



Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Benchmarking and gap analysis

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. The report is a review of health and safety data to establish the performance of the UK construction industry and identify any gaps which need to be addressed to improve the safety record of the industry.

Context:

This project looked at designing a supply chain solution to improve the energy efficiency of the vast majority of the 26 million UK homes which will still be in use by 2050. It looked to identify ways in which the refurbishment and retrofitting of existing residential properties can be accelerated by industrialising the processes of design, supply and implementation, while stimulating demand from householders by exploiting additional opportunities that come with extensive building refurbishment. The project developed a top-to-bottom process, using a method of analysing the most cost-effective package of measures suitable for a particular property, through to how these will be installed with the minimum disruption to the householder. This includes identifying the skills required of the people on the ground as well as the optimum material distribution networks to supply them with exactly what is required and when.

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The **ENERGY ZONE**
CONSORTIUM:



PEABODY



Optimising Thermal Efficiency of Existing Housing

WP7: Health and Safety
Considerations to be addressed in
Mass Delivery of Retrofit

BU1001_PM08_7.1_Benchmarking & Gap
Analysis v3.0

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Warren Pope

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1 Executive Summary

This report is a review of health and safety data to establish the performance of UK construction and what gaps need to be addressed. Various sources have been identified throughout the report and in the bibliography.

This report covers types of reportable injury; these are split into “Deaths”, “Major Injuries” and “over three day injuries” and further analysis looking at **injuries by trade, accident type, project type** and **work activity**. The statistics are provided to give an overall comparison of how the Construction Industry is performing as far as health and safety is concerned compared to other industries in the UK and in comparison with Europe and elsewhere. The report further notes where the accidents are occurring within the industry and the type of works where the accidents are occurring.

In Summary the statistics show the following fundamental points

- The Construction Industry accounts for only about 5% of the employees in Britain but it still accounts for 27% of fatal injuries to employees and 9% of reported major injuries
- Over successive years it can be seen that Construction Output has either risen slightly or at least remained constant whereas the Fatal Accidents have definitely fallen. The general trend in the number and rate of fatal injury from 2004/05 to 2010/11 is downwards, but it has been fairly static over the past 3 years, but the statistics for these years are not complete. When comparing, in percentage terms, between the numbers that do a certain type of work and the accidents that occur for those certain types of work the numbers are very similar, suggesting that one sector in the construction industry is no more or less dangerous than other sectors within the construction industry
- Falls from height account for around half of all fatal accidents in the construction industry
- The average rate for all industries with regard to days lost was 0.16 days per worker and the rate for construction is not statistically significantly different from the average across all industries.
- When questioned those in the construction industry stated that the industry culture was seen as the biggest hindrance to progress. The main issues raised were inertia and complacency.
- The attitude and approach to construction by clients were seen as the second biggest hindrance to progress.
- Lack of or poor training and education was seen as the third biggest hindrance to progress
- This final point is highlighted by the fact that those with less experience working on construction sites are much more likely to have an injury than those with more experience

- In Europe, as with the UK, the construction sector accounted for the largest number of fatal accidents at work
- The UK compares favourably with European countries, the USA and with Canada when it comes to lower accident rates on construction sites

The issues of work place culture and training will be further addressed in report 7.2.

2 Statistics within the UK

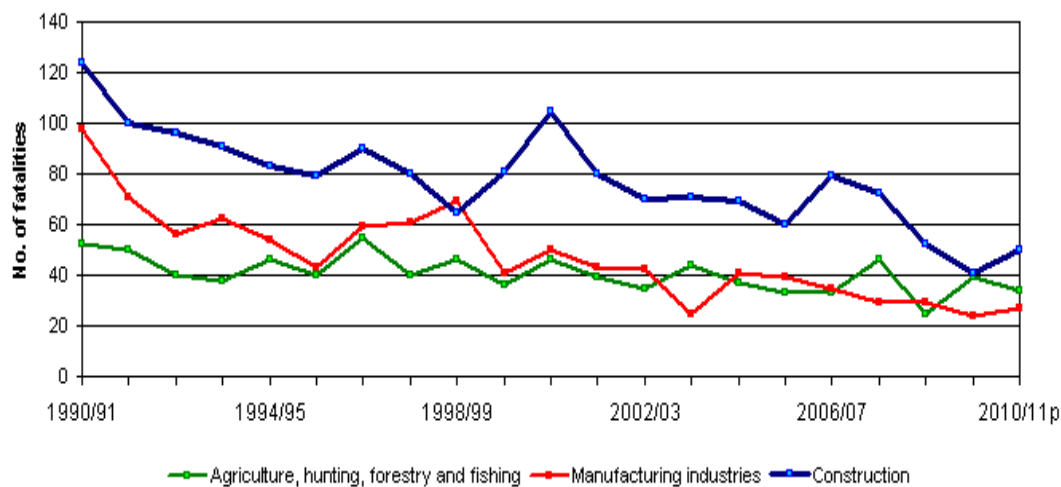
2.1 Injuries and Fatalities

A discussion on UK Health and Safety data and the definitions and categories used can be found in appendix 1.

2.1.1 Fatalities

Although this report deals with the Construction Industry it is interesting to provide comparisons with other industries within the UK. The figure below sets out the number of fatalities in three different types of industries, construction being one of them.

Figure 1 Twenty year trend in worker fatalities in three different sectors of work



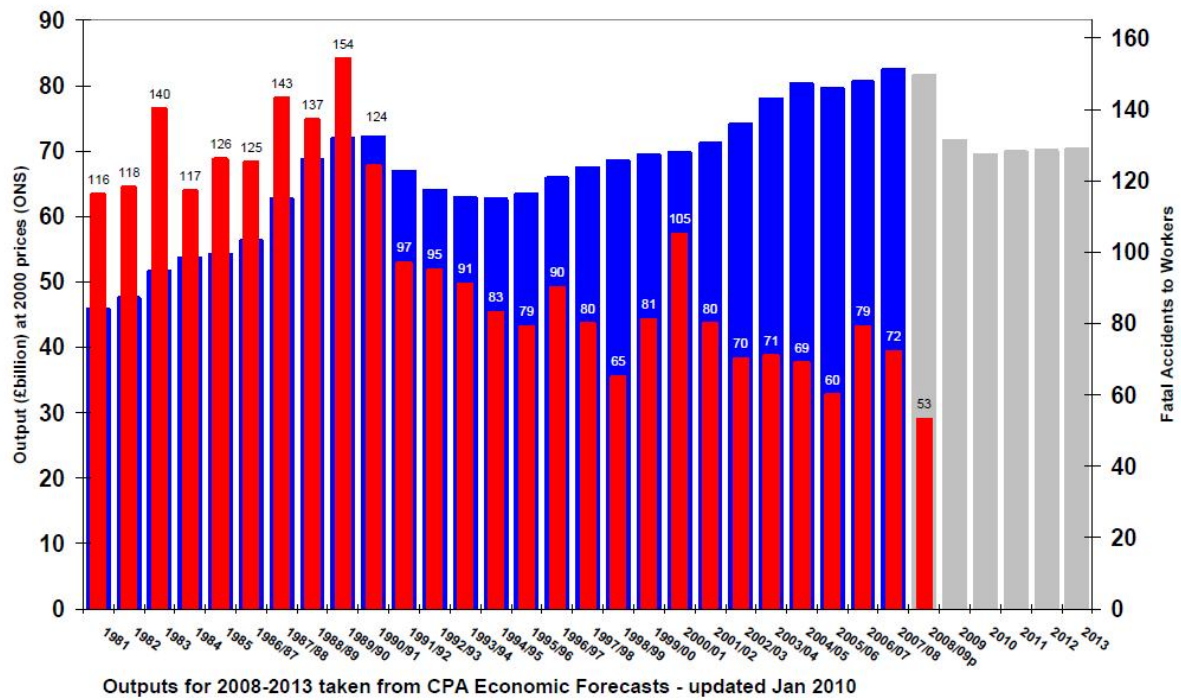
www.hse.gov.uk/statistics/

It has been reported that there have been significant reductions in the number and rate of injury over the last 20 years or more in the Construction Industry. Nevertheless, construction which accounts for about 5% of the employees in Britain accounts for 27% of fatal injuries to employees and 9% of reported major injuries. The statistics should also be compared to the total workload of the construction industry over a similar period.

There is some comparison with regard to economic performance and the rate of accident statistics which is worthy of note although not always directly. For instance 2004 saw a rise in economic activity but also a fall in accident rates.

For better comparison see the chart below. The red column is the fatal accident to workers and the blue column is the construction output at 2000 prices.

Figure 2 Fatal Accidents to workers v Industry Output



www.hse.gov.uk/construction/pdf/conintreport.pdf

It can be seen that Construction Output has either risen slightly or at least remained constant whereas the Fatal Accidents have definitely fallen.

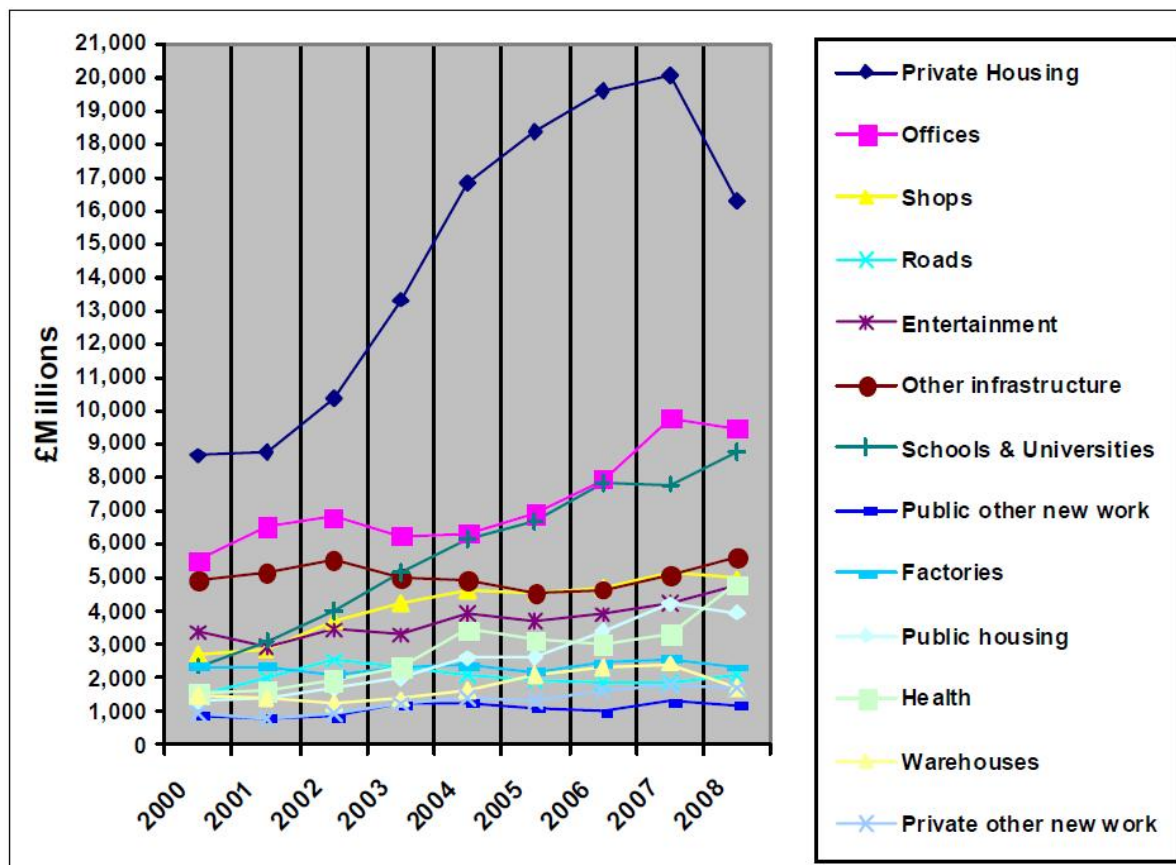
It is also worth noting the breakdown of types of work within the construction industry. There are some 225,000 construction professionals involved in 24,000 firms. Almost 30% of construction work is carried out for public and/or infrastructure clients¹.

Public and private housing is predicted to increase by up to 20% a year, although recent economic events may have changed this prediction whereas commercial, industrial and infrastructure work is likely to increase less dramatically. The top 4 clients are Department of Health, Department of Transport, the ministry of Defence and Network Rail, who have each spent more than £1bn over the past year². The variation over time of work by value in various sectors of the industry is shown below:

¹ www.hse.gov.uk/construction/pdf/conintreport.pdf

² www.hse.gov.uk/construction/pdf/conintreport.pdf

Figure 3 Work by Value 2000/08 (ONS Construction Statistics 2009)



www.hse.gov.uk/construction/pdf/conintreport.pdf

Some 25% of construction work is domestic repair and maintenance (R&M), with all R&M making up about half of total output. Almost half the domestic work is glazing. The highest demand for household R&M is in the South East, (excl Greater London), with the 2nd highest in the NW. This work attracts micro and Small and Medium Enterprises, (SMEs) with less than 4 employed, who carry out 75% of the work; only half have professional affiliations.

A further survey, called the Construction Workers Survey, was commissioned as part of the British Market Research Bureau's (BMRB) rolling "Omnibus" survey. The survey was carried out over three phases from 2006 to 2009. This also allows for a comparison, in percentage terms, between the numbers that do a certain type of work and the accidents that occur for those certain types of work

Those working in the various types of works were found to be as follows in the tables below.

Figure 4: Construction Projects Main types

	Number of Projects	Where accidents occurred
New build - commercial	14.2 %	13.9%
New build - public	3.4 %	
New build - housing	17.6%	15.1%
New build - industrial	5.1%	5.5%
New build - total	40.3%	34.5%
Refurb/repair - commercial	10.6 %	10.5%
Refurb/repair - public	5.1 %	
Refurb/repair - housing	24.5%	28.6%
Refurb/repair - industrial	3.5%	2.9%
Refurb/repair - total	43.7 %	42.0%
Civil engineering	5.5 %	4.6%
Demolition	1.1%	1.7%
Roads and paving	3.2%	5.9%
Other	6.2%	11.3%
Misc Total	16%	23.5%

The number of accidents that occurred during refurbishment works is not that dissimilar to the percentage of people that do that sort of work.

With regard to fatal injuries, there were 50 fatal injuries to workers in Construction in 2010/11, 18 of these fatalities were to the self-employed. This compares with an average of 61 over the previous 5 years – including an average of 19 to the self-employed.

Figure 5 Number and rate of fatal injuries to workers 2004/05 to 2010/11



www.hse.gov.uk/statistics/

The rate of fatal injury per 100,000 construction workers was 2.3 in 2010/11 (see the line for Worker Injury Rate), compared with a 5 year average of 2.5, while in 2010/11, 29% of all fatal injuries to workers were in Construction and it accounts for the greatest number of fatal injuries of the industry sectors.

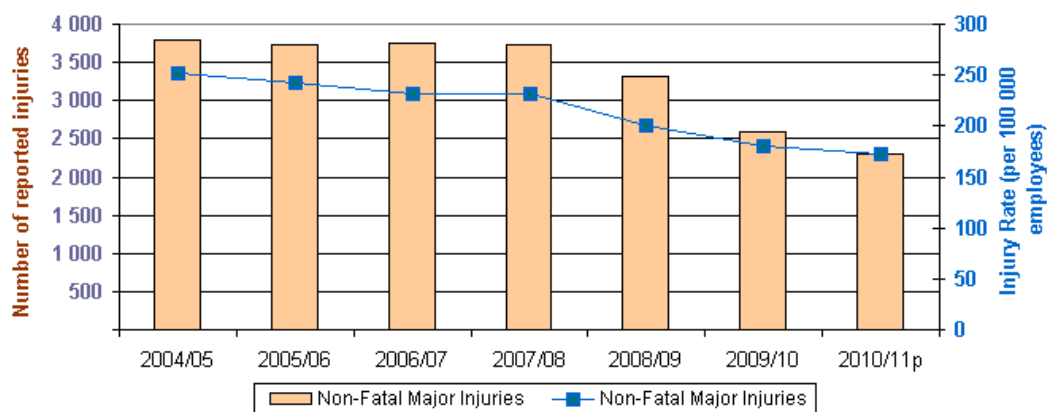
The general trend in the number and rate of fatal injury from 2004/05 to 2010/11 is downwards, but it has been fairly static over the past 3 years. The fatal injury rates quoted above are slightly lower than the most recently provided on the HSE website because a different source for

employment estimates (Annual Population Survey) has been used³. This gives a higher estimate (8% for employees and 4% for all workers in 2010/11) for construction employment. See www.hse.gov.uk/statistics/sources.htm#employment for further information.

2.1.2 Major Injuries

For Major injuries (defined in Appendix A) there were 2,298 reported major injuries to employees in 2010/11, compared to an average of 3,423 over the previous five years. The corresponding rates of major injury per 100 000 employees were 173.2 in 2010/11 and an average of 217.6.

Figure 6 Number and rate of major injuries to employees, 2004/05 to 2010/11



www.hse.gov.uk/statistics/

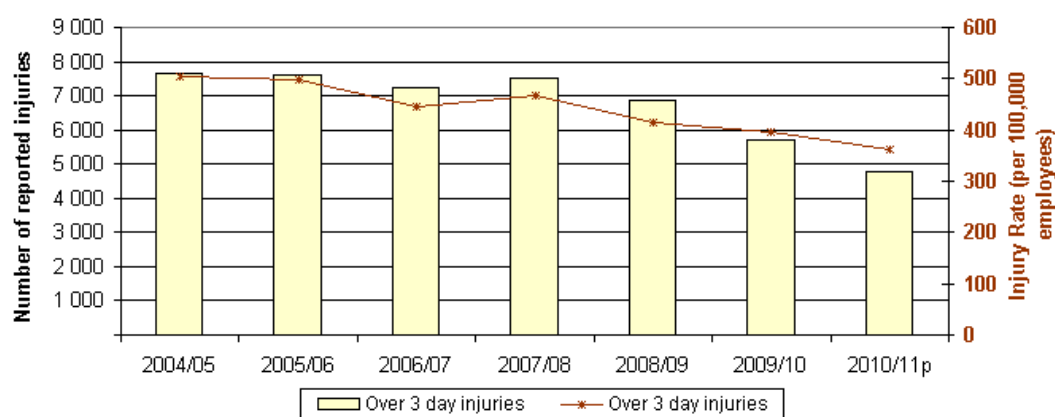
There has been a general reduction in the rate of reported major injury since 2004/05. The number of reported injuries has also fallen (25% for rates and 38% for numbers) since 2007/08.

2.1.3 Over Three Day Injuries

For over-3-day injuries there were 4,784 reported over-3-day injuries to employees in 2010/11, compared to an average of 6,990 over the previous five years. The corresponding rates of over three day injury per 100 000 employees were 360.5 in 2010/11 and an average of 444.5 over the previous five years.

³ The number of fatalities is the same as when calculated using the SIC2003 definition of construction, but the rate is slightly lower as construction, under SIC2007, includes development and selling of real estate. More information on this can be found in appendix A

Figure 7 Number and rate of over-3-day injuries to employees, 2004/05 to 2010/11



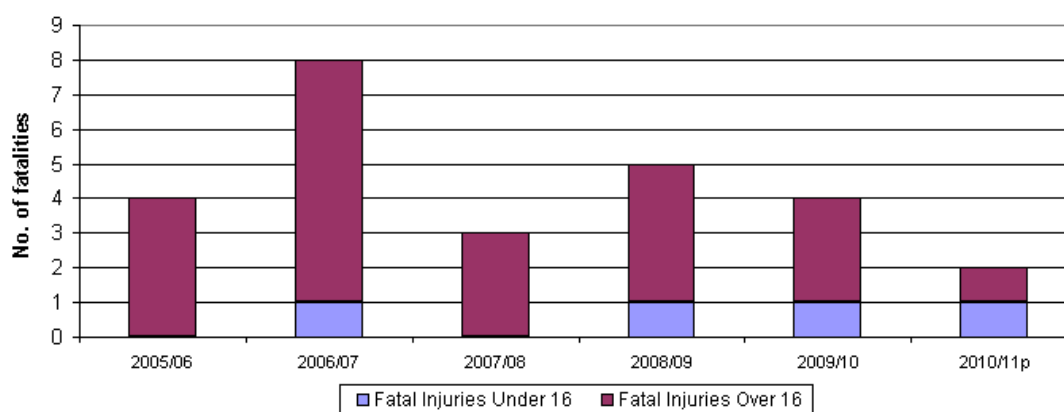
www.hse.gov.uk/statistics/

As with major injuries there has been a general reduction in the rate of reported over three day injuries since 2004/05. The number of reported injuries has also fallen (22% for the rate of reportable injuries and 36% for number of reportable injuries) since 2007/08.

2.1.4 Injuries to the Public

For reported injuries to members of the public there were two fatal injuries to members of the public in 2010/11 compared to an average of five a year over the previous five years. One of these fatalities was to someone aged 16 or under.

Figure 8 Fatal injuries to members of the public from 2005/06 to 2010/11p

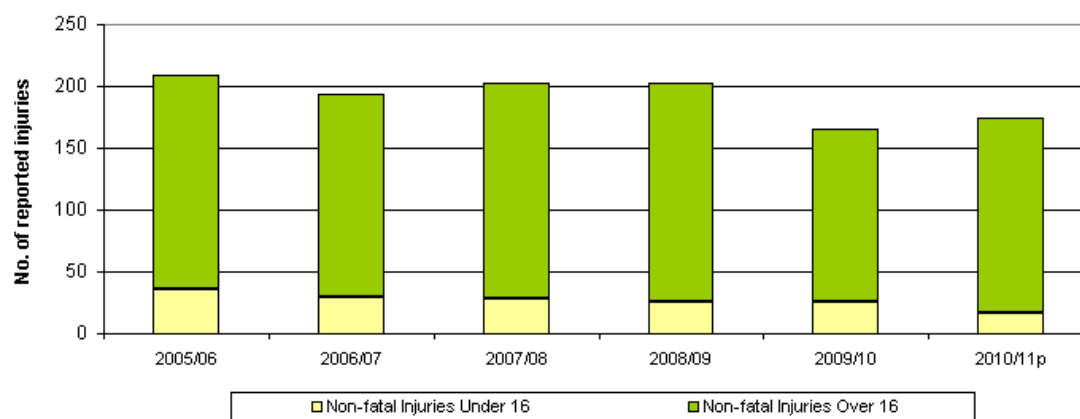


www.hse.gov.uk/statistics/

The number of fatalities has fallen fairly steadily over the past five years but, statistically speaking, the numbers are small and considerable year-on-year variation can be expected.

Just over a quarter (27%) of fatal injuries to the public over the last five years were due to falls. Slips/trips and moving vehicles accounted for 18% and 14% respectively.

Figure 9 Non-fatal injuries to members of the public 2005/06 to 2010/11



www.hse.gov.uk/statistics/

There were 174 reported non-fatal injuries to members of the public in 2010/11 compared to an average of 195 a year over the previous five years. 17 of these injuries were to those aged 16 or under.

Nearly half (44%) of reported non-fatal injuries to the public over the last five years were due to slips and trips. Almost a third (30%) were due to injuries from falling objects and one eighth (12%) from falls.

2.1.5 Statistical Summary

In summary since 2004/5 there has been good progress in construction health and safety:

fatal injuries have reduced from around 3 per 100,000 to around 2 per 100,000 employees

- major injuries have dropped from around 250 per 100,000 to around 175 per 100,000 employees
- 3 Day injuries have dropped from around 500 to 375 per 100,000 employees
- Fatal injuries to the public has reduced from 4 to per year (with a peak of 8 in 2006/7)
- Non-fatal injuries to the public have dropped from 200 to 175 per year.

2.2 Cause of Injuries and fatalities

The statistics provided above give an indication of total numbers of fatalities and injuries within the category specified. These figures, however, do not give an indication as to the direct cause of the injury, such as fall from height, etc nor do they give an indication as to which trades the injury occurred.

Construction accounted for 5% of the employees in Britain, and accounted for 6% (broken down as 27% fatalities, 9% major and 6% of over-3-day injuries) of reported injuries to employees.

The most common kinds of reported injuries to employees in all industries occur as a result of handling (31%), or slips and trips (27%). These also represent the most common kinds of reported injury within Construction. In 2010/11, handling accounted for 28% of all reported injuries to employees, slips and trips accounted for 23%.

Construction accounted for 26% (247 cases) of all reported injuries to employees involving high falls, 29% (32) of collapses, 25% (3) of drowning/asphyxiation, 16% (70) involving electricity and 16% (10) explosions. Taking all kinds of falls together it accounted for 12% (1,209) of all reported injuries from falls⁴. Further detail can be obtained using Hands-On at www.hse.gov.uk/statistics/handsn/index.htm

The following charts give an indication as to the types of accidents that occur and in what trades

⁴ <http://www.hse.gov.uk/statistics/industry/construction/construction.pdf>

Figure 10: Fatal injuries by Kind of accident



www.hse.gov.uk/construction/pdf/conintreport.pdf

As can be seen from the chart above falls from height account for around half of all fatal accidents; the other main causes, in lesser numbers, were struck by object, struck by vehicle, electricity and collapse

Figure 11: Fatal and Major Injuries by Trade

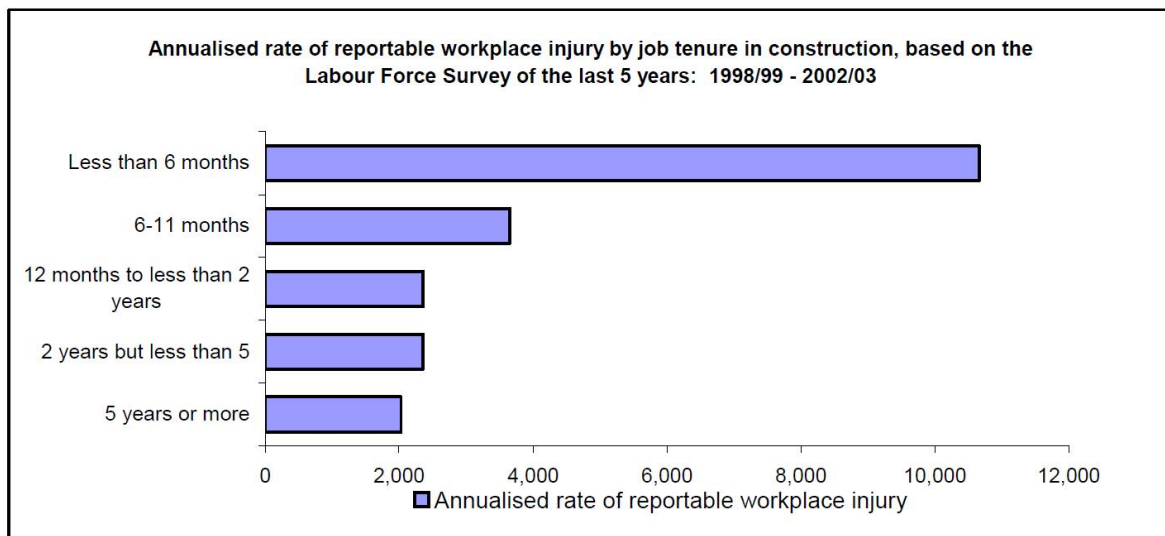


www.hse.gov.uk/construction/pdf/conintreport.pdf

Note: n e c: not elsewhere classified

The chart above was provided by the HSE but there is no further information on the breakdown of these statistics. The indication is that Construction Labourers have the most accidents but then this may be because the most workers on a construction site are construction labourers.

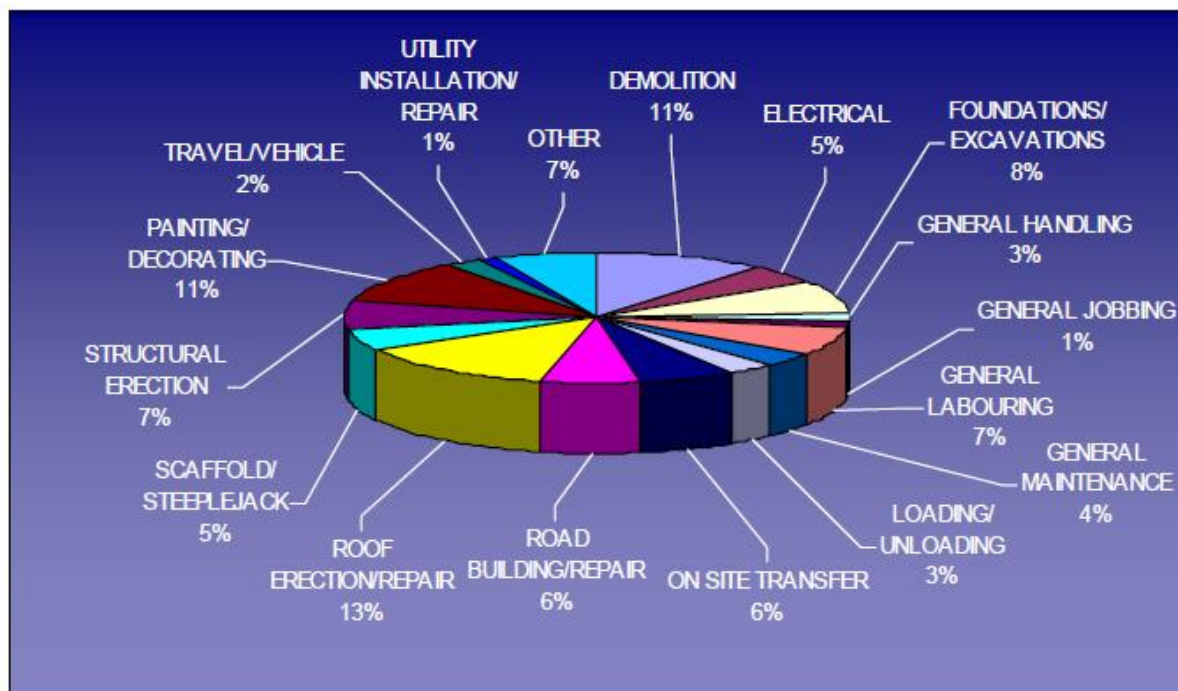
Figure 12: Reportable Injuries by job tenure



www.hse.gov.uk/construction/pdf/conintreport.pdf

This chart is self explanatory as it clearly indicates that those with less experience are more likely to have an injury than those with more experience. It may also suggest that training in health and safety for those starting to work in the industry is possibly lacking.

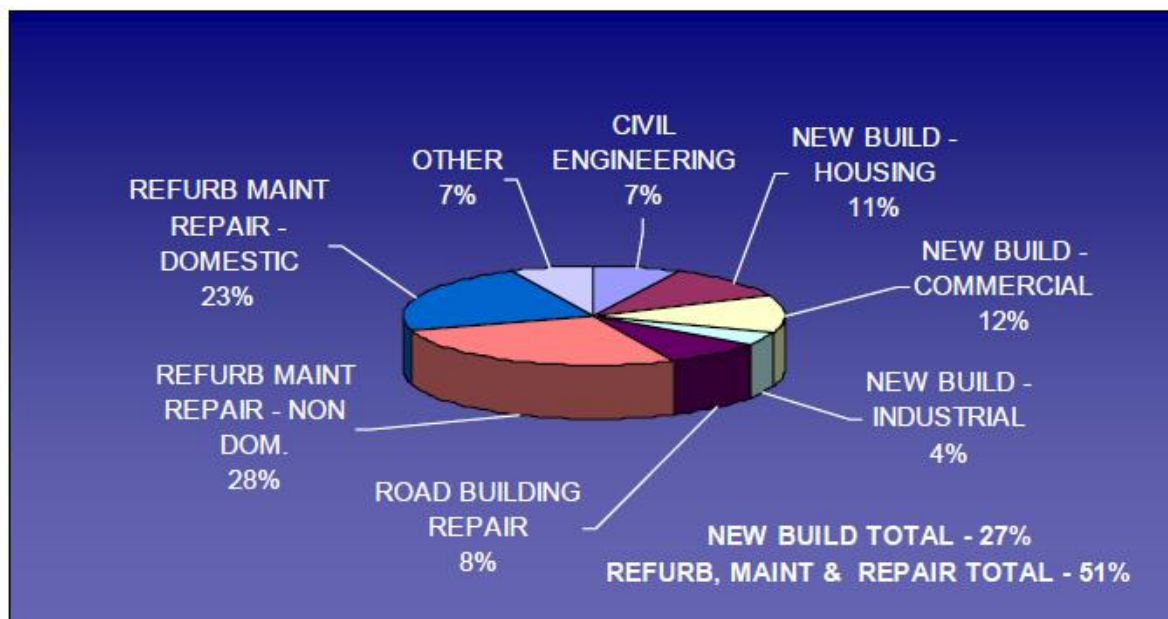
Figure 13: Fatal accidents by Work Activity



www.hse.gov.uk/construction/pdf/conintreport.pdf

Roof erection and repair has the highest fatalities. Categories stated in the above chart that could possibly fit into works that retrofit would be associated with, are scaffold, roof repair, loading and unloading, general maintenance, general labouring, general jobbing, general handling, electrical and utility installation repair. If so these make up 42% of fatal accidents.

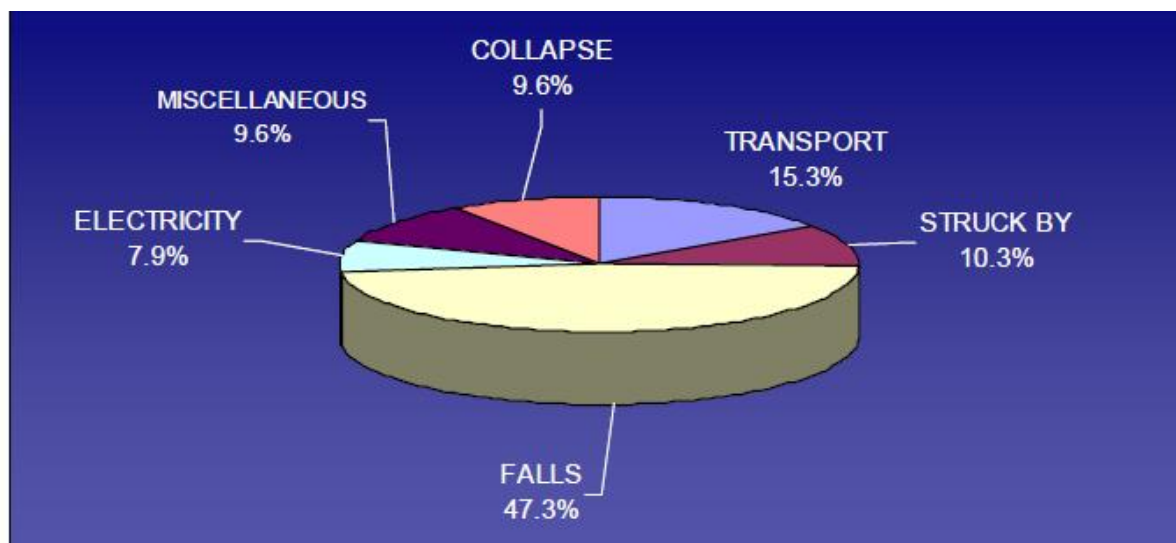
Figure 14: Fatal accidents by Project Type



www.hse.gov.uk/construction/pdf/conintreport.pdf

Around half of all fatal accidents occur in refurbishment/maintenance/repair projects, which tend to attract the smaller, less experienced contractors and include the vast proportion of the informal construction economy (estimated at more than £10bn each year).

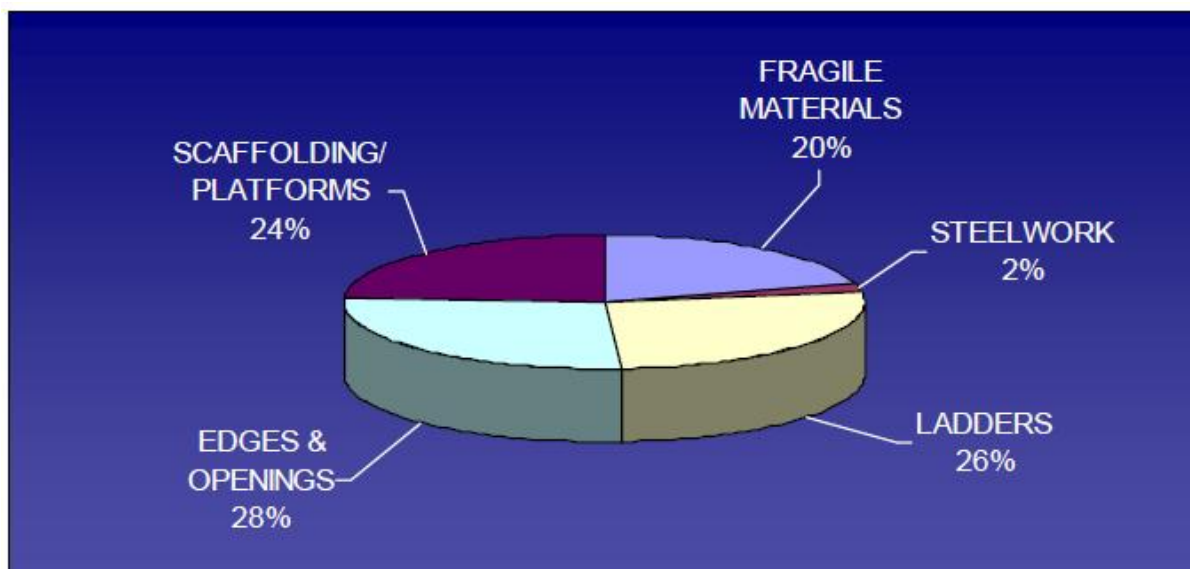
Figure 15: Fatal accidents by Kind of Accident



www.hse.gov.uk/construction/pdf/conintreport.pdf

Traditionally falls make up around 50% of fatal injuries in construction most years, even when total fatal numbers have been low in the past, the number of fatal falls has remained fairly constant. More recently the overall percentage of fatal falls has decreased, but this trend has not been sustained into 2007/2008, transport accidents almost invariably take 2nd place, however the “struck by, electrical and collapse” fatalities percentages which have similar total numbers of people involved are smaller trends and can vary markedly year on year. Figure 16 breaks down where fatal falls occur:

Figure 16: Fatal accidents by Total Falls

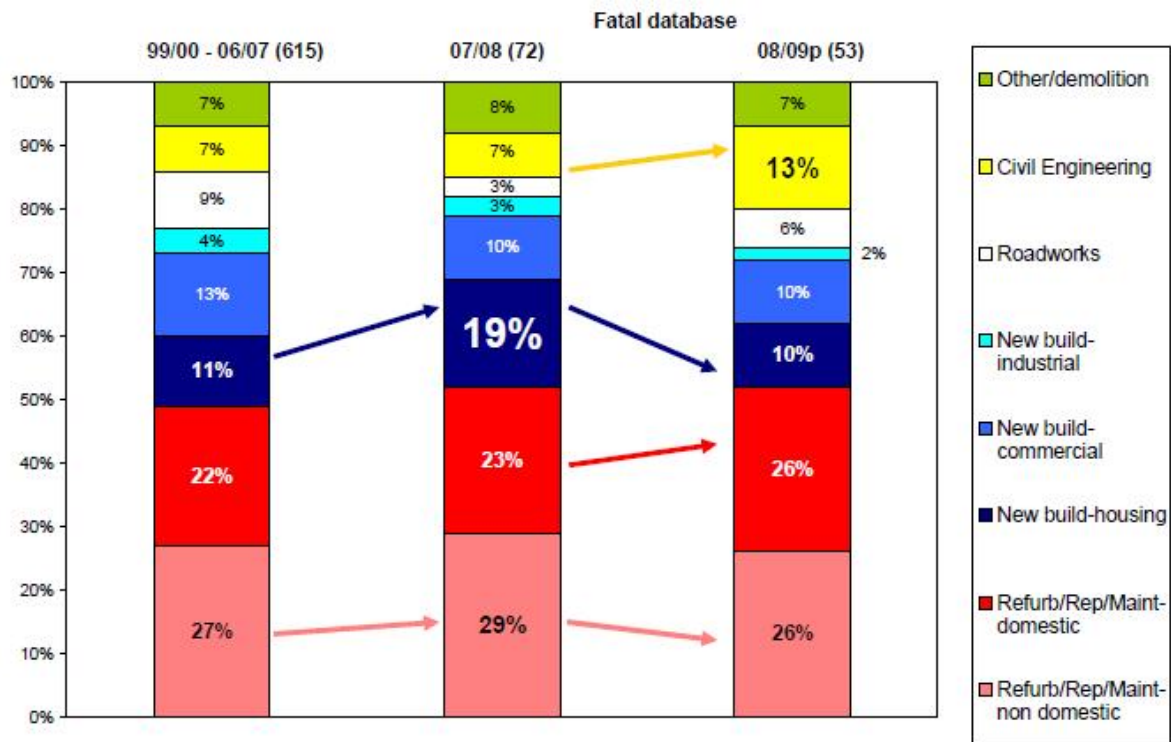


www.hse.gov.uk/construction/pdf/conintreport.pdf

Steel erectors and scaffolders have some of the highest fatal accident rates in construction. Fatal accidents to steel erectors have reduced considerably over the years, most probably due to the use of mobile elevating working platform (MEWPs). In the two year periods 2001/02 & 2002/03 and 2005/06 & 2006/07 there were no fatal accidents to steel erectors as a result of falls from steelwork.

Although the proportion of scaffold/platform fall fatalities is around 25% of the total falls, less than a quarter of these involve scaffolders.

Figure 17: Where fatal accidents occurred 2008/09

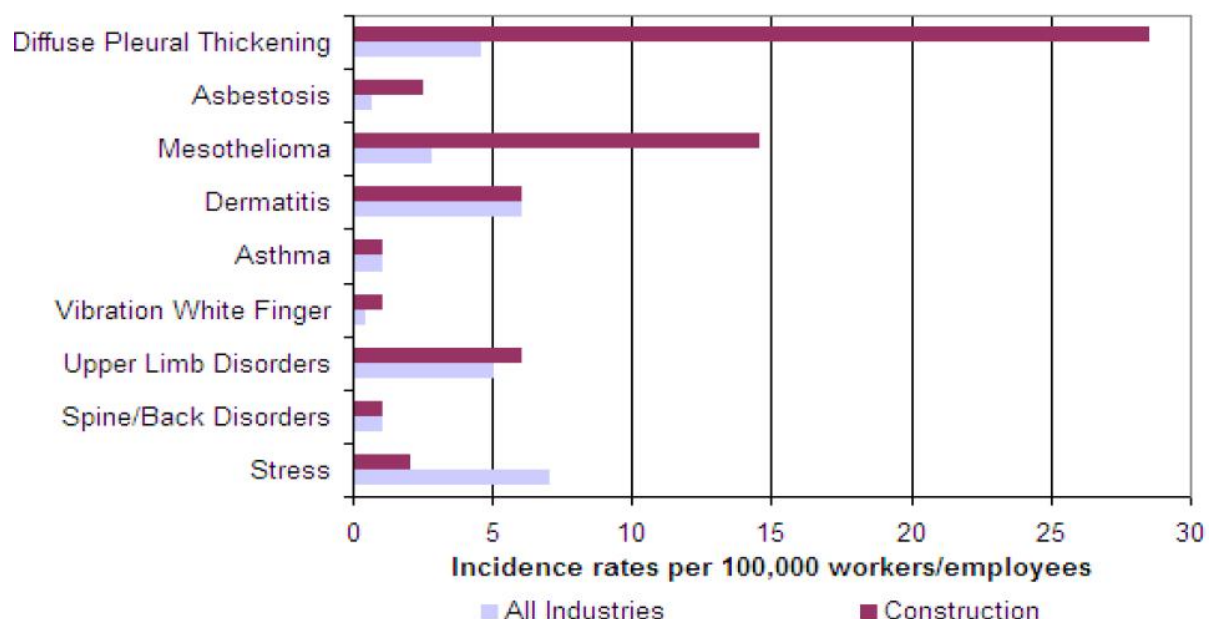


www.hse.gov.uk/construction/pdf/conintreport.pdf

This chart is of particular relevance to the retrofit process in that much of what has been proposed with regard to the retrofit process uses traditional construction processes found in the refurbishment, repainting and maintenance processes for domestic properties, (pink in the chart above). The proportion of fatal accidents in retrofit and refurbishment has remained largely constant overtime.

Although outside the scope of this work package, but worthy of interest nonetheless, occupational health issues are an issue within the construction industry as can be seen by the statistics set out below.

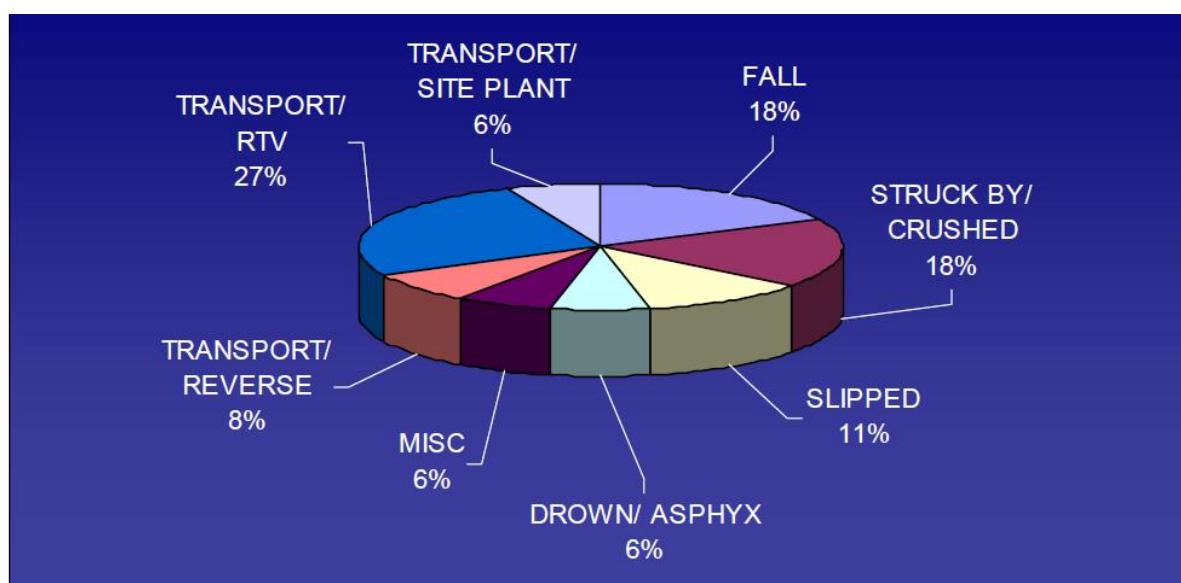
Figure 18: Annual average incidence rates of occupational diseases seen by disease specialist doctors in the THOR surveillance schemes; 2005-2007



Diffuse plural thickening is the thickening and hardening of the membrane around the lung. Mesothelioma is a cancer in the external linings of the organs of the body. The primary occupational cause of both is asbestos exposure. Asbestos could be encountered in retrofit work and needs to be managed appropriately.

Reference was made above to accidents to members of the public and statistics have been collected as to the cause of such and these are set out below.

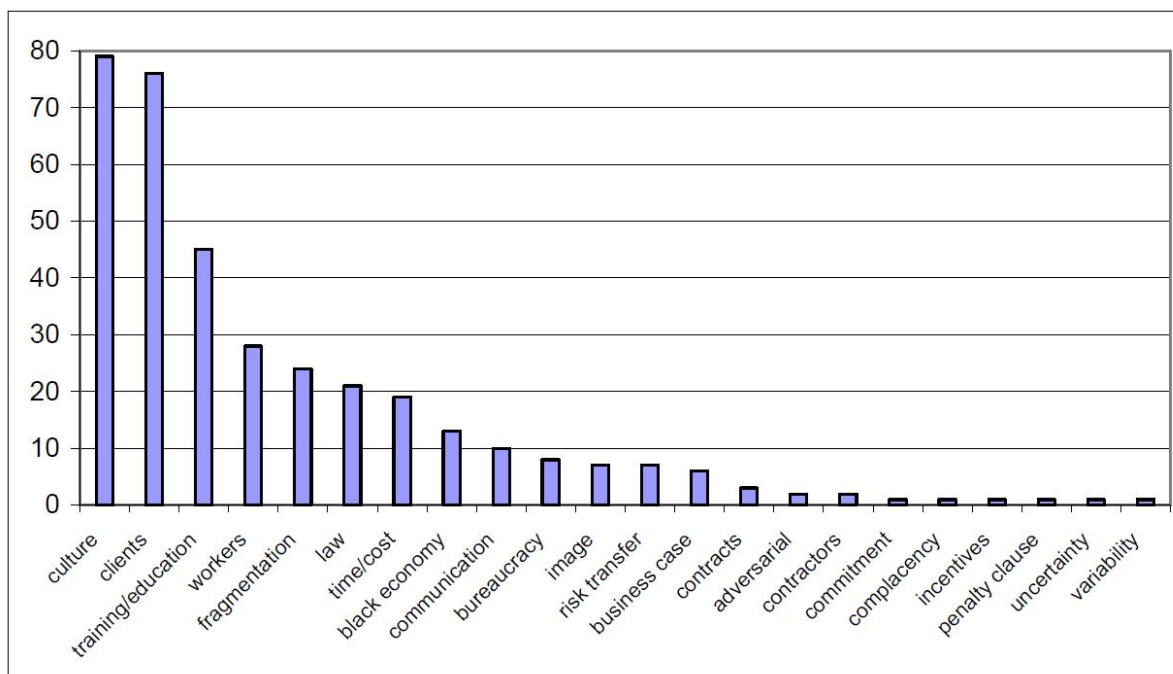
Figure 19: Causes of Fatal accidents to Members of the public



www.hse.gov.uk/construction/pdf/conintreport.pdf

Another final set of statistics is also worth noting. A survey was carried out by the HSE in 2002 (see <http://www.hse.gov.uk/consult/2002.html>), which asked various question of the industry. One of the questions asked was what were the greatest barriers to change within the industry? The results were as follows.

Figure 20: Answer to Question: “What were the greatest barriers to change within the industry”



<http://www.hse.gov.uk/consult/2002.html>

Industry culture was seen as the biggest hindrance to progress. The main issues raised were inertia and complacency.

The attitude and approach to construction by clients were seen as the second biggest hindrance to progress. Three quarters of those who raised this issue saw the cheapest quickest approach of clients as the main challenge.

The third issue was the need for training and education.

3 Statistics outside the UK

International comparisons can be difficult as data can be fragmented and collection methods inconsistent. Much of the data reported that relates to outside of Europe is from the International Labour Organization (ILO), which compiles statistics on occupational deaths and injuries based on information supplied by relevant national organizations. The ILO also compiles basic information on the sources and survey methods used in each country

Statistics for Europe have been mainly obtained from Eurostat which is a Directorate-General of the European Commission, located in Luxembourg. Its main responsibilities are to provide statistical information to the institutions of the European Union (EU) and to promote the harmonisation of statistical methods across its member states and candidates for accession.

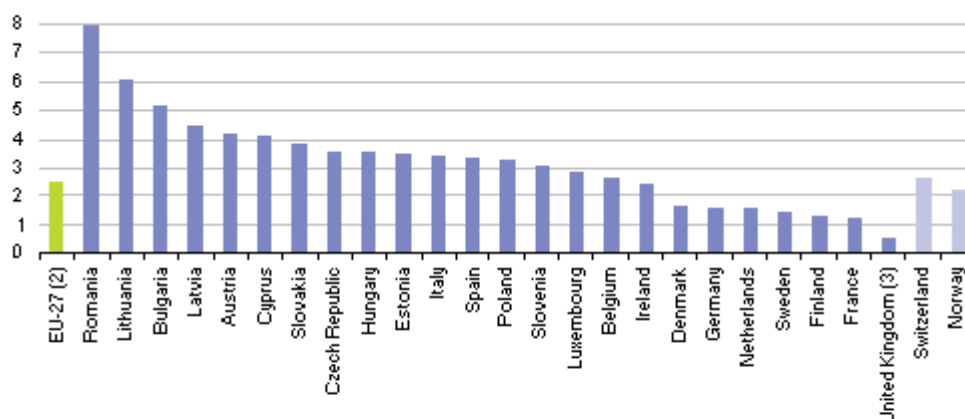
In addition to injury cases, it is essential to have numbers employed and hours worked to calculate injury rates that can be compared directly. However, obtaining the correct data from each of these countries for the calculations can be difficult. For example, the U.S. employment data are from household surveys (such as the Current Population Survey) and may not match the fatality data, which are collected from employers and other sources. Inconsistent methods of classifying industries are yet another source of data variability. The ILO asks the reporting agencies in each country to align their data with the International Standard Industrial Classification (ISIC), but many countries have their own industry classification systems. However, most countries' classification systems are similar enough to the ISIC to allow general comparisons at a broad level.

An analysis of nonfatal injury data has not been included because of wide variability in reporting and qualifying cases among countries

Eurostat have made a comparison of the fatal injury rates across EU countries. This reveals that the fatal injury rate for Great Britain is consistently one of the lowest in Europe. The data can be found on the Eurostat website. From the 'Data Navigation Tree' select 'Population and social conditions'; then 'Health'; 'Health and safety at work'; 'Accidents at work'. (<http://www.hse.gov.uk/statistics/fatals.htm>). (See also <http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tps00042&language=en>)

The overall accident rates throughout Europe that occur at work are as follows:

Figure 21: Overall Accident Rates throughout Europe at work



(1) Greece, not available.

(2) Estimate made for the purpose of this publication includes under-reported levels for Latvia, Poland and Romania, but excludes Greece and Northern Ireland.

(3) Great Britain (hence, excluding Northern Ireland); also excludes road traffic accidents at work.

Source: Eurostat (online data code: hsw_n2_02)

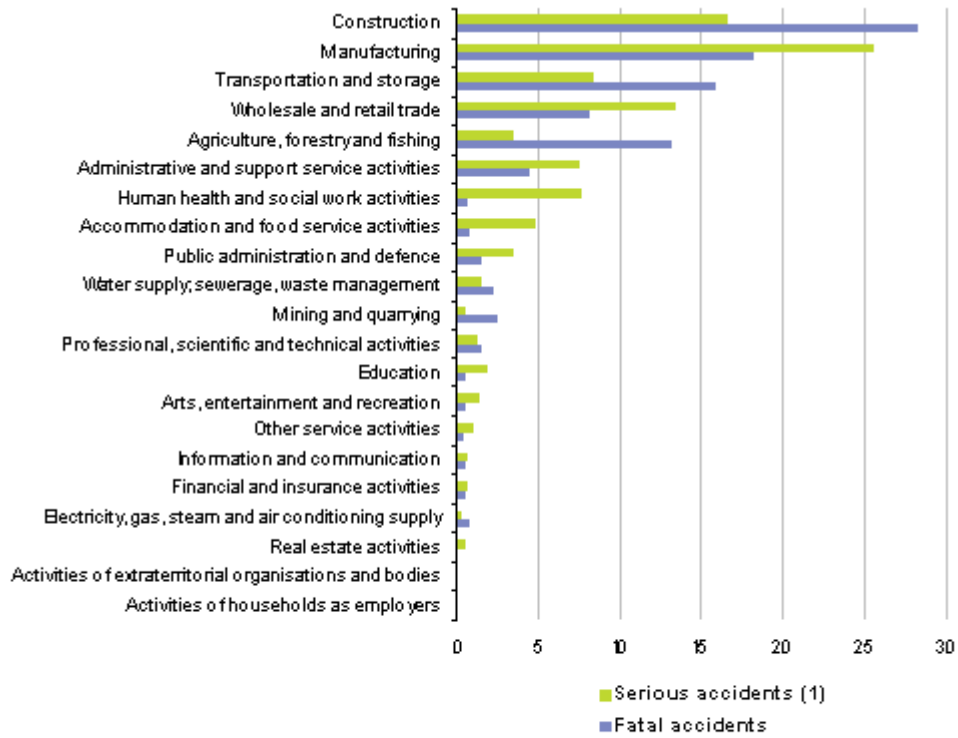
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Health_and_safety_at_work_statistics

Romania, with an average of 8.0 fatal work accidents per 100 000 persons employed, had the highest incidence rate followed by Lithuania and Bulgaria (6.0 and 5.2 fatal accidents per 100 000 persons employed). Denmark, Germany, the Netherlands, Sweden, Finland and France, (as well as the United Kingdom, although values excluded Northern Ireland and road traffic accidents at work), had the lowest incidence rates with less than two fatal accidents at work per 100,000 persons employed in 2008.

According to the information that is available broken down by gender, men are considerably more likely to have an accident or to die at work than women. EU-27, (a source provided by Eurostat), incidence rates for serious accidents at work for men were 2.5 times higher on average than those for women in 2008. In Denmark, Sweden and Norway the average incidence rates for serious accidents at work for men were 1.5 times as high as the average incidence rate for women, while in France, Spain, Italy, Bulgaria and Finland they were 2.5 times as high and in Germany three times as high.

The number of accidents at work throughout Europe also varies considerably depending upon the economic activity where the victim works (see figure 22). The construction sector accounted for the largest number of fatal accidents at work (28.2% of all fatal work accidents), followed by the manufacturing sector (18.1%), transportation and storage (15.8%) and then agriculture, forestry and fishing (13.1%). Most of the serious accidents at work also took place within the manufacturing and construction sectors, respectively 25.5% and 16.5% of all serious accidents, followed by wholesale and retail trade activities and transportation and storage, respectively 13.4% and 8.4% of all serious accidents.

Figure 22: Accidents by Economic Activity

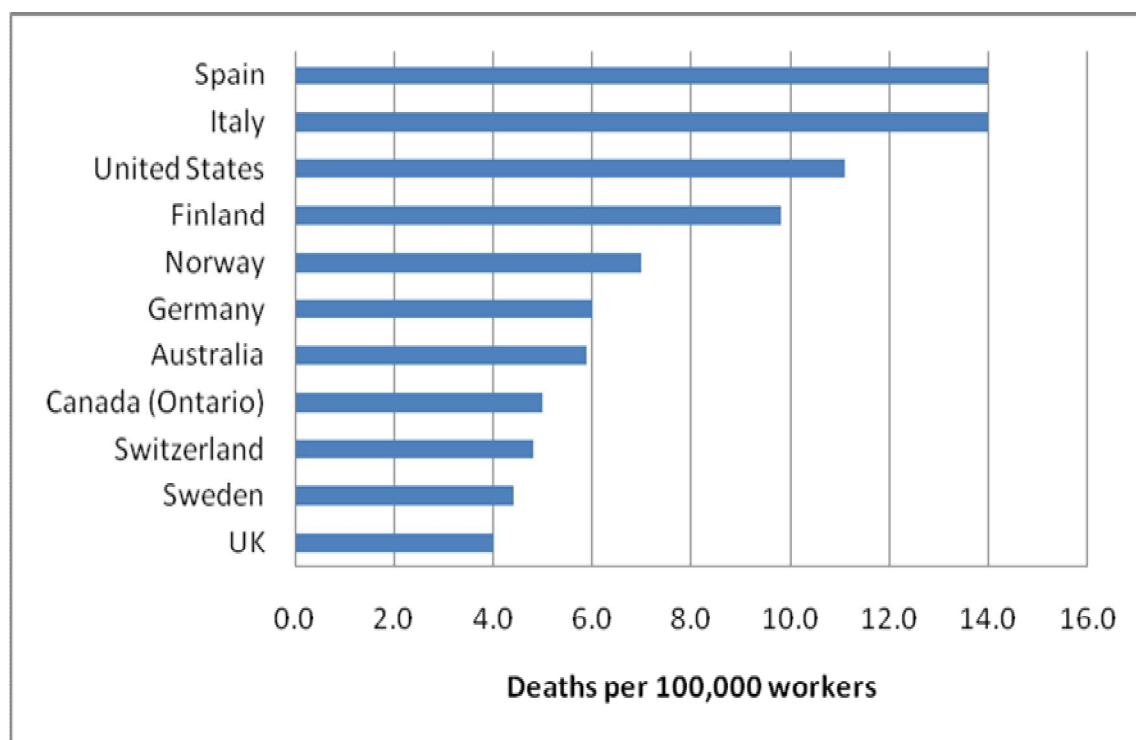


(1) Estimates made for the purpose of this publication including under-reported levels for Latvia, Poland and Romania, but excluding Greece and Northern Ireland.
 Source: Eurostat (online data codes: hsw_n2_01 and hsw_n2_02)

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Health_and_safety_at_work_statistics

The construction fatality rate in the UK compares well with other major economies.

Figure 23: Rate of deaths from injuries in construction, selected countries, 2005 and UK (2005/6)



Source:

(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Health_and_safety_at_work_statistics) except for UK which is www.hse.co.uk/statistics

Current legislation in the UK must therefore be having some impact on the better statistics that the UK has experienced with regard to incidents and accidents. Further details on construction accidents at work across Europe can be found in Appendix 2.

Figure 24 highlights the different approaches to the collection of data.

Figure 24: Parameters and qualifications of construction fatalities, selected countries, 2005

Country	Number of Deaths	Period for Qualifying Death as Work-Related	Includes Commuting	Includes Self-Employed	Report Source	Total Employment (In Thousands)	Hours Worked (Per Week)
Australia	36	Within one year of accident	●	●	Labor force	887	38.2
Finland	12	Within one year of accident	●		Insurance records	171	38.6
Germany	138	Within one month of accident	●	●	Insurance records	2,400	39.0
Italy	239	No maximum period	●	●	Insurance records	2,046	37.0
Norway	11	No maximum period		●	Labor inspectorate records	NA	38.1
Spain	248	Within one month of accident	●		Insurance records	2,509	38.0
Sweden	11	No maximum period	●	●	Insurance records	253	39.3
Switzerland	13	Within one year of accident	●		Insurance records	269	41.0
United States	1,243	No maximum period		●	Labor-related establishment census	11,178	38.6

4 Conclusions

Some of the tables and figures presented do raise more questions than answers but they do give an overall view of the direction that health and safety is going in the construction industry. One point that this report highlights is that there needs to be a more standardised approach to statistical collation and there needs to be further research to standardize definitions and measurement methods. This is more than feasible when it comes to collating data for the EU. Standardized occupational injury surveillance data would allow all countries, including those with very limited resources, to compute calculations according to a standard definition. Such efforts, in turn, could lead to a better understanding of the causes of occupational injuries worldwide and to develop better intervention strategies.

It has been proposed that the works proposed to improve the thermal efficiency of existing housing be carried out by a four strong polycompetent team. The type of works proposed are not that dissimilar to refurbishment works that is carried out regularly in the construction industry. Therefore the trends identified are relevant.

The key benchmarks are:

- Fatal accident rates in construction have roughly halved since 1989/90. Although still higher than the number of fatalities in manufacturing the gap is closing.
- There are fewer fatal accidents per 100,000 workers in the UK construction industry than in nearly all other countries.
- In the last three years up to 2012 there is evidence, although statistics are incomplete, that fatalities have not declined in proportion to economic activity in the construction industry. However it is too early to be able to comment on the causes.
- The HSE confirm that around half of all fatal accidents occur in refurbishment/maintenance/repair projects, which tend to attract the smaller, less experienced contractors and includes the vast proportion of the informal construction economy, (estimated at >£10bn each year). This is confirmed by Figure 14.
- Figure 4 shows that the number of accidents that occurred during refurbishment works is not that dissimilar to the percentage of people that do that sort of work. Therefore the works are no more inherently dangerous than other types of work
- Retrofit works that are likely to be carried out by the polycompetent team are likely to include scaffolding, roof repair, loading and unloading, general maintenance, general labouring, general jobbing, general handling, electrical and utility installation repair. If so these make up 42% of fatal accidents, (see figure 13 above).

- Retrofit works comprise works where a large amount of fatalities occur. This does not mean that the work is inherently more dangerous as the figures may be high due to the numbers of projects that involve these types of work being high.

Although good progress has been made in Health and Safety in the construction field there is no room for complacency. There are clearly gaps that need to be addressed. These are largely around the need to change the culture of the industry:

- Ø When the HSE in 2002 asked those in the Construction Industry “What were the greatest barriers to change within the industry”. The top answer was that industry culture was seen as the biggest hindrance to progress and that the main issues raised were one of inertia and complacency. The second most popular answer was the attitude and approach to construction made by clients. Three quarters of those who raised this issue saw the cheapest quickest approach of clients as the main challenge. And the third was the lack of or poor education and training
- Ø This last point is reinforced by Figure 13 which clearly indicates that those with less experience are much more likely to have an injury than those with more experience. This suggests that training in health and safety for those starting to work in the industry needs to be improved.

These issues will be discussed further in report 7.2.

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Appendix 1: The UK data and its sources

The package objective is to review the HSE data with regard to incident rates within the construction industry. HSE data is limited in what it can provide but the HSE is a guaranteed source of data. It will be difficult to produce evidence based conclusions, unless a full scale data collection project is launched, which is outside the scope of the OTEoEH brief, however some conclusions can still be made based on further statistics provided from elsewhere which are noted in the report. It should also be noted that occupational health issues and statistics are outside the scope of this work package but do have relevance and so some statistics are mentioned in brief.

Before providing statistics it needs to be explained how these statistics are collated. The HSE now uses the SIC 2007 classification scheme to define industries, rather than the SIC 2003 scheme, which was used in previous years; (<http://www.hse.gov.uk/statistics/industry/sic2007.htm>). The HSE also refer to the Labour Force Survey (LFS) and voluntary reporting of occupational diseases by doctors (THOR and THOR-GP) and provide data about health risks in different industries and occupations. For further information on these data sources, see www.hse.gov.uk/statistics/sources.htm. Definitions are also provided on various categories

The construction industry for RIDDOR reports, (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995, the Regulations that cover the reporting of incidents and accidents in the UK), before April 2010 was coded using the older classification whilst the Labour Force Survey (LFS) was coded using SIC2003 prior to 2008/09. This data has been computer recoded to allow for comparisons over time. There may be errors as a result of this recoding.

The definition of construction is very similar in the two coding schemes except that, under SIC2007, it includes the development of building projects, which now accounts for about 4% of the construction workforce. This makes rates slightly lower as real estate, (a previous category now not used), involves a much lower risk – at least in terms of health and safety.

Between 2003/04 and 2006/07 some injuries were allocated to other industry groups, effectively reducing the numbers and rates of non-fatal injuries for construction. This means that numbers and rates of injury for those years cannot be straightforwardly compared with numbers and rates for earlier or later years.

The Labour Force Survey, (LFS), introduced a new automatic coding tool at the same time as the change to SIC2007. A more detailed explanation of the impact to the LFS can be found on the ONS website, see www.statistics.gov.uk, in the LFS User Guide – Volume 3. LFS rates of illness and injury for construction are of a similar order to those previously published under SIC2003.

Below is a list of processes and operations that have been included in what is termed as the Construction Industry and is what the LFC defines as the Construction Industry. It is this list that then categorises in what sector an injury or accident takes place. The list includes main heading and sub headings that fall within those main headings. Although the list is long it is listed here in full so as to give an indication of the wide scope that the term Construction Industry covers. The Construction Industry therefore includes, (the numbering is the LFC numbering for the Construction Industry). :

41 Construction of buildings

- 41.1 Development of building projects
- 41.2 Construction of residential and non-residential buildings
 - 41.20/1 Construction of commercial buildings
 - 41.20/2 Construction of domestic buildings

42 Civil engineering

- 42.1 Construction of roads and railways
 - 42.11 Construction of roads and motorways
 - 42.12 Construction of railways and underground railways
 - 42.13 Construction of bridges and tunnels
- 42.2 Construction of utility projects
 - 42.21 Construction of utility projects for fluids
 - 42.22 Construction of utility projects for electricity and telecommunications
- 42.9 Construction of other civil engineering projects
 - 42.91 Construction of water projects
 - 42.99 Construction of other civil engineering projects n.e.c.

43 Specialised construction activities

- 43.1 Demolition and site preparation
 - 43.11 Demolition
 - 43.12 Site preparation
 - 43.13 Test drilling and boring
- 43.2 Electrical, plumbing and other construction installation activities
 - 43.21 Electrical installation
 - 43.22 Plumbing, heat and air-conditioning installation
 - 43.29 Other construction installation
- 43.3 Building completion and finishing
 - 43.31 Plastering
 - 43.32 Joinery installation
 - 43.33 Floor and wall covering
 - 43.34 Painting and glazing
 - 43.34/1 Painting
 - 43.34/2 Glazing
 - 43.39 Other building completion and finishing

43.9 Other specialised construction activities

43.91 Roofing activities

43.99 Other specialised construction activities n.e.c.

43.99/1 Scaffold erection

43.99/9 Specialised construction activities (other than scaffold erection) n.e.c.

All statistics that are listed below are incidents, injuries and fatalities that have occurred in any one of the categories that have been listed above.

RIDDOR puts duties on employers, the self-employed and people in control of work premises (the Responsible Person) to report serious workplace accidents, occupational diseases and specified dangerous occurrences (near misses). While the enforcing authorities are informed about almost all relevant fatal workplace injuries, it is reported by the HSE that non-fatal injuries are substantially under-reported. Currently, it is estimated that just over half of all such injuries to employees are actually reported, with the self-employed reporting a much smaller proportion.

Categories are provided to describe types of accidents and injuries and these are as follows:

Types of reportable injury

- Deaths
- Major injuries
- Over-three-day injuries

People not at work are defined as:

- Where a member of the public or person who is not at work has died, or
- Injuries to members of the public or people not at work where they are taken from the scene of an accident to hospital for treatment.

Reportable major injuries are:

- fracture, other than to fingers, thumbs and toes;
- amputation;
- dislocation of the shoulder, hip, knee or spine;
- loss of sight (temporary or permanent);
- chemical or hot metal burn to the eye or any penetrating injury to the eye;
- injury resulting from an electric shock or electrical burn leading to unconsciousness, or requiring resuscitation or admittance to hospital for more than 24 hours;
- any other injury leading to hypothermia, heat-induced illness or unconsciousness, or requiring resuscitation, or requiring admittance to hospital for more than 24 hours;
- unconsciousness caused by asphyxia or exposure to a harmful substance or biological agent;
- acute illness requiring medical treatment, or loss of consciousness arising from absorption of any substance by inhalation, ingestion or through the skin; acute illness requiring medical

treatment where there is reason to believe that this resulted from exposure to a biological agent or its toxins or infected material.

Over 3 day injuries are:

This is where an employee or self-employed person is away from work or unable to perform their normal work duties for more than three consecutive days (not counting the day of the accident). This is to change in 2012 from over three days to over 7 days.

Although not directly relevant to this report it should be noted that from 6 April 2012, subject to Parliamentary approval, RIDDOR's over three day injury reporting requirement will change. From then the trigger point will increase from over three days' to over seven days' incapacitation (not counting the day on which the accident happened).

Incapacitation means that the worker is absent or is unable to do work that they would reasonably be expected to do as part of their normal work.

Employers and others with responsibilities under RIDDOR must still keep a record of all over three day injuries – if the employer has to keep an accident book, then this record will be enough. The deadline by which the over seven day injury must be reported will increase to 15 days from the day of the accident. New guidance that explains the change will be available to download from the HSE website on 16 January 2012.

Based on the collation of statistics and the definitions those statistics are collected under described above the following information has been provided. Much of the information stated below comes from; <http://www.hse.gov.uk/statistics/industry/construction/index.htm>

Appendix 2: Further European Accident Data

The first table is the number of accidents that were fatal. The statistics are not full and some countries have no figures for certain years.

Figure 25: Number of Fatal Accidents in each country

SEVERITY: Fatal accident

AGE: Total

NACE_R1: Construction

TIME	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GEO										
Belgium	18	30	27	35	25	17	28	18	33	34
Bulgaria	:	:	:	:	:	:	26	26	29	34
Czech Republic	:	:	:	:	:	:	36	34	47	53
Denmark	12	10	13	9	7	9	8	17	7	13
Germany	233	221	193	163	187	170	128	132	150	145
Estonia	:	:	:	:	:	:	:	:	6	:
Ireland	15 (i)	14 (i)	11 (i)	17 (i)	21 (i)	15 (i)	15 (i)	21 (i)	12	14
Greece	31	30	21	24	38	31	33	9	27	35
Spain	241	244	229	226	246	247	217	248	235	219
France	226	172	201	188	165	196	184	114	154	169
Italy	293	289	274	258	233	282	248	239	274	219
Cyprus	:	:	:	:	:	:	6	6	9	4
Latvia	:	:	:	:	:	:	11	15	10	21
Lithuania	:	:	:	:	:	:	30	31	29	23
Luxembourg	4	2	6	1	2	:	:	4	4	:
Hungary	:	:	:	:	:	:	55	39	36	45
Malta	:	:	:	:	:	:	:	:	4	4
Netherlands	30	26	25	25	28 (b)	23	24	16	28	33
Austria	47	49	50	32	39	38	30	41	39	36
Poland	:	:	:	:	:	:	:	106	113	92
Portugal	96	83	102	139	109	113	110	111	83	103
Romania	:	:	:	:	:	:	:	123	89	128
Slovenia	:	:	:	:	:	:	:	6	10	16
Slovakia	:	:	:	:	:	:	12	22	21	21
Finland	10	9	9	11	6	15	11	13	9	9
Sweden	9	6	13	12	12	10	6	11	11	16
Great Britain	65 (i)	81 (i)	105 (i)	80 (i)	70 (i)	71 (i)	68 (i)	60 (i)	77 (i)	72 (i)
Norway	11	6	6	3	10	8	7	11	8	4

TIME	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GEO										
Switzerland	:	:	:	:	:	:	23	23	27	33

No footnotes available

Available flags:

break in series **b**

estimated **e**

forecast **f**

see metadata **i**

provisional **p**

revised **r**

Eurostat estimate **s**

unreliable **u**

confidential **c**

not significant **n**

not applicable (incl. real zero) **z**

Special values:

0 less than half the final digit shown and greater than real zero

: not available

Figure 26: Number of accidents that caused 4 days absence or more

SEVERITY: More than 3 days lost (4 days absence or more)

AGE: Total

NACE_R1: Construction

TIME	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GEO										
Belgium	16,322	17,187	15,234	15,695	14,165	12,536	12,339	11,629	11,963	12,201
Bulgaria	:	:	:	:	:	:	:	:	:	:
Czech Republic	:	:	:	:	:	:	:	:	:	:
Denmark	7,024	7,782	7,190	7,031	6,895	6,765	7,212	8,405	8,806	9,093
Germany	291,500	287,205	258,783	219,083	194,465	168,621	152,913	136,389	139,816	133,200
Estonia	:	:	:	:	:	:	:	:	:	:
Ireland	1,750 (i)	2,231 (i)	1,977 (i)	4,498 (i)	4,197 (i)	5,214 (i)	5,924 (i)	6,205 (i)	6,018	5,362
Greece	12,153	11,191	10,387	10,691	10,210	10,517	9,189	7,601	8,110	7,126
Spain	148,393	171,284	188,728	202,293	206,010	205,887	192,649	204,345	206,154	204,079
France	122,542	117,236	121,882	120,070	121,314	115,796	114,672	117,614	114,195	116,511
Italy	97,960	100,731	102,789	100,138	89,794	92,902	92,532	88,534	86,176	83,016
Cyprus	:	:	:	:	:	:	:	:	:	:
Latvia	:	:	:	:	:	:	:	:	:	:
Lithuania	:	:	:	:	:	:	:	:	:	:
Luxembourg	2,650	2,840	3,036	3,260	3,497	3,212	3,147	2,675	3,087	2,892
Hungary	:	:	:	:	:	:	:	:	:	:
Malta	:	:	:	:	:	:	:	:	:	:
Netherlands	9,114	10,769	10,713	10,047	9,568 (b)	7,280	8,753	22,465 (b)	17,729	22,754
Austria	17,913	18,566	16,682	14,811	15,006	15,443	15,104	14,562	14,863	14,009
Poland	:	:	:	:	:	:	:	:	:	:
Portugal	42,709	36,786	42,390	45,680	41,920	40,751	42,229	40,185	40,770	37,139
Romania	:	:	:	:	:	:	:	:	:	:
Slovenia	:	:	:	:	:	:	:	:	:	:
Slovakia	:	:	:	:	:	:	:	:	:	:
Finland	9,919	10,481	10,796	10,006 (b)	9,917	9,284	9,104	10,338	10,189	10,631
Sweden	4,704	5,382	5,343	5,865	5,518	5,119	4,507	4,498	4,769	4,665
Great Britain	46,218 (i)	45,644 (i)	49,910 (i)	56,267 (i)	54,593 (i)	54,242 (i)	51,671 (i)	52,375 (i)	47,697 (i)	47,837 (i)
Norway	9,325	8,980	9,868	8,830	8,160	7,783	7,000	7,558	5,653	7,510
Switzerland	:	:	:	:	:	:	16,764	16,856	17,250	17,131

The figures do give some guidance on which countries have a better safety record than others but an indication as to numbers of workers working in the construction industry also has to be

given. The table below provides that information. The Key for annotations is the same as the table above.

Figure 27: Numbers of workers working in the construction industry

NACE_R1: Construction

INDIC_SB: Number of employees

SIZE_EMP: Total

TIME	2002	2003	2004	2005	2006	2007
GEO						
Belgium	:	188,835	182,923	188,938	197,131	202,140
Bulgaria	101,715	116,537	123,654	147,215	175,004	207,645
Czech Republic	257,639	253,020	255,623	261,844	262,414	264,041
Denmark	154,510	154,376	157,663	169,087	181,581	185,196
Germany	1,614,028	1,504,996	1,429,124	1,337,042	1,318,689	1,326,407
Estonia	33,452	34,890	35,973	40,643	49,320	57,995
Ireland	:	41,693	46,816	49,085	71,420	69,939
Greece	183,694	193,554	174,895	172,069	193,064	182,601
Spain	1,811,550	1,933,627	2,034,314	2,242,117	2,384,513	2,421,426
France	1,292,007	1,317,257	1,366,488	1,373,497	1,471,855	1,544,487
Italy	907,284	1,010,612	1,037,308	1,082,072	1,127,103	1,170,144
Cyprus	26,143	29,299	30,068	32,485	30,847	33,678
Latvia	46,897	48,010	52,730	61,805	72,901	85,556
Lithuania	71,194	82,140	88,670	97,718	110,918	124,106
Luxembourg	:	:	31,994	33,044	34,708	36,798
Hungary	177,475	188,830	192,834	187,776	197,937	199,209
Malta	9,244	:	:	:	:	:
Netherlands	326,368	384,473	369,188	374,162	375,762	379,747
Austria	233,999	234,520	233,999	231,528	233,507	241,880
Poland	:	:	429,537	469,541	496,042	570,343 (p)
Portugal	370,716	373,365	403,879	458,097	466,873	490,712
Romania	342,453	356,859	376,938	383,094	421,579	505,773
Slovenia	55,811	54,216	54,299	55,878	60,555	67,881
Slovakia	65,542	67,779	62,926	68,588	71,688	74,129
Finland	111,556	112,911	118,000	:	122,948	131,908
Sweden	203,670	198,178	201,620	210,227	224,723	242,641
United Kingdom	1,130,090	1,138,056	1,147,265	1,195,475	1,220,266	1,254,523
Norway	111,546	:	121,985	125,881	137,151	150,511

There are gaps in the statistics. The author of this report is unable to find exact reasons for this but either way the tables give enough information to allow some comparison to be made. From

the tables above a percentage of accidents and fatalities to numbers working within each country in the construction industry can then be extrapolated.

The percentages of fatalities to total numbers working in the industry are as follows and the next two tables are the relevant percentages, the first based on fatalities and the second based on accidents that cause a 4 day break from work.

Figure 28: Percentages of fatalities to total numbers working in the Construction industry

TIME	2002	2003	2004	2005	2006	2007
GEO						
Belgium		0.009	0.015	0.009	0.016	0.016
Denmark	0.004	0.005	0.005	0.01	0.003	0.007
Germany	0.011	0.011	0.008	0.009	0.011	0.01
Ireland		0.035	0.032	0.042	0.016	0.02
Greece	0.02	0.01	0.018	0.005	0.013	0.019
Spain	0.013	0.012	0.01	0.011	0.009	0.009
France	0.012	0.014	0.013	0.008	0.01	0.01
Italy	0.025	0.027	0.023	0.022	0.024	0.018
Netherlands	0.008	0.005	0.006	0.004	0.007	0.008
Austria	0.016	0.016	0.012	0.017	0.016	0.014
Portugal	0.029	0.03	0.027	0.024	0.017	0.02
Finland	0.005	0.013	0.009		0.008	0.006
Sweden	0.005	0.005	0.002	0.005	0.004	0.006
United Kingdom	0.006	0.007	0.005	0.005	0.006	0.005
Norway	0.008		0.005	.008	.005	0.021

Figure 29: Percentages of accidents to total numbers working in the Construction industry

TIME	2002	2003	2004	2005	2006	2007
GEO						
Belgium		6.64	6.74	6.15	6.06	6.03
Denmark	4.46	4.38	4.57	4.97	4.85	4.91
Germany	12.05	11.20	10.70	10.20	10.60	10.04
Ireland		12.50	12.65	12.64	8.43	7.66
Greece	5.56	5.44	5.25	4.42	4.20	3.90
Spain	11.37	10.65	9.47	9.11	8.64	8.43
France	9.39	8.79	8.39	8.56	7.76	7.54
Italy	9.90	9.19	8.92	8.18	7.64	7.09
Netherlands	2.93	1.89	2.37	6.00	4.72	5.99
Portugal	11.31	10.91	10.25	8.77	8.73	7.57
Finland	8.89	8.22	7.71		8.25	8.06
Sweden	4.87	4.68	4.51	4.92	4.53	4.38
United Kingdom	4.83	4.77	4.50	4.38	3.91	3.81
Norway	7.31		5.74	6.00	4.12	4.99

As can be seen there are variations with regard to which country is safer or better in their work practices than others. To analyse the variations for each country is as already stated outside the scope of this report as are the reasons for the fluctuations within each country. The causes could be wide and varied, but the issue here is to compare how the UK compares with other countries and looking at the figures UKs health and safety record compares very favourably with those of the rest of Europe. Economic activity and number of projects has not been considered in these figures but the total numbers that work in the construction industry does vary and this gives an indication as to whether the activity is rising or falling.