
# An examination of dutyholder responsibilities: Fatal construction accidents 1997-2002

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December 2003

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This research is funded by the Health and Safety Authority. Its contents, including any conclusions or recommendations, are those of the author alone and do not necessarily reflect HSA policy.

## Executive Summary

The purpose of this report is to assess the performance of dutyholder responsibilities in relation to fatal incidents in the period 1997-2002.

The study questionnaire lists dutyholder responsibilities as they are outlined in the Safety, Health and Welfare at Work (Construction) Regulations, 1995. HSA inspectors were asked to indicate if a failure to fulfil any of these requirements made a 'possible' or 'definite' contribution to the fatal accident they investigated.

Inspectors attribute almost 50% of all failures to contractors, 32% to the PSCS, 14% to the client, while only 4% and 3% of failures are allocated to the PSDS and designer respectively.

However, evidence from other sources contradicts the outcome. Studies by the HSA and the HSE reveal that a significant proportion of clients, designers and project supervisors are failing to meet their statutory obligations.

The attribution pattern raises two further issues. Firstly, the results mirror the structure of the Regulations. Contractor and PSCS duties are many and detailed compared to those described for other dutyholders. Hence, the difficulty of identifying failures on the part of the client, PSDS and designer. It is recommended that the Regulations should describe the requirements for all dutyholders at the same level of detail.

Secondly, the pattern indicates a lack of depth in accident analyses. Placing responsibilities with dutyholders upstream of the construction site was a major innovation of the 1995 Regulations – however this development is not reflected in the attribution of responsibility by inspectors. It is recommended that further training should locate accident analysis within the framework of dutyholder responsibilities as set out in the Regulations. Specifically, a standardised methodology to facilitate the identification of root causes is required.

Analyses of the accident-related data e.g. location, site-size, reveal the necessity for a more differentiated approach to fatal incidents. The Regulations, guidelines and HSA publications are generally premised on large-scale, commercial construction activity. It is recommended that guidance should be adapted for small-scale construction tasks.

# 1. INTRODUCTION

## 1.1 Study Objectives

This study follows from the research report *'Fatalities in the Irish construction industry: A survey of contributory factors'* prepared for the Construction Advisory Committee in November 2002 (HSA, 2002). The report examined contributory factors at Headquarter, Site Management and Injured Party levels. The statistical analyses in the report, and in previous reports in Ireland and the UK, found that the contributory factors in construction fatalities were Site Management factors, Headquarter factors (upstream of the site) and Injured Party factors in the ratio 2:1:1 respectively. However, on the basis of separate theoretical studies e.g. Reason's theory of accident causation, the report concluded that measures to improve the performance of HQ dutyholders (including clients, designers, project supervisors) could have significant beneficial effects on performance at site and injured party levels.

Discussion arising from the previous report focused on HQ or Upstream factors. There was concern that the category was too broad, incorporating the activities of client, designer, Project Supervisor for the Design Stage (PSDS) and Project Supervisor for the Construction Stage (PSCS). Committee members requested further detailed analysis of the role of each of these parties.

The primary objectives of this study are exploratory:

- To assess the implementation of **dutyholder responsibilities**, as reported by HSA inspectors in the context of fatal incidents investigated since 1997.

- To gather information on **enforcement action** taken by the HSA in relation to fatal incidents.

- To develop an understanding of the **types and features of fatal accidents** by analysing accident data for the period 1997-2002.

## 1.2 Study Context: Construction Safety in Ireland - 2003

**Public Awareness:** Events in the past twelve months have raised the profile of construction safety in Ireland. The concentration of tragic deaths around Christmas 2002, the overall increase in construction fatalities for 2002 (22 compared to 18 for each of the previous three years), and the subsequent public demonstrations by building workers in March 2003 have brought the issue to public awareness. The continuing upward trend in construction and construction-related deaths in 2003 prompted the HSA to express concern as early as May of this year (The Irish Times, 13 May 2003).

**Legislative environment:** In line with growing concern about construction safety, the legislative environment has become more punitive. The highest ever fine for health and safety offences was handed down by Castlebar Criminal Court on 3 July 2003. Oran Pre-Cast Concrete Ltd was fined half a million euros for failure to provide adequate training in fall protection. While the number of prosecutions brought by the Health and Safety Authority has more than doubled since 1997, there has been criticism that fines were not sufficient to motivate companies to improve their health and safety performance. The record fine of half a million euros 'underlines the truly criminal nature of businesses who fail to protect the safety of workers' according to Mr Tom Beegan, Chief Executive of the Health and Safety Authority (HSA 2003).

**Levels of enforcement action:** The level of enforcement action undertaken by the HSA represents a further change in the context of construction safety. Despite the high number of recorded fatalities, the HSA has been forced to reduce the number of scheduled building site inspections for this year to 4500, compared to 6100 in 2002 and 6508 in 2001. Inspectors have less time to allocate for visits due to increased administrative and legislative responsibilities.

# 2. REVIEW OF RELEVANT RESEARCH

## 2.1 Research: Health and Safety Management

Like any other element of a construction project, safety must be managed. It is not a process that can be 'bolted on' to a project by a few interested individuals. Stepping back from specific dutyholder roles, this section reviews the literature for general information on **when** health and safety should be managed, and by **whom.**

### *(i) Health and safety should be considered from the outset*

Early management is essential so that safety issues are considered at the design stage, and throughout the construction and operational phases.

The European Agency for Safety and Health at Work highlights the main responsibilities brought in under Directive 92/57/EEC in the leaflet *Accident Prevention in the Construction Sector*. The first requirement is to consider 'occupational safety and health from the planning stage onwards in all construction work. Work has to be co-ordinated between all parties involved in planning and doing the work'. Other requirements are listed, pertaining to safe work equipment, safety signs and personal protective equipment, and welfare activities. In effect these are sub-factors which should all be in place if the primary requirement to plan and co-ordinate has been carried out effectively. The Directive requires that a general framework to manage health and safety be in place, including 'assessment and prevention of risks; giving priority to collective measures to eliminate risks; consulting employees; providing information and training; and co-ordination on safety with contractors'. These responsibilities are characterised by the fact that they require extensive effort prior to the commencement of the construction phase.

For example, the benefits of early action by dutyholders is evident in the case of risk assessments. A comprehensive risk assessment should be conducted at the outset of any project. The utility of such assessments is often questioned due to the infinite number of events that might befall a project – many of which are unforeseeable, even with the best risk identification techniques. But in the case of the construction industry there are a small number of recurring risks that account

for a major proportion of fatalities e.g. falls from heights, especially falls from scaffolds, falls through unguarded openings and through fragile roof materials. Therefore, it is not risk identification or risk assessment particularly that is the problematic in the construction context - but rather the risk response. An early risk assessment offers several opportunities for action – the risk may be eliminated through redesign (responsibility of client, designer and PSDS). Concurrently, every effort should be made to minimise the residual risk by designing in safety features (responsibility of client, designer and contractors to make use of the safety provisions). Changes are less practicable and more expensive and time-consuming when the design has passed into the execution phase.

***Health and safety should be considered at the highest level***

The previous report (HSA, 2002) concluded that while most pre-cursors of fatal accidents occur at site level, actions upstream of the site may have most impact on safety behaviour. Only those participants with sufficient authority and resources can ensure that safety is integral to the project process. The thesis is that decisions by dutyholders are fundamental to on-site performance. It is dutyholders who determine:

- the resources allocated for health and safety;
- the priority of health and safety in relation to other functions;
- the health and safety policy;
- the degree to which the organisation meets the statutory requirements; and
- the selection of competent health and safety personnel.

The importance of high-level activity is reflected in HSC issued guidance (INDG 343 “Directors’ responsibilities for health and safety”). This document advises organisations to assign directorial responsibility to a board member, and outlines a range of board level tasks that may be undertaken to improve the efficacy of the health and safety function. A recently published study for the HSE (HSE 2003) examines the extent to which this guidance has been implemented in major UK companies (> 250 employees) in the private and public sectors. Respondents (n =

403) included managing directors, operations directors, HR directors and CEOs, 30% of which were board members.

Comparing baseline data from 2001/02 with follow-up data from 2003 revealed an overall increase (from 58% to 66%) in the number of companies having board members with responsibility for health and safety. Differences did exist between types of company – of the companies in the top 350 of FTSE 90% had an individual board member with responsibility for health and safety compared to 77% of public sector organisations. Overall, one third of companies had a board member with heath and safety as their primary responsibility, one third had a board member directing health and safety as a secondary role, and one third delegate responsibility for health and safety to managers below board level.

The research was premised on the principle that health and safety performance improves on being directed from board level. Respondents identified the following benefits - the role offers strong leadership, a public show of commitment and adds impetus to efforts to improve health and safety and risk management. Boards were involved in health and safety in the following ways:

- policy reviews,
- major accident reviews,
- receipt of audit reports and performance measures, and
- workforce consultation

Companies with either board level direction or delegated management were asked why they had made such arrangements. Their responses typify the ongoing debate about where responsibility for health and safety should properly lie. Respondents with board level direction justified their policy on the basis:

- That it represents best practice,
- That power and control are at board level,
- That the health and safety function warrants corporate direction
- That new legislation requires it.

Respondents who delegated management of the health and safety function cited the following reasons:

- Health and safety is an operational matter
- The company has a general policy of delegation
- Delegation represents best practice
- Health and safety is not an issue for directors

Delegation is not wrong – health and safety is most certainly an operational matter. Different aspects of the safety function are relevant at different levels in the organisation. But the key premise of this report, and of HSE guidance and the theoretical models, is that unless safety is given priority at board level, it is most unlikely that time or resources will be available for effective safety performance at the operational level.

But do decisions by dutyholders have a significant impact on health and safety performance? The HSE commissioned a review of the research evidence on the role of managerial leadership in determining organisational safety outcomes (HSE, 2003). The authors distinguish three levels of management - corporate (senior) management, site (middle) management and supervisors (first-line management).

Corporate managers are 'concerned with strategy i.e. making long-range plans, formulating policy, modifying the organisation's structure, and initiating new ways of doing things' (p.3). In the terms of this report, clients, designers and project supervisors may all be said to operate at the corporate level – they are likely to have strategic-level input and they tend to be remote from the site and its daily management.

Corporate governance 'relates to the degree and ownership and control which the organisation holds in relation to safety' (p.7). In effect, dutyholder roles are a manifestation of how organisations are increasingly required to take responsibility for their actions. This has become an important issue for organisations in the UK with the advent of corporate manslaughter legislation. With the possibility of

prosecution, clear and detailed definitions of dutyholder responsibilities become imperative.

The HSE review of the evidence confirms the impact of management-level actions on health and safety performance. ‘Senior management commitment is crucial to a positive health and safety culture. It is best indicated by the proportion of resources (time, money and people) and support allocated to health and safety management and by the status given to health and safety' (HSE, 1999, p.46). Thus, the priority assigned to health and safety by the client and designer, and the authority and resources allocated to the project supervisors, will determine the emphasis on health and safety through middle and front-line management.

The authors list the factors associated with positive safety outcomes at each management level - the section of the model relating to corporate management is reproduced below. The authors note that the path of influence between corporate management and behaviour at subsequent management levels requires further research.

The factors variously apply to dutyholders. It is the client’s ‘attitude to safety’ that has most impact – they give safety an integral position by allocating responsibility at board level, by making resources available to ensure safe performance, and by insisting on compliance with the Regulations. ‘Leadership style’ and ‘trust’ are relevant to the project supervisors, who have the opportunity to emphasise safety through contact with the design and construction teams.

| | | |
|---|---|---|
| **Senior Management Factors** | **Attitudes to safety** | Safety viewed as integral to competitiveness and profitability<br>Perceived importance of statutory compliance |
| | **Leadership style** | Transformational leadership<br>Charisma |
| | **Trust** | Commitment to developing trusting relationships with subordinates |

***Summary of senior management factors associated with positive safety outcomes - adapted from HSE, 2003, p.53***

## 2.2 Implementation of Dutyholder Responsibilities

This section presents information on the implementation of the dutyholder responsibilities in Ireland, the UK and across Europe. Formal evaluations of the impact of the European Directive 92/57/EEC are limited.

- **Ireland**

The most recent figures for the implementation of the 1995 Regulations are those submitted to the European Construction Campaign (2003). The campaign involved inspection blitzes in June and September of 2003.

Data was gathered on general compliance as follows:

- Identification of activities and precautions involving falls from height
- Selection, use and maintenance of equipment
- Systems for the procurement and control of contractors.

Data was also gathered on compliance with specific aspects of the Directive:

- Appointment of co-ordinators
- Health and safety plan
- Prior notice given
- Health and safety file produced

The composite results show that 425 inspections took place in Ireland during the campaign. Written or verbal warnings were issued on 78% of visits, formal improvement notices were served during 7% of visits with 15% of visits resulting in the cessation of work.

In terms of general compliance, the Irish statistics point to poor levels of implementation, but they are in line with European averages (see below):

| | Ireland | ECC average |
|---|---|---|
| | % insufficient application | |
| Falls from height | 49 | 44 |
| Equipment | 35 | 40 |
| Sub-contractors | 47 | 41 |

In terms of compliance with aspects of the Directive, Irish performance is consistently worse than the average ECC figure (see below):

| | Ireland | ECC average |
|---|---|---|
| | % insufficient application | |
| Appointment of co-ordinators | 18 | 9 |
| Health and safety plan | 26 | 13 |
| Prior notice given | 25 | 15 |
| Health and safety file produced | 47 | 36 |

This pattern of results is consistent across the separate reports for June and September.

Figures submitted to the European Construction Campaign are divided into site size categories. A comparison of the data across categories reveals a pattern within the Irish industry – implementation on small sites (1-5 workers or 6-20 workers) is significantly worse than on larger sites (see below).

| Site size | Appointment of coordinators % compliance | Health and Safety Plan % compliance |
|---|---|---|
| 1-5 | 57 | 41 |
| 6-20 | 85 | 77 |
| 20-50 | 100 | 96 |
| 50+ | 100 | 96 |

For example, project supervisors are appointed on 82% of all sites. But a breakdown of this figure reveals a wide range of compliance from 57% on the smallest sites to 100% on the largest sites. Health and safety plans are prepared on 74% of all sites, but the site size categorisation reveals that this figure falls to 41% on smaller sites.

Concern over the implementation of designer duties prompted HSA inspectors to make 204 visits to design offices in 2001-02 (HSA, 2002). Visits were of two types – proactive visits where there had been no prior contact with the designer, and reactive visits in response to problems identified during inspections or investigations. Subsequent to the visit phase, inspectors completed a survey questionnaire.

The results suggest deficiencies in several areas:

- Designers have inadequate understanding of the Regulations – only 20% score more than five on a ten-point scale.
- It was found that the majority of designers were unaware of the General Principle of Prevention under the Regulations, let alone its content or implications.
- Only 10% of designers have any health and safety qualification. The HSA identify this as a primary cause for the poor understanding of the Regulations. It is noted that many designers perform the role of PSDS, a key safety-related role, without any relevant qualification.

The state of designer knowledge is 'alarming' according to the HSA. They claim that it must undermine the ability of designers to carry out their statutory duties. Results relating to designer performance confirm that this is the case:

- In only 15% of cases were the efforts of designers to positively influence safety rated higher than five out of ten. For the reactive visits subset, this figure drops to 2.5%. Inspectors report that decisions by designers have produced site conditions that were so dangerous as to require immediate cessation of work.

Overall, the evidence indicates that a significant proportion of the Irish construction industry has failed to take on board the legal requirements of the construction regulations.

- **United Kingdom**

The Construction (Design and Management) Regulations (CDM) 1994 transpose the design and management aspects of the Directive in the UK.

The UK submission to the European Construction Campaign provides the latest information on the implementation of CDM. Of the 2801 inspections conducted in the UK, 21% resulted in a cessation of work. UK figures for general compliance are similar to ECC averages but compliance with aspects of the Directive is significantly better than the average (see below):

| | UK | ECC average |
|---|---|---|
| | % insufficient application | |
| Appointment of co-ordinators | 4 | 9 |
| Health and safety plan | 5 | 13 |
| Prior notice given | 5 | 15 |
| Health and safety file produced | 9 | 36 |

The UK has the highest compliance in the prior notice and health and safety file categories, and second highest compliance for the appointment of co-ordinators and health and safety plan.

The implementation of designer duties has been the focus of several HSE initiatives. The HSE arranged in-depth designer audits by discipline specialists (CONIAC, 2003). Auditors found that designers did not fully understand how to discharge the CDM regulations. For example, their design risk assessments (DRAs) were too long, did not provide relevant information on hazards, and did not add any value to the health and safety process. The audits also revealed that many design companies were not committed to CDM principles – their CDM manuals were not up to date, were often not available in the drawing room, and there was no evidence that designers had the opportunity to learn from completed projects. Very few design houses had a company-wide CDM policy on hazardous operations (CONIAC, p.3).

In the first direct contact with designers since the implementation of the CDM regulations in 1995, the Scotland and Northern England Division of the HSE's Construction Division conducted a 'designer initiative' during the week commencing 17 March 2003 (HSE, 2003). This entailed pre-arranged meetings between a construction inspector and the leading designers on 123 current construction projects.

Similar to the audit, it was found that many designers (approximately 33%) lacked adequate knowledge of their responsibilities under the CDM Regulations. 'A significant number had failed to consider the practical detail of how the structure that they designed could be safely constructed and maintained' (HSE, 2003). Less than 10% of designers had any training in CDM.

The results portray a situation where the design phase is divorced from the subsequent construction phase. It is telling that when meetings were being arranged, in 25% of cases the planning supervisor could not readily identify the lead designer for the project (p.5). In turn, the report concludes that **planning supervisors** (similar to the PSDS in the Irish Regulations) are failing in their duties to ensure co-operation between designers, and to involve themselves in ongoing design issues during the lifetime of a project.

- **Europe**

The results of the European Construction Campaign illustrate a range of compliance levels across member states. However, no country has exceeded 80% compliance in any of the three general compliance categories. Results relating to specific aspects of the Directive also suggest poor take-up across Europe. Performance in the health and safety file category is particularly inadequate. Italy and the UK are the exception with less than 15% insufficient compliance in all four categories.

Papers presented at a European Conference jointly organised by FIEC and EFBWW in September 2002 confirm that other Member States have experienced difficulty with the implementation of dutyholder responsibilities.

Carruthers (2002) acknowledges the variation in national laws but identifies the following trends:

1. Member states report considerable reluctance among **clients** to accept their responsibilities. Smaller clients in particular struggle with the obligation to ensure the competence of designers and co-ordinators.
2. The fulfilment of **designer** responsibilities is also a problem in many countries. Carruthers suggests that 'only stronger enforcement action will stimulate design organisations to invest in the training and controls needed to fulfil their obligations'.
3. The Co-ordinator roles have caused most controversy. Because the Directive does not specify qualifications, training or experience, the

Co-ordinator role has been variously interpreted. Some countries stipulate specific qualifications, while others, like Ireland, require the client to be satisfied of their 'competence'. Dias (2002) has charted the transposition of the co-ordinator role by member states. His analysis reveals that Ireland has done more than most, adding a significant number of extra duties for the PSCS. Dias recommends that the duties in the Directive should be 'worked' to create roles appropriate to the reality of the national construction industry.

4. Carruthers observes that the allocation of responsibilities to other dutyholders should, in theory, simplify the construction process. However, excessively detailed safety documentation and incompetent co-ordinators have had the opposite effect. Some member states report that the roles have resulted in the blurring of lines of responsibility.

## 2.3 Proposed Amendments to the UK Regulations

Widespread dissatisfaction with CDM Regulations has prompted a review of the Regulations. The UK Government has devoted substantial resources (research, consultations, dedicated forums) to the review. Several of the proposed amendments are relevant to the Irish Regulations.

The Strategic Forum for Construction, formed in July 2001 and chaired by Sir John Egan, proposes updated dutyholder roles – 'Planning supervisors face the axe, making way for independent safety advisors, clients face greater responsibility for safety, and contractors and consultants will have to prove they are up to the job' (Pearson, 2001).

The most radical revisions relate to the role of the Planning Supervisor. Difficulties identified in the 1997 evaluation have not abated. Problems of interpretation and implementation have brought about a situation where 'the inadequately trained planning supervisor is seen by clients as a bureaucratic overhead contributing no value other than a superficial compliance with regulations' (Building, Issue 49).

Instead, Egan proposes the appointment of an **independent safety advisor** who would:

- Sit on the integrated supply team
- Act as a single point of responsibility from the outset of the project
- Function throughout the project duration

This has implications for how the safety plan would be prepared and maintained. Currently (in the UK and Ireland), the safety plan passes to various parties throughout the project but 'if we are to have a holistic approach, responsibility for the health and safety plan should lie with one party from early pre-planning through to the construction on the site and even on to maintenance' (Klein, 2001).

The Institute of Planning Supervisors is understandably resisting the demise of their profession, claiming that the statutory duty to monitor compliance will have to be carried out in some form. They suggest that the problem is not with the Regulations, but in their interpretation. Further, planning supervisors claim they are not being given the authority and resources that would allow them to enforce compliance, they are not involved early enough in the design phase, and there are no procedures to allow them access the quality of information they require.

**'Integrated supply teams'** are also proposed. The project team would meet at the outset of the project and work together to design out risk, on the basis that 'projects can be managed more cheaply and efficiently if everyone involved has a chance to discuss what they are doing before they do it' (Pearson, 2001). This holistic approach requires the integration of the design and construction teams – 'According to Egan, all members of the project, including specialist contractors, should be appointed before the design stage. The theory is that each interested party would be consulted on the parts of the design that affected them, that responsibility for risk would be shared and so risk could be designed out before construction begins' (Broughton, 2001).

A further proposal by the Forum seeks to clarify dutyholder competence. Construction personnel should be able to prove their competence through a **standardised system of accreditation**. 'The regulations do not contain any reference point that allows for effective enforcement – a fundamental weakness' (Klein, 2001). In Ireland the Safe Pass and Construction Skills Certification Schemes have standardised the system for site workers, but the Regulations do not stipulate the minimum level of competence for the design profession or the PSDS / PSCS roles.

# 3. METHOD

## 3.1 Selection of Sample and Respondents

Fatalities in the period 1997-2002 (inclusive) have been selected for this study. Although the Regulations were first implemented on 6 June 1995, certain requirements did not take full effect until 1 March 1996. For this reason 1997 has been selected as a suitable starting point for an assessment of the 1995 regulations.

The dataset is limited to fatal incidents. The collection of data for serious accidents would not have been feasible within the time and resources available. Considerable demographic information for each fatality (e.g. age, employment status, incident type) was available from previous research (HSA, 2002).

HSA inspectors were selected as respondents. Assessing dutyholder performance is integral to their work. Inspectors know the Regulations in detail and may offer a relatively unbiased attribution within that framework. They have also attended the scene of the fatality and can use that experience when identifying contributory failures.

There are obvious limitations to responses obtained from HSA inspectors. They are on-site for only a brief period and may not be aware of a host of other important factors e.g. the safety culture on site, the relationships between supervisors and workers etc. But the limitations of obtaining data from any other group are even more severe – clients, designers, supervisors and contractors are all implicated by virtue of their responsibilities under the Regulations.

## 3.2 Development of Questionnaire

This is an exploratory study. There is no existing model describing patterns of dutyholder responsibility - unlike the previous report which was based on an existing theoretical model (the management-organisational-human hierarchy used by the HSE in 1992 and the HSA in 1997).

As such, a fact-finding questionnaire has been developed. Having collated the facts, we can begin the process of identifying patterns and developing theories and models, based on real data rather than ad-hoc theorising.

There is little to be gained from investigating the performance of dutyholders (dutyholder responsibility data) without at the same time gathering contextual information (accident-related data). This facilitates an informed review of the Regulations, so that updated dutyholder requirements target the real circumstances that lead to fatal incidents.

The questionnaire is in two parts. The first concerns the incident and details of enforcement action taken by the HSA. Much of the relevant demographic information was available from the 2002 study but the following items were recommended by CAC members:

- the county where the accident occurred;
- the number employed on the site;
- the type of developer; and
- the category of project.

The second part of the questionnaire is based on the dutyholder responsibilities as they are outlined in the 1995 Regulations. Inspectors were asked to indicate where a dutyholder's failure to fulfil their responsibility made a 'possible' or 'definite' contribution to the accident.

The format of the questionnaire is similar to that used in the previous study (HSA, 2002). A familiar layout indicates continuity with the previous research and allows the inspectors to process the document quickly.

The questionnaire data is analysed using Statistical Package for the Social Sciences (SPSS).

## 3.3 Literature Mapping Exercise

A literature mapping exercise is undertaken as a complementary element of this research project. A method utilised by the HSE, this literature mapping exercise attempts to map the guidance that is available to dutyholders from within the HSA. The objectives of the exercise are:

- to collate a list of the HSA documents that are available to the various dutyholders
- to identify gaps in the information flow that might require supplementary guidance.

The mapping exercise is based on information available on the HSA website and consultation with the HSA Publications Officer.

# 4. FINDINGS

## 4.1 Response Rate

A dataset comprising 103 responses (a rate of 83%) is acceptable for this type of exploratory study. Many of the non-respondents are inspectors who have since retired from the HSA.

| Year | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | Total |
|---|---|---|---|---|---|---|---|
| No. fatalities (incl. Construction-related) | 15 | 22 | 18 | 18 (25) | 18 (22) | 21 (22) | 112 (124) |
| No. responses | 10 | 18 | 13 | 20 | 22 | 20 | 103 |
| % response | 67 | 82 | 72 | 80 | 100 | 91 | 83 |

*Table 1. Rate of response by year*

## 4.2 Fatality Statistics

The consistent figure of 18 fatalities for the three years 1999 to 2001 (Figure 1) represented a steady decrease in the rate of fatalities (Figure 2). However, both the number and rate of fatalities increased during 2002. There were three more fatalities, while the numbers employed in the construction industry remained relatively unchanged – 180200 in 2001 and 181100 in 2002. This caused an increase in the fatality rate from 7.7 to 11.6 per 100000 workers.

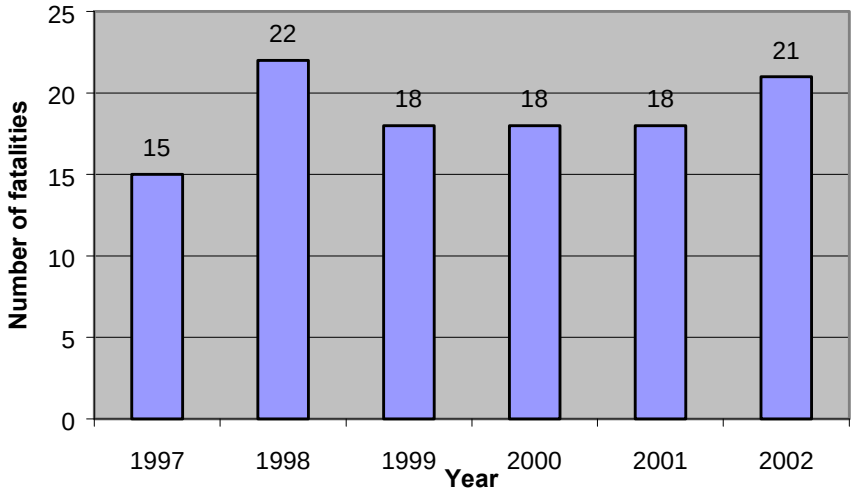



*Figure 1. Number of fatalities 1997-2002*

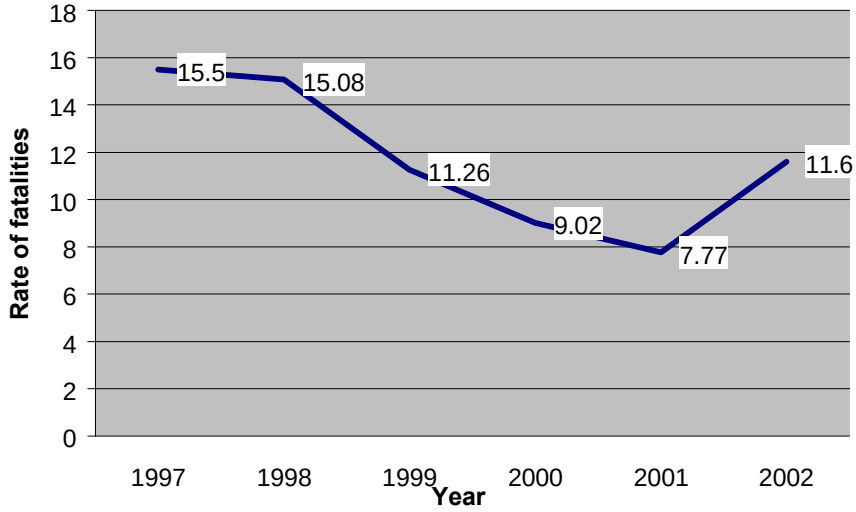



***Figure 2. Rate of fatalities 1997-2002***

## 4.3 HSA Enforcement Action

Levels of enforcement action undertaken by the HSA have generally increased through the six-year period. However, the most recent figures relating to construction inspections signal a decline between 2001 and 2002, and this trend is set to continue, according to HSA forecasts.

Table 2 outlines the actions taken by inspectors upon visiting sites where a fatality occurred. The number of prohibition notices has increased. Although there is no discernible trend in improvement notices or closures, the total enforcement actions have increased with time.

| **Year**<br>*n = 103 valid responses* | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **Total** |
|---|---|---|---|---|---|---|---|
| **No. prohibition notices** | 1 | 3 | 2 | 7 | 10 | 10 | **33** |
| **No. improvement notices** | 0 | 0 | 2 | 3 | 3 | 1 | **9** |
| **No. closures** | 1 | 2 | 1 | 1 | 2 | 3 | **10** |
| **Total enforcement actions** | 2 | 5 | 5 | 11 | 15 | 14 | **52** |

***Table 2. Enforcement action by HSA inspectors on fatality sites***

Table 3 includes information about cases taken by the HSA under the Construction Regulations. The table shows the information for each dutyholder, specifying prosecutions taken and convictions secured in either the district courts or the circuit court.

| Year | Valid Responses | No Action Prosecution Initiated – District Court | Prosecution Initiated – Circuit Court | Conviction Secured – District Court | Conviction Secured – Circuit Court |
|---|---|---|---|---|---|
| **CONTRACTOR** | | | | | |
| **1997** | 10 | 0 | 1 | 3 | 0 |
| **1998** | 18 | 4 | 0 | 1 | 2 |
| **1999** | 13 | 1 | 2 | 7 | 0 |
| **2000** | 20 | 2 | 0 | 7 | 0 |
| **2001** | 22 | 1 | 3 | 3 | 5 |
| **2002** | 20 | 5 | 4 | 3 | 0 |
| Total | **103** | **13** | **10** | **24** | **7** |
| | | | | | |
| **CLIENT** | | | | | |
| **1997** | 10 | 1 | 0 | 0 | 0 |
| **1998** | 18 | 0 | 0 | 1 | 2 |
| **1999** | 13 | 1 | 0 | 1 | 1 |
| **2000** | 20 | 0 | 0 | 2 | 0 |
| **2001** | 22 | 0 | 0 | 1 | 0 |
| **2002** | 20 | 2 | 2 | 0 | 0 |
| Total | **103** | **4** | **2** | **5** | **3** |
| | | | | | |
| **DESIGNER** | | | | | |
| **1997** | 10 | 1 | 0 | 0 | 0 |
| **1998** | 18 | 0 | 0 | 0 | 0 |
| **1999** | 13 | 1 | 0 | 0 | 0 |
| **2000** | 20 | 0 | 0 | 0 | 0 |
| **2001** | 22 | 0 | 0 | 0 | 0 |
| **2002** | 20 | 0 | 0 | 0 | 0 |
| Total | **103** | **2** | **0** | **0** | **0** |
| | | | | | |
| **PROJECT SUPERVISORS** | | | | | |
| **1997** | 10 | 1 | 0 | 2 | 0 |
| **1998** | 18 | 0 | 0 | 0 | 0 |
| **1999** | 13 | 3 | 0 | 1 | 0 |
| **2000** | 20 | 0 | 0 | 3 | 0 |
| **2001** | 22 | 0 | 2 | 2 | 2 |
| **2002** | 20 | 1 | 3 | 1 | 0 |
| Total | **103** | **5** | **5** | **9** | **2** |

***Table 3. Prosecutions and convictions relating to fatal accidents***

The frequencies do not permit statistical analysis but some general trends may be identified:

- The number of prosecutions taken through the circuit court is increasing with time. In 1997 only one prosecution was initiated against a contractor in the circuit court. In 2002, there are four prosecutions against contractors, two against clients and three against project supervisors.

- Many more prosecutions have been taken against contractors than any other dutyholder. Action was taken against 22% (23 out of 103 cases) of contractors involved in fatal incidents.

- The dataset is inevitably incomplete due to non-respondents. However, the lack of enforcement action taken against designers is striking. Only two prosecutions in the circuit court are recorded in this dataset.

- The overall number of prosecutions taken against each dutyholder (through the circuit court or district courts) is a crude measure but it suggests a pattern - the number of prosecutions increases with proximity to the site. Contractors are on-site full time and are most often prosecuted (23 prosecutions). Project supervisors spend time on-site as part of the requirement to co-ordinate and monitor safety activity (10 prosecutions). Clients may also have some level of contact with the site due to their long-term involvement and vested interest (6 prosecutions). Designers have least direct contact, often working remotely and only being contracted for the duration of the design phase (2 prosecutions).

## 4. 4 Accident Data: Victim-Related

- **Age (*n = 119*)**

  Almost one half (45%) of fatal incidents involved workers in the 21-30 and 41-50 age categories. Combining the categories from age 21 to age 60 accounts for over three-quarters (76%) of all fatalities.

  The 11-20 category (10%) represents 13 fatal incidents. Nine of these workers were aged between 18 and 20.

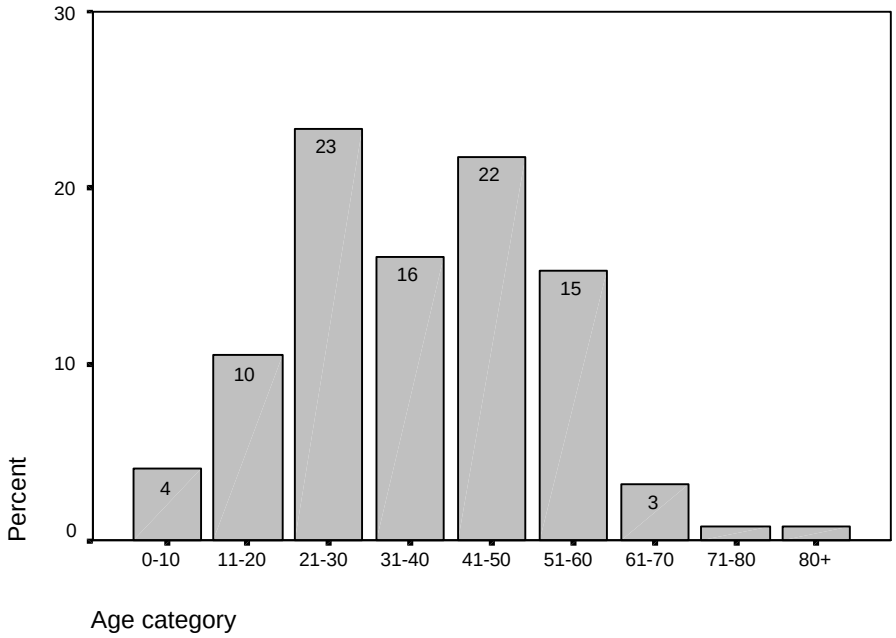



***Figure 3. Fatalities by age category***

- **Occupation (*n = 124*)**

  The dataset includes a wide range of job titles, many with only one or two fatalities in each category. The occupations that do stand out in the graph (Figure 4) are as follows:

  - 43% of all victims were working as 'general operatives'.
  - The 'not applicable' category (11%) represents those who were not involved in the construction industry i.e. members of the public.
  - The 'roofer', 'contractor' and 'carpenter' trades each represent over 5% of all fatalities.

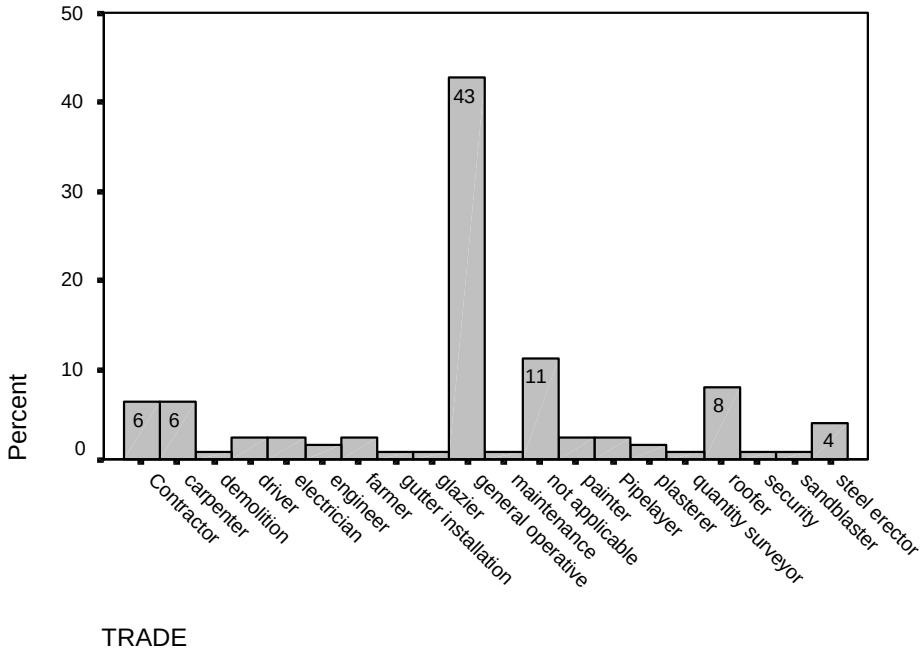



***Figure 4. Fatalities by trade***

- **Employment status (*n = 124*)**

  Of the construction fatalities between 1997 and 2002, 63% were employed workers, 25% were self-employed workers, and 12% were members of the public. Restricting the analysis to those working within the industry, employees and self-employed represent 72% and 28% respectively.

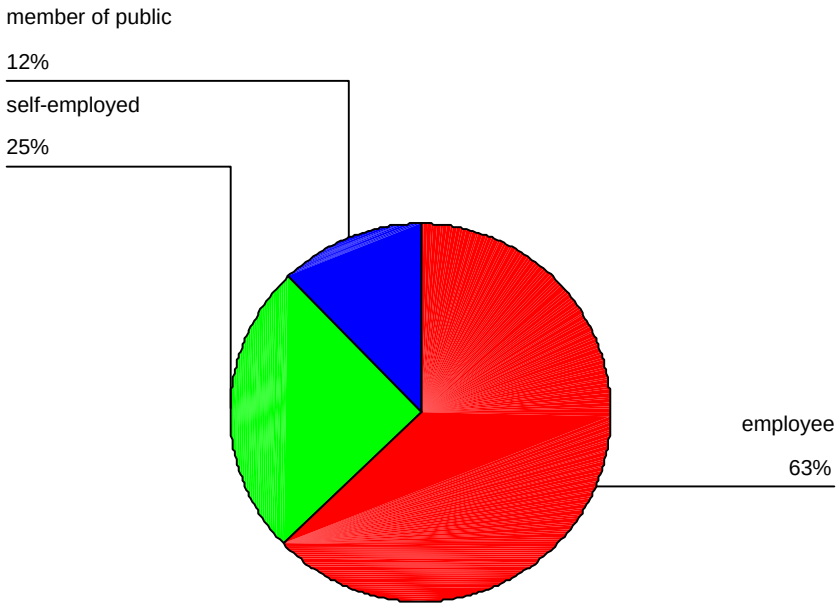



***Figure 5. Fatalities by employment status***

## Comment

When compared to the statistics for 'employment status' and 'age' in the period 1991-2001 (HSA, 2002), the results for the period 1997-2002 are strikingly similar:

- Of the fatalities in the period 1991-2001, 63% were employees, 28% were self-employed and 9% were members of the public.

- The age profile is also similar to that obtained in the previous study – 24% of all fatalities were in the 21-30 age-band and 23% were in the 41-50 age-band.

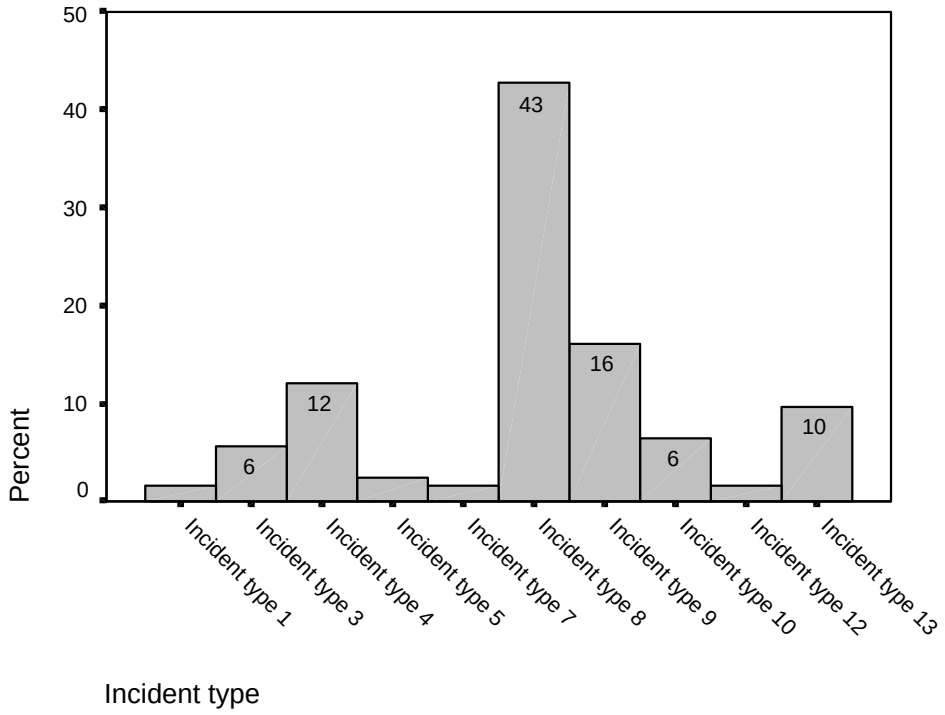
The 1997-2002 data represents the period in which the 1995 Regulations became operational. The similarity of the results over both studies suggests that the implementation of the Regulations has had little impact on the profile of victims involved in fatal incidents.

## 4.5 Accident Data: Incident-Related

- **Incident Type (*n = 124*)**

In line with previous research, approximately half (43%) of all fatalities are due to 'falls from heights'. This incident type accounts for more than twice as many fatalities as the next most common incident – 'struck by something collapsing / overturning'.

As with the victim profile, the introduction of the 1995 Regulations does not seem to have caused any change in the types of incidents than occur – 44% of all fatalities were as a result of falls from heights during the period 1991-2001.




**Key: Incident types as defined by ******

| | |
|---|---|
| **1** | **Contact with moving machine parts** |
| **3** | **Injured by falling object** |
| **4** | **Transport (excluding RTA)** |
| **5** | **Road traffic accidents** |
| **7** | **Slips/trips or falls on level** |
| **8** | **Fall from height** |
| **9** | **Struck by something collapsing/overturning** |
| **10** | **Drowning or asphyxiation** |
| **12** | **Fire or explosion** |
| **13** | **Contact with electricity** |

***Figure 6. Fatalities by incident type***

- **Type of developer (*n = 106*)**

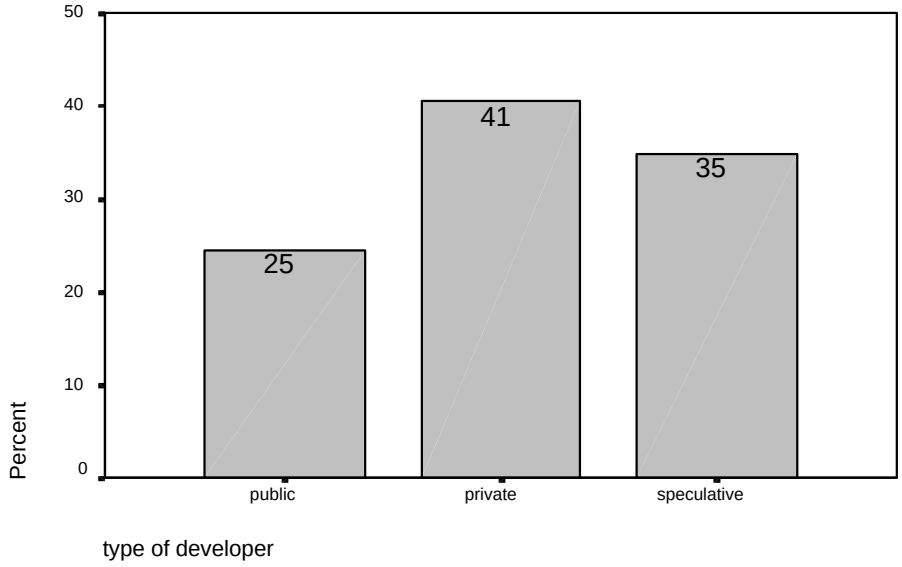
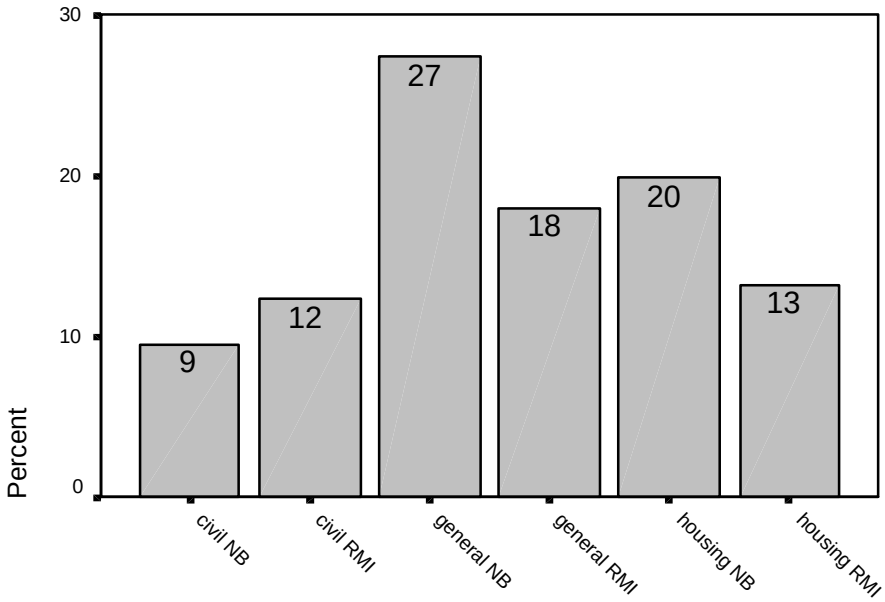



***Figure 7. Fatalities by type of developer***

- **Category of project (*n = 106*)**




**Key: NB = New build**
**RMI = Repair, maintenance and improvement**

***Figure 8. Fatalities by project category***

The results for 'type of developer' (Figure 7) and 'category of project' (Figure 8) are described in conjunction as they seem to capture related information.

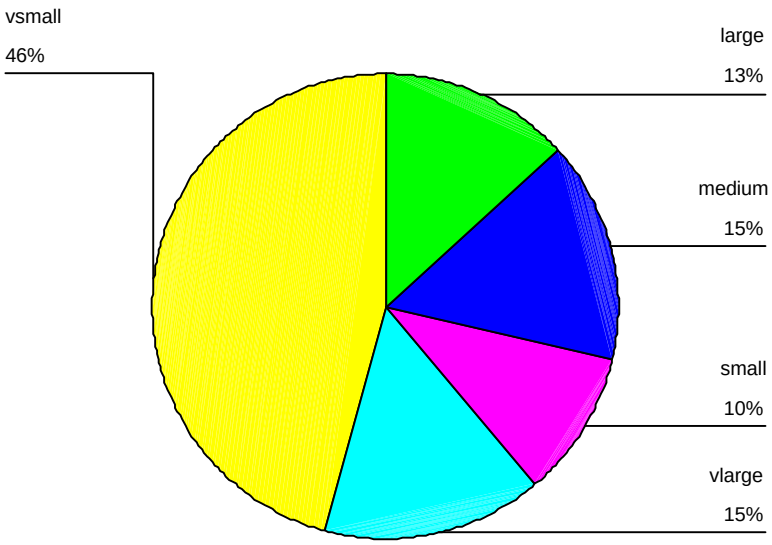
One quarter of all fatalities occurred on sites developed by the public sector. These map on to the 21% of fatalities on civil projects (9% 'new build' and 12% 'repair, maintenance and improvement').

The 'speculative' developer is generally involved in housing projects – hence the equivalence between one third (35%) of fatalities on speculative sites and 33% of fatalities on housing projects (20% 'new build' and 13% 'repair, maintenance and improvement').

The remaining 41% of fatalities on privately developed sites approximate to the 'general' project category.

- **Site Size (*n = 98*)**

Almost half (46%) of fatalities from 1997 – 2002 occurred on sites with between one and five workers employed. The remaining site-size categories have a relatively even distribution of fatalities.




**Key: Number of employees in site-size categories**

| | |
|---|---|
| **Very small** | **= 1-5 employees** |
| **Small** | **= 6-10 employees** |
| **Medium** | **= 11-20 employees** |
| **Large** | **= 21-50 employees** |
| **Very large** | **= 51+ employees** |

***Figure 9. Fatalities by site size***

**Comment**

The findings for site size support the widely-held belief that smaller sites pose a particular risk.

The UK statistics paint a similar picture. 'An analysis of the data provided for the HSE by the Bomel Consortium, the research consultant, shows that significantly more fatal accidents – of which falls from height make up the largest category – have occurred on sites of between one and 13 workers. Of approximately 300 deaths on site between 1996 and 2001, about 212 occurred on sites of fewer than seven people' (Hay 2003). Hay concludes that serious accidents are 'much more likely to happen on smaller, less regulated sites'.

Small-scale construction projects present several difficulties:

- Clients for minor construction jobs do not usually work full-time in the industry. Consequently they may be unaware of their obligation to appoint competent dutyholders. This is confirmed by the results of the HSA blitz in March 2003 – Project Supervisors were appointed on only 30% of small sites (1-5 workers). Without appointed dutyholders, there is unlikely to be a coherent approach to safety management.

- A further difficulty is that smaller enterprises are unlikely to be reached through conventional stakeholder networks e.g. trade bodies. The HSE concludes that different techniques are needed to reach these groups. They aim to make training more relevant to the needs of small firms and to develop programmes to improve communication e.g. Safety and Health Awareness Days.

- **Accident location (*n = 123)***

Data relating to accident location is presented both by county (see Figure 10) and by region (see Figure 11).

**County:** When divided according to county where the fatality occurred it is clear that the largest percentage (22%) were in Dublin county. Cork has the second highest percentage of fatalities at 12%. No other county has more than 10% of fatalities.

Twenty-four counties are represented on the bar chart. There are no recorded construction fatalities in Westmeath or Monaghan for the period 1997-2001.

**Region:** The regions do not contain equal numbers of counties and as such they are not directly comparable. Rather, the graph indicates the dispersion of fatalities across the regional divisions used by the HSA. The graph might inform decisions about resource allocation and enforcement activity, within the HSA and trade bodies.

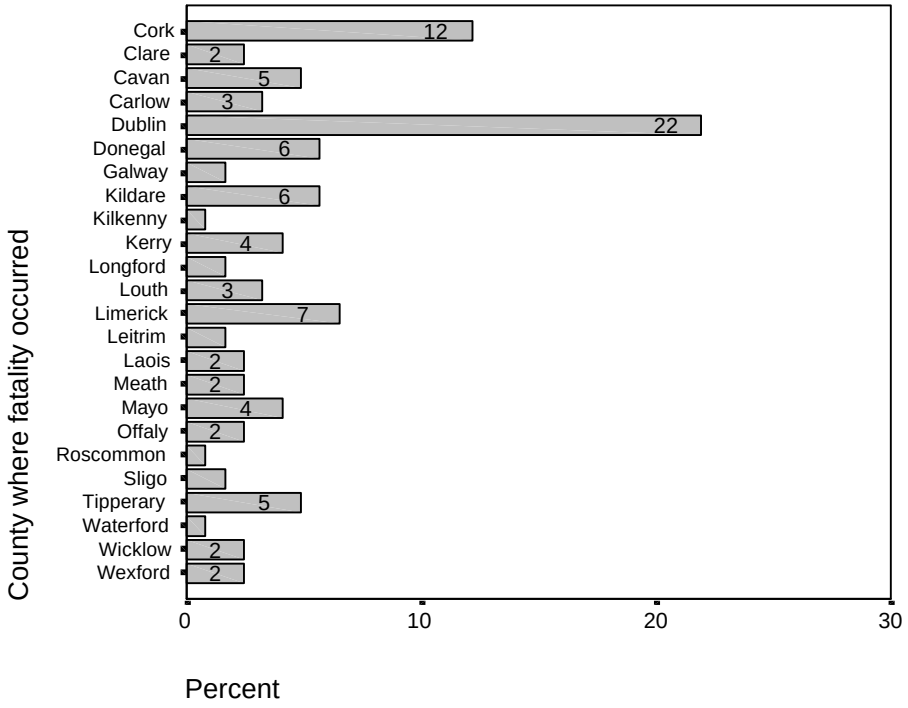
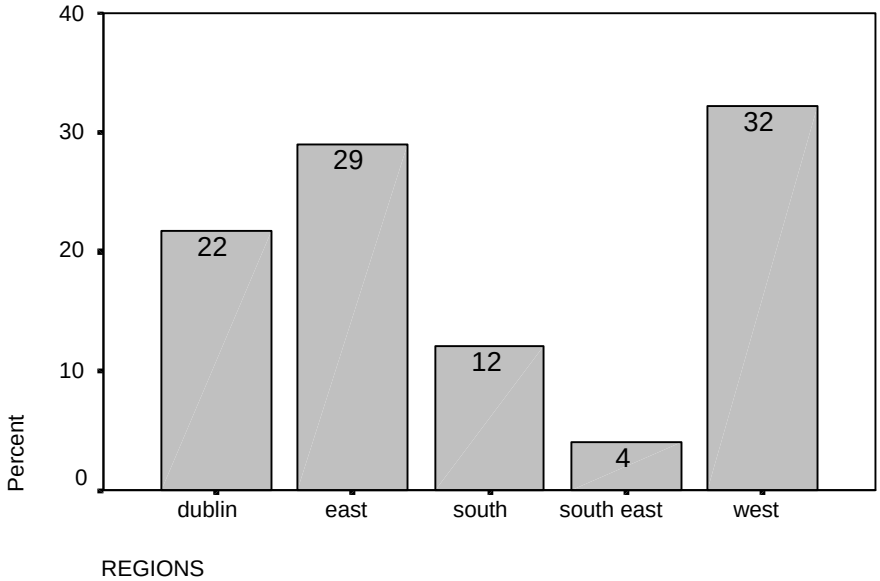



***Figure 10. Fatalities by county***




| | |
|---|---|
| **Key:** | **Counties included in region categories** |
| **Dublin:** | **North Dublin, South Dublin** |
| **East:** | **Wicklow, Kildare, Laois, Offaly, Carlow, Meath, Louth, Cavan, Monaghan, Westmeath, Longford, Roscommon** |
| **West:** | **Galway, Mayo, Sligo, Donegal, Leitrim, Limerick, Clare, Kerry, Tipperary** |
| **South-east:** | **Waterford, Wexford, Kilkenny** |
| **South:** | **Cork** |

***Figure 11. Fatalities by HSA region***

## Comment

By combining the output for 'site size' and 'regions' we obtain a more detailed account of the context in which fatalities are occurring.

The average number of workers on site in each region is recorded in Table 4.

| **Region** | **Dublin** *n = 19* | **East** *n = 31* | **West** *n = 32* | **South** *n = 12* |
|---|---|---|---|---|
| **Average number on site** | 61 | 23 | 28 | 26 |
| **>50 on site** | 42% | 16% | 9% | 8% |
| **£ 5 on site** | 21% | 42% | 69% | 33% |
| **1 person on site** | 0% | 0% | 22% | 8% |

The 'South-east' category is omitted from this analysis due to the small number of fatalities (n = 5).

***Table 4. Site size by region***

Sites in Dublin have on average twice as many workers as sites in other regions. However, the average masks a wide range of site sizes e.g. the recorded number of workers on site in the Dublin region ranges from 400 to 2 workers.

Looking at numbers within specific site size categories may offer more accurate information. A large site is defined as having 50+ workers. Of the nineteen fatalities in the Dublin region 42% were on sites with 50+ workers. Of the fatalities in the other regions, only a small percentage occurred on large sites.

Conversely, the Dublin region had the smallest percentage of fatalities occurring on very small (1-5 workers) sites. The Western region has substantially more fatalities on very small sites (69%) than any other region.

Narrowing the analysis to sites with only one worker produces a corresponding result. While the Dublin and Eastern regions had no fatalities on one-person sites, almost one quarter of the fatalities in the Western region are in this category. The figure of 22% represents seven fatalities. Referring back to the database reveals that all seven were private projects, six of which were classified as 'repair, maintenance or improvement' jobs.

## 4.6 Dutyholder Responsibility Questionnaire

- **Distribution of dutyholder responsibility**

For this section of the questionnaire, inspectors were asked to judge if failure to fulfil dutyholder responsibilities had contributed to the fatality they investigated.

Figure 12 illustrates the average level of contribution by each dutyholder, as judged by the inspectors, using the options provided on the questionnaire. Almost 50% of the failures identified as definite or possible contributions are perceived to be the responsibility of contractors. The PSCS was responsible for 32% of failures and clients were responsible for 14%. PSDS and designers contributed 4% and 3% respectively.

The graph must be interpreted with caution – it is not simply the case that half of all failures are attributable to contractors. Fifty per cent of contributory failures were attributed to contractors **within the limits of the questionnaire, by a particular sample of respondents** (see comment box for discussion)**.**

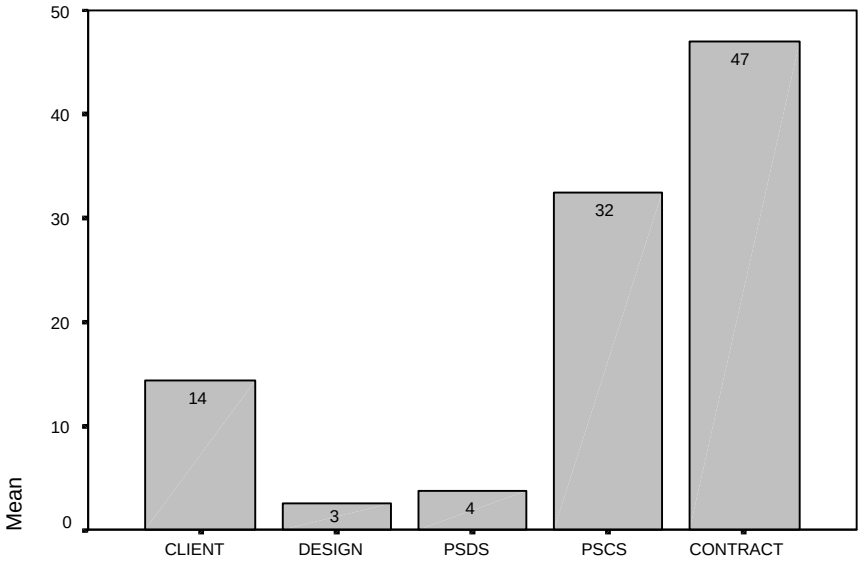



***Figure 12. Average contribution by dutyholder***

### Comment

It is important to interpret the results in the context of the questionnaire. There are several qualifying factors that must be addressed

- **Restricted response options.** Inspectors were limited to the items on the questionnaire, which were in turn limited by the duties described in the Regulations. Other dutyholder failures that are not covered by the Regulations may have contributed to the fatal incident.

- **Number and detail of items.** The sections outlining PSCS and contractor responsibilities have many and detailed items compared to the other dutyholder sections. The number of items in each section has been accounted for in the statistical analysis, but it may have influenced the attribution process.

- **Relevance to the accident event.** The PSDS and Contractor items also relate more directly to the accident event. For example, items such as 'failure to co-ordinate measures to permit authorised persons only on to construction site' or 'failure to comply with the Regulations in the erection or alteration of scaffolding' describe accident circumstances more directly than items like 'failure to co-operate with the PSDS or PSCS as appropriate'. The failure to co-operate triggers a series of events that eventually contribute to the fatality – it does not lead directly to the incident.

- **Respondent perspective.** Inspectors have uneven access to information - they have most contact with, and obtain most information from the contractor and workers on-site. The degree of access to the client, designer or PSDS is generally limited. Thus, given the point at which the HSA inspector enters the chain of events, the information they gather will tend to focus primarily on contractor and site factors.

Table 5 offers a more detailed analysis of Figure 12 - breaking down the average attribution for each dutyholder across the six years. The data in Table 5 is insufficient for further statistical analysis due to the small sample, e.g. (n = 7 for 1997).

| | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **Total** |
|---|---|---|---|---|---|---|---|
| ***n* =** | **7** | **12** | **12** | **16** | **20** | **16** | **83** |
| **Client** | 20 | 26 | 16 | 13 | 5 | 14 | 14 |
| **Designer** | 6 | 3 | 6 | 2 | 1 | 0 | 3 |
| **PSDS** | 13 | 0 | 7 | 0 | 3 | 5 | 4 |
| **PSCS** | 43 | 26 | 34 | 30 | 38 | 28 | 32 |
| **Contractor** | 18 | 45 | 38 | 54 | 53 | 53 | 47 |

***Table 5. Average Contribution (%) by year***

A graph representing the same information (Figure 13) offers a visual guide to the pattern of attribution by HSA inspectors over the six years. The lines on the graph are erratic due to the small dataset but it is apparent that 'contractors' and 'PSCS' have consistently higher attributions over the six years than 'PSDS' and 'designers'.

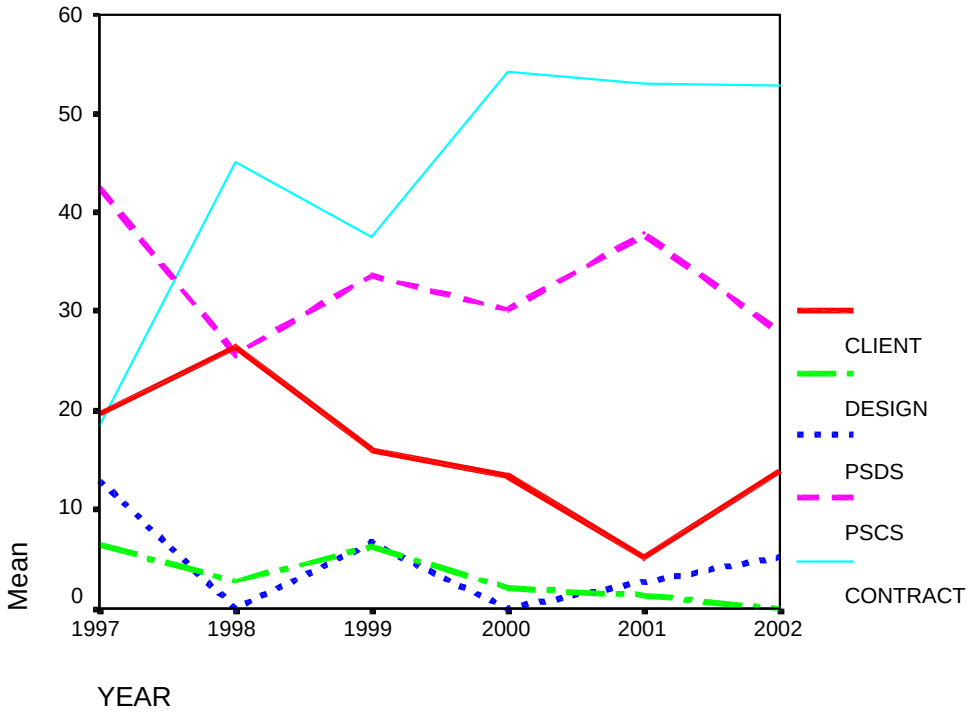



***Figure 13. Attributions by year***

- **Analysis of individual items**

Table 6 lists the failures that inspectors most often judged as possible or definite contributions to the fatal incident. Following the pattern of the overall results, it is failures by the contractor, PSCS and client respectively that are most often cited.

| Item | Dutyholder | Definite (x2)* | Possible (x1)* | Total Score |
|---|---|---|---|---|
| Failure to comply with Regulations in erection, installation, working and use of plant equipment | Contractor | 33 | 13 | 79 |
| Failure to ensure arrangements for checking the implementation of safe working procedures | PSCS | 21 | 13 | 55 |
| Failure to appoint competent PSCS | Client | 8 | 18 | 34 |

* Note: 'Definite' responses have been weighted at a value of 2,
'Possible' responses have been allocated a value of 1.

***Table 6. Questionnaire items with highest scores***

- **Incidents for which the questionnaire items were 'not applicable'**

For twenty of the fatalities in the dataset, the inspectors indicated that none of the questionnaire items were applicable to the accident circumstances. This represents a substantial 19% of the completed questionnaires. We will examine this sub-group more closely.

It is clear from the database that the majority of these fatalities occurred on smaller sites - 12 out of 17 occurred on sites with fewer than five workers employed, 8 of these on sites with only one or two workers.

Fifteen of the twenty (75%) were private sector projects. Twelve of the fatalities (60%) were 'repair maintenance and improvement' jobs.

Of the fatalities where none of the dutyholder responsibilities were applicable, the majority (65%) were in the Western region. Three occurred in Dublin, two in the south and one each in the east and south-east.

# 5. LITERATURE MAP AND ANALYSIS

| **Document** | Guide to the Safety Health & Welfare at Work Act 1989 and (General Application) Regulations,1993 | Guidelines for preparing your Safety Statement & carrying out Risk Assessment | A Guide to Safe Working Practices | Workplace Health and Safety Management | A Short Guide to Health and Safety Law |
|---|---|---|---|---|---|
| **Pages** | 200 | 22 | 51 | 40 | 12 |
| **Price** | 12 | 2 | 12.70 | 12.70 | 2 |
| **Regulations** | 1989 / 93 | 1989 / 93 | 1989 / 93 | 1989 / 93 | 1989/93/01 |
| **Description** | Comprehensive guide to the new legal framework brought about by the 1989 Act. General account of issues such as manual handling & PPE. | Practical guidance for preparation of safety documentation. Sample risk assessments and pro-forma. | Identification of common hazards – with checklists. How to organise for safety – PPE, safe systems, training, accident response etc. | Practical guidance for planning, implementation & evaluation of safety management systems. | Brief guidelines to the 1989 Act and the General Application Regulations |
| **Client** | Ö | | | | |
| **Designer** | | | | | Ö |
| **PSCS** | | | | | |
| **PSDS** | | | | | |
| **Contractor** | Ö | Ö | Ö | Ö | Ö |
| **Worker** | Ö | | | | Ö |

**Literature Map Table 1:**



Generic documents based on:
the Safety, Health and Welfare at Work Act 1989,
the Safety, Health and Welfare at Work (General Application) Regulations, 1993, and
the Safety, Health and Welfare at Work (General Application) (Amendment) Regulations, 2001.

| **Document** | Guidelines to the Safety, Health & Welfare at Work Construction Regs 1995 | Guidelines for Clients involved in Construction Projects | Build in Safety – A short guide to good practice & legislation | Code of Practice for Access and Working Scaffolds | Safety at All Levels | Stay Safe on Site | Safety with Asbestos | Timber Frame Erection Guidelines |
|---|---|---|---|---|---|---|---|---|
| **Pages** | 64 | Leaflet | Leaflet | 52 | Video/52pp | 20 | 8 | 20 |
| **Price** | 10 | 1 | 1 | 6 | 63 | 1 | FREE | 2 |
| **Regulations** | 1995 | 1995 | 1995 | 1995 | 1995 | 1995 | 1995 | 1995 |
| **Description** | Comprehensive guide to the 1995 Regs. Outlines dutyholder responsibilities. Emphasis on management of safety and creating chain of responsibility. | Bullet point summary of client duties under the 1995 Regs. | Brief guide outlining duties of client, designer, PSDS/CS and contractor. Practical information on preparation of safety & health plan and safety file | Practical guidance for those with specific duties in relation to the supply, design, construction & use of scaffolds | Pack includes video and Code of Practice for Access and Working Scaffolds. | Bullet-point practical guidance for a range of site hazards e.g. ladders, cranes, electricity, excavation work etc. | Description of asbestos and potential harmful effects. Instructions for employee and outline of what to expect from employer. | Method statement relating to a two-storey semi-detached erection. To be used as guideline for other types of timber frame erection |
| **Client** | Ö | Ö | Ö | | | | | |
| **Designer** | Ö | | Ö | Ö | | | | Ö |
| **PSDS** | Ö | | Ö | Ö | | | | Ö |
| **PSCS** | Ö | | Ö | Ö | | | | Ö |
| **Contractor** | Ö | | Ö | Ö | | | | Ö |
| **Worker** | | | Ö | Ö | Ö | Ö | Ö | Ö |

**Literature Map Table 2:**



Construction – specific documents based on the Safety, Health and Welfare at Work (Construction) Regulations 1995

| **Document** | Guidelines to the Safety, Health & Welfare at Work Construction Regs 2001 | Safety and Health on Construction Projects – the Role of Clients | The Absolutely Essential Health and Safety Toolkit: For the Smaller Construction Contractor |
|---|---|---|---|
| **Pages** | 14 | Leaflet | 30 - pocket notebook format |
| **Price** | 5 | FREE | 5 |
| **Regulations** | 2001 | 2001 | 2001 |
| **Description** | Comprehensive guide to the 2001 Regs. Highlights amendments and additions to dutyholder responsibilities | Bullet point summary of client duties under the 2001 Regs. | Advice on managing safety e.g. reporting and recruitment practices, together with a site safety checklist. |
| **Client** | Ö | Ö | |
| **Designer** | Ö | | |
| **PSDS** | Ö | | |
| **PSCS** | Ö | | |
| **Contractor** | Ö | | Ö |
| **Worker** | Ö | | |

**Literature Map Table 3:**



Construction – specific documents based on the Safety, Health and Welfare at Work (Construction) Regulations 2001

| **Specific Hazards** |
| --- |
| Safety and Workplace Vehicles<br>Guidelines to the Noise Regulations<br>Is your work making you deaf?<br>Obligatory Safety Signs<br>Handle with Care: Safe Manual Handling<br>Occupational Asthma: An Employee's Guide<br>Occupational Asthma: An Employer's Guide<br>Code of Practice for Working in Confined Spaces |
| **Policy Documents** |
| Construction Safety Partnership Plan 2000-2002<br>Construction Safety Partnership Progress Report 2001<br>Construction Safety Partnership Plan 2003-2005 |
| **Research Documents** |
| Safety Behaviour in the Irish Construction Industry<br>Fatalities in the Irish Construction Industry: A Survey of Contributory Factors |

The poor take-up of dutyholder responsibilities may be in part due to lack of information. HSA publications represent the principle means by which health and safety information is disseminated through the industry. The documentation aims to outline best practice, raise awareness of the Regulations and emphasise the consequences of failing to fulfil the legal requirements. Any gaps in the literature map may point to areas where regulatory information is not reaching dutyholders.

The literature mapping exercise identifies all the relevant documentation that is available to the public, via the Publications office or the HSA website. It is acknowledged that this literature map is inevitably incomplete, given that it is restricted to HSA documents. Supplementary guidance may be available in-house, from trade bodies and others.

The mapping exercise produced four tables, comprising both generic and construction-related documents. The documents are mapped chronologically in Tables 1-3, based on the following Regulations:

- **Table 1:** Safety, Health and Welfare at Work Act 1989 / (General Application) Regulations 1993
- **Table 2:** Safety, Health and Welfare at Work (Construction) Regulations 1995
- **Table 3:** Safety Health and Welfare at Work (Construction) Regulations 2001

Publications are assessed in terms of both their content and format.

## 5.1 Analysis of Content

The documents in Table 1 (Safety, Health and Welfare at Work Act 1989 and the (General Application) Regulations, 1993) relate to all industries. As such they are not directly relevant to construction-specific dutyholders e.g. designer, and the PSCS / PSDS roles were not in existence until 1995. However, it is interesting to note that every document includes guidance for the contractor, perhaps reflecting contemporary theories of accident causation.

Two strands of documents emerge from the analysis of documents from 1995 onwards – those that are **task-based** and those that are **dutyholder-based**. Booklets such as the 'Code of Practice for Access and Working Scaffolds' and 'Timber Frame Erection Guidelines' span the entire task, outlining duties from the design stage through to execution. Alternatively, 'Guidelines for Clients involved in Construction Projects' is not task-specific, but rather describes the full extent of a dutyholders' responsibilities on any project.

In terms of dutyholder-based documents, contractor duties have received significant attention. Most documents from 1989 onwards have outlined contractor responsibilities in some level of detail. The most recent publication, the 'Absolutely Essential Health and Safety Toolkit', is aimed specifically at the 'smaller construction contractor'. This signals a more differentiated approach to health and safety guidance, in accordance with emerging research findings e.g. the site size statistics confirm that guidance for smaller construction contractors is urgently required. There is room for this trend to continue, with leaflets that would translate the relevant regulations to other contexts e.g. guidance for domestic repair jobs or construction on the farm.

Leaflets listing client responsibilities were produced as a result of both the 1995 and 2001 Regulations. The HSA is aware that many clients are not necessarily involved in the construction industry, and have no knowledge of the Construction Regulations or of their statutory responsibilities. Similarly in the UK, the Confederation of Construction Clients (CCC) is undertaking a review of existing process maps. The results are to be presented in a way that suits 'general client groupings, i.e. small/occasional/repeat' (Strategic Forum for Construction 2002, p.23).

Other dutyholders work within the industry and therefore should have a working knowledge of the Regulations and their responsibilities - but this cannot be assumed. It is important that changes to dutyholders responsibilities should be communicated. For example the 2001 review of the Regulations introduced extra responsibilities for the PSCS, but apart from the general guidelines booklet there is no document that alerts the PSCS to their additional duties. Leaflets

highlighting the updated duties of the designer and supervisor might be useful additions to the publications list.

Table 4 outlines other relevant publications that are available to the public. The Policy and Research documents are useful for interested parties such as government departments, academic researchers or health and safety professionals. The proposals and statistics that they contain are particularly useful for those preparing bids or making presentations. A link on the HSA website to direct such parties to these documents might be advantageous, and would facilitate the wider circulation of HSA statistics and research findings.

## 5.2 Analysis of Format

Documents like the 200-page guide to the 1989 Act are clearly for reference purposes. Subsequent Guideline booklets to the 1995 and 2001 Construction Regulations are not so weighty (64 pages and 14 pages respectively) but the level of detail and the formal language are not suitable for use on-site or under time constraints. The function of the Guideline booklets is to provide an overview of the allocation of responsibilities across dutyholders. These are perhaps most usefully held at HQ at the point where management are making strategic project decisions.

Since the 1995 Regulations, the HSA has produced shorter, less expensive documents to deal with specific hazards e.g. 'Safety with Asbestos'. These are intended as portable documents that might be referred to in a site situation.

'The Absolutely Essential Health and Safety Toolkit: For the Smaller Construction Contractor' – incorporates some the best features identified so far and might serve as a template for future publications:

- It is pocket-sized and portable;
- The information is clearly presented, in bullet points and illustrations;
- It is construction-specific; and
- It is tailored to the context of the smaller contractor.

## 5.3 Summary

In terms of content, two general categories of document have been identified. The HSA provides a comprehensive selection of task-based documents. Recent publications have a holistic approach and describe best practice for the entire task or hazard. Dutyholder-based documents are not as prolific. While they are available for clients and contractors, offering this resource to other dutyholders might facilitate the impact of the Regulations on improved safety performance.

Ultimately, the purpose of HSA publications is to communicate safety duties and best practice to the construction industry. While all the documentation in the literature map contains important content, the accessibility and relevance of the information for the end user are equally important. Thus, bullet points, check lists, portable formats and specificity are important features of documents that aim to disseminate safety information in the construction context.

# 6. CONCLUSIONS

This section presents conclusions based on an overview of the results.

## 6.1 Pattern of Dutyholder Responsibility

A consistent pattern of dutyholder responsibility emerges from the data. The results for (i) average dutyholder responsibility, (ii) enforcement action and (iii) highest-scoring item, all follow the same order of dutyholders:

1. Contractors
2. PSCS
3. Client
4. PSDS
5. Designer

Placing responsibility for health and safety upstream of the construction site was one of the major innovations of the 1992 Directive. Yet this new balance of responsibility is not reflected in the questionnaire responses.

The pattern raises several issues.

### *(i) The pattern reflects the structure of the Regulations*

It is clear from the questionnaire that some roles have been transposed in more detail. Thus, the results are to some extent a function of the number of options and level of detail available for describing the performance of each dutyholder.

The contrast is clear in the case of the results for the PSDS (average contribution = 4%) and PSCS (average contribution = 32%), both roles created under the 1995 Regulations. The Directive outlines minimum requirements but member states may transpose stricter rules than those specified. The Irish PSDS duties equate to the minimum requirements for the duties of the Safety and Health Co-ordinator for the Design phase (SHC-D). However, the PSCS role has been extended significantly beyond the minimum duties. Dias (2002) identifies fifteen

'alternative or other duties' that are included in the Irish transposition of the Safety and Health Co-ordinator for the construction phase (SHC-C). Dias recommends that the Directive should be 'worked' to suit the context of the construction industry in each country – clearly the transposition of the PSDS role requires further 'work' to bring it into line with the PSCS role.

**Recommendation**

The review of the Regulations should seek to describe client, designer and responsibilities at the same level of specificity as PSCS and contractor responsibilities to facilitate accurate attribution of causality.

> ***Note:*** *The Construction Safety Partnership Plan 2003-05 (HSA 2003), proposes additional duties for clients and designers. Extra responsibilities for the client include the requirement to notify the HSA of a project at the time of appointment of the project supervisors. Clients and designers are responsible for ensuring sufficient timescales are allowed for the entire project. These changes are under discussion in Phase Two of the review of the Construction Regulations.*

More precise language should be used to describe the requirements – words such as 'competent' and 'appropriate' should be defined further. Ambiguous wording has two effects - it is difficult to assign accountability for the purposes of prosecution, and it offer little practical guidance to those who wish to implement the Regulations.

> ***Note:*** *To standardise the competence of project supervisors, the CSP recommends a register of qualified PSDS and PSCS 'to ensure that only those who have the necessary qualifications, experience and resources will be recognised as competent to undertake these key dutyholder positions'. Training and guidance for professionals operating in the capacity of PSDS is proposed.*

The Regulations should describe the activities that operationalise requirements. Requirements to 'co-ordinate', 'communicate' and 'take account of' are not sufficient - the means by which these ends are achieved should be specified. For example, the item about plant equipment specifies failures relating to the 'erection, installation, working and use' - the duties of other dutyholders do not contain the same level of detail in relation to their execution.

> ***Note:*** *The level of detail is set to improve under the review of the Construction Regulations. For example, the CSP Plan indicates that guidelines for the preparation and content of the safety file are to be included. Practical guidelines for the selection of safety consultants are also proposed.*

### *(ii) Results from alternative sources contradict the pattern*

Despite the requirements placed on other dutyholders under the 1995 Regulations, perceptions of accident causation remain focused on the construction site. Clients, designers and PSDS are perceived to make a relatively minor contribution by comparison with contractors and the PSCS.

But research from other sources suggests that this pattern may not be representative of actual dutyholder performance:

- Data from the HSA suggests that a significant proportion of **clients** are failing to meet their obligations. Previous research on construction fatalities revealed that supervisors were not appointed on 45% of sites where fatalities occurred between 1991 and 2001 (HSA, 2003). The figures for the Irish submission to the European Construction Campaign (2003) indicate that project supervisors were not appointed on 18% of applicable sites.

- Design audits by the HSA and the HSE (see section 2.2) indicate that failures by **designers** may be more prevalent than this study suggests. Although the designer has been allocated least responsibility for fatal incidents in this study (only 3%), the audit results illustrate that designer knowledge and performance is lacking in the area of health and safety.

- The ECC figures also indicate that the health and safety plan and file are insufficient in 26% and 47% of cases respectively. This implies a failure by the **PSDS,** who has a duty to prepare a preliminary Safety and Health Plan and must provide the PSCS with necessary information for the Safety File

## 6.2 'Joined-Up' Accident Analysis

The pattern of dutyholder responsibility suggests that the creation of new roles and formalised duties have had limited impact on the scope and depth of accident analysis. Explanations continue to focus on actors and circumstances in the

immediate environment – contractors and the PSCS together account for nearly 80% of all the failures that make 'possible' or 'definite' contributions to fatal incidents.

The fragmented nature of the construction industry complicates accident analysis. Turnover on construction projects is such that very few roles exist for the duration of a project. With different dutyholders responsible for safety at different stages, it is difficult to evaluate safety performance through the project life cycle.

However, the increasing number of prosecutions taken against clients and supervisors is evidence that HSA inspectors have already begun to widen their analysis of fatal incidents.

**Recommendation**

A framework is required whereby failures at the level of contractor are not regarded in isolation, but are traced back through the hierarchy so that participants who failed to fulfil their requirements are held accountable.

Perhaps a simple hierarchical model based on the duties in the regulations might guide in-depth analysis of the circumstances leading up to the accident. For example, if a worker is electrocuted when working near high voltage power lines:

- The incident may be clearly attributable to the failure to comply with the Regulation for the 'working and use of plant equipment' (contractor duty).
- However, the model would then guide inspectors to move up the hierarchy and question why such a failure had occurred – were arrangements in place for checking safe working procedures (PSCS duty)?
- If not, had the high voltage power lines been highlighted as a particular risk in the safety file (designer responsibility) and passed on to the PSCS (PSDS responsibility)?
- If not, the inspector must question the steps taken to ensure the competence of designers and supervisors (client duty).

Specific hierarchies could be developed for frequently occurring incidents (e.g. falls from heights), which would trace the causes of the incident through the potentially relevant duties in the Regulations.

***Note:*** *The CSP Plan 2003-05 emphasises pre-site factors. It acknowledges that there 'high priority issues in the design and planning process that need to be tackled'. The proposals in the section 'Pre-construction / Design / Procurement' seek the co-operation of the client, designer and project supervisors to agree a strategy that ensures safety throughout the project life cycle.*

## 6.3 One Size Fits All? - A Differentiated Approach to Construction Safety

The accident data indicates that we might usefully differentiate construction fatalities according to their context. A particular profile emerges based on recurring accident features. The evidence is summarised below:

- **Site-size data:** 47% of all fatalities occur on 'very small' sites (with less than five people employed).
- **Regions data:** Of the fatalities on 'very small' sites, 69% of these are in the HSA's Western region. Of the nine fatalities with only one person on-site, seven of these were in the Western region.
- **Developer and Project Type data:** All fatalities on one-person sites were private developments. Eight out of the nine were 'repair, maintenance and improvement' (housing or general) projects.
- **Implementation figures:** The data gathered for the European Construction illustrates that levels of compliance vary with site size. Results relating to the appointment of project supervisors and the production of the health and safety plan (see p.16) are indicative.

**The Profile:** The site-size data indicates small-scale construction. The developer and category data suggests domestic or farm construction, mostly repair or maintenance jobs that require only one or two workers. From the regions data it is clear that the majority of fatalities in this category occur in the Western region.

Most importantly for this study, inspectors indicated that the dutyholder responsibilities were not applicable to twenty of the fatalities in the dataset – fifteen were private projects, twelve were repair maintenance or improvement and thirteen occurred in the Western region. Twelve out of seventeen were on sites with less than five workers, eight of which were on sites with one or two workers.

Here we have identified a significant proportion of fatalities for which the current dutyholder responsibilities are not directly relevant. Clearly, there is a need to differentiate and specify according to the construction context.

## Recommendation

Given that this accident profile represents a substantial proportion of all fatalities it is recommended that such incidents be given particular consideration in any review of dutyholder responsibilities.

The Regulations are pitched at a certain level within the industry – they are premised on large-scale commercial construction. Hence the difficulty for inspectors of applying them to other environments. While it is not possible to write Regulations that apply equally to all situations, there is clearly a requirement for the Regulations to be translated to the context of minor construction tasks. Roles and responsibilities should be clarified for projects involving only one or two workers.

The findings in this study might inform the allocation of resources and the activity of HSA regional inspectors, and the focus of action by trade bodies. For example, the results indicate that the circumstances of fatalities in the Dublin region are different in some respects from those in the Western Region – the majority of fatalities on very large sites occur in Dublin whereas the majority of fatalities on very small sites occur in the West. Therefore, alongside nation-wide campaigns, it may be possible to develop more targeted initiatives within regions.

> ***Note:*** *Recent publications by the HSA have adopted a more differentiated approach. Many booklets deal specifically with one particular hazard or dutyholder role e.g. 'The Absolutely Essential Health and Safety Toolkit' is aimed specifically at the smaller contractor.*
>
> *The CSP Plan 2003-05 proposes the development of safety management courses for small firms and house builders. This would include training for administrative staff to assist in dealing with documentation, records and reports.*

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## APPENDIX 1 – COVER LETTER

## APPENDIX 2 - DUTYHOLDER RESPONSIBILITY QUESTIONNAIRE

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Dear Inspector,

I am writing to request your assistance on a research project being undertaken by the HSA and the CAC.

This latest study follows on from the report *'Fatalities in the Irish construction industry: A survey of contributory factors'* prepared for the HSA in November 2002 (available on the HSA website). The report examined contributory factors at Headquarter, Site Management and Injured Party levels. The statistical analyses in this report, and in previous reports in Ireland and the UK, found that the contributory factors in fatalities were Site Management factors, Headquarter factors (upstream of the site) and Injured Party factors in the ratio 2:1:1 respectively. However, on the basis of separate theoretical studies the report concluded that measures to improve the performance of HQ dutyholders (including clients, designers, project supervisors) could have significant beneficial effects on performance at site and injured party levels. Our aim in this project is to assess the effectiveness of dutyholder responsibilities under the Regulations.

The attached questionnaire is based on the dutyholder responsibilities as they are defined in the Safety, Health and Welfare at Work (Construction) Regulations 1995 – the version of the regulations that pertain to the period 1997-2002.

- I understand that questionnaire items may not apply to all fatalities – please fill in what is relevant to the case. I will assume that uncompleted sections are 'not applicable'.
- Some items may refer to information that was not recorded in your report on the fatality. Please use your recall of the event and the environment to answer these items.
- Court cases may be pending on some of the more recent fatalities. Please be assured that the report will not refer to any individual incident.
- **Returning questionnaires:** Please complete a questionnaire for each fatality you investigated. You may complete the questionnaire electronically and email it to me at M.Dalton@postgrad.umist.ac.uk. Alternatively, you may wish to print off the questionnaire and return it to the Dublin office for the attention of Vincent Darcy.

I would like to take this opportunity to thank you for your co-operation with the previous research study. It is hoped that further research will increase awareness of crucial issues in construction safety.

Thank you for your time.

Yours sincerely,

**Marie Dalton**

Research Consultant

# Dutyholder Responsibility Questionnaire

1. **Fatality number:**

2. **Deceased name** (for reference only)**:**

3. **County** (where accident occurred)**:**

4. **No. employed on site:**

5. **Employment Status:** Employed / Self-employed / Member of Public

6. **Type of developer:** Public / Private / Speculative

7. **Category of Project** – please tick

| | | |
|---|---|---|
| **Civil** | New Build | |
| | Repair, Maintenance or Improvement | |
| **General** | New Build | |
| | Repair, Maintenance or Improvement | |
| **Housing** | New Build | |
| | Repair, Maintenance or Improvement | |

8. **Action taken by the HSA** in light of detection of breach of statutory duties specified under the regulations, during investigation of fatal accident:

| **CONTRACTOR** | | | **Please tick** |
|---|---|---|---|
| Prohibition notice served | | | |
| Improvement notice served | | | |
| Voluntary closure | | | |
| Compulsory closure | | | |
| | Prosecution Instituted | Conviction Secured | Penalty Imposed |
| District Court | | | |
| Circuit Court | | | |

| **CLIENT** | Prosecution Instituted | Conviction Secured | Penalty Imposed |
|---|---|---|---|
| District Court | | | |
| Circuit Court | | | |

| **DESIGNER** | Prosecution Instituted | Conviction Secured | Penalty Imposed |
|---|---|---|---|
| District Court | | | |
| Circuit Court | | | |

| **PSDS/PSCS** | Prosecution Instituted | Conviction Secured | Penalty Imposed |
|---|---|---|---|
| District Court | | | |
| Circuit Court | | | |

**9. Dutyholder Responsibilities**

Please indicate which of the items below contributed to the fatality as follows:

***D = Definite contribution*** ***P = Possible Contribution***

| | |
|---|---|
| **CLIENT:** | |
| Failed to appoint competent PSDS | |
| Failed to appoint competent PSCS | |
| | |
| **DESIGNER:** | |
| Failed to take account of the 'General Principles of Prevention' (1993 Regs) | |
| Failed to take account of and relevant Safety and Health Plan or Safety File | |
| Failed to co-operate with the PSDS or PSCS as appropriate | |
| Failed to provide the PSDS or PSCS with information regarding particular risks | |
| | |
| **PSDS:** | |
| Failed to take account of the 'General Principles of Prevention' (1993 Regs) | |
| Failed to co-ordinate the activities of other persons engaged on the design of the project | |
| Failed to prepare a preliminary Safety and Health Plan | |
| Failed to provide PSCS with necessary information for the Safety File | |
| | |
| **PSCS:** | |
| Failed to develop Safety and Health Plan before construction commences | |
| Failed to notify HSA before work commences (if applicable) and display notice on site | |
| Failed to prepare Safety File (if more than one contractor engaged) | |
| Failed to keep a record of accidents | |
| Failed to ensure arrangements to check the implementation of safe working procedures | |
| Failed to co-ordinate measures to permit authorised persons only on to construction site | |
| Failed to organise co-operation between Contractors and co-ordinate their activities | |
| Failed to co-ordinate implementation of 'General Principles of Prevention' (1993 Regs) | |
| | |
| **CONTRACTOR:** | |
| Failed to provide appropriate information to PSCS, including copy of Safety Statement | |
| Failed to appoint Safety Officer (if >20 persons under direct control of the Contractor) | |
| Failed to co-operate with PSCS | |
| Failed to take account of directions of the PSDS | |
| Failed to comply with Regs in erection, installation, working and use of plant equipment | |
| Failed to comply with the Regs in the erection or alteration of scaffolding | |
| Failed to provide information to and consult with employees or Safety Representatives | |