injury to personnel. This compares with one in 6 incidents reported in the first year 2007 – 2008 – a much better performance.*
- *The severity of injuries to personnel appears to have increased this year (2010) with more injuries resulting in time lost in excess of 2 weeks and regrettably the first fatality reported during the period.*
- *Incidents resulting in injuries to leading hands, driver/operators, foremen/supervisors and engineers are collectively of the order of 50% of all injuries recorded.*
- *More incidents appear to be occurring with specialised equipment both in the workshop/yard and on site whilst assembling/disassembling or undertaking maintenance. There appear to be a high percentage of incidents involving welders/mechanics/fitters on site – presumably working on equipment.*
- *Damage to eyes, and injuries resulting from manual handling activities rate very highly in the reports.*
- *Injuries resulting from falling, slipping, tripping etc whilst walking around site, or climbing on equipment continue to be one of the most common incidents reported.*

SAFETY INCIDENT INVESTIGATION REPORT 2007-2010

Background

In early 2007 the Members of the Federation endorsed a proposal to introduce a reporting system for its members so that it could better understand the nature of incidents occurring within the piling and foundation engineering sector of the industry. This system was intended to be as simple as possible to encourage participation but detailed enough to provide meaningful information – it was never intended to replace existing systems for record keeping required under law in each state.

The system adopted followed very closely the similar system used successfully by the European Federation of Foundation Contractors (EFFC) in Europe since 1995. Their system is in operation in 13 countries and they have a database of over 4,000 accidents!

The essence of the system is to use a simplified “tick a box” type format with minimal additional writing required. ALL incidents are reported whether they are time lost or no time lost incidents or involve damage to equipment only. This gives a much broader coverage than the statutory requirements. The system was introduced as from July 2007 and we have presented reports for each of the 2 years to date. We have now updated the results to the end of June 2010 thus completing the first 3 years of study.

This system is now web based for ease of submission.

A total of 186 reports were received in 2007 – 2008 and an additional 194 reports for the year 2008 - 2009 from all states of Australia. In the past year 2009-2010 incidents reported were only 119 bringing the total for the 3 year period to 499. This is a relatively low database for comparison purposes with the European information but it provides us with a positive start which can only be improved upon in the future.

We are indebted to the member companies who have provided information for this study.

It is estimated that these companies would have undertaken well in excess of 60% of the specialised foundation work covered by our membership in Australia in the period studied so it is a good sample to commence the investigation with. It should be noted however that all of the companies listed are based in the Eastern and Southern States – we have no reports from Western Australia based companies, so the report will naturally be skewed accordingly.

A brief summary of the most significant results from the study are attached with some initial comments. Members are encouraged to review their own experience and offer their comments and suggestions for improvement of the reporting system and their thoughts on how to use the information collected.

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Incident analysis by state: (Table 1)

The overall number of incidents reported was 35% less than in the 2 previous periods as shown in table 1. The main decrease in incidents reported was from Queensland – all other states reporting relatively similar numbers of incidents as previously.

Place of incident: (Table 2)

For the three year period the percentage of all incidents reported that took place in the yard or workshop was 24%. This compares with about 16% in EFFC. Incidents occurring on site comprised 73% of all incidents and in travelling 3%. These figures are based on the reports that included a location. It should be noted that 33% of the incident reports did NOT include the actual location of the incident – so the actual final figures for each category could have been different if recorded. It should also be noted that several of the site incidents also involved mechanics, welders and electricians working on equipment. This continues to be an obvious area of concern that should be examined by all members.

Day of the week: (Table 3)

The EFFC report includes details of the day of the week that incidents occurred. We have not compared this information before, so the figures in this years report are for one year only and do not correlate too well with the European experience.

Time of incident: (Table 4)

Almost 60% of incidents occur in the morning as in the EFFC figures. The figures relate to the European experience quite closely considering the small database that we have.

Age of persons injured: (Table 5)

66% of all incidents involve personnel under 40 years old. These figures indicate a similar age distribution in general as EFFC with some small differences probably again due to the small database that we have.

Severity of injury: (Table 6)

This year a PSFA member fatality occurred for the first time in the 3 year period that the records have been taken.

We also experienced a significant number of incidents involving lost time in excess of 2 weeks, but these were offset by incidents involving a reduced amount of time lost as shown in table 6 (reproduced below).

	2007-08	2008 - 09	2009-2010
FATAL	0	0	1
Greater than 2 weeks lost time	8	1	12
3 days – 2 weeks lost time	8	11	1
Less than 3 days lost time	12	9	2
No lost time	126	132	77
Damage to plant & equipment only	32	41	26
Total	186	194	119

SAFETY INCIDENT INVESTIGATION REPORT 2007-2010

Vocation of personnel involved in incidents: (Table 7)

Collectively the experienced personnel comprising engineers, foremen, leading hands, operators & drivers and offsidiers were involved in 50% of all incidents resulting in injury. Injuries to the less qualified General site labourers only involved 30% of all incidents. Tradesmen such as mechanics, electricians and welders were involved in 16% of injuries.

Injured parts of the body: (Table 8)

The nature of injuries to various parts of the body follows the EFFC very closely on the information recorded even with a low database. ***Injuries to Fingers, Eyes and Feet are a standout representing 36% of all injuries.***

Activity of the injured person at time of incident: (Table 9)

14% of all incidents occurred when "Walking around site or climbing on equipment" (cf similar to 12% in Europe) and 19% in "manual handling". This year we have continued to see a high incidence involving operating equipment at 27% compared with only 10% in Europe. Some discrepancies in descriptions may be prevalent in this category but it is recommended that the causes be examined by the Federation Safety Committee.

Incident description: (Table 10)

Most common causes of incident are "Slipping, tripping or falling on same level" – 19% for the 3 year period and 'Lifting & wrong movement" associated with manual handling activities also 19%.; "Struck by falling object" 12%; "Damage to eyes" – 7% . Many of these could point to poor housekeeping on site, and the need for more emphasis and training in relation to awareness around site and manual handling techniques.

Foundation activity: (Table 11)

In the 3 year period Bored piles and cfa piles were the basis for 55% of the incidents reported in Australia (compared with only 33% in Europe). The driven piling component was 30% compared with 15% in Europe. EFFC figures included a much wider range of activities such as anchoring, diaphragm wall underpinning and ground improvement works. This year appears to have seen an increase in incidents involving diaphragm wall activity in Australia.

Table 1 - Incident Analysis by State

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average
	No	No	No	%	%
QLD	112	95	43	36%	51.0%
NSW	41	51	40	34%	26.9%
VIC	27	30	25	21%	16.7%
SA	3	4	6	5%	2.7%
ACT	1	0	4	3%	1.0%
WA	2	4	1	1%	1.4%
Tasmania	0	1	0	0%	0.2%
Totals	186	185	119	100%	100.0%

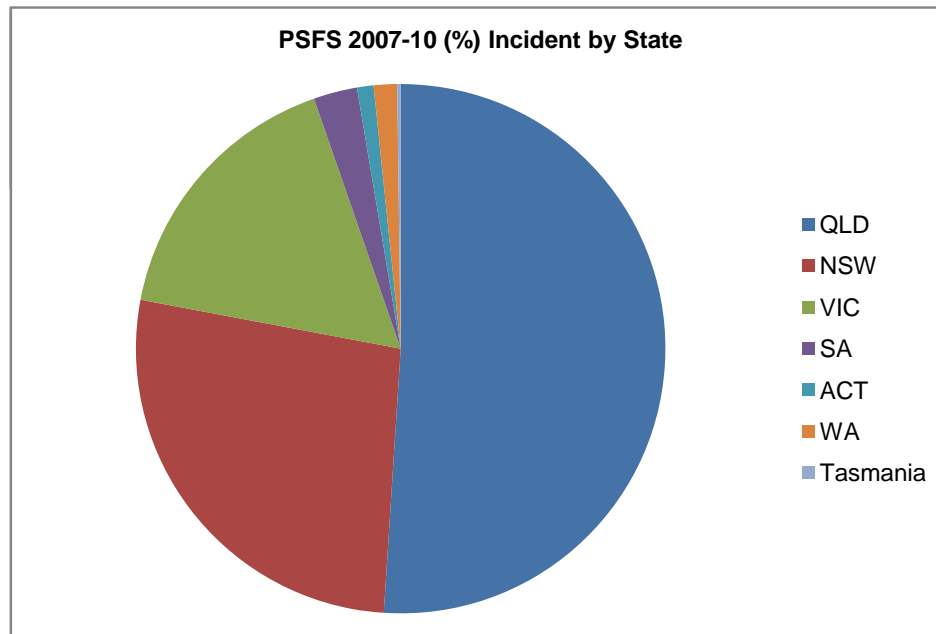


Table 2 - Incident Analysis by Location of Incident

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 3 year Average	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	No	%	%
Site	131	89	95	105	73%	79%
Workshop/Yard (Combined)	51	35	17	34	24%	16%
Travelling	4	5	4	4	3%	4%
Office	0	0	1	0	0%	1%
Other	0	0	0	0	0%	0%
Total	186	129	117	144	100%	100%

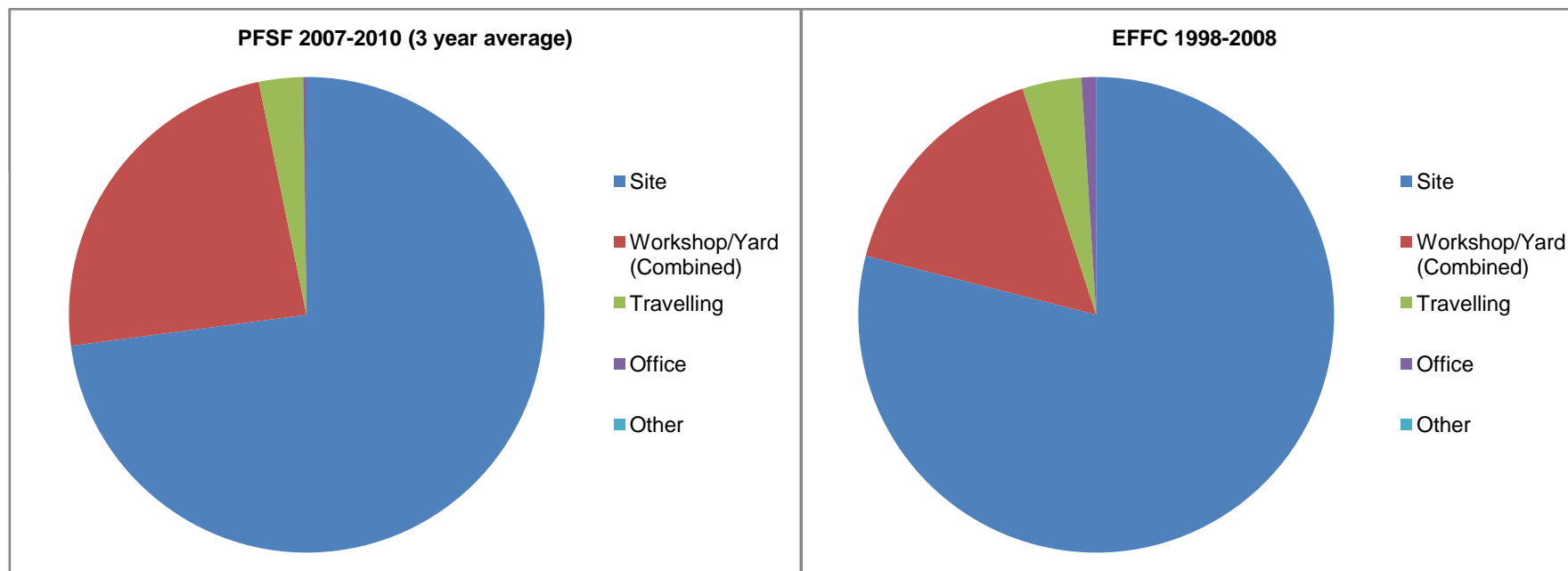


Table 3 - Incident Analysis Day of the Week

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	EFFC 1998-2008
	No	No	%	%
Monday			14%	22%
Tuesday			20%	21%
Wednesday			12%	19%
Thursday			20%	18%
Friday			24%	15%
Saturday			9%	3%
Sunday			1%	2%
Total			100%	100%

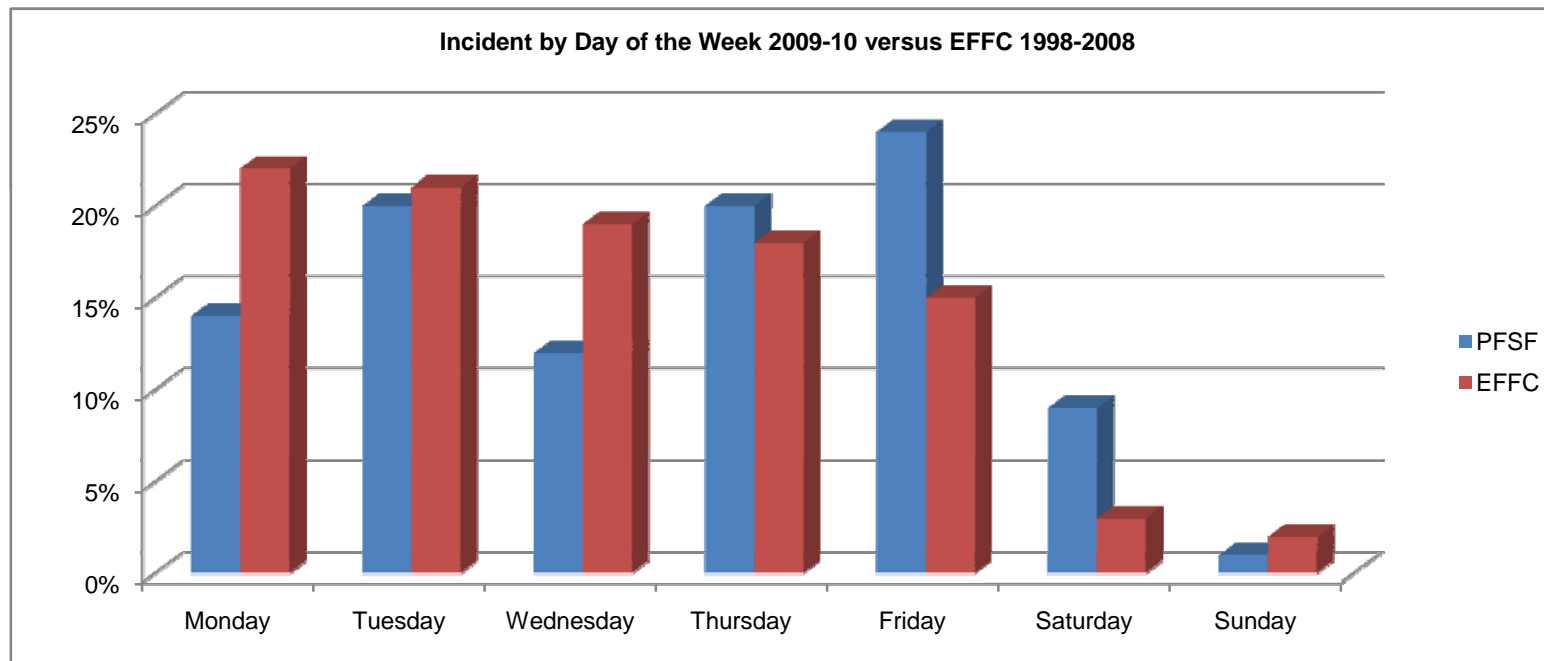


Table 4 - Incident Analysis by Time of Day

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	%	%	No	%	%	%
10am - 11.59am	20%	24%	29	31%	25%	26%
8am - 9.59am	23%	24%	24	26%	24%	16%
2pm - 3.59pm	20%	22%	14	15%	19%	17%
12 noon - 1.59pm	11%	10%	9	10%	10%	13%
4pm - 5.59pm	10%	13%	9	10%	11%	15%
6am - 7.59am	15%	7%	6	6%	9%	5%
After 6pm	1%	0%	3	3%	1%	6%
Before 6am	0%	0%	0	0%	0%	2%
Total	100%	100%	94	100%	100%	100%

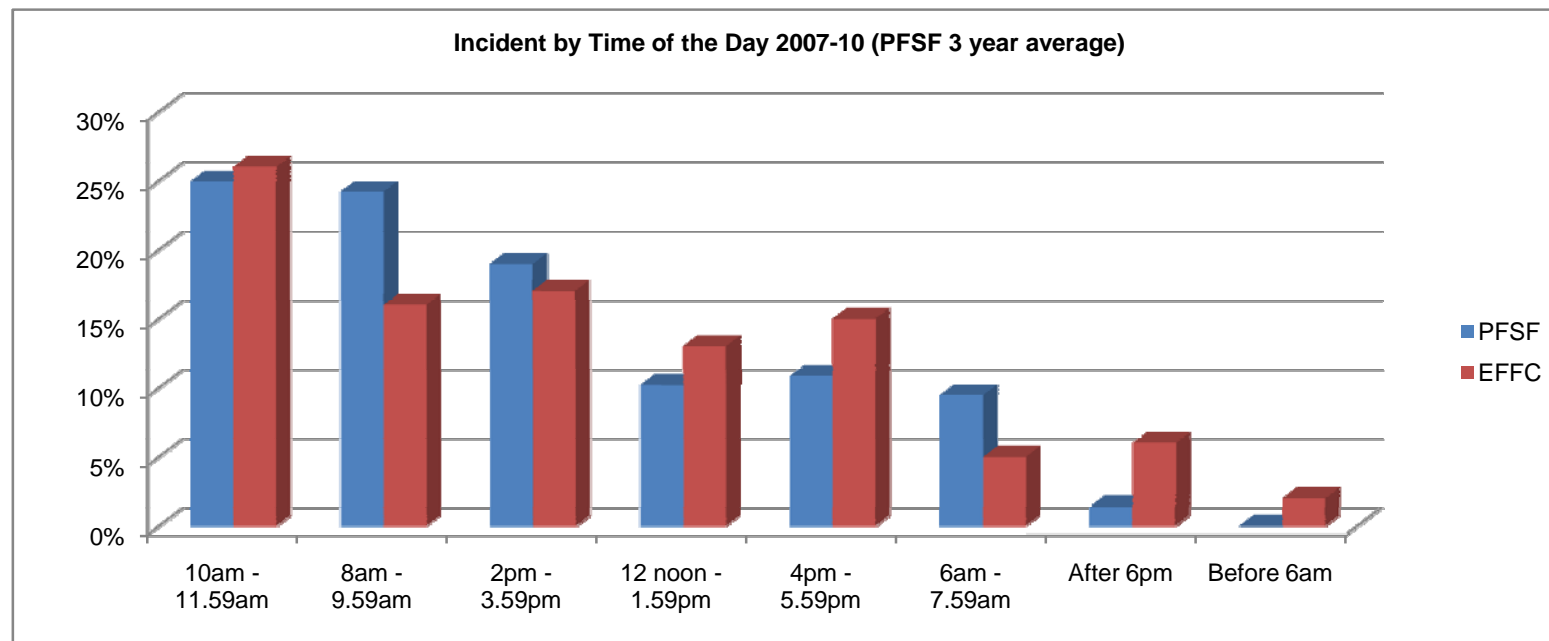


Table 5 - Incident Analysis by Age Group

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	%	%	No	%	%	%
21 - 30	20%	20%	18	34%	25%	22%
31 - 40	38%	37%	17	32%	36%	33%
41 - 50	16%	15%	11	21%	17%	24%
51 - 60	15%	21%	5	9%	15%	15%
< 20	9%	5%	1	2%	5%	4%
> 60	2%	2%	1	2%	2%	2%
Total	100%	100%	53	100%	100%	100%

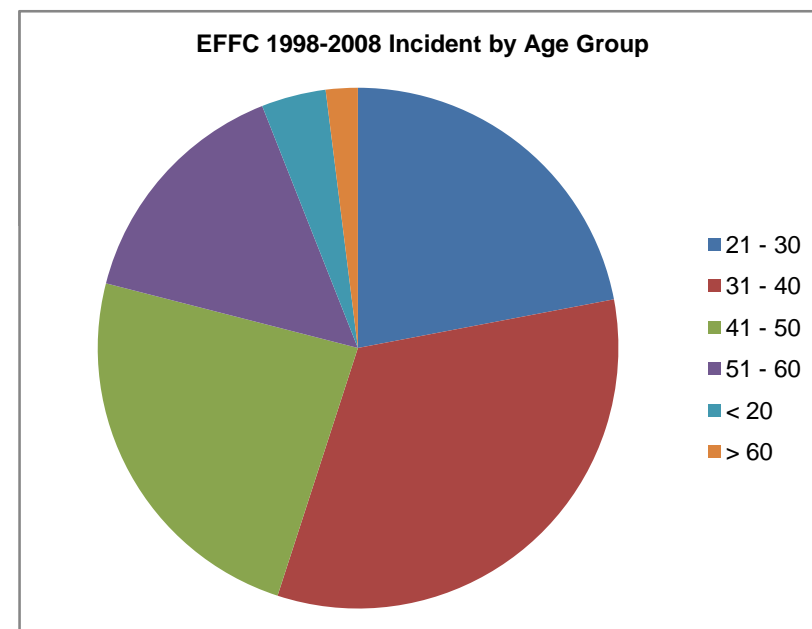
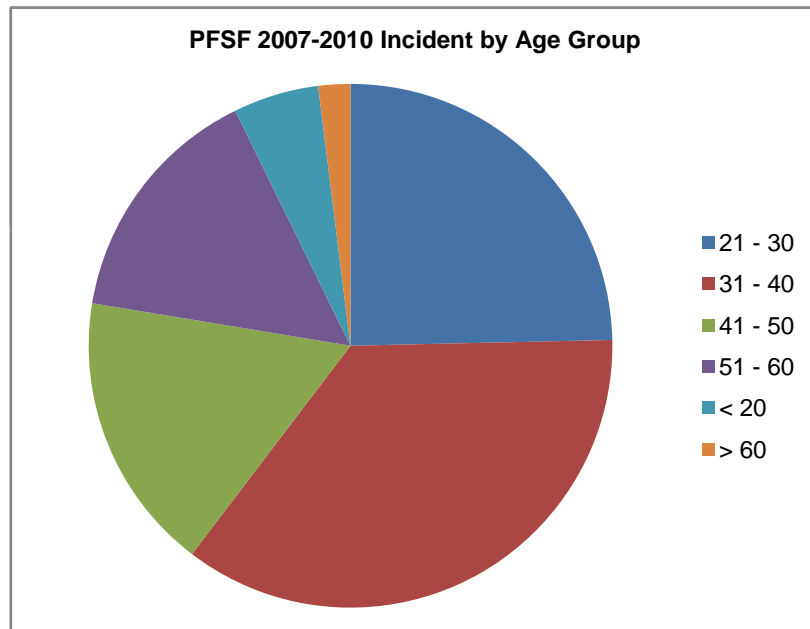


Table 6 - Incident Analysis Severity of Incident (Australia only)

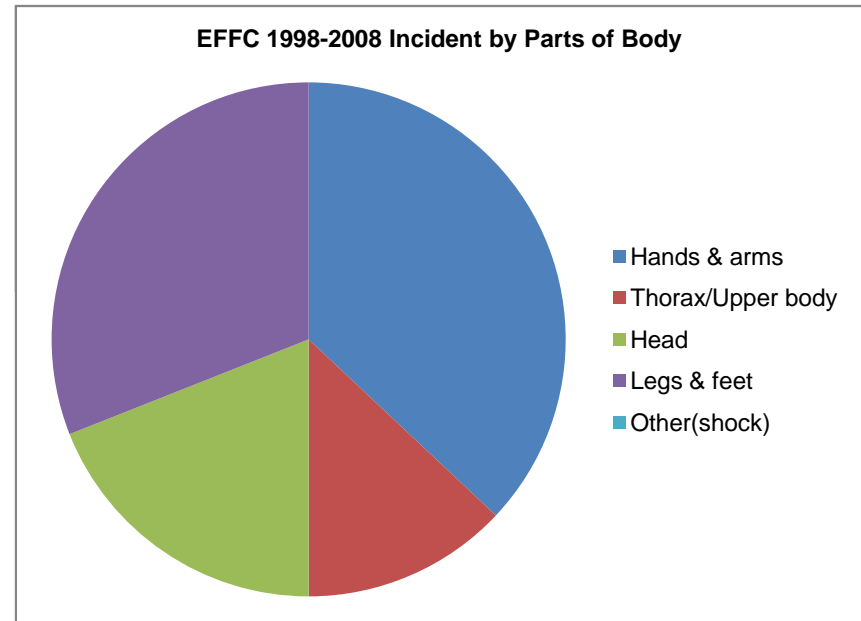
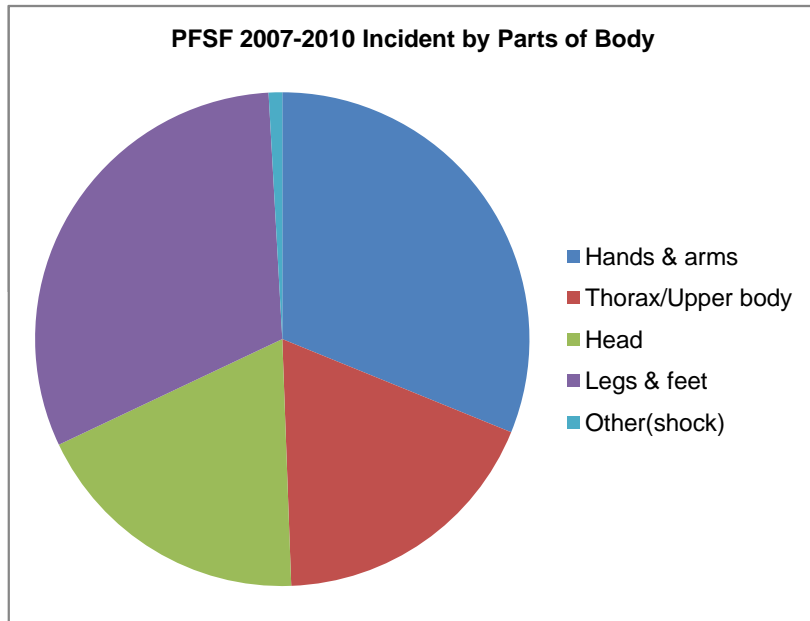
	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10		PFSF 2007-10 3 year Average
	No	No	No		%
FATAL	0	0	1		0.2%
More than 2 weeks	8	1	12		4.2%
3 days to 2 weeks	8	11	1		4.0%
Less than 3 days	12	9	2		4.6%
No time lost	127	132	77		67.3%
No time lost (Plant or Property Damage)	31	41	26		19.6%
Total Incidents Reported	186	194	119		100.0%

Table 7 - Incident Analysis by Vocation of persons involved

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Engineer	2	5	1	1%	3%	?
Foreman/Supervisor	4	5	4	6%	4%	8%
Leading Hand	17	10	12	17%	12%	16%
Operator/Driver	19	27	15	21%	19%	16%
Offsider	13	16	13	18%	13%	4%
Mechanic/Electrician	11	10	7	10%	9%	7%
Welder	14	5	2	3%	7%	3%
General Labourer	38	45	12	17%	30%	22%
Others	0	0	0	0%	0%	5%
Trainee	0	0	1	1%	0%	0%
Storeman	0	0	1	1%	0%	0%
Steelfixer	1	0	3	4%	1%	0%
Unlisted	6	0	0	0%	2%	0%
Total	125	123	71	100%	100%	81%

Table 8 - Incident Analysis by Parts of Body Injured

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Hands & arms	39	40	30	40%	31%	37%
Thorax/Upper body	28	18	18	24%	18%	13%
Head	30	20	15	20%	19%	19%
Legs & feet	46	51	12	16%	31%	31%
Other(shock)	3	0	0	0%	1%	0%
Total	146	129	75	100%	100%	100%



Specific Sensitive Areas (subsets)

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Fingers	19	20	25	33%	18%	16%
Back (incl neck)	27	18	24	32%	20%	8%
Eyes	15	10	13	17%	11%	8%
Feet	10	7	7	9%	7%	9%
Knees	18	17	4	5%	11%	7%
Legs	18	7	1	1%	7%	7%
Others	39	50	1	1%	26%	45%
Total	146	129	75	100%	100%	100%

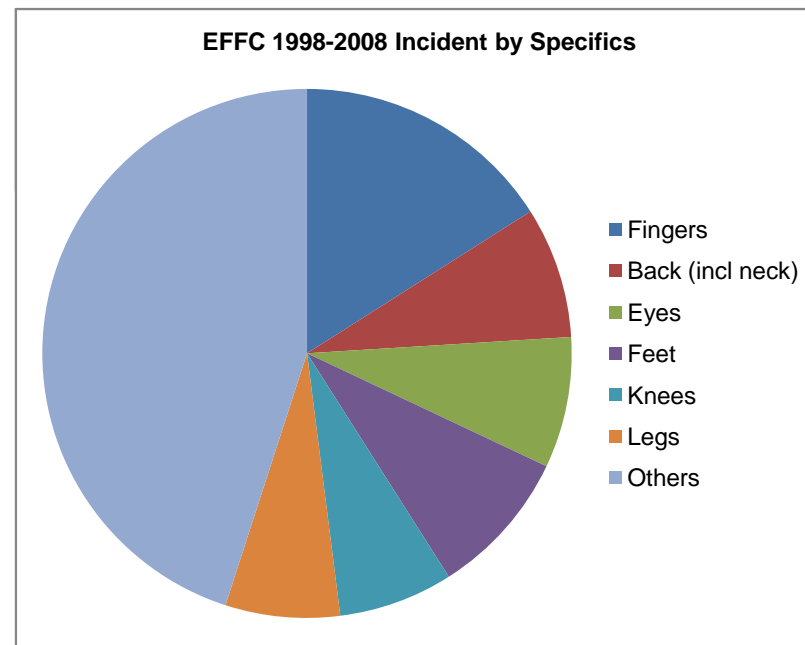
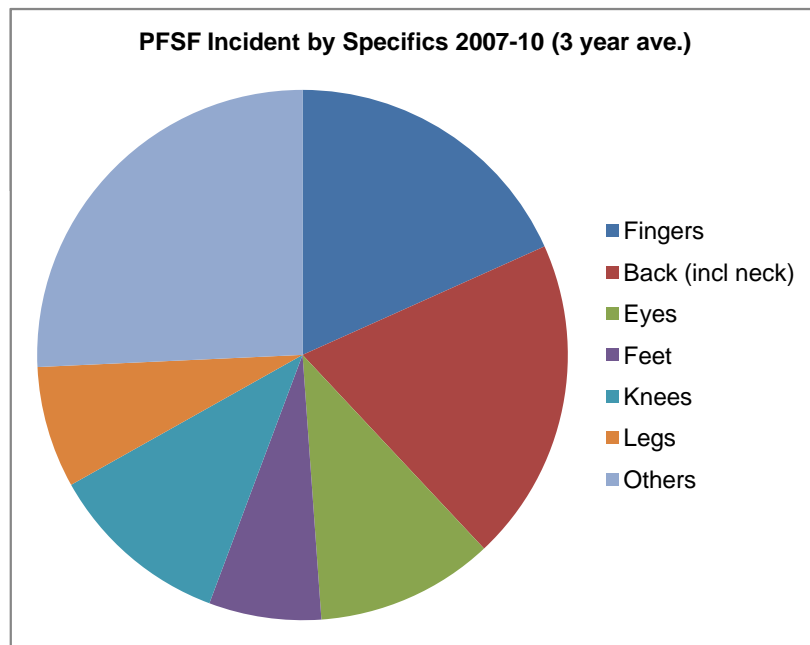


Table 9 - Activity of Injured Personnel at Time of incident

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Operating Equipment	26	35	25	27%	24%	10%
Manual handling	22	29	17	18%	19%	31%
Walking around site & equipment	13	24	13	14%	14%	12%
Other	2	2	11	12%	4%	0%
Assembling/Dismantling equipment	14	12	7	8%	9%	8%
Maintenance	10	35	7	8%	15%	8%
Handling Construction Materials	15	8	6	6%	8%	11%
Travelling	8	0	4	4%	3%	5%
Mobilisation/Demobilisation	0	3	2	2%	1%	4%
Screwing Rods & Pipes	1	1	1	1%	1%	11%
Total	111	149	93	100%	100%	100%

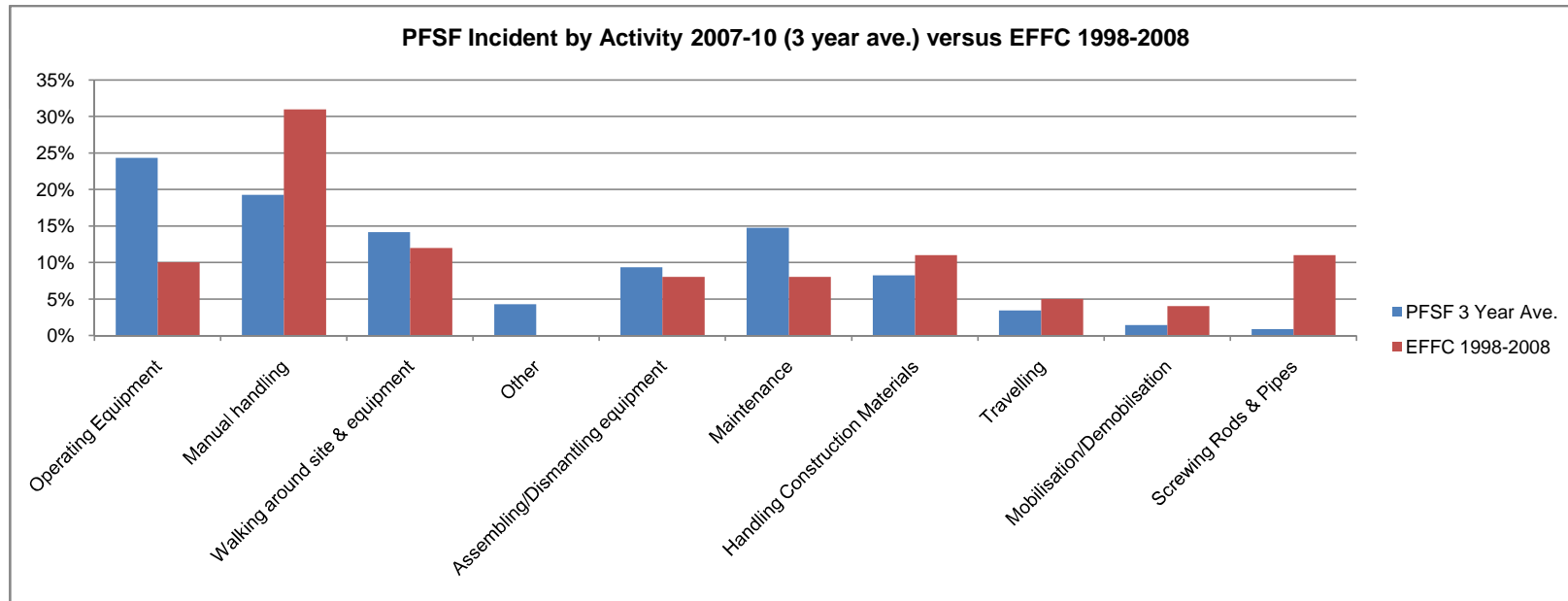


Table 10 - Description of Incident

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Slip, trip or fall on same level	35	24	14	16%	19%	22%
Lifting/wrong movement	33	25	13	15%	19%	2%
Struck by moving object	15	11	8	9%	9%	10%
Equipment failure	3	6	8	9%	4%	1%
Struck by falling object	22	15	7	8%	12%	13%
Struck by something fixed	12	16	7	8%	9%	8%
Contact with moving machinery	2	2	7	8%	3%	6%
Struck by moving machinery	4	4	6	7%	4%	10%
Exposure to harmful substances	3	4	4	5%	3%	2%
Electrical discharge	2	3	4	5%	2%	1%
Damage to eyes	14	8	3	3%	7%	6%
Splash	3	1	2	2%	2%	1%
Fall from height	5	6	1	1%	3%	7%
Traffic incident	0	3	1	1%	1%	3%
Trapped by overtruning equipment	1	2	1	1%	1%	3%
Other (incl explosion/fire)	3	4	1	1%	2%	5%
Total	157	134	87	100%	100%	100%

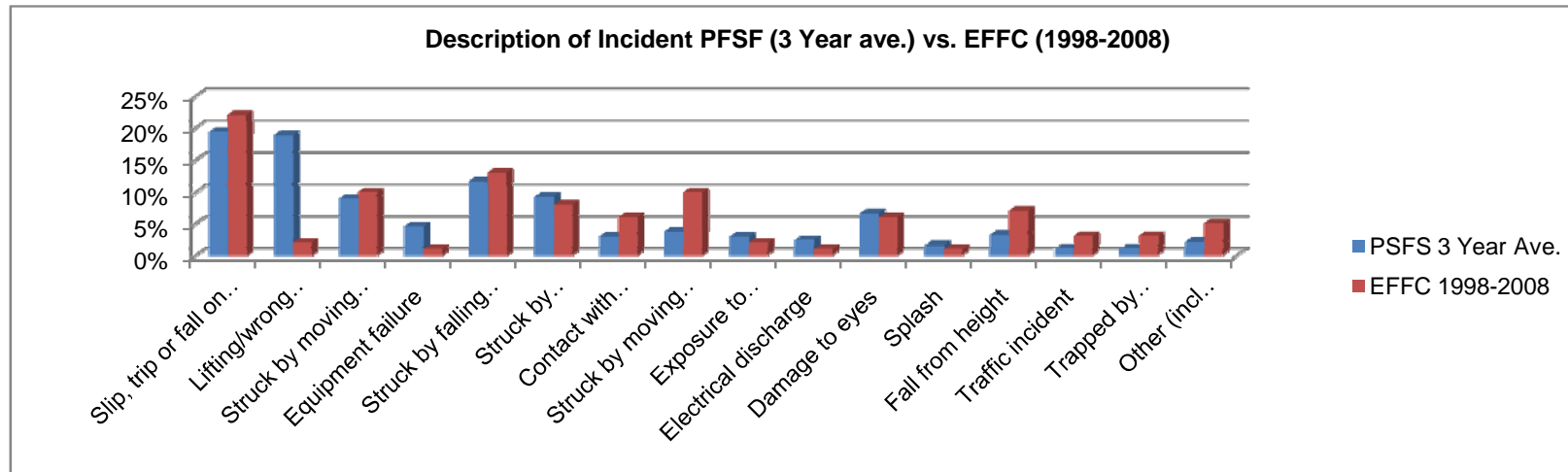


Table 11 - Foundation Activity at time of Incident

	PFSF 2007-8	PFSF 2008-9	PFSF 2009-10	PFSF 2009-10	PFSF 2007-10 3 year Average	EFFC 1998-2008
	No	No	No	%	%	%
Bored Piling	36	35	23	28%	34%	Combined CFA
CFA Piling	15	21	21	26%	21%	33%
Driven Piling	33	32	18	22%	30%	15%
Ground Improvement	1	1	5	6%	3%	23%
Diaphragm Walls	5	10	4	5%	7%	10%
Anchoring	1	1	4	5%	2%	11%
Grouting	1	1	2	2%	1%	Combined Ground Impv
Underpinning	2	0	2	2%	1%	4%
Soils Investigation	0	1	1	1%	1%	4%
Sheet Piling	0	0	1	1%	0%	Incl Driven
Total	94	102	81	100%	100%	100%

Specialist Foundation Engineering in Europe Analysis of accident occurrences from 1998 to 2008

Dipl.-Ing. Walter Ensinger, Munich

Basics

The European Federation of Foundation Contractors (EFFC), that now represents over 450 companies in 17 countries, agreed when founding the federation in 1989 to award maximum priority to the topic of occupational health and safety. It was therefore an obvious next step to set up a Health & Safety Working Group (EFFC H&S-WG).

Efforts made by this working group to acquire statistics on accident occurrences in specialist foundation engineering from public sources showed little success. Most countries do not have any data on accidents in foundation engineering and a benchmarking between different countries could not be carried out due to the lack of information or non-comparable data. The EFFC H&S-WG therefore committed itself to collecting and analysing accident records provided by member companies. In doing so, it has been able to fall back on experiences gathered in Germany since 1992 in a similar accident analysis carried out by the Institute for Statutory Accident Insurance and Prevention in Civil Engineering (Tiefbau-Berufsgenossenschaft), in cooperation with the Foundation Engineering Department of the Federation of the German Construction Industry (Hauptverband der Deutschen Bauindustrie). After making minor alterations to the used report sheet for specifying accident details, it was possible to use this sheet for the EFFC-wide survey.

The collection and evaluation of data commenced on a European scale in 1998, after completion of a test phase. The Institute for Statutory Accident Insurance and Prevention in the Construction Industry (BGBau) participated in both the nationwide and European project right from the start. There have been several reports on the results (e.g. in TIEFBAU 1/1995, 6/1998, 9/2001 [http://www.baumaschine.de/portal_tbg.html]).

During the period between the last publication and the end of 2008 details have been sent in on some further 1,500 accidents, meaning that the following analysis has been prepared using nearly 4,000 reports from 13 countries¹.

¹ Austria, Belgium, Czech Republic, Denmark, France, Germany, Hungary, Italy, Netherlands, Spain, Sweden, Switzerland, United Kingdom



Fig. 1 A standard situation on construction sites in urban areas – featuring substantial accident potential

Data acquisition

The EFFC bids all member associations and companies to regularly provide information on all accidents that occur in specialist foundation engineering. In a specially prepared report sheet information is to be given on

- Time of accident
- Duration of shift
- Age and occupation of the injured person
- Place of accident, applied engineering methods and machines
- Type of injuries
- Activity at the time of the accident and
- Description of accident

In most cases this is implemented by simply marking one of the given options. The report sheet is available in different languages and can be downloaded under <http://www.foundationworld.org.uk/jsp/effc.jsp?lnk=632>.

The report is on a completely voluntary basis and is anonymous. This data collection within the federation does therefore not allow the benchmarking hoped for (e.g. comparisons of “country A with country B”, “year X with year Y” or “sector I with sector II”). These analyses do, however, allow the detection of key accident hazards and point out workflows that are particularly prone to accidents, thus creating a basis for essential and effective protection measures.

In most member countries it is common practice to only record and report accidents that resulted in an absence of more than 3 days. The fact that one in seven of the accident report sent in describes an accident occurrence with an absence from work of less than 3 days shows that, sometimes, also such minor accidents were reported. It would be a good thing if also near-accidents, and those involving just a short absence from work could be analysed in future, as this would provide a more comprehensive picture of the accident occurrences.

After 14 % of the accidents recorded the injured person was absent from work for just a short period of up to max. 3 days. 48 % involved an accident with an injury-related absence of 4 days to 2 weeks, and in 38 % of the reported cases the absence from work was longer than 2 weeks. 19 of the reported accidents involved fatal injuries.

Evaluations

Sectors

The accident reports show that member companies of the EEFC are active in all sectors of specialist foundation engineering. The data collection and evaluation is therefore significant for the entire branch.

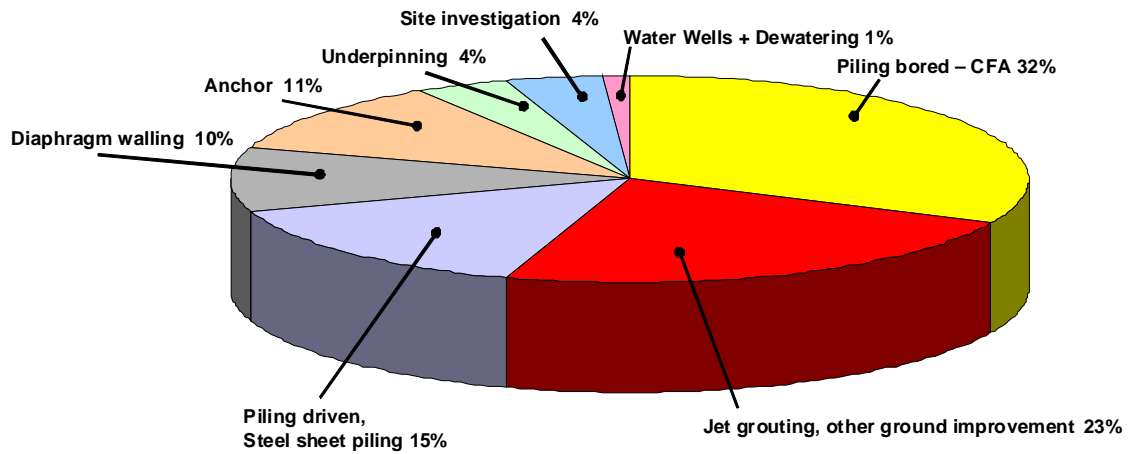


Fig. 2: Work processes (Share of the reported accidents)

Time of accident

The distribution of accidents over the days of the week, the hour the accident took place and the shift duration up to the accident occurrence were investigated.

Weekday

There are an above average number of accidents at the beginning of the week. As it is to be assumed that the number of working hours carried out on Mondays is likely to be less than on the following days (travel time to site?) the accident frequency on this day is major issue that requires further analysis (see also “time of day”).

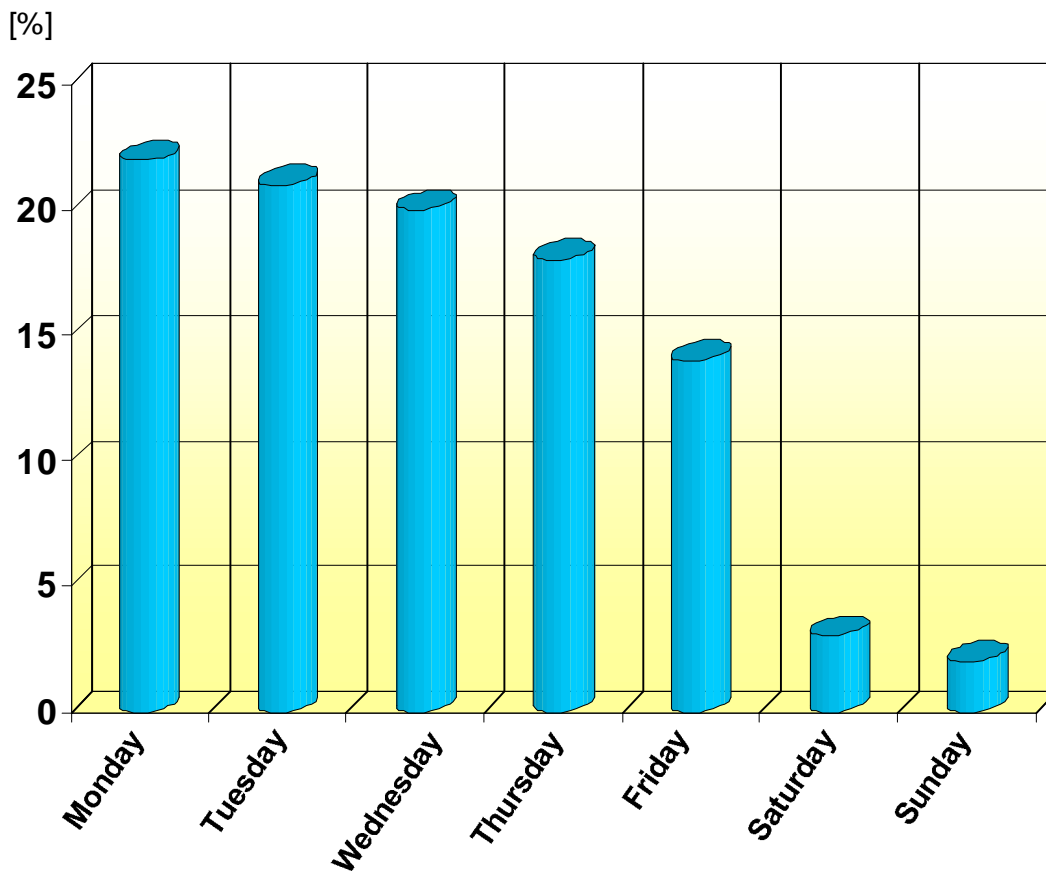


Fig. 3: Accidents on day of the week

Time of day

In all previous analyses it has shown that there is a particular frequency of accidents in the hours between 10 a.m. and 12 Noon. The hourly evaluation now available clearly shows that a well above-average number of accidents occur during the two hours before midday. It would appear to be proving true that effects such as “wanting to or having to finish the work before the midday break” or increasing carelessness and failing concentration clearly increase the risk of an accident.

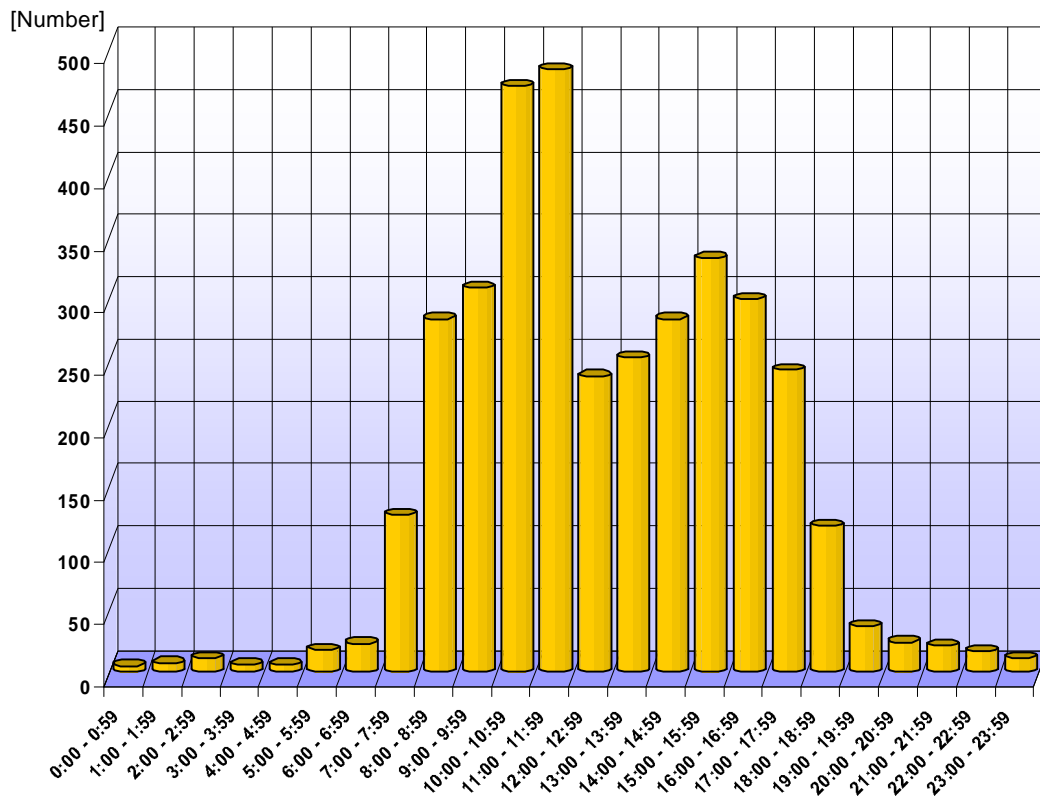


Fig. 4: Accident hour (weekly average)

Also an individual evaluation for each weekday shows a similar development.

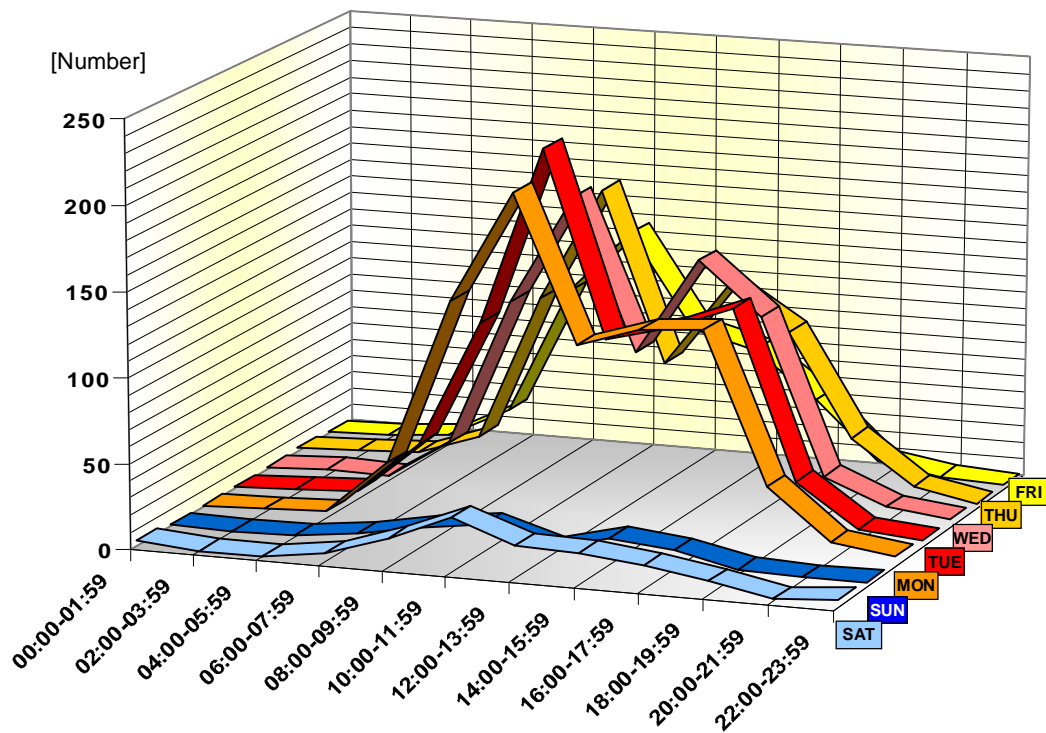


Fig. 5: Accident hour / weekdays

Shift duration

As the reports give the time the work commenced and the time of the accident it is possible to determine the duration of the shift up to the accident occurrence. Any breaks taken are not deducted (as these have not been reported). The accumulation in the 4th working hour is consistent with the results on the accident hour. An increase in the accident frequency is again determined as the shift progresses.

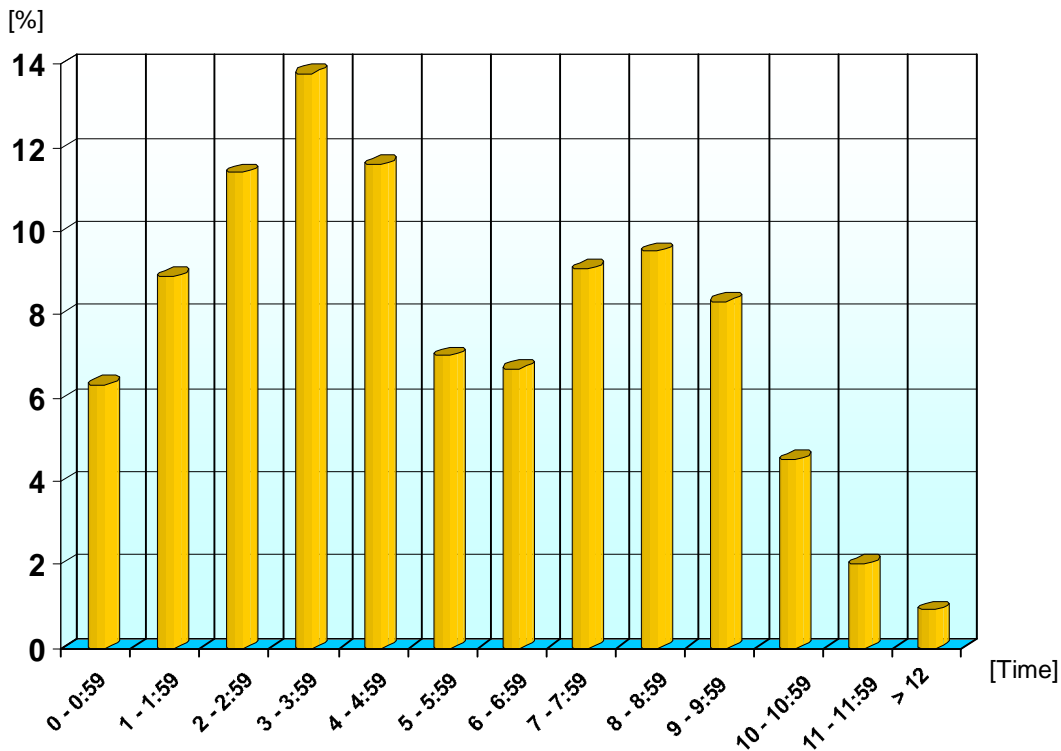


Fig. 6: Shift duration up to accident occurrence

The H&S-WG recommends that all EFFC member companies should investigate the accident occurrence in their own company in terms of the time of the accident and the duration of the shift and adopt appropriate counteractive organisational measures.

Place of accident

80 % of the reported accidents occurred on the actual construction site. Accidents in the contractor's yard and in the workshop accounted for 16 %. This clearly reveals that with the highly mechanised operations of specialist foundation engineering machine maintenance and servicing play a particularly important role. By employing qualified staff and appropriately equipping service departments the hazards revealed can be counteracted effectively.

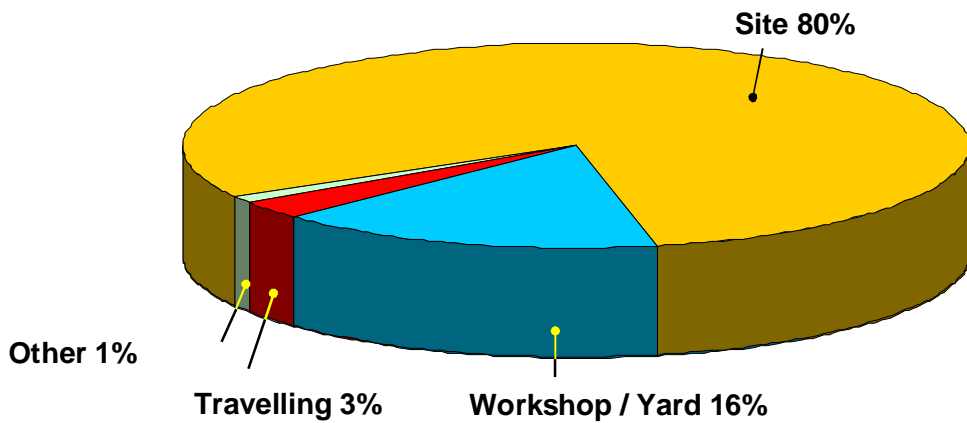


Fig. 7: Place of accident

Persons involved in accidents, accident outcome

Vocational groups

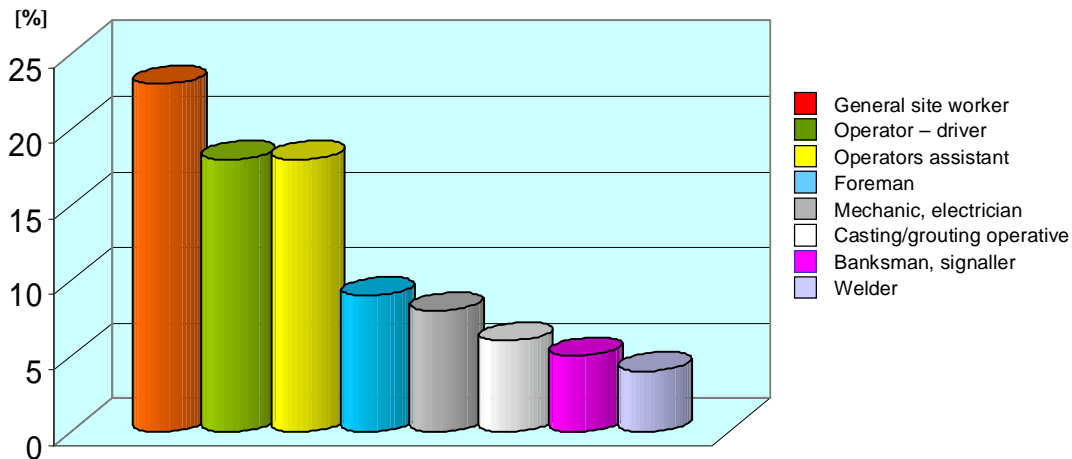


Fig. 8: Vocations of injured persons

Age structure

The analysis of the report sheets sent in shows the percentage of the different age groups involved in accidents. As there is no overall information on the age structure of persons employed in specialist foundation engineering (neither on a country-specific basis nor for Europe as a whole) it is not possible to evaluate this observation. Here again it is only possible to recommend corresponding investigations within the company or in cooperation with the association of the respective country.

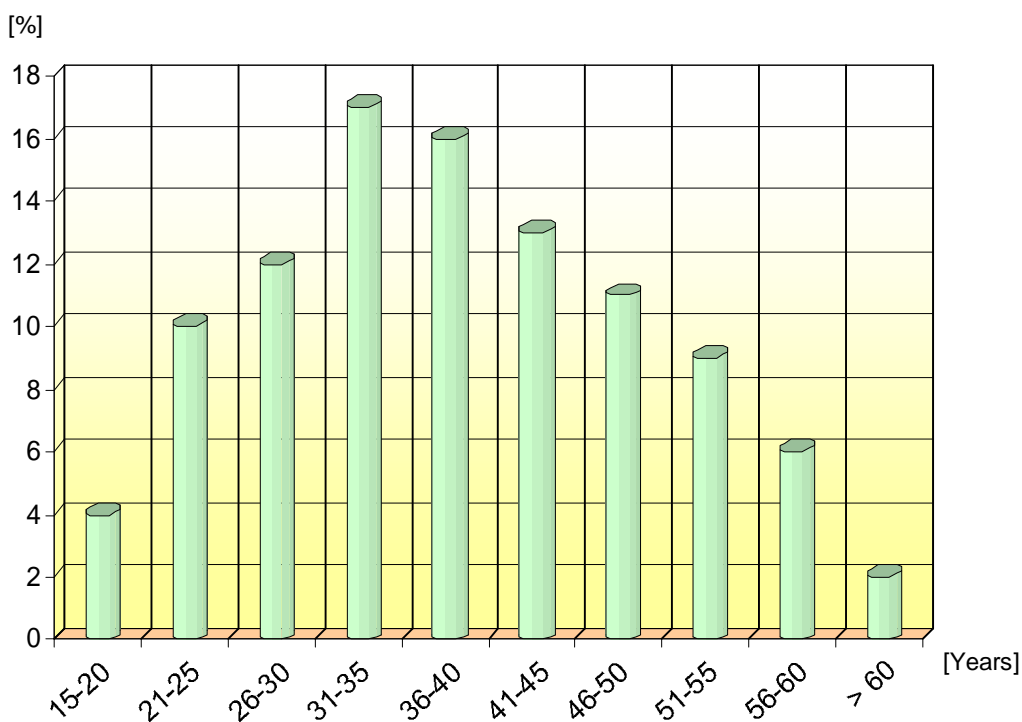


Fig. 9: Age structure (injured persons)

The consequences of an accident differ widely when comparing the respective age group –: whereas accidents of the age group of 31 to 40 years mostly come under the category “absent for 3 days to 2 weeks”, those over 40 years of age are much more frequently involved in accidents that cause an absence from work of more than 2 weeks.

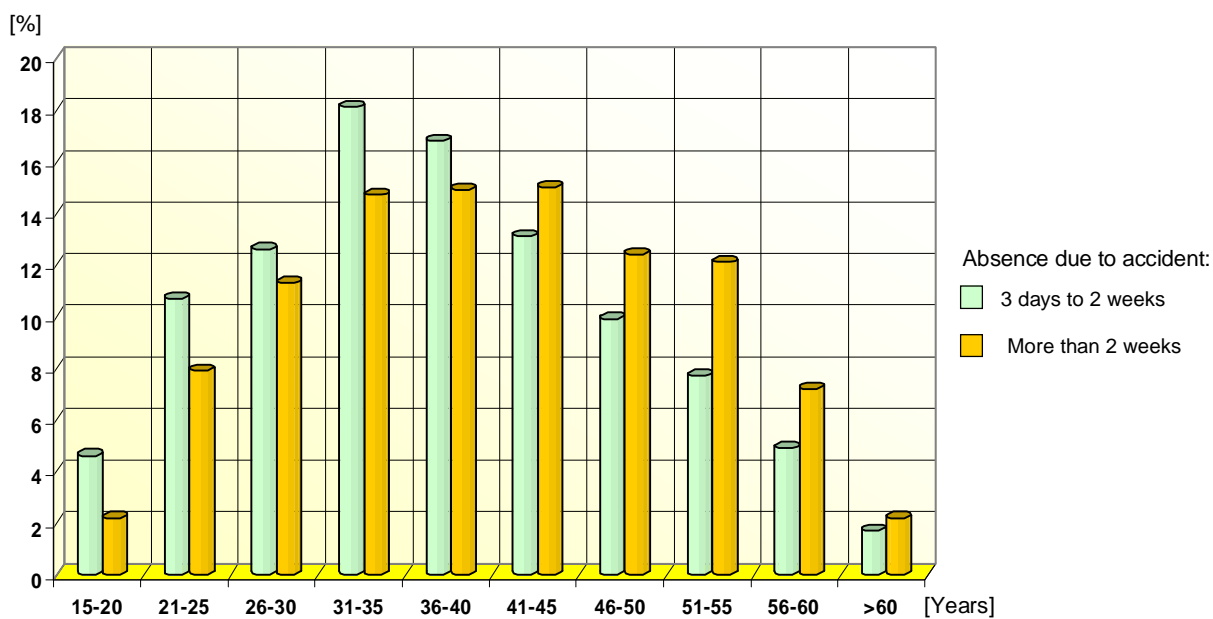


Fig. 10: Accident severity (absence due to accident)/age of injured persons

Injuries

Fig. 11 shows the injured body areas.

In 8 % of all the reported injuries eye injuries occur. This risk can be reduced substantially at minimum expense by wearing protection goggles at all times.

Technical measures are able to reduce injury hazards in specialist foundation engineering as well. However, in this specific construction sector it is most important to counteract residual risks that still prevail, in spite of the implemented technical measures, by providing personal protection equipment. Suitable protective equipment selected according to ergonomic aspects decisively reduces the risk of injury if the equipment is used on a consistent basis.

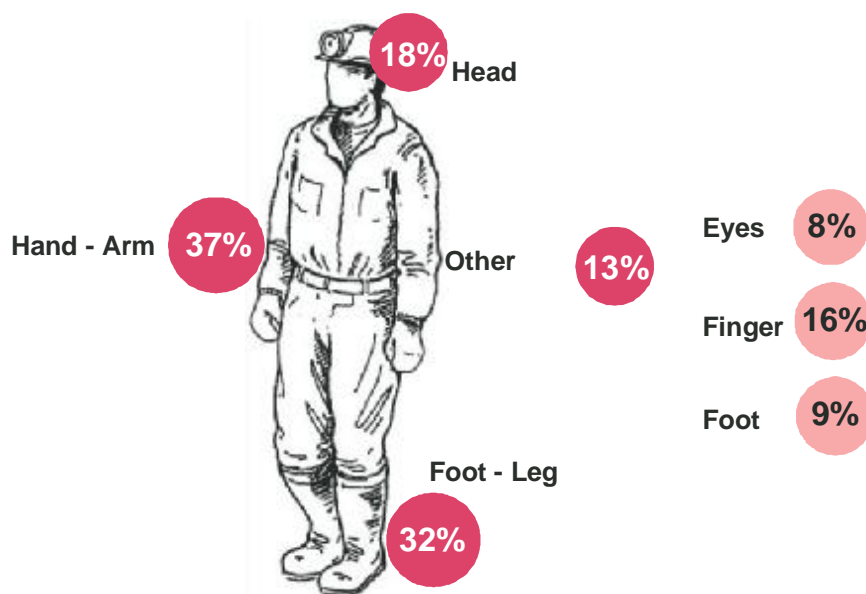


Fig. 11 Injured body area

27 % of the reported injuries resulted from jamming, 20 % were sprains/dislocations and 16 % were fractures.

“Accident causes”

“Accidents do not happen – they are caused by something!” It must be the objective of every accident review to determine the cause of such an event and the boundary conditions that had an impact on the negative occurrence “accident”. It nearly always involves several, sometimes independent factors, and in most cases it is combinations of technical and organisational deficiencies and human error that cause disturbances in the workflow and accidents are particularly critical disturbances!

“Accident experience” is important for prevention work and it forms an essential basis for the implementation of hazard assessments. Accident prevention will be successful when accident causes that have proven to be relevant in the past can be successfully defined and ruled out for future projects.

The problem that arises with every collection of accident data on report sheets is that only a restricted number of options can be given for selection.

Also the point concerning the “main cause of the accident“ quickly proved to be less suitable for our project because a purely subjective conclusion of the person reporting the accident would block out queries regarding other accident causes.

In the report sheet (still) in use there are no longer questions on the cause or causes of the accident. Instead, details on the “description of the accident“ are requested. There are 15 possible answers to mark and a field „Other“ in which other details can be entered, as required.

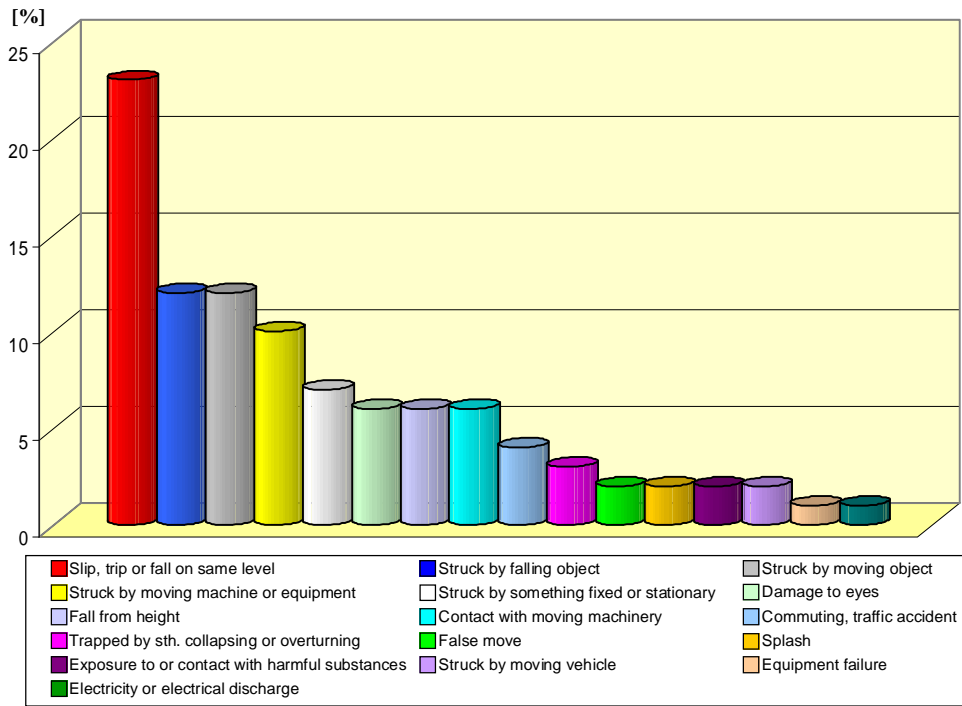


Fig. 12 Accident description (all sectors)

The key accident hazards become even more evident when the analysis of the data is carried out separately for the individual specialist foundation engineering sectors. For better clarity the chart given here only shows the seven terms most frequently named for each sector.

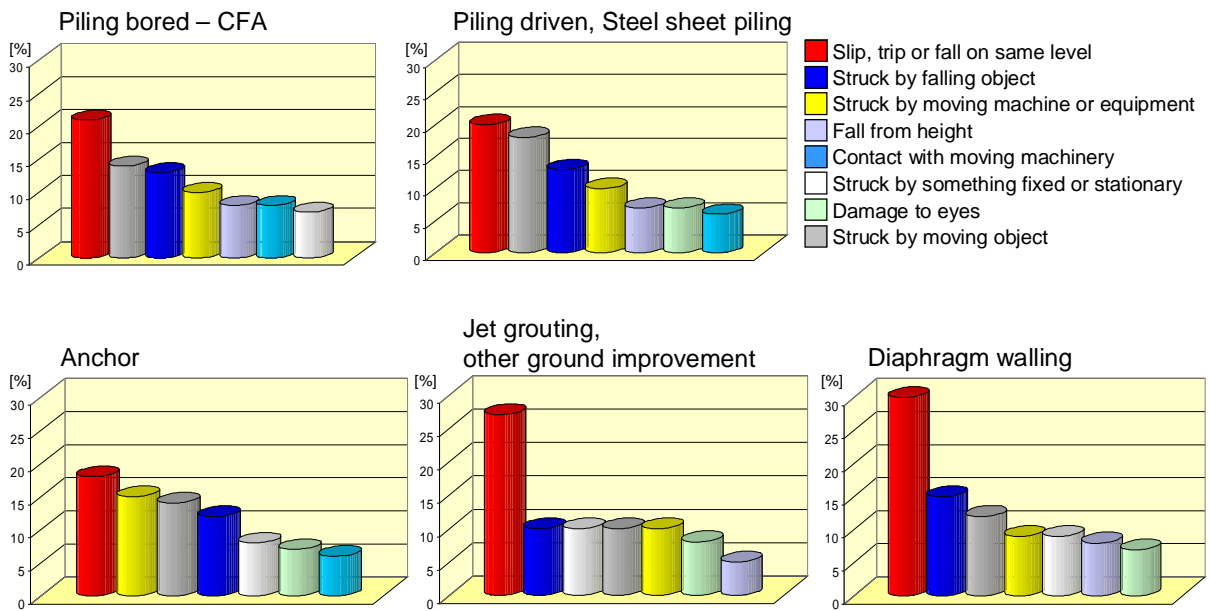


Fig. 13 Accident description (individual sectors)

Activity of the injured person at the time of the accident

Another way to describe an accident is to examine the activity carried out by the injured person at the time of the accident. The members of the Health&Safety Working Group of the EFFC agreed during the last revision that the question concerning the “activity of the injured person at the time of the accident“ would provide much more conclusive information than the question concerning the “cause of the accident“. In this way, work that is particularly prone to accidents can be determined, leading to the deduction of appropriate improvement measures. For this purpose, the report sheet gives 8 typical activities as options. There is an additional input field available under „Other“.

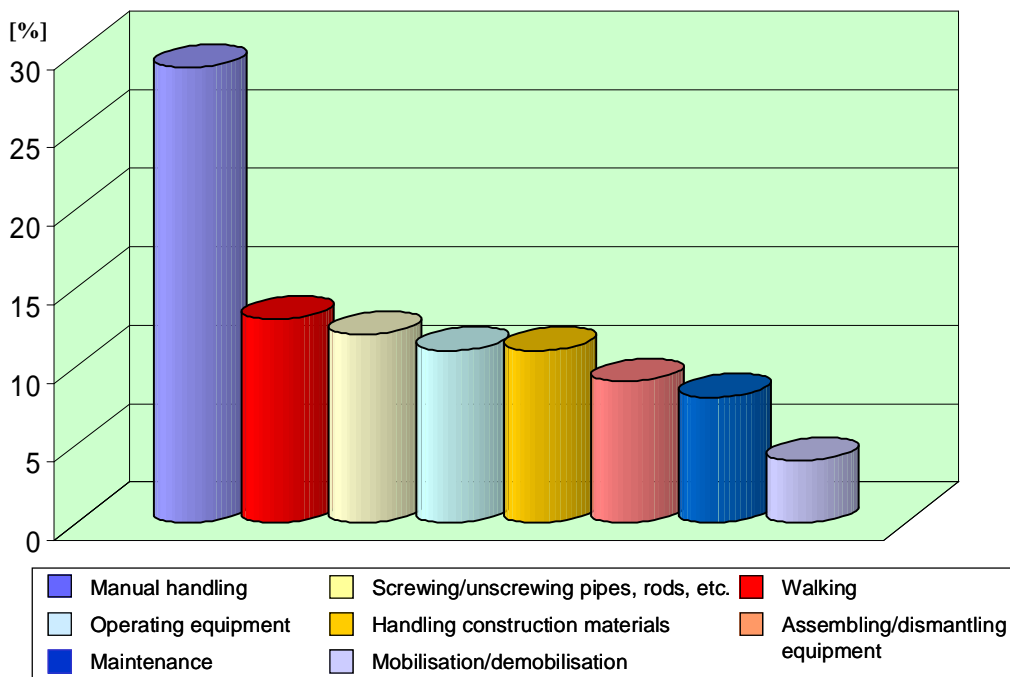


Fig. 14 Activity at the time of accident (all sectors)

A separate analysis of the accident occurrence for the different sectors is again expedient.

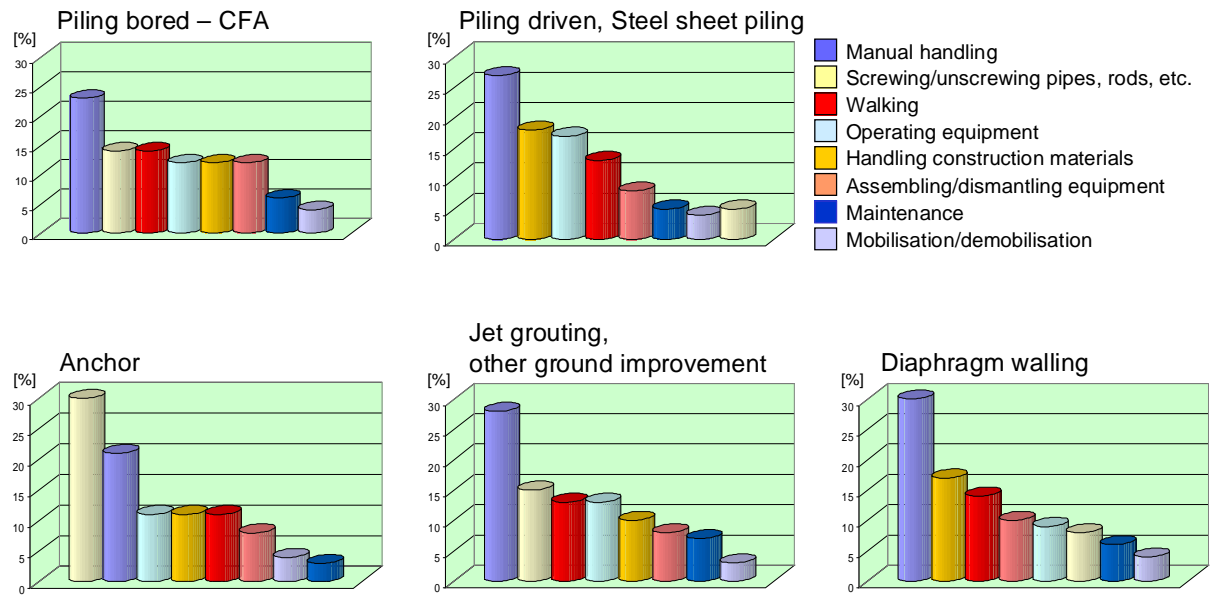


Fig. 15: Activity at the time of the accident (individual sectors)



Fig. 16 Diaphragm wall preparation during the construction of the Munich subway

Summary

The current analysis is based on approximately 4,000 accident reports from the specialist foundation engineering sector in 13 European countries. The report sheets have completed by EFFC member companies and associations on a voluntary basis. The accident reports from the years 1998 to 2008 have been collected by the BG BAU and analysed successively in coordination with the Health&Safety Working Group of the EFFC.

A comparison with the previously published analyses confirms trends that were apparent at that time. The conclusions can therefore be deemed as valid. These "EFFC figures" are therefore suitable for use as reference values for the analysis of company internal accident data or data collected on a nationwide basis.

After consulting the EFFC the Piling and Foundation Specialists Federation (PFSF) in Australia adopted this report sheet and used it as a basis for its own accident analysis. In many details the results of the 2007/2008 analysis in Australia coincide to a great extent with the EFFC results.

Unlike the EFFC, the PFSF not only examines accidents at work, but also "dangerous incidents". The PFSF therefore correctly uses the term "Incident Reporting System" and not "Accident report", and only 8 % of the reports sent in describe an accident at work in which a worker was so severely injured that he was absent for at least 3 days. The broad coincidence of the results shows that the analysis forms a reliable basis for specific preventive measures, in spite of the different reporting methods (PFSF: 100% reporting of all hazardous incidents; EFFC: voluntary reports of accidents with injuries to persons).

The "Accident pyramid" theory is confirmed. A disturbance in the workflow can remain without an incident or end in a minor accident, it can, however, also be the cause of a serious accident. Prevention must therefore set in at the bottom, with the aim to ensure a disturbance-free and thus safe and accident free working process.

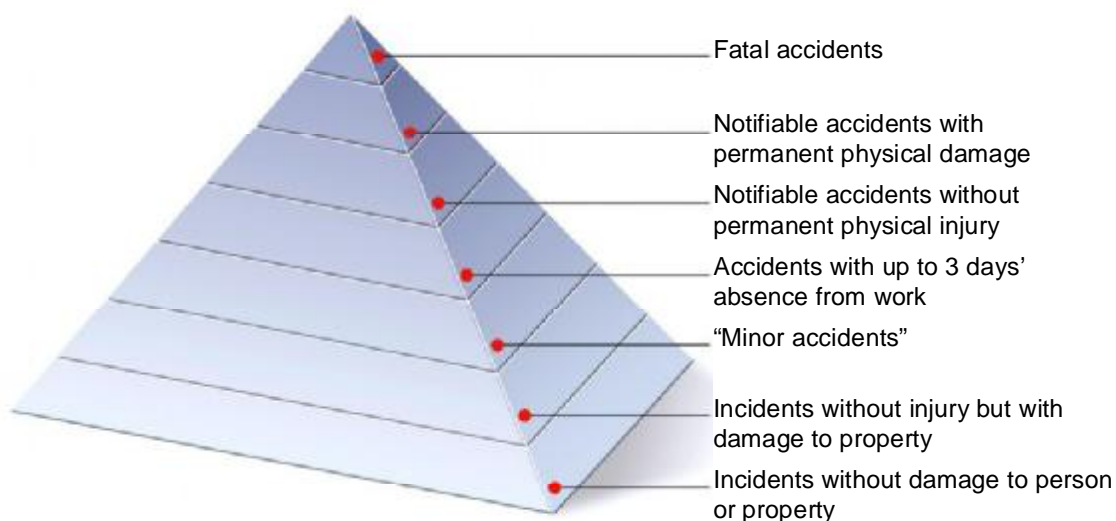


Fig.15 Accident pyramid (from H&S training)