CONSTRUCTION INTELLIGENCE REPORT

ANALYSIS OF CONSTRUCTION INJURY AND ILL HEALTH INTELLIGENCE

The Construction Intelligence Report gives:

- *background data on the construction industry,*
- *analysis of statistics,*
- *research/information from other sources on construction injuries and ill health,*
- *and analysis of construction fatal accidents over a twelve year period from 1997/98 to 2008/09p.*

1. Introduction:

The introduction gives details of the various sources of accident and ill health information which are available in construction.

2. Background:

This section gives detailed background information on the construction industry together with details of progress towards meeting the RHS and industry accident/ill health targets.

3. Main trends:

This section gives the current trends in fatal accidents together with reported major and over-3-day injuries. There is also information on ill health and lost time performance in construction.

4. Research/other data sources:

This section gives the details and results of recent intelligence research projects in construction. There are also details of other sources of accident and ill health data.

5. Fatal accident pen-pictures and analysis: (Appendix)

This section includes typical fatal accident summaries together with the associated charts which show the detailed analysis of the accidents into the various categories. The fatal accidents are broken down by kind and include further charts giving an analysis of the accidents within these categories.

Charts are based on an analysis of the fatal accident summaries – unless otherwise stated.

Introduction

1 Traditional “Blackspot Construction” reports have confined themselves to a detailed breakdown of construction fatal accidents and relatively little analysis. Most of the analysis has been confined to factors which had a “direct” influence on the accident, and tend to be hardware/site related. The fatal accident summaries and related analysis in this report have been enhanced to extract the maximum possible information from the RIDDOR/FOCUS/COIN Investigation Reports. The source of information has also been expanded to include analysis from the fatal accidents database. Charts based on this analysis are included in the fatal accident summaries in the Appendix. In addition, the opportunity has been taken to present an analysis of both fatal and non-fatal accidents, and to include the findings of research and statistical work which has been carried out to improve the Construction Division’s (CD’s) intelligence base.

2 It is important that CD takes a more holistic approach to intelligence than traditional “Blackspot Construction” reports can provide, because:

(a) Fatal accident figures alone can give a distorted picture of risk (for instance, there are few handling and slips & trips fatalities but, together, these make up more than 50% of all construction accidents);

(b) The RHS and Construction Industry targets are based on a combination of fatal and major injuries (over 3-day injuries are not included in the targets though they will be mentioned in this report);

3 Ill health needs to be considered, despite the lack of extensive and reliable data. Both ill health, and the significant lost time it causes, are included in the RHS and Construction Industry targets.

4 There are 3 main aspects to CD intelligence:

(a) Statistics as shown on the HSE website at http://www.hse.gov.uk/statistics/industry/index.htm - con and http://www.hse.gov.uk/statistics/pdf/rhscon.pdf;

(b) Intelligence from inspector reports. At present, quantitative intelligence is limited to Risk Control Indicator (RCI) scores. These have only been available for the last few years, so any conclusions drawn from them may be less than entirely reliable; however, they can be used in conjunction with other forms of intelligence to form a larger picture. There has also been qualitative intelligence from reflective reports, which has informed the development of the Construction Programme;

(c) Research, which has provided a great deal of both qualitative and quantitative information on accident causation, and this will be referred to widely in the report.

Background

Nature of construction industry – Chart 1
Work by value – Chart 2
% change in injury rates since 1999/2000 – Chart 3
Fatal accidents to workers v industry output – Chart 4

5 Construction has one of the highest accident rates of all industries in the UK and this is also the situation in other parts of the world. However, whilst we have reliable information on fatal injuries, non-fatal RIDDOR reports are subject to significant under-reporting. Estimates of the true level of accidents are around 30,000 reportable construction accidents each year, rather than around 4600 major and 8,000 over 3-day accidents actually reported. Reporting levels derived from the Labour Force Survey are about 50% overall but levels are very low for the self-employed at around 5%. Consequently, HSE statisticians quote numbers for self-employed injuries, but derive rates for major and over-3-day (O3D) injuries only for employees. All these figures for under-reporting are estimates, and are based on a sample of around 7000 construction workers who are interviewed each year as part of the Office of National Statistics' Labour Force Surveys (LFS).

6 The issue is further complicated by the nature of self-employment. Research by UMIST suggests that only 10-20% of the 700,000 self-employed quoted in official figures (total workforce in excess of 2m) actually work on their own. This ties in with the 70,000 single-person contractors in BERR statistics.

Nature of the construction industry - Table 1

The United Kingdom's construction industry contributed over £100 billion in 2005 to gross domestic product (8.5%); the output volume of the sector has increased by over 25% since 1995.

Construction has a workforce of over two million people across 170-200,000 firms. Nearly 90 per cent of these companies employ ten workers or fewer and are therefore micro-SMEs. The number of companies has declined by 20,000 since 1993, though there was an increase in micro-SMEs in 2003. 70,000 are single-employee companies (the “true” self-employed?). The table below shows the reduction in output by smaller firms and a corresponding increase in the output of larger firms over a period of 4 years:

Percentage Work Output Value by Company Size 2001- 2008

Size	2001	2002	2003	2004	2005	2006	2007	2008
1	6	3	3	2	3	3	3	4
2 to 3	11	3	5	4	4	4	4	3
4 to 7	10	7	8	6	6	6	5	6
8 to 13	7	8	8	7	7	7	7	7
14 to 24	9	9	8	8	8	8	9	8
25 to 34	6	5	4	5	5	5	5	5
35 to 59	6	10	9	9	9	9	10	9
60 to 79	3	4	4	5	5	5	4	5
80 to 114	5	5	5	6	6	5	5	5
115 to 299	11	14	12	14	13	14	13	13
300 to 599	6	7	7	8	8	8	9	10
600 to 1199	9	9	7	7	6	6	7	5
1200+	12	15	18	19	20	20	19	20

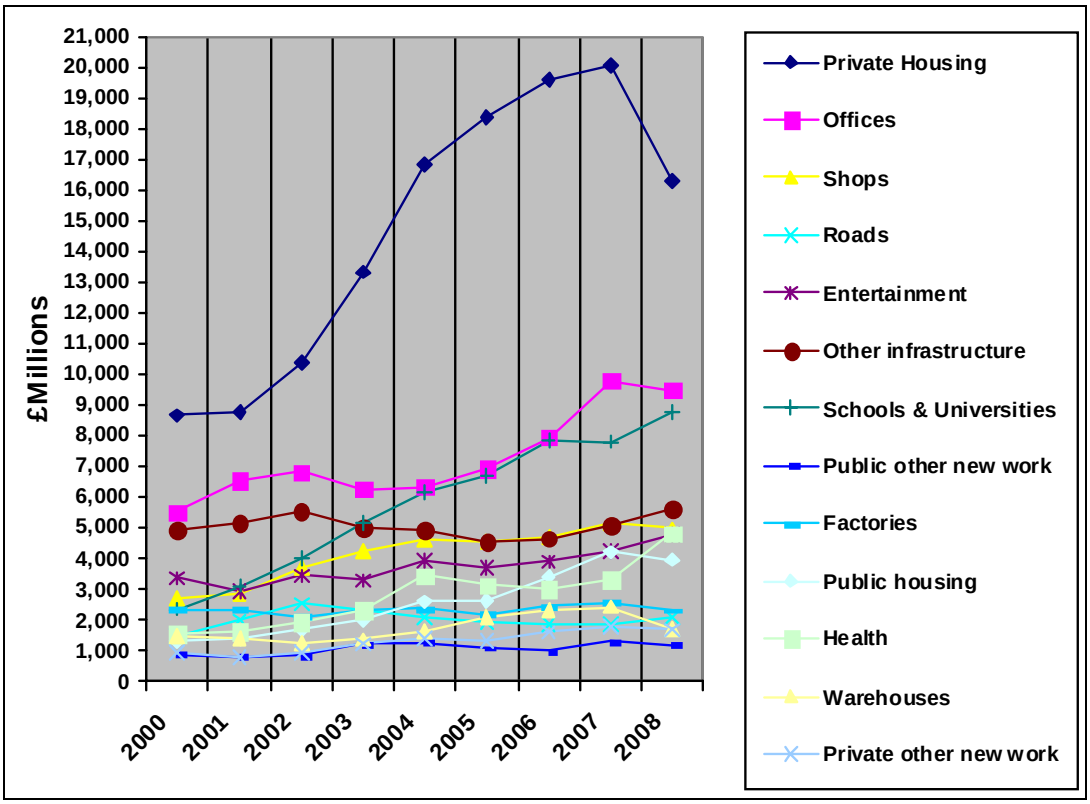
(ONS Construction Statistics 2009)

In a survey of construction workers published in October 2003, 41% of those in the construction industry had been with their current employer for less than a year & 52% had been working on their current contract for 6 weeks or less.

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 clients. Public and private housing is predicted to increase by up to 20% a year, whereas commercial, industrial and infrastructure work is likely to increase less dramatically. The top 4 clients are DH, DTp, MoD and Network Rail, who have each spent >£1bn over the past year. The variation over time of work by value in various sectors of the industry is shown below:

Work by value 2000/08 - Chart 2 **(ONS Construction Statistics 2009)**



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 SE (excl Greater London), with the 2nd highest in the NW. This work attracts micro-SMEs <4 employed, who carry out 75% of the work; only half have professional affiliations.

These problems have implications for the measurement of progress against the Revitalising and industry targets, viz to:

(a) (RHS target) reduce the incidence rate of fatal and major injury accidents by 5 per cent (2004/05) and 10 per cent (2009/10). The industry target is for a 40% and 66% reduction, respectively.

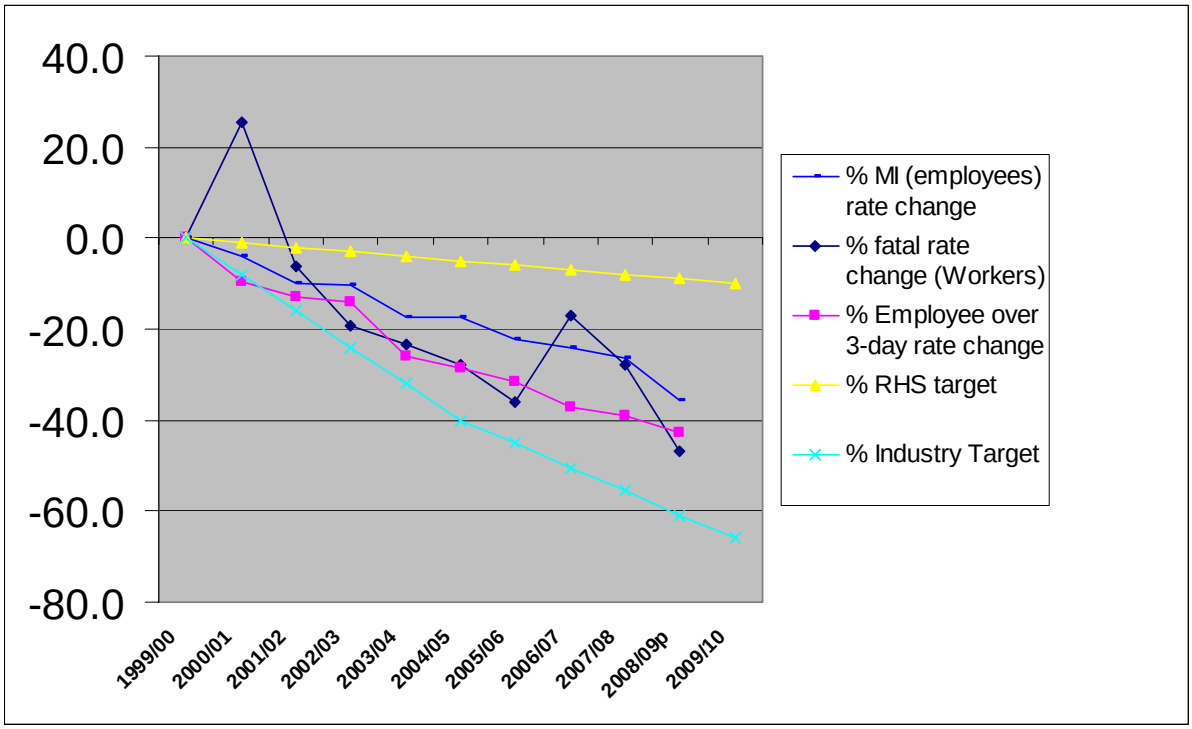
(b) (RHS target) reduce the number of working days lost per 100,000 workers from work-related injury and ill health by 15 per cent (2004/05) and 30 per cent (2009/10). The industry target is for a 20% and 50% reduction, respectively.

(c) (RHS target) reduce the incidence rate of cases of work-related ill health by 10 per cent (2004/05) and 20 per cent (2009/10). The industry target is for a 20% and 50% reduction, respectively.

8 The RHS injury target is very difficult to measure accurately because a 1% change each year cannot be reliably determined through RIDDOR reports (due to changes in reporting levels) or through LFS (because the sample sizes are too small to detect such changes). Progress on the more ambitious industry injury target can be more accurately assessed, though it depends on the measurement criteria used.

9 In the charts below, we have compared the performance of the industry over time by the change in rates of reported injury. This takes account of changing employment levels, and is a more accurate indicator than numbers of injuries. Chart 3 shows progress on fatal, major and O3D injury rates compared to the 1999/2000 baseline. Although the RHS target is for fatal and major injuries (MIs), the relatively small fatal injury rate has little effect on the rates for employee MIs only. Reporting rates for employees have changed from 52% in 1999/2000 to 57% in 2005/06 - 2007/08p, whereas the rate of reported major injury has dropped by a much more significant amount in the same period. The other indicators are showing downwards trends for both the rate of over 3 day injury and the Labour Force Survey. The LFS is not subject to underreporting, and alongside the major and over 3 day injury rates, shows a general reduction in the rate of injury in construction.

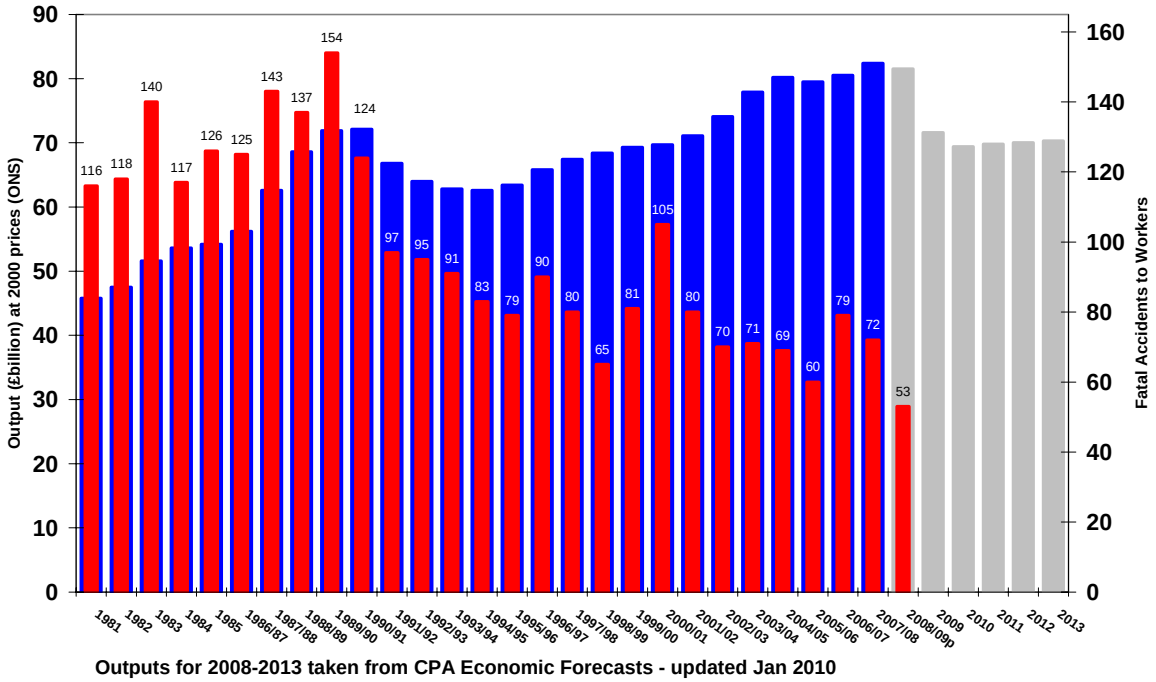
% change in reported injury rates since 1999/2000 – Chart 3



Source: RIDDOR accident rates 1999/00 to 2008/09p

The chart shows a significant improvement in fatal injury rates, following the high number (105 workers, rate 5.9 per 100,000) in 2000/1. The current rates of fatal, MI and O3D injuries all lie between the RHS and industry target lines.

Fatal accidents to workers v industry output - Chart 4

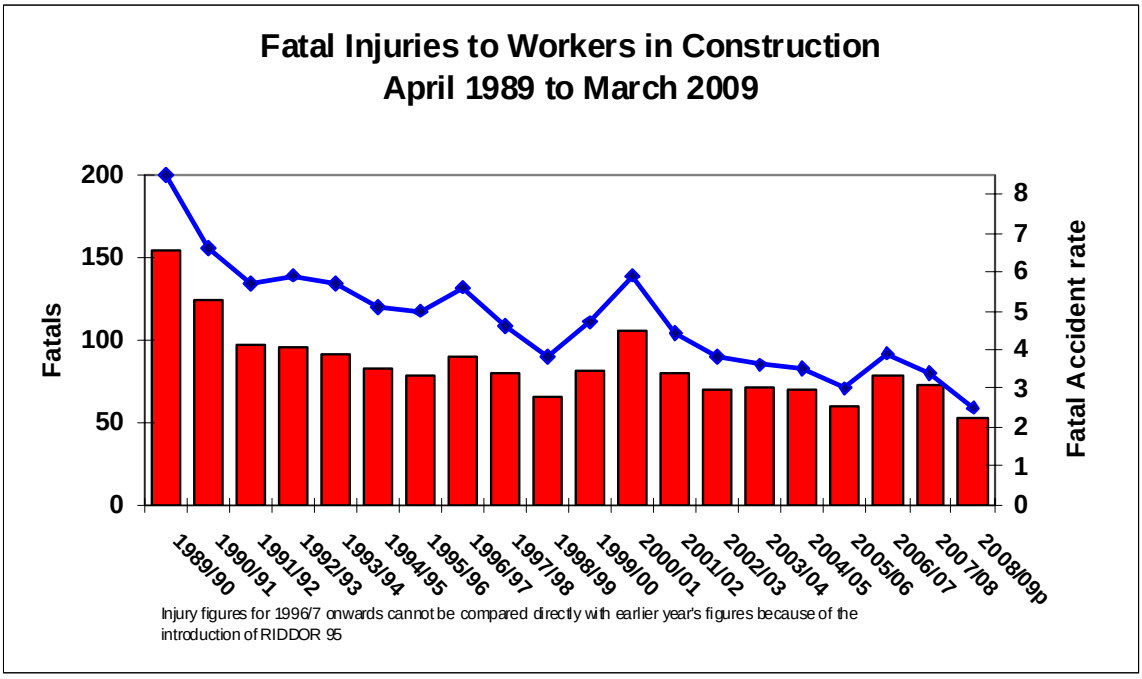


Outputs for 2008-2013 taken from CPA Economic Forecasts - updated Jan 2010

Main trends

Fatal injuries	The rate of fatal injury to workers is 47**%** lower in 2008/09p compared to the **base year in 1999/00** following the decrease from 3.4 to 2.5.
Reported major injuries	The rate of reported major injury to employees shows a clear downward trend. The rate in 2008/09p is 36**%** lower than in the **base year**.
Reported over-3-day injuries	The rate of reported over-3-day injury to employees has fallen steadily over the previous 8-year period from 1999/2000. It is nearly 43**%** lower in 2008/09p than in the **base year**.
Reporting levels.	Levels of reporting for non-fatal injury to workers (as measured by the LFS rate) have increased from 52% in 1999/2000 to around 57% by 2005/06-2007/08p. Although there is no clear improvement in reporting rates, recent trends in LFS support the reduction in reported injury rates

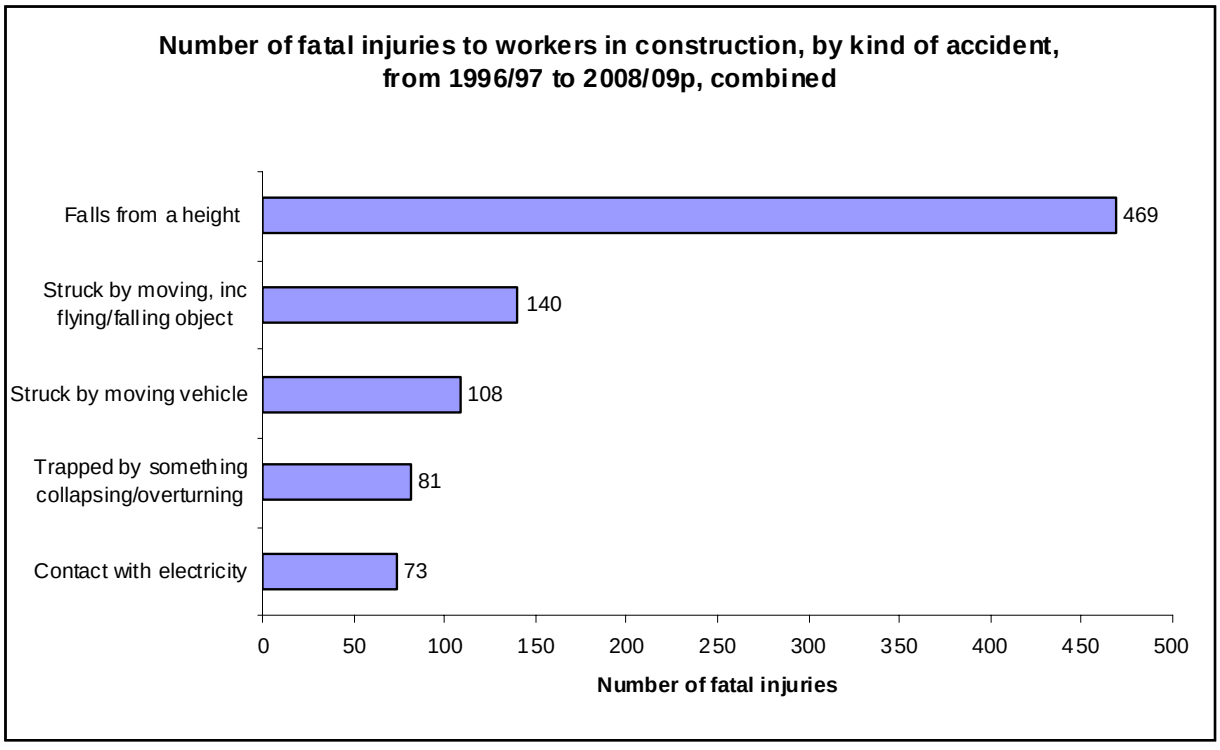
Trends in Fatal Injuries –Chart 5



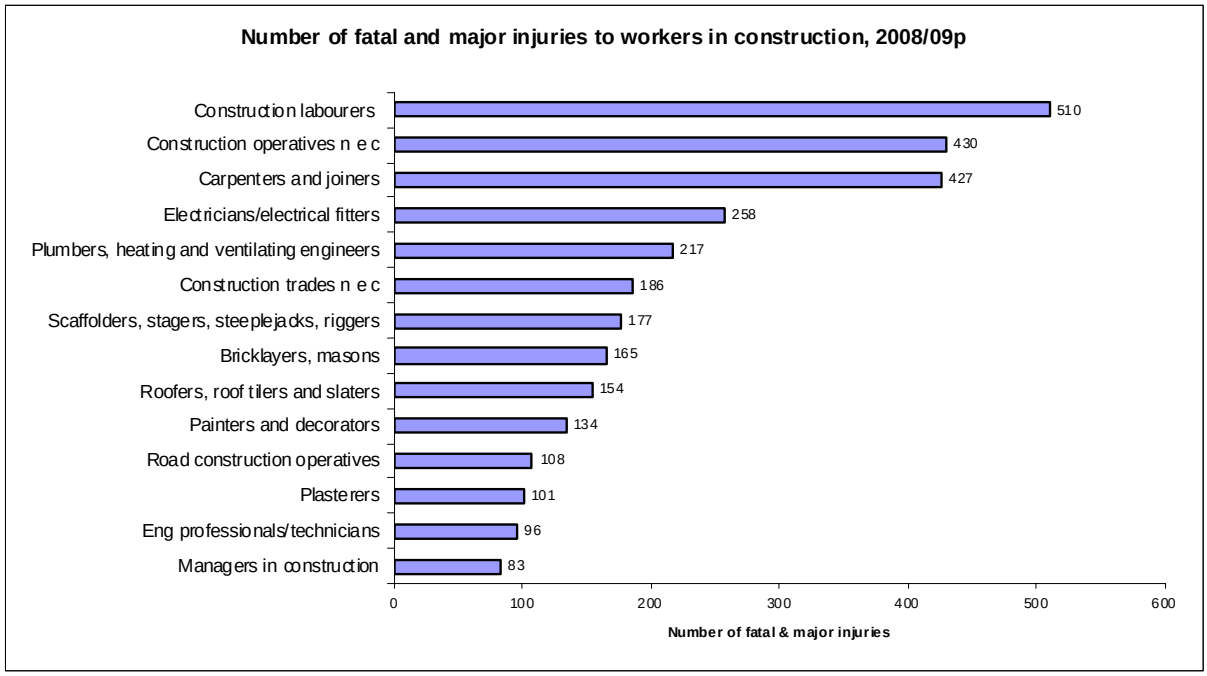
10 .There were 53 fatal injuries to *workers* in 2008/09p, a decrease of 26% over the final figure of 72 for 2007/08. 33 employees were killed and 20 self-employed. The rate has also declined by 26% to 2.5 from 3.4. The rate has fallen by 47% since the baseline year in 1999/00.

11. Falls from height account for around half of all fatal accidents, a proportion which is regrettably fairly typical. The other main causes, in lesser numbers, were struck by object, struck by vehicle, electricity and collapse. Details of individual fatal accidents are given in the appendix to this report.

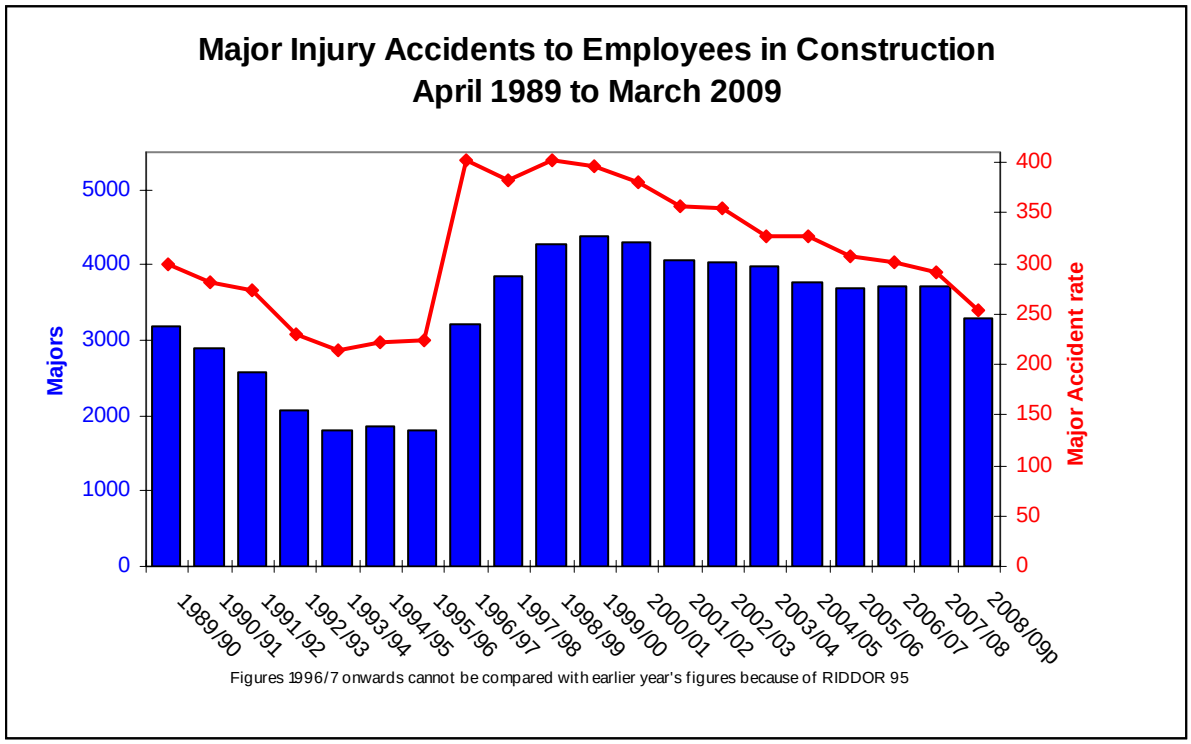
Fatal injuries by Kind of accident – Chart 6



Fatal and Major Injuries by Trade – Chart 7



Major injuries – Chart 8

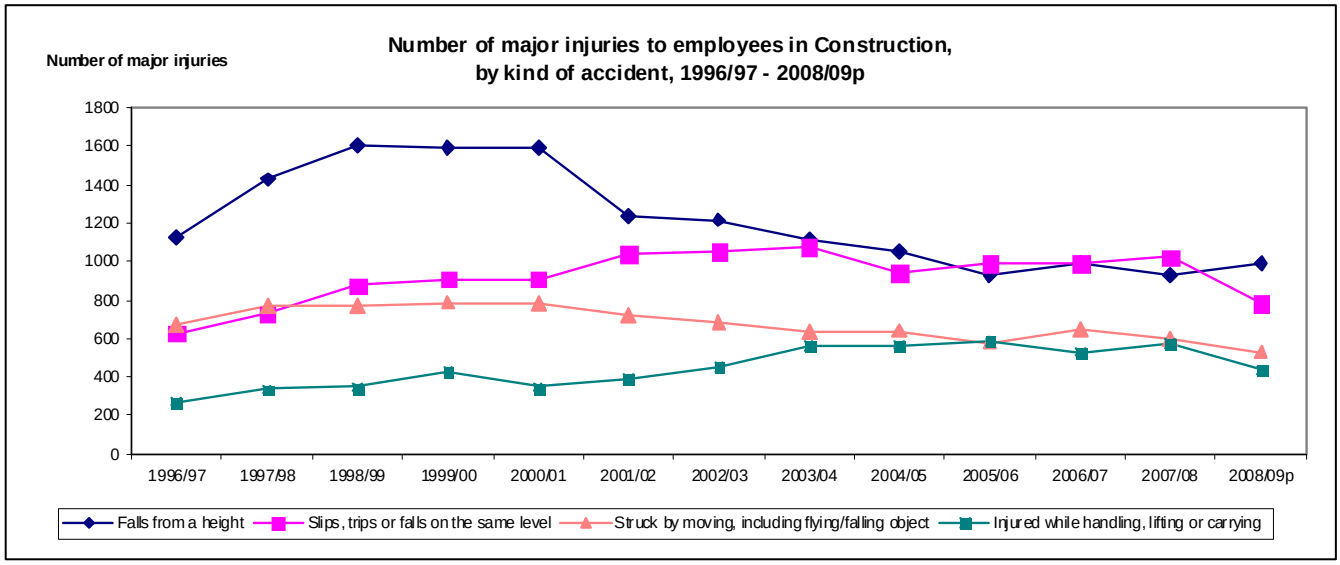


12 The total reported major injuries to *employees* for 2008/09p was 3286. The rate of major injury to employees decreased to 254.1 per 100,000 employees; this incidence rate is lower (by 12.9%) than 2007/08 which was the lowest since the definition of major injury was changed in 1996/7.

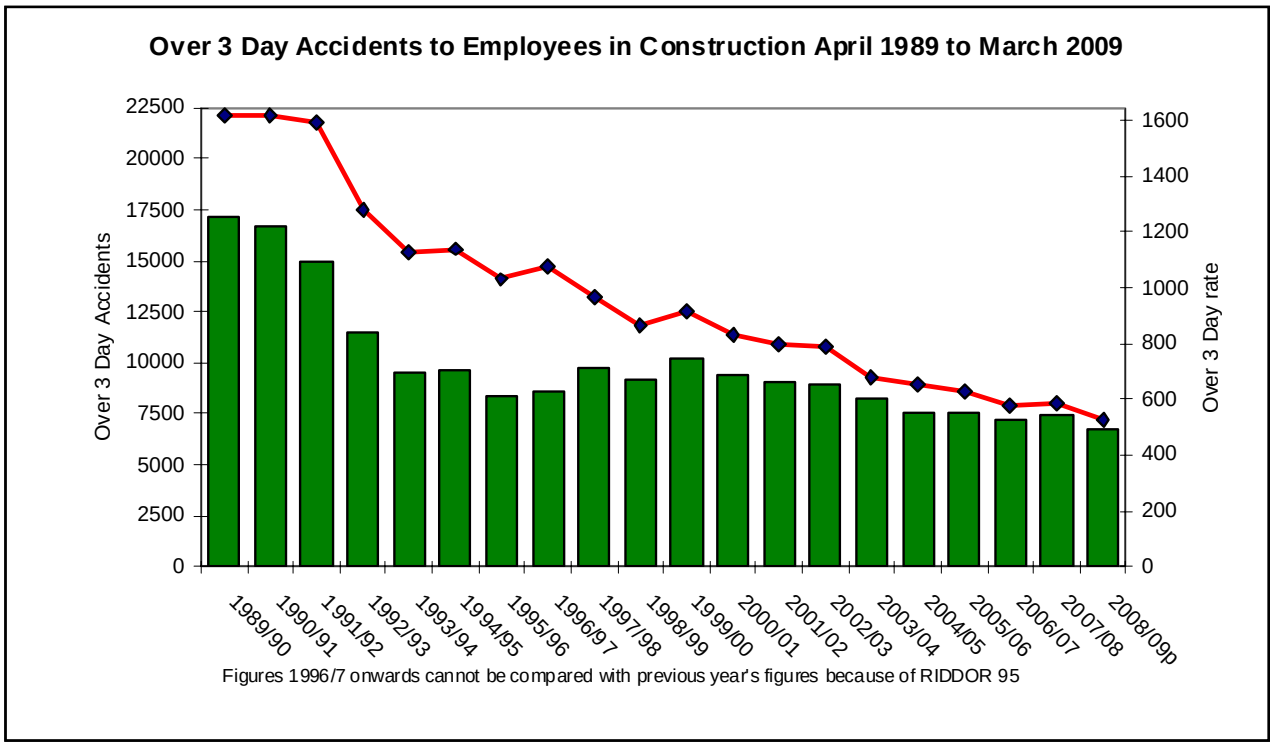
13 This decrease is in line with the general downward trend in the rate since 1998/99. The rate has fallen by around 33% since the Summit of 2001 and by over 35% since the 99/00 RHS baseline. This exceeds the RHS target for the 9 years to 2008/09p (9%), but is short of the industry's more challenging targets (which would have produced a reduction of over 60%).

14 Falls from a height now account for more than a quarter of all major injuries in construction, with more low falls than high falls. The other main causes were slips and trips, struck by moving object and manual handling. Over the last 9 years, there has been a significant reduction in the number of reported fall accidents in construction. Whilst some of this has been due to coding changes, which have led to an apparent increase in slips and trips at the expense of falls. The reduction in falls therefore appears to be genuine and is borne out by inspector RCI scores which suggest an improvement in the control of fall risks, this also applies to over-3-day falls.

Major Injuries by kind of accident – Chart 9

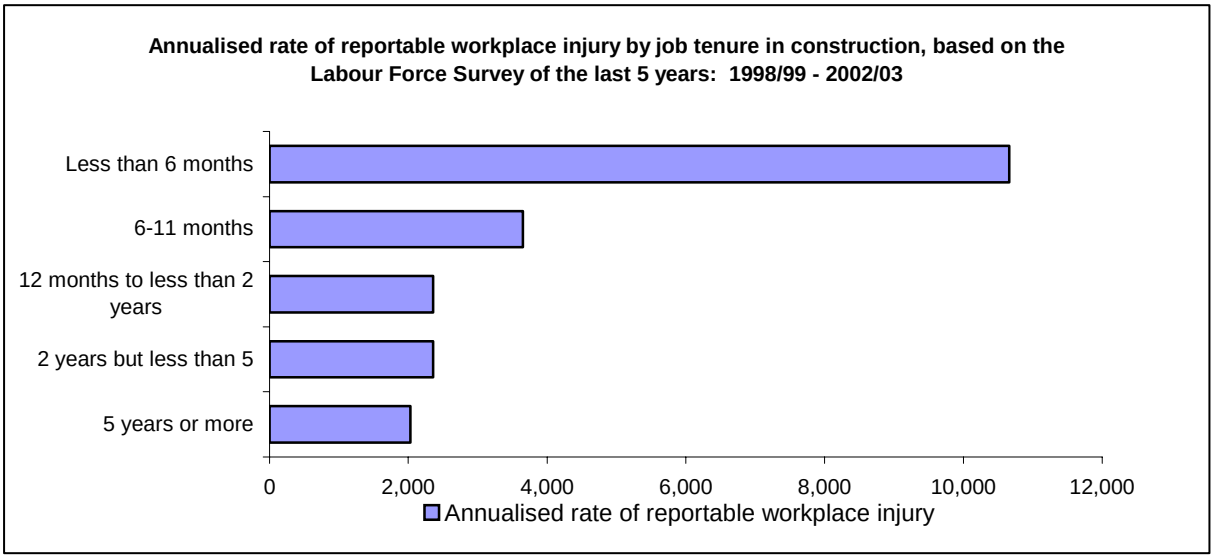


Over-3-day Injuries – Chart 10



15 The rate of reported over-3-day injuries to employees was the lowest ever in 2008/09p at 524.9 per 100,000 a decrease of 10.8% from 2007/08 when it was 588.6. There were 6789 injuries in 2008/09p; more than a third of these involved manual handling. Bomel and Loughborough Research (see paras 20 (c)&(d)) both cited these issues as the main causes of site injury. The over-3-day rate has fallen by over 40% since the RHS baseline year.

Reportable Injuries by job tenure – Chart 11



Ill health and lost time

16 Estimates from Self-reported Work-related Ill health survey (SWI 2008/09) suggest that the current overall prevalence rate of ill health ascribed to the current or most recent job in the construction industry is 3720 per 100,000 people working in the last 12 months, which equates to 93,000 suffering from work-related ill health in 2008/09 (137,000 in 2001/2). This rate is lower than the 2001/02 baseline figure (4500 per 100,000) and similar to the average 2007/08 rate of 3330 per 100,000 for all industries. SWI 2001/2 showed construction as having amongst the highest prevalence rates for musculoskeletal disorders (MSD) for people working in the last 8 years. Although recent estimates suggest a fall in the incidence rate of MSD overall, RCI scores by inspectors show that this risk is poorly controlled in construction. Also, in research by Bomel (see para 20 (c)), many respondents indicated that they felt that a lack of manual handling training contributed to handling accidents.

17 The estimated total time lost per annum in 2008-09 was 3.04 million[1] days (2.43m from work-related ill health and the balance of 0.61m from injuries). In 2001/02, the estimated loss to employers was between £100 million and £180 million from ill health and £140m from injuries. However, it is estimated that non-injury accidents cost the industry between £0.4 billion and £1.6 billion, giving a total estimate of between £0.7 billion and £1.9 billion from all accidents and ill health that occurred in 2001/02.

18 The BMRB Omnibus Construction Workers Survey (under **Research**) has provided a better indication of performance against the ill health and accident baselines, as will the recent Phase III re-run which has been modified now that the WHASS (Workplace Health and Safety Survey) has been completed. Data on ill health and injury in Construction and Agriculture is given in THOR-GP, Health & Occupational Reporting Network for General Practitioners. Details of ill health prevalence and incidence rates are given in the table below and in the document at http://www.hse.gov.uk/statistics/industry/factcon.pdf.

[1] Combines estimates for injuries and ill health from different dates, and using somewhat different methodologies.

Ill health data from a range of sources for the construction industry, also showing all industry total – Chart 12

Sources	*THOR* (Specialist and OPRA) (2001-2003)		**THOR** (Specialist Only) (2001-2003)	**SWI2001/02**	*IIS* (2001-2003)	
Estimated Average annual incidence	*Rate per 100,000 workers per year*	*Estimated Average annual incidence*	*Rate per 100,000 workers per year*	*Estimated Prevalence Rate Per 100 employed in the last 8 years*	*Total New claims (over 3 years)*[3]	*Average rate per 100,000 employees*
{ All Musculoskeletal Diseases	395 (7,200)	23 (31)	262 (2,229)	15 (10)	88,000 (690,000)	3.6 (2.0)	45 (1125)	1.4 (1.5)
Upper Limb Disorders	278 (4,476)	15 (19)	201 (1,669)	11 (7)	26,000 (249,000)	1.0 (0.72)	-	-
Spine & Back Disorders	79 (2,129)	4 (9)	55 (464)	3 (2)	44,000 (327,000)	1.8 (1.0)	-	-
Contact Dermatitis & Skin Disease	175 (2,742)	10 (12)	130 (1,779)	7 (8)	-	-	55 (575)	1.6 (0.8)
Respiratory Disease	18 (656)	2 (3)	19 (387)	1 (2)	8,000 to 17,000	0.32 to 0.70	25 (490)	0.7 (0.6)
Audiological Disease	15 (294)	1 (1)	- (78)	- (-)	-	-	110 (865)	3.7 (1.3)
Mental Ill Health	112 (7,065)	7 (30)	64 (2,576)	4 (11)	8,000 to 18,000 (452,000)	0.33 to 0.73 (1.3)	-	-
Infectious Diseases	3 (1,425)	- (6)	1 (1,318)	- (6)	-	-	-	-
Vibration White Finger[1]	990 (8197)*	-	271 (2480)*	-	-	-	405 (6,780)	13.6 (10.5)
Headaches or eyestrain	-	-	-	-	-	-	-	-
Estimated days off work due to work-related illness in 2001/02	-	-	-	-	2,834,000 (28,029,000)	-	-	-
Overall Ill health[2]	-	-	-	-	137,000 (1,484,000)	5.6 (4.3)	-	-

Bracketed figures are for all industries.

1 THOR data given for VWF show the total number of cases for VWF with the total number of diagnoses for all musculoskeletal diseases in brackets.

2 SWI data relates to illnesses caused or made worse by the current or most recent job in the last 8 years.

3 IIS case figures have been rounded to the nearest 5 for confidentiality reasons.

* Awaiting new figures from THOR.

A full list of cases and rates tables can be found on: http://www.hse.gov.uk/statistics/disease.htm

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

Annual incidence rates for work related ill health seen by The Health and Occupation Reporting network (THOR) hospital specialists and cases assessed with compensatable prescribed diseases under the Industrial Injuries Disablement Benefit Scheme (IIDB), in the period 2004-2006

Condition	THOR hospital specialist cases				IIDB prescribed disease cases	
	Construction		All industries		Construction	All industries
	Average annual cases	Average annual rate per 100 000	Average annual cases	Average annual rate per 100 000	Average annual rate per 100 000 employees	
Asthma	14	1.0	**403**	**1.0**	**0.9**	**0.7**
Dermatitis	**137**	**6.0**	**1749**	**6.0**	**1.2**	**0.5**
Spine/Back Disorders	**40**	**2.0**	**411**	**2.0**	n/a	n/a
Upper Limb Disorders	**153**	**7.0**	**1518**	**6.0**	n/a	n/a
All MSDs	**203**	**10.0**	**2053**	**8.0**	**1.0**	**1.1**
Occcupational Deafness	**12**	**1.0**	**38**	**0.0**	**2.9**	**1.0**
Vibration White Finger	**18**	**0.9**	**154**	**0.6**	**7.3**	**1.6**
Asbestosis	**46**	**2.2**	**142**	**0.5**	**22.1**	**2.9**
Mesothelioma	**269**	**12.7**	**743**	**2.7**	**42.4**	**5.5**
Diffuse Pleural Thickening	**600**	**28.3**	**1300**	**4.8**	**7.2**	**1.5**
Infections	1.0	0.0	**1376**	**5.0**	n/a	n/a
Stress	**32**	**2.0**	**2160**	**8.0**	n/a	n/a

n/a - not applicable, condition not covered by IIDB Scheme **THOR** disease specialist cases: Figures in light type if based on fewer than 10 cases **IIDB** Prescribed disease cases: Rates shown in light type based on 10 or fewer cases. Rates shown in table are approximations to true incidence rates of assessed cases in the industries shown, because of uncertainties about correct denominators (populations at risk). Information collected by DWP

for statistical purposes does not include whether claimants were still employed in the industry which caused the disease, or how long ago they were so employed (which might be many years previously). 2003/2004, 2004/2005 and 2005/2006 Short Term Employment Survey figures have been used as denominators. Rates calculated using average of ONS Annual Population Survey (APS) denominators for the years 2004-2006.

Research

19 The commentary in earlier parts of this report has been supplemented by information from the various research projects which have been commissioned to improve understanding of the factors involved in construction accidents. Most are based on RIDDOR reported accidents, but in some cases attempts have been made to extend the scope beyond the statutory reporting arrangements, as in the case of the Loughborough work (see (d) below). The major findings of the projects have been reviewed in an attempt to identify any common themes or suggest any further avenues for investigation. The following provides an outline of the projects and their findings, and includes links to the full reports:

(a) *Bomel – Improving health and safety in construction Phase 1: Data collection, review and structuring (CRR 387).* The project covered the collection and review of data used in RIDDOR to help understand the causes of construction accidents, and structure information on accident causation using the Influence Network (IN) to provide a basis for quantifying risk and the benefits of improvement measures. In particular the IN was used for falls from height. Methodology used considered the technical and human activities in construction within site organisation, the corporate approach of the principal parties, and the wider environmental factors such as the regulator's influence on the industry.

Results of the Bomel Phase 1 Research

Although this has been largely superceded by subsequent work, it laid the basis for further analysis using the Influence Network. Whilst this tool was used exclusively to test its effect on falls from height, its findings seemed to have more general implications. These findings related to the major influences on construction health and safety, viz:

(a) Market influences;
(b) Contracting strategy;
(c) Safety management;
(d) Procedures;
(e) Competence;
(f) Situational awareness;
(g) Communications, and
(h) Compliance

Social pressures, labour relations and equipment maintenance, had little influence. On the issue of further RIDDOR analysis, the key findings of the report were:

- Confirmation of the priorities for action identified by HSE and the industry (for example, it confirmed that falls are a major cause of fatalities with ladders and scaffolds being the main agents with scaffolders and roofers continuing to be at most risk);
- Whilst fatalities occur on sites of all sizes, the majority of fatal accidents happen on smaller construction sites but there is no specific association with time of day, age or geographic region.

(b) *Bomel – Improving Health and Safety in Construction Phase 2 (RRs 114, 231-6),* includes development of a datatool, application and validation of IN technique across a range of health and safety issues in construction (falls from height, transport, HAVS etc) and investigation of HSE's intervention mechanisms (to be published).

Results of the Bomel Phase 2 Research

This research is an extension of Phase 1 to apply the Influence Network (IN) to a range of hazards and develop a generic IN tool. The outputs included:

1. a critical path of influencing factors (Vol 1) – see list below;
2. a datatool to enable RIDDOR data to be analysed more effectively (Vol 2) – this has been used by Bomel to supplement the IN work and by HSE to provide some of the data for this report;
3. specific influences on falls, HAVS, and construction transport (Vols 3-5) – the HAVS and parts of the transport reports differ in their INs in that equipment issues play a more significant part;
4. a generic IN model to be used for any hazard (Vol 6) – this is available for industry to use to tailor to specific project hazards;
5. an assessment of HSE mechanisms (Vol 7) – this considered options for risk reduction based on mechanisms open to HSE, eg. targeting SMEs.

The critical path included the following influences:

- Company culture
- Health and safety management
- Health and safety culture
- Management/supervision
- Competence
- Situational awareness
- Communications
- Advice and information

In addition, there was a subsidiary critical path which culminated in design for safe construction. Targeting these issues is likely to have the greatest effect on H&S.

(c) *Bomel – Sample analysis of construction accidents reported to HSE (RR 139).* The report presents the results of a telephone survey, conducted on behalf of the Health & Safety Executive, of some 1000 notifiers of major and over-3-day injury construction accidents that occurred between 19 December 2001 and 31 March 2002. The accidents were representative of the kind and severity notified to HSE throughout the 2001/2 year.

Results of the Bomel RIDDOR Research

This research explored, in greater depth, some of the factors involved in RIDDOR-reported accidents. The results can be summarised as follows:

•Biggest single cause of accidents was "getting to the workface"
•Single greatest number of injuries = domestic newbuild
•Majority of clients were repeat clients
•Private jobs outweighed public ones by 2:1, but no significant difference in performance.
•Modal length of project was around 1 year .
•Half projects involved weekend working.
•Most had independent PS
•Most designers = architects.
•Most accidents involved general contractors, M&E, developers and refurb/maintenance/repair
•The majority of notifying companies had more than 50 staff
•Mostly directly employed.
•Modal site number was 2.
•Modal group had 20 yrs in the trade and had been on site 1-3 mths.
•Two-thirds had formal qualifications.

It was clear from the results that there was a distinct bias in the sample towards larger employers, even though the sample was based on a typical RIDDOR distribution. This was established by comparing the ratio of large/small employers in fatal accident circumstances with the ratio of major and over-3-day accidents in the research sample.

The research also looked at coding accuracy of the injuries. It determined that the level of miscoding is almost directly proportional to the number of possible alternative codings. This finding tends to suggest that there is little to gain from increasing the number of coding options, as this would only add to inaccuracy rather than provide more or better data.

(d) *Loughborough - Causal factors in construction accidents (RR 156).* This research used a combination of focus groups and detailed study of 100 construction accidents, using an ergonomics systems approach, to identify where safety is compromised and why. Drawing together the

findings, an accident model has been proposed, illustrating the hierarchy of influences in construction accidents. The model describes how accidents arise from a failure in the interaction between the work team, workplace, equipment and materials. These immediate accident circumstances are affected by shaping factors, whereby the actions, behaviour, capabilities and communication of the work team are affected by their attitudes, motivations, knowledge, skills, supervision, health and fatigue. The workplace is affected by site constraints, work scheduling and housekeeping. This model is very similar to the Bomel IN and implies that such models are a realistic representation of the factors which influence accidents and ill health in construction. The report concludes that achieving a sustained improvement in safety in the industry will require concerted efforts directed at all levels in the influence hierarchy.

Results of the Loughborough Research

This research explored in detail some of the factors involved in 100 accidents. Whilst many of the accidents were minor and non-reportable, there were issues arising which were just as relevant to more serious accidents. In fact, the level of injury was not the major issue in most cases, as more serious injuries could easily have resulted in slightly different circumstances. The results can be summarised as follows:

•Transferring across site giving rise to significant numbers of accidents;
•Poor H&S supervision;
•Untreated ill health and fatigue;
•Communication too informal (not language);
•Poor housekeeping, in the broadest sense;
•Materials (weight, convenience, packaging);
•Equipment (ergonomics);
•PPE (overuse, poor, risk homeostasis)
•Design influence up to 50%
•H&S education rather than training;
•Superficial accident investigation by employers;
•Little client influence.

This research has been particularly useful in highlighting the contribution of design to injury and how relatively simple design changes can reduce the severity of injury in up to 25% of cases (more complex changes would be required for a 50% reduction). The research also supported the increased attention being paid to injuries from slips and trips.

One important (and, perhaps, counter-intuitive) finding was poor communication was endemic in construction, not restricted to language issues.

(e) FISCA - An analysis of the significant causes of fatal and major injuries in construction in Scotland (Factors influencing Scottish construction accidents – FISCA) (RR 443)

This research was carried out by a consortium of research organisations consisting of Bomel Ltd of Maidenhead, the Institute of Employment Research (IER) of the University of Warwick, Coventry and Glasgow Caledonian University. It was commissioned to investigate the reasons why the accident rates for both fatal and major accidents for construction in Scotland are consistently higher than those for GB as a whole. Fatal accident rates to employees are around 50% higher and those for major injuries are around 15% higher.
The investigation included a detailed analysis of data from the Labour Force Survey (LFS) by IER and other work involving a Steering Group and key body consultations with associated fieldwork.

Results of the FISCA Research

The results can be summarised as follows:

- The construction workforce in Scotland is significantly different from that in GB as a whole because it has a higher proportion of workers in manual occupations.
- These manual trades can expect to be more hazardous than non-manual occupations, where there is a greater concentration south of the border.
- There are other regional/national variations in the proportion of manual workers in construction. North of England region has the highest proportion/injury rates, followed by Wales and Scotland with Yorkshire and Humberside somewhat lower.
- The high proportion of manual handling accidents suffered by bricklayers identified.
- There was no evidence to show that the use of "sarking" board on pitched roofs in Scotland has any effect on accident rates during roofwork.
- The use of system scaffold in Scotland may be connected with the increased rates of falls from scaffolds by non-scaffolders.
- The lower rates of accidents to plant operators in Scotland may reflect the enhanced influence of the main/principal contractor there. This, combined with the lower rate of self employment may give rise to more structured/disciplined approach.
- There was no evidence to show that local dockyards had any effect on the availability of certain construction trades or the higher proportion of public housing in Scotland on accidents in the construction/maintenance of domestic premises.

(f) Results of BMRB Omnibus Construction Workers Survey – Phase III

The Construction Workers Survey was commissioned as part of the British Market Research Bureau's (BMRB) rolling "Omnibus" survey. Construction workers (both current and those who had worked in the last twelve months) were identified during the survey and they were asked a number of detailed questions about their accident and ill health experiences. They were also asked a range of questions about their employment status, qualifications, time in construction etc together with questions

about their countries of origin in cases where they had come to GB to work. Details of the numbers of foreign/migrant workers are given in the following tables.
A total of 5813 construction workers were contacted in Phase I between January 2005 and April 2006. Phase II took place between November 2007 and July 2008 (for 30 weeks) when 2801 workers were contacted.
Phase III took place between January and November 2009 (for 40 weeks) when 3961 workers were contacted – see results below:-

Total number in survey (adults aged 16+)	80,291	
Construction workers	3961	(4.9% of total survey)

Construction projects - main types:

New build - commercial	563 (14.2 %)
New build - housing	696 (17.6%)
New build - industrial	203 (5.1%)
New build - public	135 (3.4 %)
New build - total	**1597 (40.3%)**
Refurb/repair - commercial	421 (10.6 %)
Refurb/repair - housing	971 (24.5%)
Refurb/repair - industrial	139 (3.5%)
Refurb/repair - public	202 (5.1 %)
Refurb/repair - total	**1733 (43.7 %)**
Civil engineering	217 (5.5 %)
Demolition	42 (1.1%)
Roads and paving	127 (3.2%)
Other	245 (6.2%)

Construction workers - main trades:

Carpenter & joiner	418 (10.5%)
Labourer	280 (7.1%)
Construction professional	367 (9.3%)
Bricklayer & mason	228 (5.7%)
Plumber, heating & ventilating	276 (7.0%)
Electrician	268 (6.8%)
Site manager, supervisor	253 (6.4%)
Painter & decorator	219 (5.5%)
Plasterer	143 (3.6%)
Civil engineer	152 (3.8%)
Construction administrator & office worker	252 (6.4%)
Groundworker & landscaper	137 (3.5%)
Plant driver	82 (2.1%)
Steel erector	91 (2.3%)
Roofer, tiler & slater	121 (3.1%)
General/handyman	157 (4.0%)
Glazier & window fitter	75 (2.0%)
Floorer & wall tiler	66 (1.7%)
Other	406 (10.2%)

Construction workers - CSCS cardholders:

Yes	2006 (50.7%)
No	1953 (49.3%)

Construction workers – other main qualifications:

City & Guilds	1346
NVQ/SVQ	1048
GNVQ/GSVQ	186
Other	695
Degree	227
None	1113
Don't know	25

Total responses more than 3961 workers total - result of multiple entry responses.

Construction workers - experience in construction:

10 years or more	2278 (57.5 %)
5 - 10 years	717 (18.1%)
1 - 5 years	721 (18.2%)
1 - 12 months	185 (4.7%)
1 - 4 weeks	30 (0.8%)
7 days or less	29 (0.7 %)
Don't know	1 (0.0%)

Questions about language/foreign workers indicated that 324 workers (8.2% of total) said that they had come to the UK from another country to work.
Another question asked about British citizenship and 298 said they were **not** British citizens.
There was some inconsistency with these answers and the groups did not overlap completely
There were 347 workers (8.8% of total) for whom English was a second language.

Of the foreign workers, 193 (60%) said they had been working for over 5 years, 47(15%) working 3-5 years, 60 (18%) working 1-3 years and 24 (7%) working less than 1 years.

Countries of origin were Poland 47, Romania 36, Lithuania 26, South Africa 26, India 20, Irish Republic 15, Bulgaria 13, New Zealand 12, Portugal 6, and other 123.

The regional breakdown of these figures shows that 60% of the foreign workers were in London, with a further 16% in the rest of the South East.
The full breakdown is as follows:-

Region	Foreign workers	Total workers	% of total workers
London	193	524	37 %
South East	52	840	6 %
Yorks/Humber.	15	312	5 %
Scotland	11	258	4 %
Wales	10	225	4 %
East Midlands	11	332	3 %
South West	11	324	3 %
West Midlands	10	383	3 %
North West	8	424	2 %
East Anglia	2	126	2 %
North	2	211	1 %

Employment Status:

Employee	2090 (52.8%)
Self - employed	1663 (42.0%)
On government scheme	98 (2.4%)
Don't know	110 (2.8%)

CIS Tax Exemptions:

Yes	707 (18%)
No	3131 (79%)
Don't know	123 (3%)

Those claiming to be self - employed numbered 1663 (42% of those in the survey).
Whereas 707 (18%) claimed to have a CIS Tax Exemption.
Hence the true level of self - employment could be considerably less than the level claimed.

Role of current employer:

Principal Contractor	1143 (28.9%)
Contractor	1595 (40.3%)
Planning Supervisor	42 (1.1%)
Designer - Architect	112 (2.8%)
Designer - Engineer	143 (3.6%)
Client	646 (16.3%)
None of these	215 (5.4%)
Don't know	65 (1.6%)

"None of these" and "Client" entries will include the self - employed who have no "employer" to report on.

Workforce on present/most recent site:

0 - 15	2155 (54.4%)
16 - 50	801 (20.2%)
51 or more	854 (21.6%)
Don't know	151 (3.8 %)

Total of 1900 workers (48.0%) had some responsibility for supervising others.

Hours worked - including overtime:

0 - 29	423 (10.7%)
30 - 39	814 (20.6%)
40 - 49	1772 (44.7%)
50 or more	909 (22.9%)
Don't know	43 (1.1%)

Accidents experienced total	**240**	**(6.1% of construction workers)**
Accidents - road traffic	9	
Accidents - returned same day	79	
Accidents - still off work	**19**	
of which likely absence 1-3 days	2	
of which likely absence 4 or more days	14	
of which likely absence N/K	3	
Accidents - returned following day or after	**152**	

of which absence 0-3 days	61	
of which absence 4 or more days	72	
Accidents - absent 4 or more days - total	**86**	**(2.2% or 2171 per 100,000)**

The current average reportable accident rate (2006/07 to 2008/09 LFS) is 1430.

IP's time on site before accident occurred:

Less than 1 day	52 (22%)
1 - 7 days	45 (19%)
1 week - 1 month	45 (19%)
1 month - 12 months	71 (30%)
1 year or more	25 (10%)

Duration of site where accident occurred:

Less than 1 day	37 (15%)
1 - 7 days	43 (18%)
1 week - 1 month	35 (15%)
1 month - 12 months	83 (35%)
1 year or more	37 (15%)
Don't know	5 (2%)

Projects where accidents occurred:		**Ratio Acc/Proj**
New build – commercial/public	33 (13.9%)	0.79
New build - housing	36 (15.1%)	0.86
New build - industrial	13 (5.5%)	**1.08**
New build - total	**82 (34.5%)**	0.86
Refurb/repair – commercial/public	25 (10.5 %)	0.67
Refurb/repair - housing	68 (28.6%)	**1.17**
Refurb/repair - industrial	7 (2.9%)	0.83
Refurb/repair - total	**28 (42.0%)**	0.96
Roads/paving	14 (5.9%)	**1.84**
Civil engineering	11 (4.6%)	0.84
Demolition	4 (1.7%)	**1.55**
Other	27 (11.3%)	**1.82**

Accident kind:		**04/05 RIDDOR**
Injured while handling, lifting or carrying	53 (22.1%)	2667 (20.8 %)
Fall from a height - above 2m	24 (10.0%)	726 (5.7 %)
Fall from a height - below 2m	18 (7.5%)	1166 (9.1%)
Fall from a height - unspecified	4 (1.6%)	289 (2.3%)
Fall from a height - total	**46 (19.1%)**	**2181 (17.1%)**
Hit by moving, flying or falling object	32 (13.3%)	2045 (16.0%)
Slips and trips on the same level	37 (15.4%)	2849 (22.3%)
Hit something fixed or stationary	16 (6.7%)	437 (3.4 %)
Contact with moving machinery	10 (4.2%)	420 (3.3%)
Hit by moving vehicle	5 (2.1%)	207 (1.6%)
Exposed to harmful substance	10 (4.2%)	285 (2.2%)
Contact with electricity	3 (1.2%)	108 (0.8%)
Trapped by something collapsing/overturning	3 (1.2%)	77 (0.6%)
Contact with sharp object	16 (6.7%)	1050 (8.2%)
Other	9 (3.8%)	451 (3.5 %)

Ill health experienced total	**160**	**(4.04% or 4039 per 100,000)**
Aware for first time in last 12 months	79	(2.00%)
Aware for first time more than 12 months ago	78	(1.97 %)
Don't Know	3	(0.07%)

The ill health prevalence rate of 4039 per 100,000 compares with the SWI 08/09 rate of 3700 per 100,000, ie 9% above the self reported rate.

Types of illness:

MSD arms etc	41 (24.3%)
MSD legs etc	20 (11.8%)
MSD backs	33 (19.5%)
MSD Total	**94 (55.6%)**
Lung conditions	14 (8.3%)
Skin conditions	6 (3.6%)
Hearing conditions	5 (3.0%)
Stress etc	22 (13.0%)
Headache/eyestrain	3 (1.8%)
Circulatory problems	8 (4.7%)
HAVS	4 (2.4 %)
Others	11 (6.5%)

Total responses more than 160 in construction workers rate total as a result of multiple entry responses.

Type of work causing illness:

Lifting/carrying	36 (19.6%)
(Mental) stress	20 (10.9%)
Repetitive strain	5 (2.7%)
Kneeling	5 (2.7%)
Breathing in substances	9 (4.9%)
Wear & tear on joints	3 (1.6%)
Bending	2 (1.1%)
Noise	0 (0.0%)
Weather	10 (5.4%)
Fall	1 (0.5%)
Not stated/other etc	93 (50.6%)

Total responses more than 160 in construction workers rate total as a result of multiple entry responses.

Time off work caused by illness:

0 days	52 (32.5%)
1 – 3 days	14 (8.8%)
4 – 14 days	39 (24.3%)
15 – 180 days	40 (25.0%)
181 or more days	4 (2.5%)
Don’t know/other	11 (6.9%)

(g) Results of Fit3 Construction Employers Survey (Booster Survey)

The Fit3 Construction Booster Survey was commissioned to supplement the main Fit3 programme surveys because of difficulties in obtaining reliable data from construction respondents in the main Fit3 employers surveys. These difficulties centred around the unique transient nature of the construction industry. The aim of the study was to gain insight into site managers' views and experience of health and safety on the construction sites in question. The survey focused on how health and safety risks were controlled and how the level of these risks has changed in recent years. The survey was carried out by Ipsos MORI for the Construction sector and Phase I was conducted between November – December 2006. The second Phase was conducted between January – February 2008 and Phase III has also recently been completed (February – March 2009). The fieldwork involved 500 telephone interviews with construction site managers in each case. The sample generation for the interviews was carried out using the "universe" of construction sites notified to HSE in the UK through the F10 CDM site notification, in the period leading up to each phase. In this way a representative sample of the F10 notifications was obtained and then used in the survey. The survey provided rolling indicators of risk control as well as specific insight to progress in securing action to control risks associated with tower cranes, semi-automatic quick hitches, and silica etc. *This report is based on unedited headline figures received recently which may be subject to minor change once sampling adjustments are made*.
The survey not only generated rolling indicators of risk control across a range of safety and health topics covered by the Construction Programme but also gave specific evidence about the impact of recent initiatives as the following examples illustrate– see results below:-

Plant and vehicle movements were involved in the work on 320 of the 500 sites. On more than 50% of these, site managers were aware of recent problems with **semi-automatic quick hitches** (covered in an HSE CD safety alert). 82 sites specifically had such plant in use and nearly 90% of those respondents were able to identify additional measures introduced on their sites this year to address quick hitch risks.

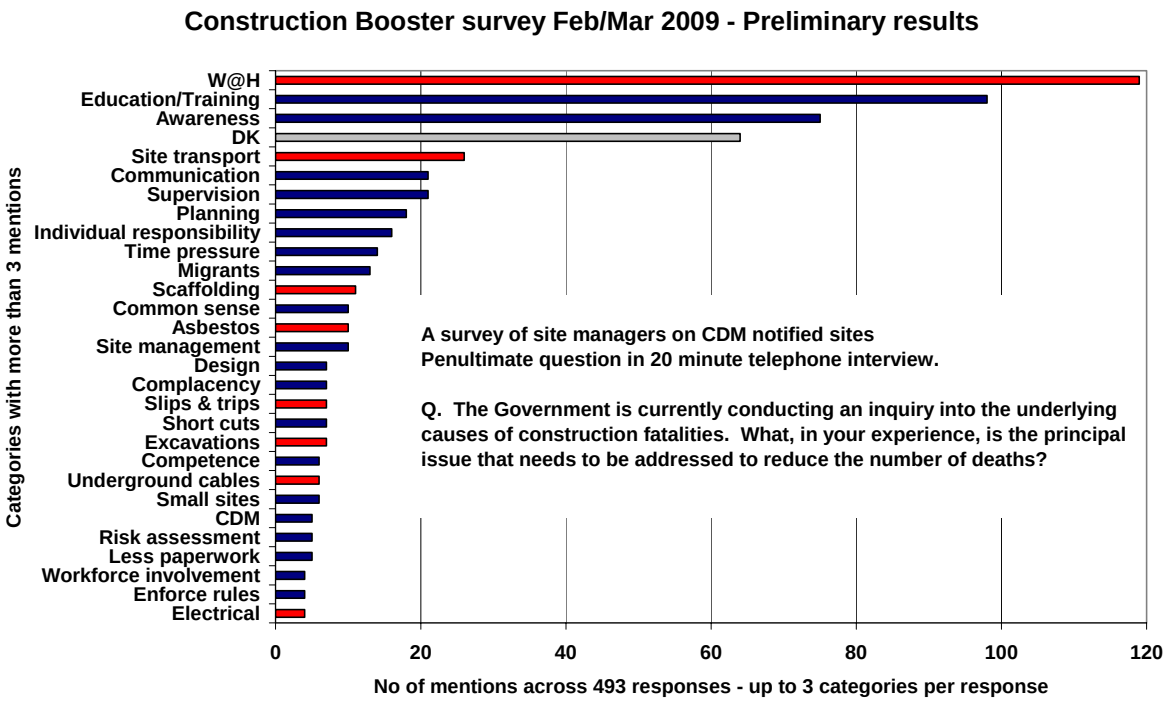
More than 80% of the respondents for the 33 sites where **tower cranes** were in use had some recognition of the recent **Strategic Forum guidance** and their detailed responses give insight to the extent to which different recommendations have been implemented.

Nearly 25% of respondents had heard of the **COHME** website launched in 2008 as an output from the Construction Programme giving information about the control of health risks. 96 respondents identified risk of exposure to **silica dust** due to the nature of work on their site. Of these 98% mentioned RPE and 87% water suppression as risk control measures in place. Although over 90% of these respondents said they were 'fairly' or 'very' confident that the risks are being properly controlled, around 50% of the total said they would like more advice.

Respondents were asked about their own training and 56% said they had completed the **CITB 5-day site supervisor course** or similar.

The survey also provided insight to levels of activity in the industry reflecting the current economic climate. In particular it seems that the picture for **migrant workers** is changing. In waves 1 and 2 (late 2006 and early 2008) of the booster survey, the profiles were almost identical with around 28% of sites having some migrant labour with some degree of language difficulty on 45% of those sites. The recent wave gives a comparable level of sites overall with some migrant labour (25%). However, where on 3% of sites more than 50% of the labour was migrant (15 and 14 sites per wave), the 2009 figure is down to 1% (6 sites). In addition **language difficulties** are now reported on only 28% of sites (cf 45% previously). Where 10% of sites with migrant labour felt more than 50% of their workers had language difficulties (19 sites in each earlier wave), this figure has reduced to 3% (4 sites). The numbers are small and some caution is necessary.

In relation to the **Secretary of State's inquiry**, a final question gave site managers the opportunity to identify the principal issue they feel needs to be addressed to reduce the number of deaths. The responses, categorised in the figure, provide useful input to the inquiry and also demonstrate the alignment between the Construction Programme and the priority topics.



h) Trends and context to rates of workplace injury (RR386)

In the context of the overarching targets for the reduction of workplace injury rates, the aim of the report is to provide an assessment **across all employment sectors** of what factors within the broader economic environment may contribute towards changes in the incidence of workplace injuries over time. The research was carried out by the Institute of Employment Research (IER), University of Warwick.

Analysis has revealed that the rates of major injury follow a pro-cyclical pattern over the course of the business cycle. This pro-cyclical pattern appears to be related to changes in the incidence of new hires over the business cycle. In terms of understanding downward trends in injury rates, these are largely driven by changes in the occupational composition of employment; particularly in terms of the balance between **manual and non-manual occupations**. Geographical variations in workplace injury rates can also be explained by differences in the personal, establishment and job related characteristics of those working within these regions. Based upon detailed occupational projections of employment, rates of workplace injury are expected to **decline by approximately 6 to 8% by 2012**. Whether comparisons of injury rates are being made over time, across regions, between industries or along other dimensions, these rates should be occupationally specific to ensure that 'like with like' comparisons are being made.

Other data sources

20 The following sources of data have also been used in this document:

(a) *Comprehensive Injury Statistics in support of the Revitalising Health and Safety Programme* (http://www.hse.gov.uk/statistics/pdf/rhscon.pdf), which has been produced to support the monitoring of the targets set under Revitalising Health and Safety (RHS) in 2000. The factsheet provides top level rates of fatal and major injury in construction together with statistics for other topics including kind of accident, age and occupation.

(b) *Fatal accident database*, which has been developed in the construction sector to obtain additional information about the circumstances of fatal accidents. It allows analysis of additional factors such as new build/refurbishment & repair, size of contactor/site, public/private and application/non application of CDM as well as the nationality of the worker killed. Nationality data has been collected for several years now such that a meaningful set of figures can be produced to show the numbers of foreign/migrant workers killed. The table also shows the region in which the fatal accident occurred.

Year	Fatal accidents Workers & MoPs	Fatal accidents Workers Total	Foreign Workers	EU	Outside EU
2002/03	75	70	2	1 (SE)	1 (NW)
2003/04	75	71	3	1 (EMids)	2 (2xLon)
2004/05	77	69	6	2 (Wales,Lon)	4 (2xSE,2xLon)
2005/06	64	60	5	5 (2xLon,SE,Scot,EMids)	0
2006/07	86	79	8	3 (SE,Lon,NW)	5 (5xSE)
2007/08	75	72	12	5 (L,Scot,NW,E,Wales)	7 (2xL,2xWMids ,2xE,Scot)
2008/09p	57	53	9	6 (2xL,3xScot,E)	3 (2xL,SE)

(c) *Bomel datatool*, which has arisen out of Improving Health and Safety in Construction Phase 2 (see above). The datatool provides a means to undertake graphical analysis of the RIDDOR accident database in order to drill down into the data and underpin the evidence based policy development approach.

(d) *Detailed Factsheet* on Occupational *Ill Health in the Construction Industry* http://www.hse.gov.uk/statistics/industry/factcon.pdf, from which the table (Chart 12) has been taken.

(e) *THOR-GP Health and Occupational Reporting Network for General Practitioners (THOR- GP).* THOR GP is a UK-wide surveillance scheme covering work-related ill health that was initiated in 2005. Participating General Practitioners (GPs) report anonymised information about newly diagnosed cases to a multidisciplinary team at Manchester University. Details are recorded on a central database and the collated information is starting to provide a powerful resource for investigating the increased risks of particular types of ill health in relation to occupations, industries and causal agents or work activities.

The pool of voluntary reporters currently participating in this project consists of around 270 GPs already trained at a postgraduate level in Occupational Medicine by the Centre for Occupational and Environmental Health (COEH) of the University of Manchester. The specific course is offered by distance learning and COEH is one of only a very few sites in the UK that offers this type of specialist GP training. Consequently volunteer GPs reporters practice in areas widely distributed across the UK. The GPs reporters are instructed to make their decisions as to whether a new case should be identified as being attributable to work on the balance of probabilities (i.e. whether it is more likely than not). Reports are collected via web forms each month. When reporting a case the GPs are asked to classify it into a broad disease category and to provide information on age, gender, job, industry, type of exposure, and absence from work.

An audit of the accuracy of the recording of sickness absence within the surveillance scheme revealed that there was a considerable level of underreporting. This was primarily because some reporters tended to forget to arrange for updating of the database on occasions when they signed off patients for further sickness absence over-and-above the initial period of sickness absence.

The scheme only covers a small fraction of the total number of GPs, and there are plans to obtain detailed demographic information about the patient make-up of the participating GPs. To this end, a breakdown is being obtained of the age, gender and postcodes of all the patients in each practice. Once this data has been collated together it will be possible to establish what proportion of the UK population is covered. Estimates will be made to determine how the employment mix of the sample of the population compares to the country as a whole.

Appendix: Fatal accident summaries

SUMMARIES OF FATAL ACCIDENTS FOR 1997/98-2008/09p

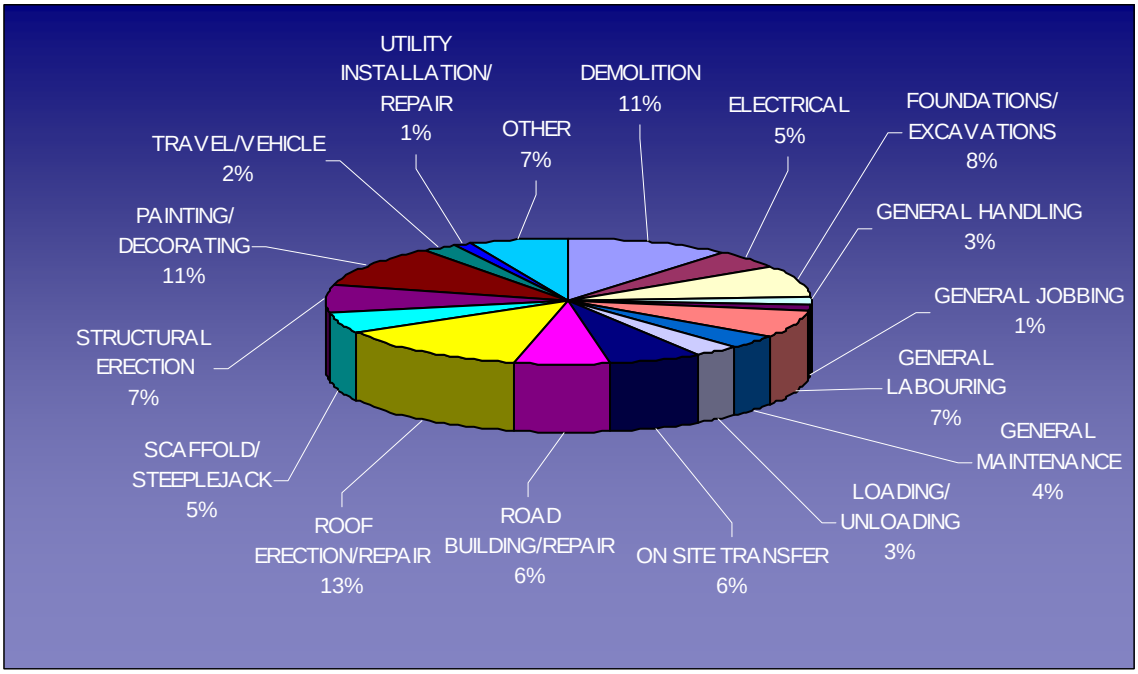
The construction fatal accident narratives, which are summaries describing the circumstances in which the accidents occurred, are accompanied by charts showing various factors relevant to the accidents. They have been produced to update earlier work including a study (Blackspot Construction) which covered a five year period during the years 1981 to 1985 during which time 739 people were killed by the construction industry.

This account of fatal accidents in construction **covers a twelve year period, April 1997 to March 2009,** when some 948 fatalities occurred, as a result of 912 incidents. In most cases reference is made to the current Health and Safety Executive publication giving relevant guidance on the precautions which are available. In many instances this guidance has been updated to take account of current developments in both technology and legislation.

In some instances the analysis/charts are based on information from Construction Sector's Fatal accident database and these cover shorter periods from 1999/00. In most cases, the time periods covered by the individual charts are clearly shown in the headings, together with the source of the data, **where this has not been taken directly from the fatal accidents summaries.** Much relevant guidance on the necessary precautions is available in Health and Safety Booklet HS(G)150, Health and Safety in Construction.

For convenience the accidents are broken down into the various categories, (falls, transport, electrical, etc.) and are then sub-divided to give an accurate picture of the circumstances and the issues involved.

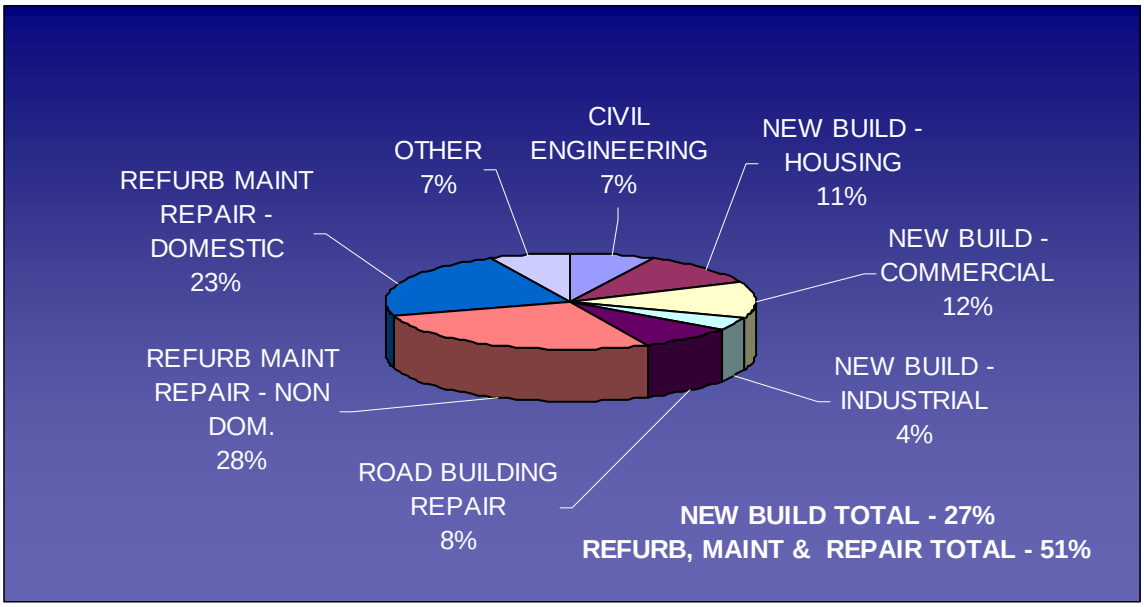
Fatal accidents by Work Activity – Chart 13



Source: Construction Sector Fatal Database

On-site transfer is a key factor in fatal accidents, which becomes even more significant when taken together with major and over 3-day accidents. In fact, research shows that this is the largest single factor in accident causation as it includes manual handling which makes up one third of all construction accidents.

Fatal accidents by Project Type – Chart 14



Source: Construction Sector Fatals Database

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).

Fatal accidents by Site Activity – Chart 15

Site Activity	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Refurb/Rep/Maint-non domestic	23 (28%)	31 (29%)	26 (33%)	21 (30%)	21 (30%)	14 (20%)	12 (20%)	17 (22%)	21 (29%)	14 (26%)
Refurb/Repair/Maint-domestic	23 (28%)	12 (11%)	19 (24%)	13 (19%)	18 (25%)	17 (25%)	12 (20%)	23 (29%)	17 (23%)	14 (26%)
Refurb/Repair/Maint-total	**46 (56%)**	**43 (40%)**	**45 (57%)**	**34 (49%)**	**39 (55%)**	**31 (45%)**	**24 (40%)**	**40 (51%)**	**38 (52%)**	**28 (52%)**
New build-commercial	13 (16%)	18 (17%)	5 (6%)	10 (14%)	9 (13%)	8 (12%)	7 (12%)	7 (9%)	7 (10%)	5 (10%)
New build-housing	6 (7%)	14 (13%)	2 (3%)	5 (7%)	6 (8%)	10 (15%)	7 (12%)	15 (19%)	12 (17%)	5 (10%)
New build-industrial	2 (3%)	5 (5%)	5 (6%)	0	5 (7%)	5 (7%)	2 (3%)	3 (4%)	2 (3%)	1 (2%)
New build-total	**21 (26%)**	**37 (35%)**	**12 (15%)**	**15 (21%)**	**20 (28%)**	**23 (34%)**	**16 (27%)**	**25 (32%)**	**21 (30%)**	**11 (22%)**
Roadworks	4 (5%)	8 (8%)	13(16%)	6 (9%)	7 (10%)	5 (7%)	8 (13%)	5 (6%)	2 (3%)	3 (6%)
Civil Engineering	8 (10%)	8 (8%)	5 (6%)	8 (11%)	3 (4%)	3 (4%)	6 (10%)	2 (2%)	5 (7%)	7 (13%)
Other/demolition	2 (3%)	9 (9%)	5 (6%)	7 (10%)	2 (3%)	7 (10%)	6 (10%)	7 (9%)	6 (8%)	4 (7%)
Total worker fatalities	**81**	**105**	**80**	**70**	**71**	**69**	**60**	**79**	**72**	**53**

Fatal Database analysis by site activity

The following conclusions may be drawn from the above table:

a) The reduction in the number of fatal accidents following the summit (in Feb 2001) occurred largely because of a substantial reduction in the number of fatal accidents occurring in new build work, (37 in 2000/01 down to 12 in 2001/02). This improvement has not been maintained, as increases have been seen in the last few years (15 fatalities in 2002/03, 20 in 2003/04, 23 in 2004/05, & 25 in 2006/07p).

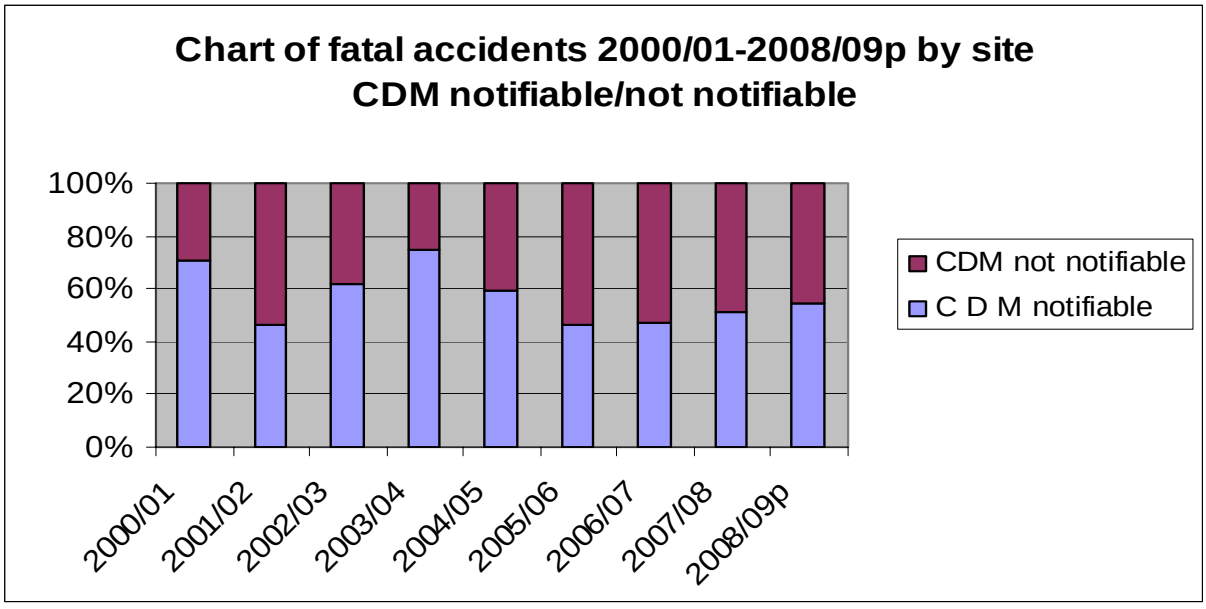
b) The change in refurbishment/repair has been far less marked, with no improvement at all in the first year (43 in 2000/01 and 45 in 2001/02). Since then however, some improvement has occurred, which has tended to offset the recent increases in the new build sector (34 refurbishment fatalities in 2002/03, 39 in 2003/04, 31 in 2004/05 & 24 in 2005/06).

c) Other points to note include the large increase in roadworks fatal accidents in 2001/02, which was against the general downward trend in numbers of fatal accidents that year. They appear to have returned to a more typical level over the last few years (6 in 2002/03, 7 in 2003/04 and 5 in 2004/05 etc).

d) The increase in fatal accidents that occurred in 2006/07p is more than accounted for by the increases in refurbishment/repair domestic (12 to 23) and new build housing (7 to 15) alone. This coincides with large increases in output **(see Chart 2)** of the housing sector (both new build and refurbishment/repair) that have occurred in recent years. In 2007/08p fatalities declined somewhat (23 to 17) & (15 to 12).

The fatal accidents database also gives a breakdown of fatal accidents against CDM notification of project, public/private sector, and size of employer/site (see following 4 charts, all taken from **Fatal Database analysis**):

Fatal accidents by CDM Notification – Chart 16



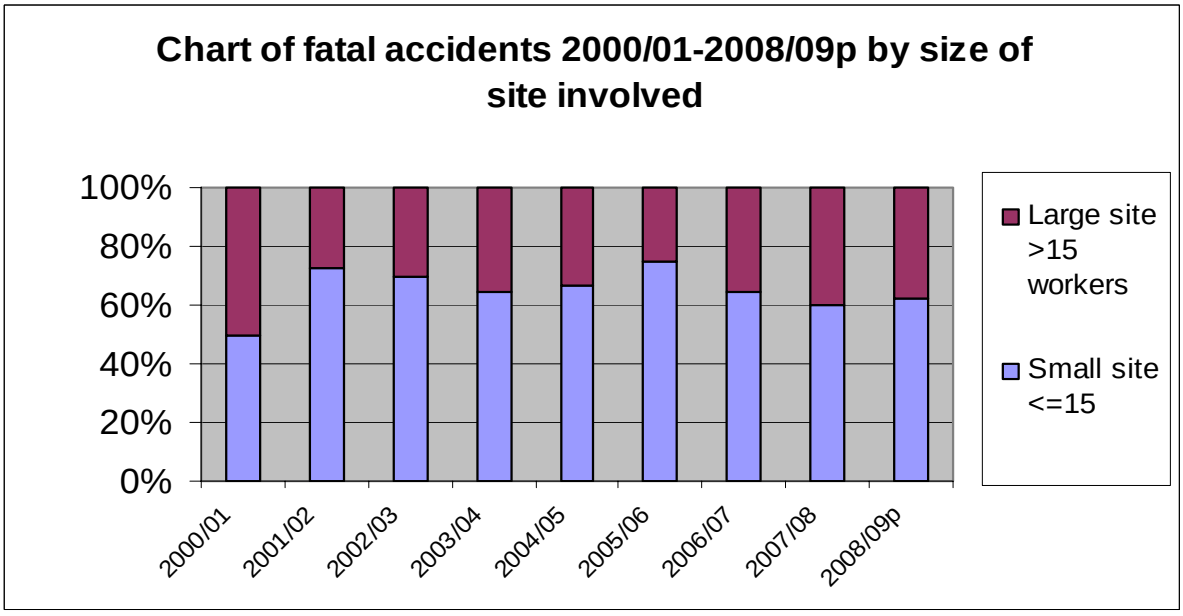
The CDM notification of the site where the fatal accident occurred follows the trend shown in the site activity table. Given the correlation between size of site/employer and type of site activity where smaller sites/employers tend to work in refurbishment/ repair, then it follows that the CDM notification will reflect the trend set by new build activity, assuming that larger sites are more likely to be notifiable under CDM. So there was a significant decline in CDM notifiability between 2000/01 and 2001/02 (down from 71% to 47%). Since then there has generally been an increase (61% in 2002/03, 75% in 2003/04 and 60% in 2004/05) which is consistent with an increase in fatal accidents on new build sites/decrease in refurbishment/repair.

Fatal accidents by Employer Size – Chart 17

For the purposes of these tables, a large contractor is defined as one with more than 15 workers.

This chart giving the size of the firm that employed the deceased shows little change between 2000/01 and 2001/02. Since then there has been some increase in the proportion of large contractors involved, which reflects the increase in fatal accidents in new build and decrease in refurbishment/repair.

Fatal accidents by Site Size – Chart 18



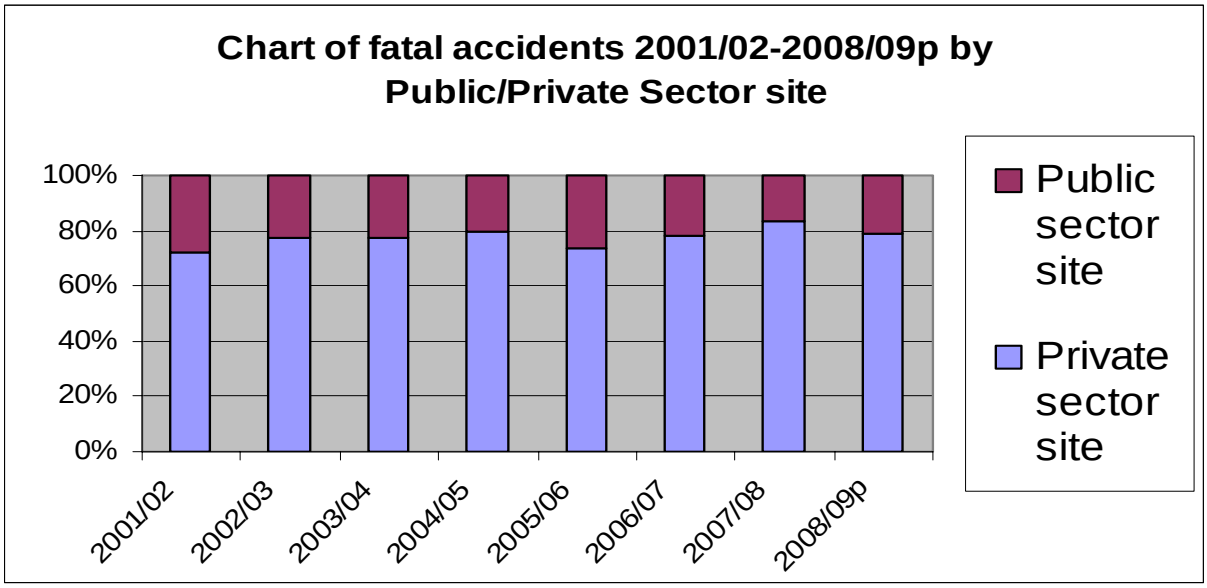
For the purposes of these tables, a large site is defined as one with more than 15 workers.

This chart shows the size of the site on which the fatal accident occurred and follows the trend shown in the site activity table. There is a large increase in the proportion of fatal accidents on small sites between 2000/01 and 2001/02 (from 49% to 72%),

which is consistent with the higher proportion of fatal accidents in refurbishment/repair. Since then the proportion on small sites has fallen, which is in line with the site activity trend.

Overall the figures show a larger proportion of small sites/small firms in refurbishment/repair activities and conversely a larger proportion of large sites/large firms in new build activities.

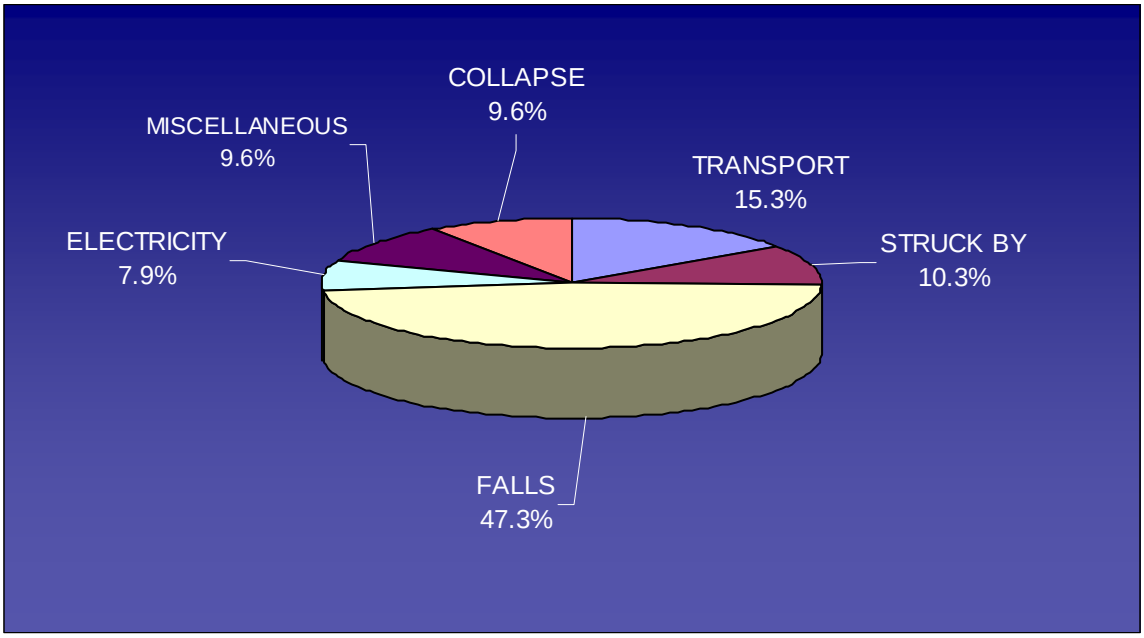
Fatal accidents by Public/Private Sector – Chart 19



2000/2001 figures not available

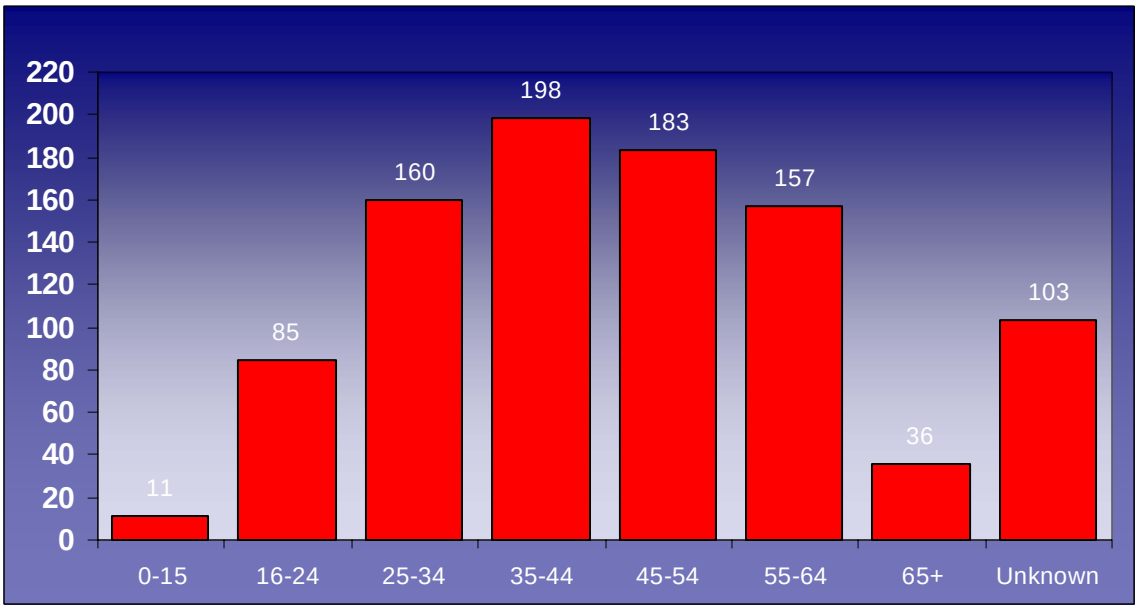
The chart shows the public sector/private sector split for sites where a fatal accident has occurred. Given that the proportion of construction work in the public sector is generally taken as around 30% then the current figure of around 20% for fatal accidents suggests that there is some difference in performance between the public/private sectors. This finding is also supported by research by Bomel (see para 20 (c)).

Fatal accidents by Kind of Accident – Chart 20



Traditionally falls make up around 50% of fatal injuries in construction almost every year. 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 2007/08p. Transport accidents almost invariably take 2nd place, but struck by, electrical and collapse fatalities, where the numbers involved are smaller, can vary markedly year on year.

Fatal accidents by Age – Chart 21 **Total = 933**

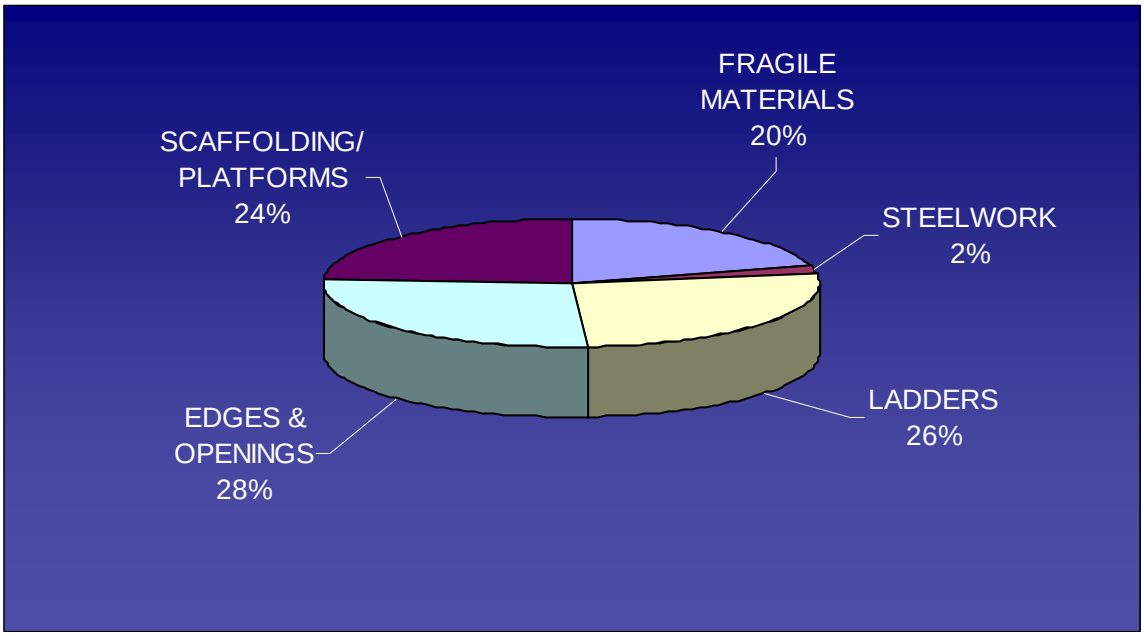


Care needs to be taken in interpreting this chart because it does not indicate injury rate. In fact, the highest fatal rates are amongst the 16-24 and over 65 age ranges, the former possibly due to inexperience and the latter to physical fragility. The mean rate for 16-34 year old men is 3.9, for 35-54 the rate is 3.8, and for 55+ the rate is 6.7 per 100,000 in 2002/3.

FALLS

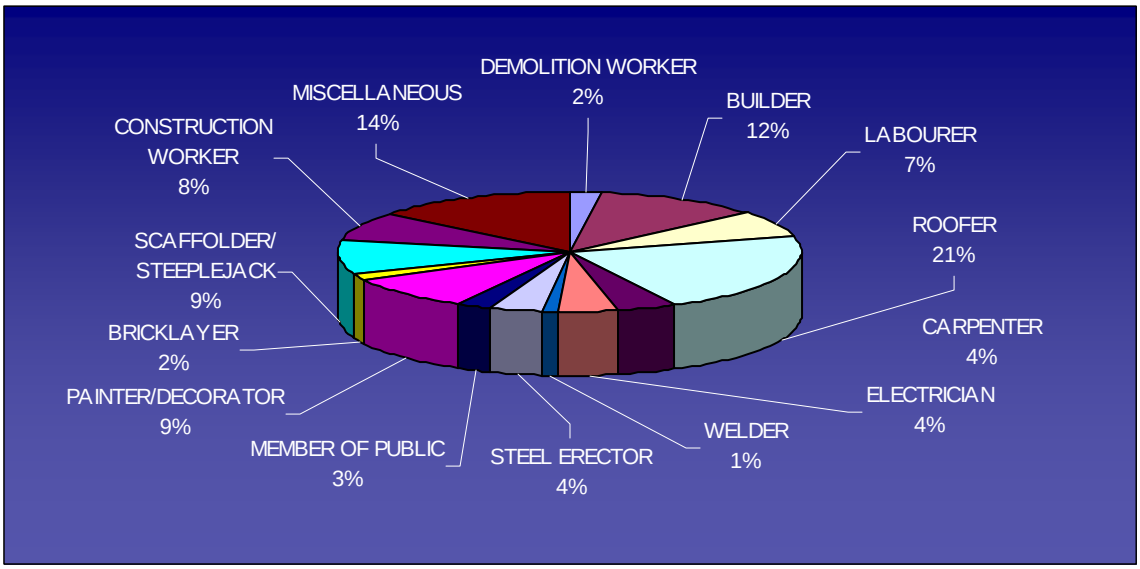
Falls from a height are by far the most common cause of fatal injuries in the Construction industry. They can be sub-divided into various categories as follows; falls through fragile materials, falls from steelwork, falls from ladders, falls from edges/ openings, and falls from scaffolding/platforms. There are numerous examples of each of these categories given below. Detailed guidance on a number of relevant issues and related precautions is contained in Health and Safety Booklet HS(G)33, Health and Safety in Roofwork.

Fatal accidents by Total Falls – Chart 22



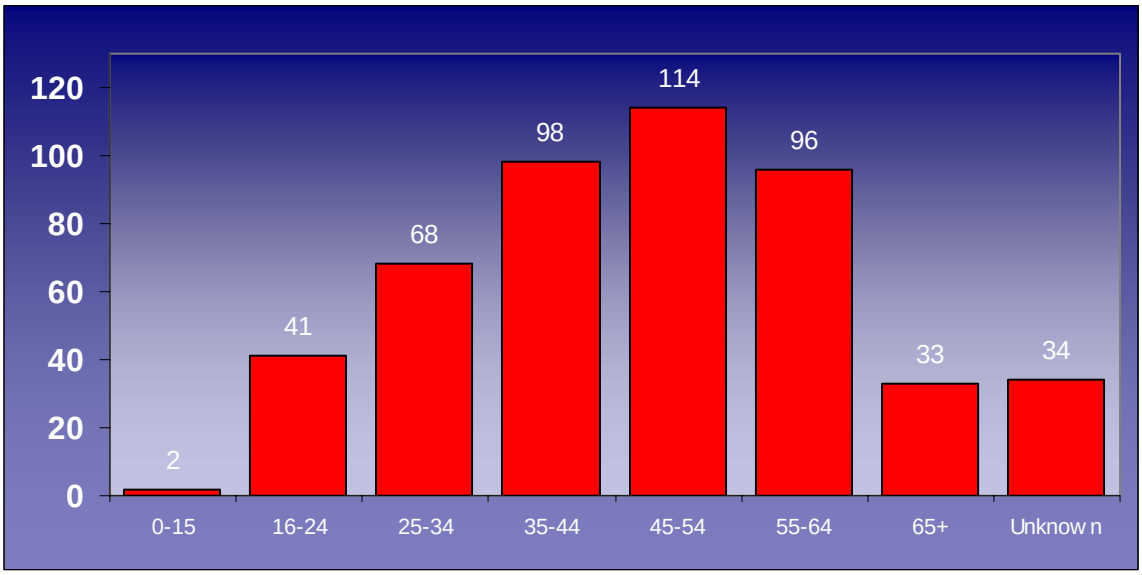
Steel erectors and scaffolders have some of the highest fatal accident rates in construction. Fatal accidents to steel erectors have reduced considerably over the years, most probably due to the use of MEWPs. In the two year periods 2001/02 & 2002/03 and 2005/06 & 2006/07 there were no fatal accidents 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.

Fatal accidents by Falls/Occupation – Chart 23



Although the rather general categories of "Builder", "Construction Worker", "Labourer" and "Miscellaneous" take up a fairly sizeable portion of this chart, roofers clearly stand out as the largest occupational group, at over 20%.
Other significant groups include, scaffolders/steeplejacks and painters/decorators. In fact, roofers have the highest fatal accident numbers from any cause in construction, though carpenters/joiners have the highest non-fatal numbers.

Fatal accidents by Fall/Age – Chart 24 **Total = 486**



Once again, it is important to appreciate that this chart does not indicate injury rates. In this case, the chart shows proportionately fewer fatal fall accidents amongst younger age groups (25-44), but proportionately higher numbers in the 16-24 and over 45 age ranges, compared to the earlier chart showing fatal accidents from all causes.

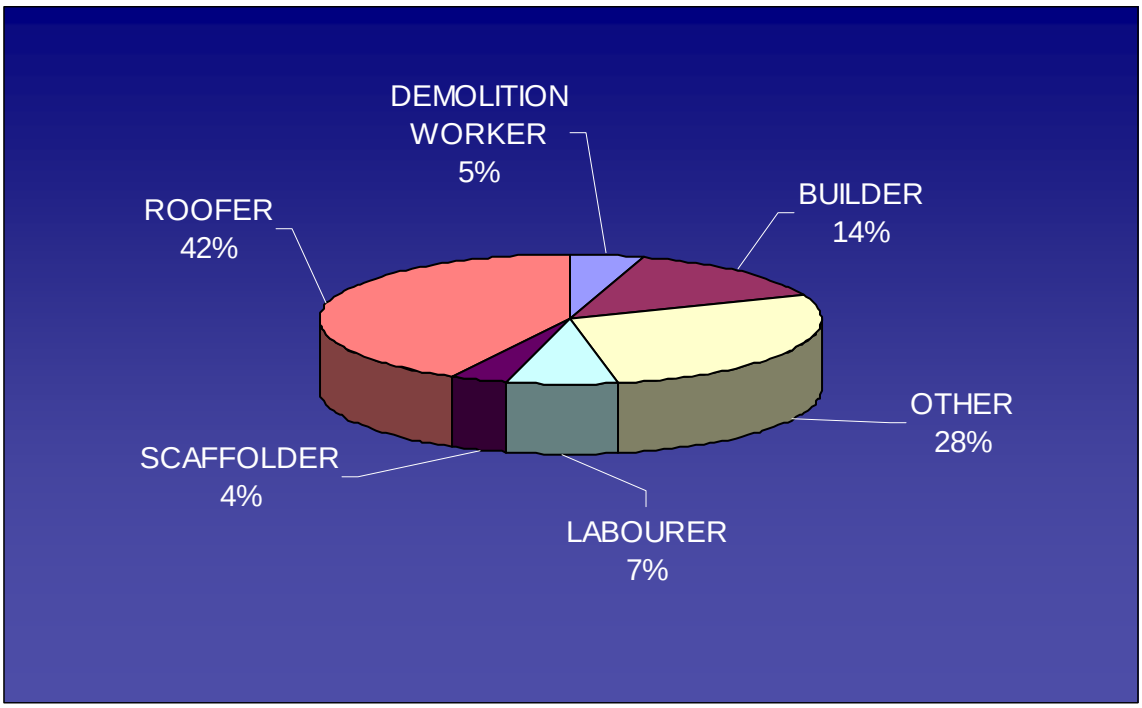
Disregarding the 0-15 range and the unknown category, the percentage of fatal accidents from falls in each age range are: (cf. 47.3% average figure)

16-24: 58%
25-34: 42%
35-44: 46%
45-54: 58%
55-64: 55%
65+: 86%

The excess in fatal falls in the 16-24 range can be explained by lack of experience/caution amongst younger workers, whilst the excess in the older groups, (most notably the 65+ range at 86%) can be explained by physical fragility with increasing age.

Fragile Materials:

Fatal accidents by Fall/Fragile Materials/Occupation – Chart 25



Roofers have the highest fatal accident numbers from any cause in construction, though carpenters and joiners have the highest non-fatal numbers.

Summaries – Fatal Falls through Fragile Materials

Ventilation contractor fell through a roof light whilst inspecting ductwork installation work which had been completed at roof level to industrial premises.

Roofer fell through a fragile roof sheet whilst carrying out re-roofing work to a fire damaged agricultural building.

Roofer fell through fragile roof sheet whilst replacing cement based sheeting with metal sheeting. The project involved refurbishment of industrial units.

Contractor fell through fragile roof sheet whilst removing ductwork insulation and bagged up debris from the roof and valley gutters of a warehouse.

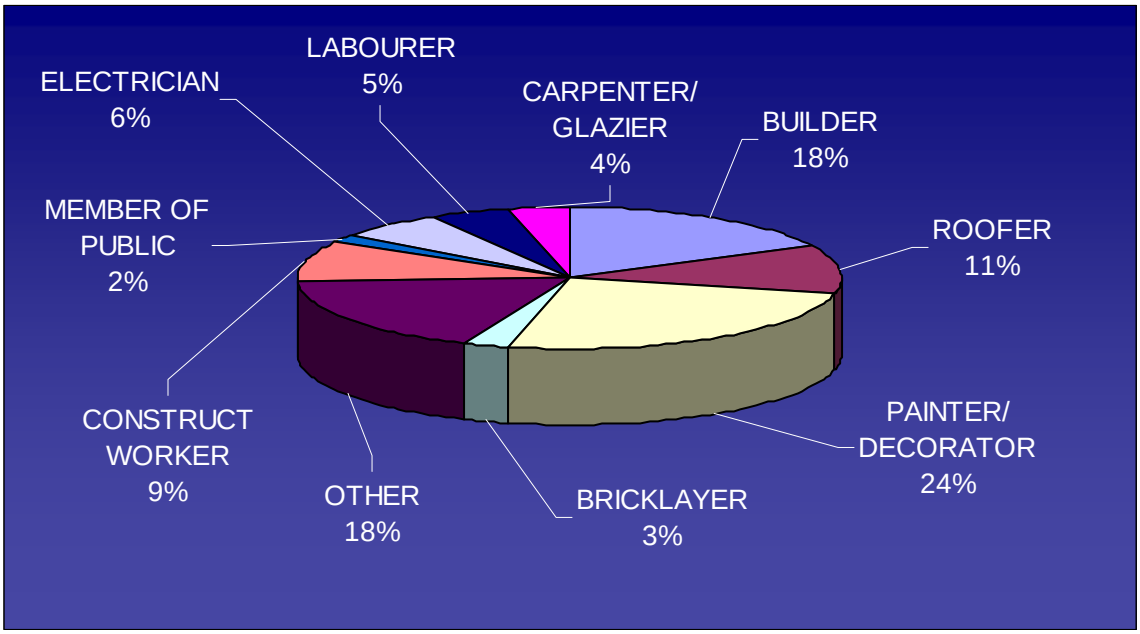
Scaffolder fell through a roof light whilst erecting scaffolding at the chemical store of a Creamery as part of the preparations for some roof work.

Summaries - Fatal Falls during Steel Erection

Steel erector aged 45 was killed when he fell from steelwork for new kiln. He was wearing harness but was not attached, construction of new kiln at cement works.

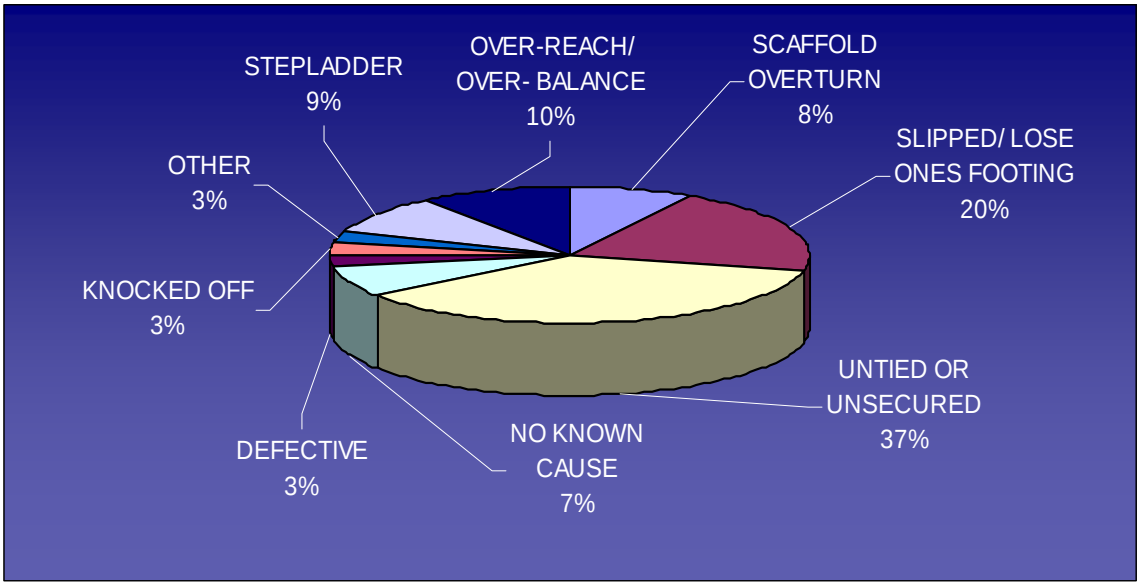
Ladders:

Fatal accidents by Falls/Ladders/Occupation – Chart 26



Whilst painters and decorators have moderately high accident numbers overall, they have a disproportionately high share (around a quarter) of the fatal fall category involving ladders!

Fatal accidents by Falls/Ladders/Reasons – Chart 27



This information was not available in earlier versions of "Blackspot Construction". It clearly shows the importance of tying securely as more than a third of fatal falls from ladders were attributed to lack of tying/securing.

Summaries – Fatal Falls from Ladders

Self employed contractor fell a short distance when his ladder, which had been placed on a canvas sheet, slipped. Project involved one off house new build.

Painter/decorator fell from a ladder whilst painting the exterior of a house. He broke his left wrist and right ankle and died later in hospital.

Building contractor fell from a ladder (adjacent to tower scaffold) which slipped whilst he was replacing fascia boards at domestic premises.

Self employed contractor fell from a ladder which he had placed against the wall of a house leading to another ladder onto the roof. Aerial installation at domestic premises.

Building contractor fell from a ladder which slipped outwards from the top of a makeshift scaffold platform. Project involved replacement of soffits to domestic premises.

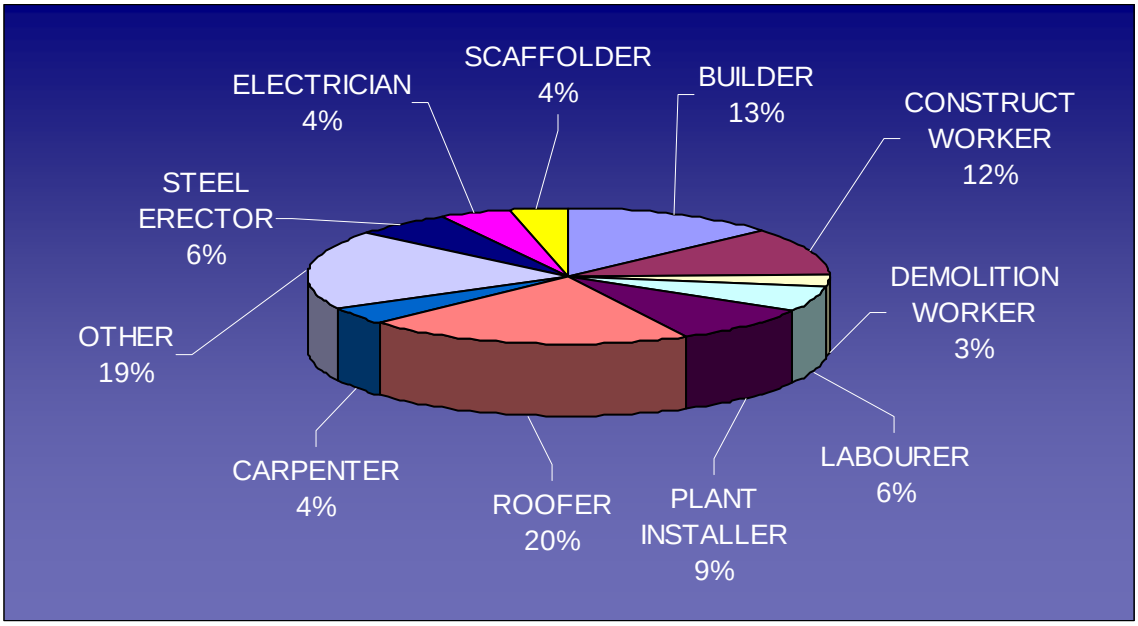
Building contractor fell from a fixed ladder whilst descending from a scaffold carrying a tool case. Project involved loft conversion at domestic premises.

Painter/decorator likely to have fallen from a ladder at front of domestic premises he was painting. There were no witnesses to the circumstances of the accident.

Migrant heating/ventilation contractor fell with a ladder which became unbalanced as he climbed down it carrying a pump. Project involved refurbishment of a block of flats.

Edges and Openings:

Fatal accidents by Falls/Edges and Opening/Occupation – Chart 28



Roofers have the highest number of fatal falls in this category.
Steel erectors make up a significant percentage of fatal falls in this category, which is distinct from fatal falls from steelwork.

Summaries – Fatal Falls from Edges and Openings

Roofer fell through the ridge cap opening during ridge cap replacement work to a fragile, cement based roof sheeted barn. Telehandler used for roof access.

Electrical fitter fell from the roof edge whilst carrying out installation work.at roof level. Installation of telecommunications equipment at a block of flats.

Thatcher fell from roof edge whilst carrying out roof thatching work with a colleague. Project involved roof thatching of a property on a farm.

Migrant construction worker fell from the open edge of a smoke extraction shaft to the level below. Project involved new build domestic flats.

Roofer fell from a steel roofing beam he had obtained access to using a ladder. Project involved maintenance work on commercial premises believed to be a garage.

Member of public fell a short distance to the basement of a property being converted to flats. He had wandered around the back as he returned home late at night.

Bricklayer fell into one of the access shafts of a large underground tank which was under construction. He was collecting bricks for the upstands at the shaft openings.

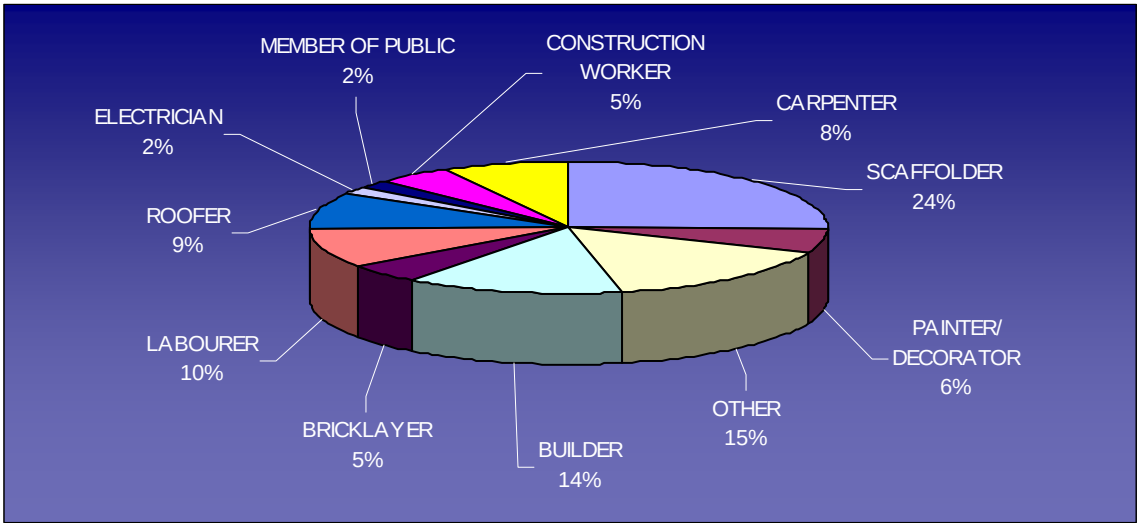
Self employed roofer fell from the edge of a pitched roof during the installation of a loft window at domestic premise. A section of aluminium ladder was recovered.

Construction worker fell into the empty tank whilst installing a gantry as part of the refurbishment of an activated sludge process tank.

Retired plumber fell through the lathes to the roof of an existing bungalow where the slates had already been stripped. A contractor was also working on the roof.

Scaffolds/Work Platforms:

Fatal accidents by Falls/Scaffold/Occupation – Chart 29



The majority of fatal fall accidents in this category do not involve scaffolders, but other trades who are using the scaffold or work platform.
However, scaffolders do make up the largest occupational group at around a quarter.

Summaries – Fatal Falls from Scaffolds and Work Platforms

Carpenter fell from the platform of a scissor lift as it overturned. Project involved the construction of a new warehouse on an estate.

Migrant construction worker fell from the top of a passenger hoist cage which was used during striking of scaffolding. Project involved refurbishment a domestic block.

Young construction worker fell through an opening in a birdcage scaffold platform. Project involved the exterior refurbishment of a building.

Scaffolder fell through a section of corroded grating as he was erecting scaffolding alongside. Project involved the refurbishment of a drilling rig.

Roofer fell as he leaned over the guard-rail of a scaffold platform. Project involved the re-roofing of a two-storey house.

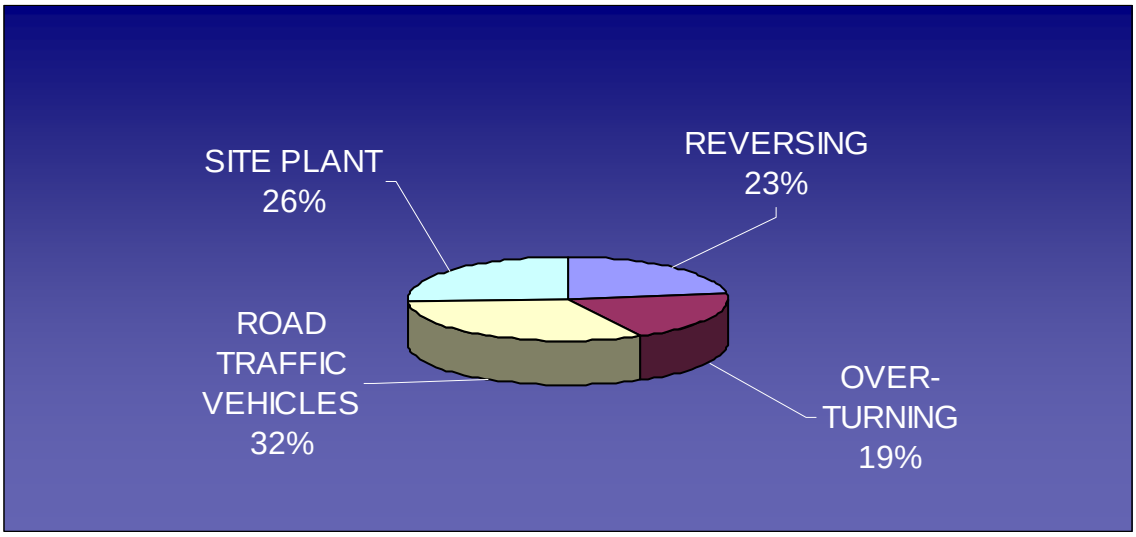
Scaffolder fell from scaffolding while he was attempting to move a cable. Project involved the refurbishment of commercial premise.

TRANSPORT

Transport accidents in construction are still one of the most significant causes of fatal injuries in the sector. A number of operations give rise to particular concerns and these include; reversing, overturning of vehicles (particularly common where sloping ground is involved), the proximity of motor vehicles (e.g. work on roads/motorways) and the proximity of site plant.

This pattern is, unfortunately, well established, and comprehensive guidance is available in Health and Safety Booklet HS(G)144, The Safe use of Vehicles on Construction Sites.

Fatal accidents Transport Total – Chart 30



Traffic Management was involved in 39 out of the 151 Transport fatal accidents – making the Traffic Management overall percentage 26%.
The Traffic Management fatal accidents consisted of 3 fatalities as a result of Site Plant, 7 fatalities as a result of vehicles reversing and 29 Road Transport Vehicle fatal accidents. This represents 8% of Site Plant fatal accidents, 20% of Reversing fatal accidents and 60% of Road Transport Vehicle fatal accidents.
No Traffic Management issues were involved in the Overturning fatal accidents.

Summaries - Transport Fatal accidents involving Reversing

Surveyor was struck by a reversing tipping lorry which was approx 350m along from the access point. The project involved motorway widening work.

Plasterer was struck by a reversing telescopic handler which mounted the pavement. The project involved refurbishment of local authority domestic properties.

Summaries – Transport Fatal accidents involving Overturning

Driver was crushed when a telescopic materials handler overturned as it was reversing down a slope. The small project involved new build housing.

Driver was crushed when a dumper overturned whilst he was attempting to tip a load of clay to form a bund. The project involved remedial work at a landfill site.

Summaries – Transport Fatal accidents involving Road Traffic Vehicles

Three traffic management workers were collecting cones from the central reservation. This involved crossing three live lanes of traffic in the dark, no precautions taken. Worker was hit by car travelling at high speed at a bend in the road.

Motorcyclist collided with a stationary crash cushion vehicle in lane 3 of a dual carriageway. Road maintenance team were removing a warning sign.

Car driver was killed when he drove into a road closure area and hit a planing machine at speed. Project involved overnight road closure for resurfacing.

Summaries – Transport Fatal accidents involving Site Plant

Groundworker was struck by a dump truck which had lost control/veered towards him and trapped him against a wall. Project involved construction school building.

Construction worker was crushed when an excavator rolled as he removed strop used to connect/tow excavator with a dumper. Project involved road resurfacing.

Plant hire maintenance fitter was crushed by mobile crushing plant unit. The tracks moved unexpectedly as he crawled beneath the unit with the engine running.

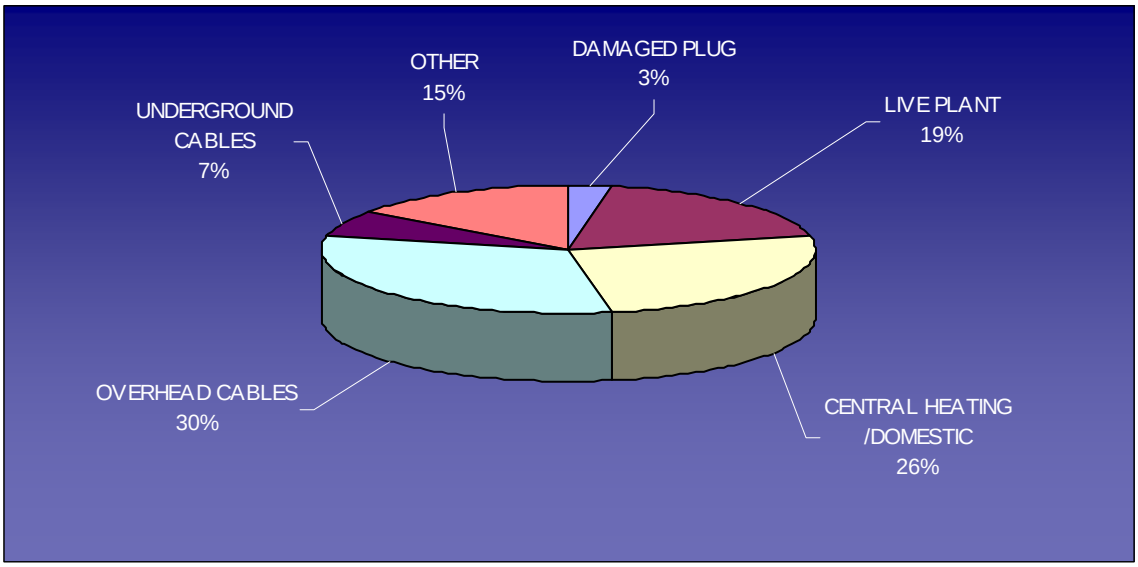
ELECTRICITY

Fatal accidents by Total Electricity – Chart 31

Electrical Fatal accidents – Summaries

Construction fatal accidents caused by electricity can be put into a number of categories, most of which are long established. Underground cable strikes remain a risk, although not at the same level as in earlier times. Despite the updated safety requirements under the Electricity at Work Regulations, working on exposed live conductors remains a significant hazard and examples resulting in fatal injuries are featured below. The other fatal accidents occurred mainly as a result of contact with overhead power lines. Guidance is given in Health and Safety Booklet HS(G)141, Electrical Safety on Construction Sites.

Fatal accidents by Total Electricity – Chart 31



Whilst, historically, contact with live underground cables has resulted in large numbers of fatalities, overhead cables now pose a far greater risk. Contact with overhead cables accounted for around a third of fatalities, whilst underground cables accounted for less than 10%. Refurbishment/maintenance of domestic premises now accounts for around 25% of fatalities.

Summaries – Electrical Fatal accidents
Overhead Lines

Two painters were electrocuted whilst carrying out external painting. They placed a two stage aluminium ladder into an adjoining field and it struck an overhead line.

Whilst working on a farm building the DP was carrying an aluminium ladder and this came into contact with an overhead power line causing electrocution.

Underground Cables

Migrant groundworker was killed when a high voltage underground cable exploded as he trimmed a pile cap with a breaker. Civil engineering infrastructure project.

Domestic/Other

Self-employed general handyman/carpenter was electrocuted when he made contact with a live cable. He was removing sink unit/installing stud wall at domestic premises

Fitter was electrocuted whilst plumbing in washing machine/tumble dryer to domestic apartment. Possible that the socket had been mis-wired causing electric shock.

Self employed contractor was electrocuted whilst repairing/installing the wiring to an immersion heater in the attic at domestic premises.

STRUCK BY/CRUSHED

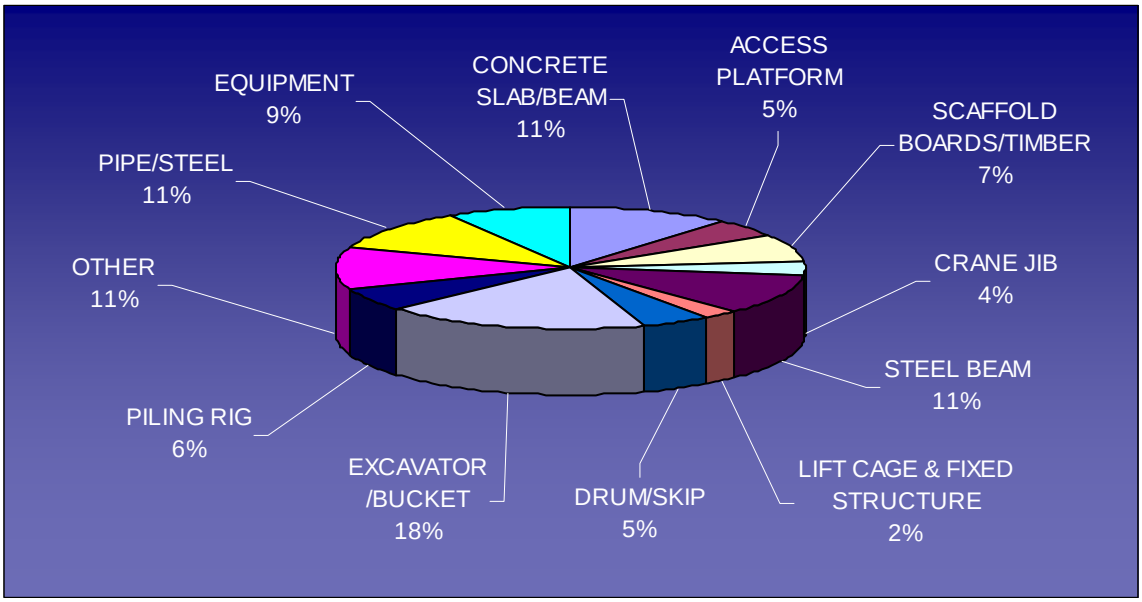
Fatal accidents by Total Struck By – Chart 32

Struck By Fatal accidents involving falls of load/equipment – Summaries

Fatal accidents in which the deceased was struck by/crushed make a significant contribution to the construction fatal accident statistics. They can readily be divided into three categories and these have been identified below. The categories are; fall of loads/equipment etc., unplanned collapse of a structure often as part of demolition/dismantling, and a miscellaneous section which includes falls of earth.

The fall of loads etc. includes work which is subject to the Lifting Operations and Lifting Equipment Regulations 1998, which came into effect on 5 December 1998. The role of adequate planning/risk assessments/method statements etc is of particular importance in avoiding premature collapses during demolition/dismantling work. This work is subject to the Construction (Design and Management) Regulations 2007.
Falls of earth during excavation work etc. have long been a cause of fatal accidents in the construction sector. Detailed guidance is available on some of these issues in Health and Safety Booklet HS(G)185, Health and Safety in Excavations.

Fatal accidents by Total Struck By – Chart 32



Crushing fatalities involving excavators are not infrequent implying that segregation from stationary slewing vehicles is as important as segregation from moving vehicles Other common causes of fatalities are when loads lifted by excavators fall or where excavator buckets become detached/fall, striking the DP. These accounted for 16 fatalities (20%) and are in addition to the cases where the deceased was directly struck by the excavator, 18% of accidents, referred to above.

Summaries – Struck by Fatal accidents involving falls of load/equipment

Migrant site cleaner was struck by a steel beam which fell from a lorry as it was being unloaded by a telescopic handler. Project was commercial new build site.

Lorry driver was struck by load of guardrails that fell from his flatbed lorry being unloaded by a Loadall. Project involved alterations at garden centre premises.

Construction worker was struck when loss of a valve assembly caused explosive release of gas. Project involved new data storage centre fire suppressant system.

Carpenter was struck by the bucket of an excavator which became detached from a quick hitch device and fell. Project involved the extension of a railway system.

Architect was struck by the bucket of an excavator which became partially detached and fell on him. The project involved small scale extension work at a garden centre.

Agency carpenter was crushed when a precast concrete plank fell on him. The project involved the construction of a university building.

Apprentice joiner/builder was struck by a surplus pallet of bricks which fell as it was loaded using lorry mounted grab. Project involved extension at domestic premises.

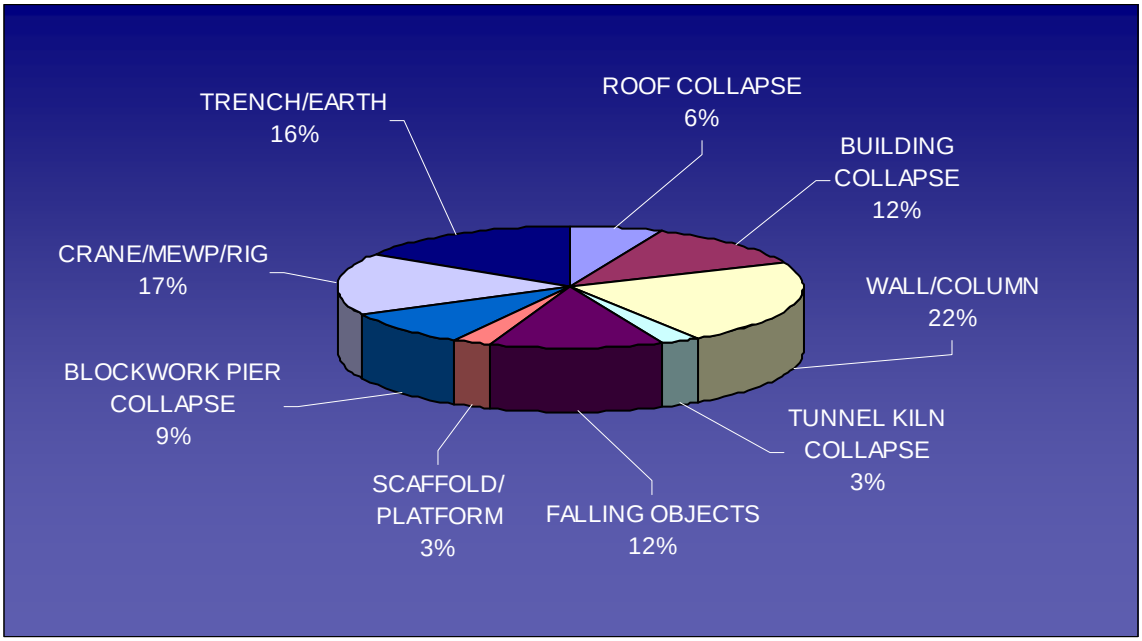
DEMOLITION/COLLAPSE

Fatal accidents by Demolition/Collapse – Chart 33

Struck By Fatal accidents involving Demolition/Collapse – Summaries

Struck By Fatal accidents involving Falls of Earth – Summaries

Fatal accidents by Demolition/Collapse – Chart 33



No particular trends can be identified from this chart.
There are large variations in the number of fatal accidents caused by collapses each year, but the chart gives some indication of how these occur.
Demolition work was involved in 39% of the fatalities and underpinning work in 5%.

Summaries – Struck by Fatal accidents involving Demolition/collapse

Contractor was struck by material from a wall which was being demolished on a small site. The project involved refurbishment of domestic premises.

Construction worker was struck by a steel roofing beam which broke free during the dismantling of a large portal frame building. He was working from a MEWP.

Burner was crushed by a heavy metal counterweight which fell as it was cut free. Project involved dismantling Shovel machine with burning gear for scrap.

Youngster was crushed when recently completed and backfilled blockwork retaining wall collapsed onto her. The project involved domestic renovation and landscaping.

Migrant agency construction worker was impaled on scaffolding when it collapsed as beam fell during lifting & installation work. Project involved extension to hospital.

Summaries – Struck by Fatal accidents involving falls of earth

Groundworker was crushed when an unsupported section of an excavation collapsed. The project involved breakout and relaying of a sewage pipeline.

Surveyor was crushed when an excavation collapsed. He was undertaking site investigation work within a trial pit to determine the suitability of the land for construction.

OTHER FATAL ACCIDENTS

Fatal accidents by Total Miscellaneous – Chart 34

Miscellaneous Fatal accidents involving Struck Against – Summaries

Miscellaneous Fatal accidents involving Machinery – Summaries

Miscellaneous Fatal accidents involving Slips, Trips and Falls – Summaries

Miscellaneous Fatal accidents involving Fire and Explosion – Summaries

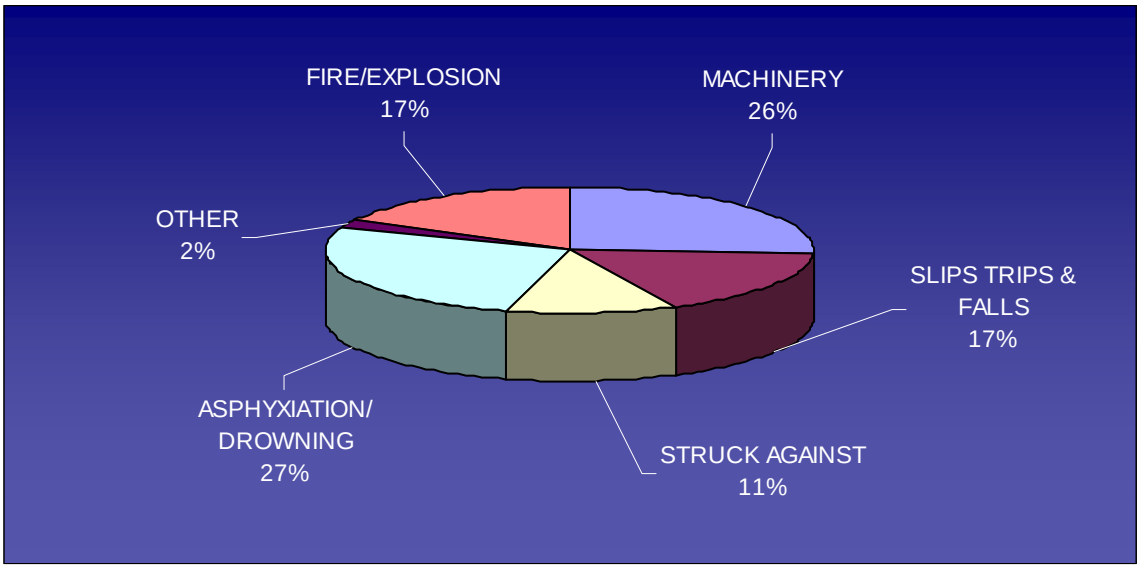
Miscellaneous Fatal accidents involving Asphyxiation/Drowning - Summaries

Fatal accidents by MoPs/Causes – Chart 35

These miscellaneous fatal accidents illustrate a number of lessons about incidents which occur in all too familiar sets of circumstances.

A variety of issues need to be considered including the safeguarding of roadworks (particularly out of working hours), which are covered by the New Roads and Street Works Act 1991, and the associated code of practice. In addition, the established guidance under Chapter 8 of the Traffic Signs Manual published by DETR should still be regarded as a useful source of detailed guidance on these matters. The safety of members of the public who may be affected by construction work is still an important issue, never more so than when children are involved. Guidance on these matters is given in Health and Safety Executive Booklet HS(G) 151, Protecting the public-your next move.

Other Fatal accidents – Chart 34



Fatalities from slips, trips and falls on the same level are relatively rare. However, 25% of non-fatal accidents involve slips and trips. Consequently, these issues deserve their full quota of attention given the large number of less serious injuries which occur. Guidance is available in Health and Safety Booklet HS(G) 155, Slips and trips: Guidance for employers on identifying hazards and controlling risks.

Summaries –Fatal accidents involving Struck Against

Migrant worker and others were adjusting the position of a beam to fit bolts, beam swivelled struck him. Project was high rise mixed commercial & residential tower.

Summaries – Fatal accidents involving Machinery

Migrant rigger was crushed between the control panel of a MEWP and a fixed roof beam. Project involved a large commercial new build development.

Migrant agency driver was crushed by the boom of telescopic handler as he leaned out of the cab (the window was missing). Construction of large hydro-electric dam.

Summaries – Fatal accidents involving Slips, Trips And Falls

Elderly householder tripped on exposed gripper rod in the hallway of own home. The work undertaken involved putting studwork in for a new wall & doorway.

Summaries –Fatal accidents involving Fire/Explosion

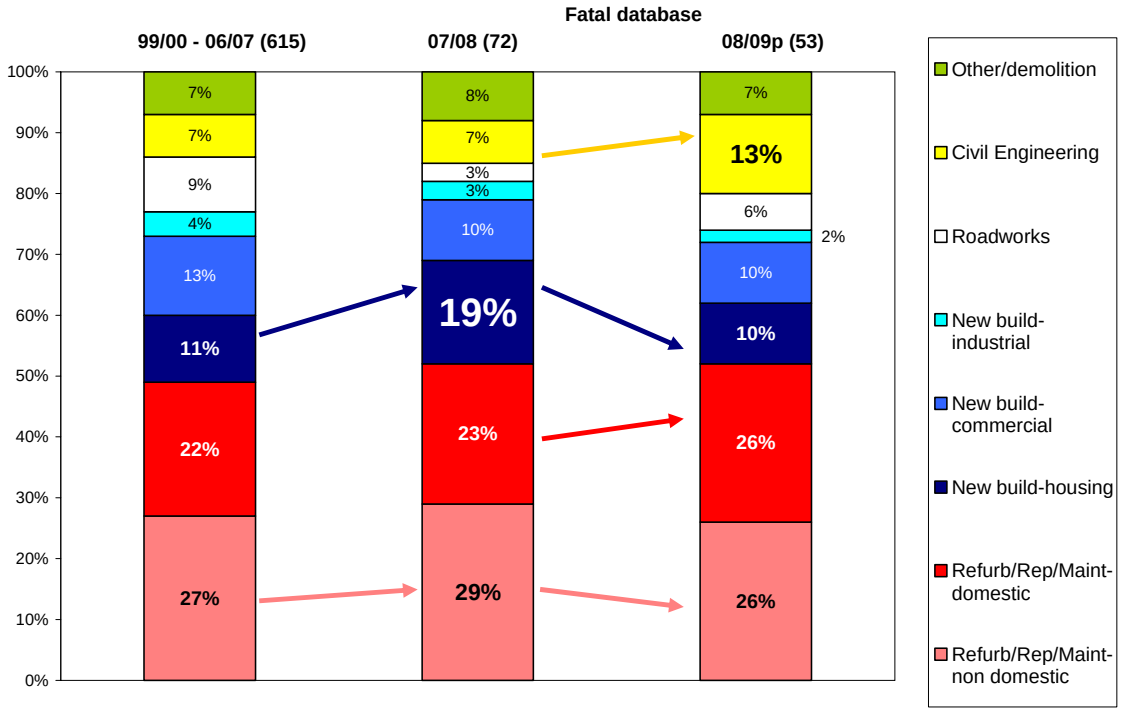
Carpenter/joiner was struck when canister of expanding foam exploded. Canister warmed using heater because of cold, during new build of domestic property.

Summaries – Miscellaneous Fatal accidents involving Asphyxiation/Drowning

Migrant security guard was overcome by fumes in site cabin with a built-in diesel generator for power. Project involved roadside excavation for jointing electric cables.

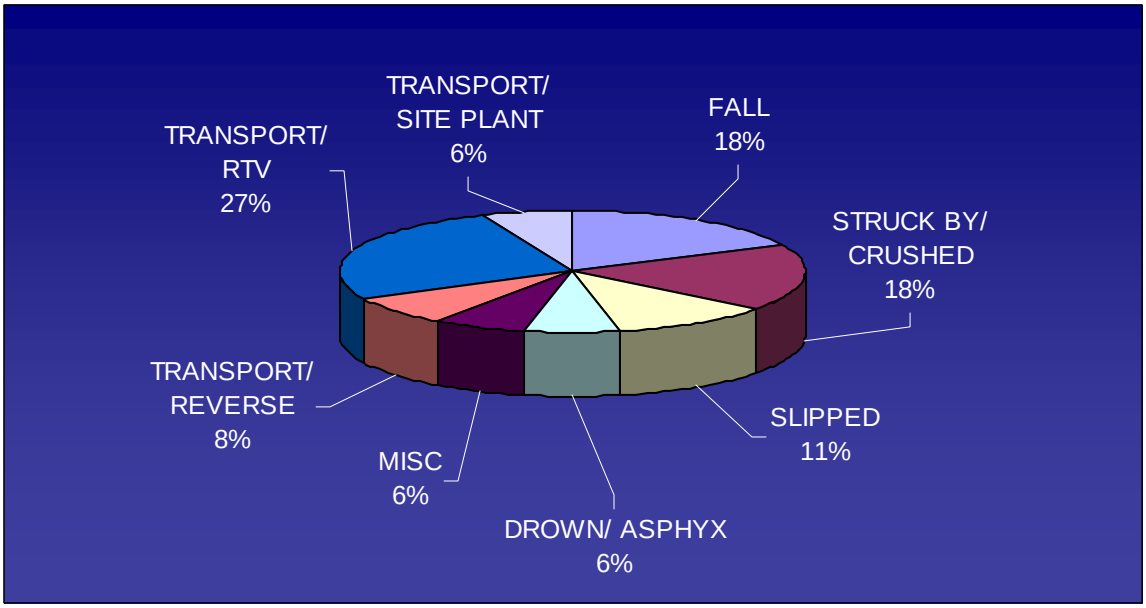
Dumper driver drowned when he drove over the edge of an earth bank into a dis-used flooded quarry. Project involved earthworks for fishery and bird sanctuary.

Where Fatal accidents occurred 2008/09p – Chart 35



FATAL ACCIDENTS TO MEMBERS OF THE PUBLIC[2]

Causes of Fatal accidents to Members of the public – Chart 36



62 fatalities to members of public caused by construction activities recorded, 10 of which (16%) were children. Most common vehicle/transport accidents, total 25 (41%)

[2] Details of these fatal accidents are included under previous headings