

HSE CONTRACT RESEARCH REPORT No. 72/1 995

**INFORMATION ON SITE SAFETY FOR
DESIGNERS OF SMALLER BUILDING PROJECTS**

Sylvester Bone BA, RIBA, AAdip, Dip TP FASI

The Camden Consultancy
2 St Martins
Bayham Street
Camden Town
London NW1 0BD

Part 1 describes the designer's role under the CDM Regulations and the duties placed on the designer. Introduces the duties of the planning supervisor and the function of health and safety plans and the health and safety file. Describes the contribution that designers can make to health and safety on site and provides a brief summary (in the form of tables) of the figures for fatalities and injuries in construction. Suggests how designers should systematically review health and safety issues at each stage of a project. Part 2 outlines the health and safety issues that designers should consider at each of the RIBA stages of work. Issues that apply generally are listed before those that apply only to existing buildings. Designers are referred to the health and safety references listed in Part 3 which lists authoritative publications (including journals and videos) under the names of the publishing organisations. There is an alphabetical index.

This report and the work it describes were funded by the Health and Safety Executive. Its contents, including any opinions and/or conclusions expressed, are those of the author alone and do not necessarily reflect HSE policy.

INFORMATION ON SITE SAFETY FOR DESIGNERS - a summary of the issues relevant to designers' responsibilities under the Construction (Design and Management) Regulations 1994

CONTENTS

ABOUT THIS PUBLICATION

PART 1: THE DESIGNER'S ROLE

- 1.1 The designer's responsibility for health and safety in building
- 1.2 The planning supervisor's duties
- 1.3 The pre-tender stage health and safety plan and the health and safety file
- 1.4 The contribution of design to accidents and ill health during construction work
- 1.5 How industrial accidents and illnesses occur in construction
- 1.6 Considering health and safety in design
- 1.7 Guidance on health and safety issues

PART 2: REDUCING THE RISK

- 2.1 Hazards to be considered at each stage of a new building project
 - A Inception
 - B Feasibility
 - c Outline proposal
 - D Scheme design
 - E Detailed design
 - F Production information
 - G Bills of quantities
 - H Inviting and receiving tenders
 - J Project planning
 - K Operations on site
 - L Completion
 - M Feedback

PART 3: REFERENCES

- 3.1 Annotated list of publications containing useful information and guidance
- 3.2 Alphabetical subject index

LIST OF FIGURES AND TABLES

- F1 Assembling and using health and safety information for a project
- F2 Example of a section of a pre-tender stage health and safety plan
- F3 Possible contents of a health and safety file
- F4 Causes of fatal accidents in construction
- F5 Fatalities for different types of construction project
- F6 Fatalities and injuries in some construction trades
- F7 Scheme design check list
- F8 Safety limits for manual handling - lifting heavy items

ABOUT THIS PUBLICATION

In March 1995 the new Construction (Design and Management) Regulations 1994(S13 140) (CDM) come into operation. The regulations are supported by an Approved Code of Practice (ACOP). They are needed because of the high rates of death, injury and ill-health associated with working in the construction industry. They also implement part of the European Community Directive on Temporary or Mobile Construction Sites (92/57/EC).

All designers have specific duties and responsibilities under the CDM Regulations. The CDM Regulations define the term designer widely so that it includes anyone who prepares designs, design details, specifications or bills of quantities relating to a structure or part of a structure. This publication gives a brief explanation of what designers are required to do and what information is currently available to help them. The publication is primarily for architects, building surveyors and quantity surveyors working on small to medium sized building projects. However, it includes some information that is relevant to the work of structural and services engineers and some that applies to designers of the manufactured components made to be installed in some buildings. All designers contributing to a project have a duty to avoid foreseeable hazards associated with the construction work and subsequent maintenance and cleaning work, as far as is reasonably practicable. Where there are risks which cannot be eliminated designers have a duty to combat those remaining risks with measures that will protect workers and people affected by the works.

Designers will be dealing with others on whom the CDM Regulations place specific duties. Most projects will have a planning supervisor to co-ordinate the health and safety aspects of the design and a principal contractor to take responsibility for health and safety once construction starts on site.

This publication focuses on aspects of health and safety that designers need to consider. The intention is to give designers an introduction to health and safety issues relevant at each stage in a project and to existing publications containing guidance on measures that can help to reduce risks. Further interpretation of the Regulations can be found in the ACOP which supports the Regulations. Further guidance on implementing the Regulations can be found in two Construction Industry Advisory Committee (CONIAC) documents "Designing for health and safety" (ISBN 0 717608807 7) and "A guide to managing health and safety in construction," (ISBN 0 71760755 0).

The preparation and publication of this document were funded by the Health and Safety Executive (HSE). Its contents and any opinions and conclusions expressed are those of the author and do not necessarily reflect HSE policy,

The stages of work defined in the RIBA Job Book are used in part 2 of this publication. When using procurement procedures that modify the RIBA work stages, such as design and build or turnkey operations, the health and safety issues to be considered and the references that apply at each stage may vary. However, in any design programme, it is only by considering health and safety issues from the earliest stages that designers can take full advantage of the opportunities for avoiding hazards on site.

The designer's responsibility for health and safety in construction

The Health and Safety at Work Act 1974 implied that designers had a responsibility to see that their work did not expose workers on site to risks (Section 3, Part 1, Chapter 37). The CDM Regulations go further and are very much more specific, they give designers certain duties. Criminal charges can be brought against any designer who does not carry out these duties. The duties are defined in regulation 13 and explained in the related ACOP. In summary the ACOP explains that the duties are:

1. To avoid hazards, and if this cannot be done, reduce the risks those hazards give rise to - so far as is reasonably practicable.
2. To include in the design adequate information on factors affecting health and safety on site.
3. To co-operate with the planning supervisor and other designers to enable them to comply with the regulations.
4. To tell the client about the client's duties under CDM before starting design work.

The ACOP sets out the general principles to be followed to avoid hazards and reduce risks (Appendix 2). Designers should include among their design considerations adequate regard to health and safety. They need to develop a systematic approach to the consideration of health and safety in the design process.

Designers must first identify the health and safety hazards associated with the construction of their design. Then, for the hazards which give rise to significant risk, they need to follow the hierarchy of risk control. This means designers should consider systematically if they can:

1. **alter the design to avoid the risk**, for example by not using fragile materials for roofing. If the risk cannot be avoided then they should;
2. **combat the risk at source**. This means altering the design to reduce the risk, for example specifying low-maintenance finishes for materials used at height, so reducing the need for work at high level; and
3. **give priority to measures which will protect all people**. This means, for example in relation to maintenance work, providing guardrailed walkways across roofs rather than a system of fixed lines to which harnesses can be attached. Installing fixed walkways provides safety for anyone requiring access to the roof and does not rely on them having access to, and using, additional safety equipment.

It is only after all of these alternatives have been considered that the designer can assume that residual risks will be managed and controlled by the contractor. Designers should not assume that just because a particular operation is regularly undertaken by contractors it is safe and that risk cannot be reduced. For example scaffolds are an acceptable and widely used means of

access for work at height. However, the erection, use and subsequent dismantling of a scaffold inevitably exposes scaffolders and others to the risk of falls.

In some cases it may be possible to reduce the risk of falls by pre-fabricating units at ground level and then craning them into position as this will reduce time spent working at height.

In relation to maintenance, sometimes the risk of falls can be reduced by reducing the need for maintenance work at high level by substituting self-coloured, upvc for painted woodwork. Alternatively, it maybe possible to reduce the risk of falls where regular work at height cannot be avoided by making provision in design, say by providing suitable access and hard-standing, for mobile elevating work platforms to be used for access.

Designers should also ensure that their designs include adequate information about any relevant health and safety issue. This information should draw attention to any matter which a competent contractor would not reasonably be expected to know.

Designers will need to be able to confirm to their clients that they have the competence and the resources to undertake their health and safety duties. The ACOP and the CONIAC guidance give more information about how to ascertain a designer's competence and the adequacy of the resources they intend to make available.

1.2 The planning supervisor's duties

Some designers will accept appointment by the client as planning supervisor for a construction project, This means that they will have the additional duties defined in CDM regulation 14. In essence the planning supervisor's job is to ensure that formal notification of the project is given, documents prepared and actions taken at the appropriate times. There are also requirements that the planning supervisor should be able to advise the client on appointments and should see that the design, the pre-tender health and safety plan and the health and safety file include adequate information. Planning supervisors also have to confirm to clients that they have the competence and resources to carry out their duties. The ACOP and CONIAC guidance set out what is required.

1.3 The pre-tender stage health and safety plan and the health and safety file

The planning supervisor ensures that these documents are developed and prepared but it will be designers who provide much of the information they contain.

The pre-tender health and safety plan is a document that is given to the contractor when tendering to ensure that the planning and resourcing of the project take into account the risks identified in the pre-contract phase and the particular health and safety requirements that apply to the project. If for example, excavation in contaminated soil cannot be avoided and presents a health risk or if out-of-sequence construction could create a risk of collapse then the contractor's attention should be drawn to these risks by entries in the pre-tender health and safety plan. The categories of information that the plan should contain are given in Appendix 4 of the ACOP.

The health and safety file is a document or, more usually, a collection of documents that are delivered to the client when the building is handed over. Its content is given in Appendix 5 of

the ACOP and in the CONIAC guidance. The health and safety file is a record of information for the end user which focuses on health and safety. The information it contains should alert those who are responsible for the structure and equipment in it of the significant health and safety risks that will need to be dealt with during subsequent construction maintenance and cleaning work.

Both the plan and the file are collections of information which are likely to be assembled over a period . When the time comes to prepare either the plan or the file relevant information from many sources may need to be brought together. This publication refers to the 'designers health and safety records' for a project, by which is meant the places where the participants in the planning and management of the project keep health and safety information ready for use in the plan or the file - and also as an internal record of decisions made and risk assessments, contractor evaluations, design audits etc that have taken place.

Figure 1 illustrates how information can be accumulated through the life of the project. In this example the RIBA work stages are used as the framework for information collection.

Figure 2 sets out one way by which information could be built up for the health and safety plans and file during the project.

Figure 3 shows one way in which information could be set out in a health and safety file.

These examples are illustrative, a wide range of techniques can be used for collecting and recording information. Systems used will be most effective if they require the minimum of bureaucracy and are compatible with systems already used by designers for the collection and control of design information. Design management and quality assurance systems may **also** provide a suitable framework for managing and recording project health and safety information.

Figure 1 Assembling and using health and safety information for a project.

RIBA work stage	Statutory documents planning supervisor HSE Form 10 ensure they are prepared	information generated horn inside the designer's office	Information from outside the designer's office
A&B inception and feasibility		designer's health and safety policy, designer's appointment, feedback from previous projects	survey and site information, standard appointments for designers and planning supervisor, reference publications on health and safety, client's brief
outline proposals	notification of project HSE Form 10 (rev) may be used	method of recording and retrieving information (filling system), records of reviews of design options and risk assessments, allocation of resources, commissions for advice from outside experts	clarification of brief, cost advice on safety issues, safety information from other designers, comments from planning supervisor, health and safety information horn experts, specialist trade contractors and manufacturers
scheme design		record of design reviews and pre-tender stage, health and safety plan and health and safety file (in note form), draft of procedures for contractor (and specialist contractor) selection	information on health and safety from other designers and QS report on cost of safety measures, client's comments on operation and maintenance, approvals from statutory bodies
detail design, production information bills of quantities		record of audit of input horn all designers with planning supervisor, draft pre-tender stage health and safety plan and health and safety file, record of design review of details, records of contractor and specialist preselection record of review of health and safety content of tender information	catalogues and safety data sheets from manufacturers and specialists, specific advice horn potential contractors and Specialists, client's agreement to programme and welfare facilities in existing buildings, standard specification cakes
J tender action, reject planning	pre-tender stage health and safety plan to be sent out with tender enquiry (or at equivalent stage) additional information to be added to HSE notification	record of review of health and safety Implications of any reductions or additions to the design	
K operations on site	contractor prepares final version of health and safety plan to be used on site)	record of review of health and safety replications of design variations, review of information in draft health and safety file	information on operation and maintenance of equipment supplied
L completion	Health and safety file to be delivered to the client	as-built drawings and specification, maintenance manual	
M feedback		record of health and safety issues and lessons learned for future projects	information from occupiers on health and safety issues involved in operation and maintenance of the building

Figure 2 Example of a section of a health and safety plan

CAWS* ref.	Drawing ref.	Hazard	Control of risk 1
A44	1044/2c Site plan	Vehicle accident caused by overloading of temporary access	Temporary access bridge over ditch on southern perimeter of site should be of adequate strength and overloading must be prevented. The contractor is required to submit details of the proposed bridge structure and the method of controlling the use of the bridge with the tender.
G20	1044/37 Roof truss arrangement 1 044/137 truss details	accidents resulting from collapse of roof structure during erection	Roof covering materials should not be stacked on the roof before all bracing, tying and wedging of the trusses is complete. The stacks of materials should then be evenly distributed across the roof While trusses are being put in place and secured personnel should not be allowed access to the space below.
H71	1044/151 Entrance canopy details	Lead poisoning	Lead welding required to form the weatherproofing of the entrance canopy should be earned out, in the outside air, in a very well naturally ventilated space or one with suitable forced ventilation. Personnel handling lead or exposed to contamination should be stopped from eating, drinking and smoking before they have used the washing facilities. The contractors attention is drawn to the Control of Lead at Work Regulations 1980.

*CAWS is the Common Arrangement of Work Sections used for bills of quantities, standard specifications and, sometimes, to annotate drawings.

Figure 3 Possible contents of a health and safety file

Item	Description	Information	Control of risk
Structural floor	Precast prestressed concrete planks	Structural engineer's drawing 118/1 /37c* XXX plc tender and calculations, 12.12.94* XXX plc catalogue 1.3.91**	When planning maintenance or alteration work the following restrictions are relevant: fire resistance period of structure is 60 minutes, the maximum occupancy for means of escape is 30 persons the floor is designed for an imposed loading of 3.5 kN/m ² concentrated. Because of the risk of damage to the integrity of the prestressed construction no holes should be drilled through the floor and no part of the floor should be removed without advice from a qualified structural engineer.
Study bedroom windows	reversible horizontally hung timber sashes	Architect's drawing 1044/121d* YYY & Son Ltd: catalogue and operating instructions 17.3.89** and ZZZ ironmongery catalogue item 3.27**	These windows are designed to be cleaned from inside. Release of a safety catch allows the window to be reversed. A second catch automatically engages to secure the window in the reverse position for cleaning. Persons cleaning these windows must be shown how the catches work. If the automatic holding catch is not properly engaged a person cleaning the top of the window from a step ladder could swing the window over and fall out.

* Information included in the as-built drawing set

** Information appended to the site health and safety file

1.4 The contribution of design to accidents and ill health during construction work

In the past construction designers have held back from advice about, and systematic consideration of, site health and safety issues. In general site conditions have been seen as exclusively the contractor's responsibility. Too often the designer's attitude has been that whatever the designer details or specifies it is up to the contractor to find a way to build it safely. It is only where maintenance is concerned that designers have been more prepared to think through the implications of the design for the safety of those who will be carrying out the maintenance in future. But even for maintenance work, buildings and other structures are not routinely designed to avoid hazards and reduce risks to health and safety.

In the causation of many accidents there is clearly a design component. If a particular task had been avoided, or an alternative material had been specified, the accident would not have happened. But it is rarely possible to apportion the share of responsibility accurately between the care taken by the operative doing the work, the contractor's management of the site and the designer's instructions. The designer might have warned management of the risks or opted for a solution that did not expose those on site to the same level of risk. By choosing a solution with inherent risks the designer has contributed to the cause of the accident or ill health. In some accidents design may have been a major factor, in others it will have made only a minor contribution or none at all. The CDM Regulations will bring the designer's contribution to health and safety into sharper focus by requiring: an identification of hazards, the avoidance of hazards and the reduction of risks wherever practicable and the preparation of the pre-tender stage health and safety plan and, on completion of the project, the health and safety file on which preventative and protective measures can be based.

1.5 How accidents and illnesses occur in construction

Figures 4, 5 and 6 give a breakdown of reported accidents in recent years. Injuries, particularly the less serious ones, are likely to have been gravely under reported. Statistics for illnesses related to construction are even less reliable as there is no sure way to relate an illness to a particular construction activity. A cancer may develop many years after exposure to one of a number of different substances. It is known, however, that musculo-skeletal injury is a significant cause of time off from work and that this can be caused by manual handling of heavy items (see Figure 7). Accident enquiries and medical diagnosis also provide circumstantial evidence that lives could be saved, disabling injuries and illness avoided and time off work reduced if more attention was paid to health and safety on site.

The available statistics show very clearly that falls are what cause more deaths than anything else. 50% of fatalities are the result of falling more than 2m and 3% from falling less than 2m. Other common causes of death are being trapped by the collapse or overturn of adjacent ground, structure or object (15%) and being struck by a moving vehicle (13%) or a moving object (90%). 37% of falls are from roofs (over the edge of roofs, through fragile roofs and through openings in roofs).

Figures for injury are less reliable but, those we have, repeat the pattern of fatalities - falls are again the commonest cause.

The high incidence of accidents involving falls of over 2m could be predicted from a comparative risk analysis. In risk analysis an assessment is made of exposure to a hazard - many people on a construction site have to work or use routes where they are exposed to a drop of over 2m therefore the exposure to falling can be classified as 'high'. Risk analysis also assesses the severity of accidents resulting from a particular cause. Falling from more than 2m, is as likely to cause serious harm as almost any other hazard. The severity of risk from falling must certainly be considered as 'high'. The combination of high exposure and high likelihood of serious harm is what makes falling such a danger on construction sites.

Figure 4
Causes of fatal injuries to employees and self employed people in construction 1986/87 - 1991/92

Cause of accident	Fatalities
Falls over 2m	379
Falls less than 2m	21
Trapped (by collapse or overturning)	108
Struck by moving vehicle	107
Struck by moving/falling object	69
Contact with electricity	45
Asphyxiation	16
Contact with moving machiner	11
Other	17
Total	773

Figure 5
Fatal injuries to employees and self employed people in construction 1986/87 to 1991/92 for different types of construction project

Type of project	Fatalities
General construction	112
Building	211
Civil engineering	146
Civil engineering maintenance	35
Installation of fixtures and fittings	21
Building completion	10
Building repair and maintenance	159
Demolition	64
Other	15
Total	773

Figure 6 Fatalities and injuries to people working in some construction trades

Site process	Fatal injury	Major injury	Recovery over 3 days
site preparation (e.g. surveys)	1	33	66
demolition	8	45	56
ground works (e.g. excavation, sewers)	7	127	441
Istructural erection	2	57	117
scaffolding	2	94	236
cutting (e.g. masonry)	2	16	132
bricklaying	2	41	209
roofing	12	97	245
surface treatments (e.g. painting)	3	44	90
surfacing (e.g. road laying)	3	65	539
concreting	1	27	97
loadingloading	1	88	744
transfer on site (e.g. person, materials)	8	250	1,294
labouring	0	50	364
handling	0	46	580
highway maintenance	0	1	15
distribution networks (e.g. gas, electricity)	0	9	78
maintaining (e.g. repair and renovation)	1	44	353

Provisional figures reported for 1993-94

1.6 Considering health and safety in design

Designers are familiar with the need to reconcile requirements - some of which inevitably conflict. A compromise often has to be reached between requirements in the clients brief, aesthetic considerations, the building budget and the requirements of building regulations, etc. The CDM Regulations introduce the requirement that designers should consider the health and safety of those involved in construction work. Priorities are set for choosing between alternative safety measures (see 1.1). There will be instances when the safest measure cannot be implemented because it conflicts with another requirement. For example, it may not be acceptable from a town planning viewpoint or it may be excessively expensive. Designers must develop strategies for reaching the best compromise between requirements that is reasonably practicable. What is important is that the approach to the solution of design problems involves a proper exercise of judgement which takes account of health and safety issues.

Health and safety cannot be left to the last moment, when the designer is finally impelled to produce information for the planning supervisor to complete a health and safety plan. Health and safety issues must be considered alongside other design considerations starting at the initiation of the project. Some risks can be avoided altogether if they are foreseen at an early stage, others can be managed by timely programming to allow the work to be done when an existing building is unoccupied or by making early arrangements for some occupants to work elsewhere. There may be other reasons for taking these decisions, but it is only when the health and safety aspects (and possibly the extra cost of protecting people on site) are taken into account that a convincing case can be made.

As designs develop from the general to the particular, different issues will need to be considered. For example at feasibility and outline proposals stages the positioning of the building footprint may be altered to avoid risks associated with contaminated land or overhead cables. At detailed design the issues to be considered may turn to health hazards associated with glues or surface finishes to be applied on site. Similarly, different decisions will fall to different disciplines within the design team. Designers should co-operate to ensure their decisions are not in conflict with steps taken by other designers to reduce risks when their designs are executed on site.

Designers are responsible for considering matters which it is reasonable to expect them to consider at the time they prepare their design. For example the designer responsible for the submission of outline proposals is expected to consider issues associated with the positioning of the structure on the site, but not necessarily with issues associated with internal surface finishes which would be considered during detailed design.

The ACOP makes it clear that designers need to apply a level of skill and care to the decisions they make about health and safety which reflects that exhibited by their profession as a whole. The level of skill of design professionals will increase with time and so will the standard by which they are judged.

Part 2 of this publication takes each stage of the RIBA plan of work and lists some of the health and safety issues that should be considered at that stage. In many cases the issues are listed at an early stage when designers may not be in a position to make a final decision - or even to make a reasonable assessment of the risks involved, nevertheless they should ask themselves:

1. Does this issue apply to the project?
2. If it does - can a decision be made that will avoid or minimise risk?
3. If no decision can be made - how can I ensure that the issue is properly considered while the options for avoiding and minimizing risk are still open?

A satisfactory answer to question 3 will only be provided by systematically reviewing health and safety issues at each stage of the project. The review should reconsider the issues raised at earlier stages in the light of more recent design decisions and should take on board additional aspects of health and safety that only become apparent as the design is developed.

1.7 Guidance on health and safety issues

Guidance on many health and safety issues is already available. Much of this guidance is about how work is executed on site, designers will find it useful to assist them in the identification of the health and safety issues to which they should turn their attention. A wider range of guidance aimed specifically at designers is likely to be published during the next few years. Part 2 of this publication suggests which of the references in Part 3 designers are likely to find most useful at each stage of the project.

The references given in Part 3 of this publication may not provide all the information that designers and planning supervisors will need to fulfil their duties under the CDM Regulations but they should provide a good starting point, Planning supervisors in particular may need to go further. By consulting the libraries, information sources and journals listed in Part 3 more detailed and specialised information can be accessed. A great deal of information is available but it is not necessary for a small practice to assemble a large library of publications as only a small percentage of the material is relevant to any one project. Current prices have been included in the reference list. In many cases basic information is free or included in publications and information systems that designers will already have in their offices.

Much useful information is also available on health and safety data sheets for products which are already available in many practice libraries. These sheets are useful for identifying health and safety issues associated with the use of the product and can be a valuable resource for designers specifying these materials.

Part 2 REDUCING THE RISK

A Inception

At this stage, when a start is made with assembling the team that will design and construct a project, there is a need for all members of the team, including the client, to become aware of their duties and responsibilities for health and safety on site.

Issues **The regulations require designers to:**

for

designers

- Make clients aware of health and safety responsibilities - of the existence of the CDM Regulations and which projects they apply to, of the need to appoint a planning supervisor, of the 'competence and resources' requirements for designers, planning supervisors and contractors and of the notification to be made to the Health and Safety Executive.

- Be prepared to co-operate with other designers and the planning supervisor for the project.

- Be prepared to provide evidence of competence and resources to handle health and safety duties as a designer and, if required, as a planning supervisor. Evidence may be required of awareness of legislation, construction hazards and steps which can be taken to eliminate hazards and reduce risks by design. Information about specialist skills available in house and externally and of the existence of design management procedures to ensure health and safety is taken into account during the design process may also be required.

Designers may also need to:

- Check that design office procedures and records take account of CDM Regulations. Note that additional and amended clauses maybe added to standard contracts and specifications.

- Include provision in the letter of appointment for planning supervision if it is required. The extent of services should be spelled out. If any charge is to be made for the services it should be specified.

- Where other designers are already involved ensure that the letter of appointment specifies who will take the planning supervisor's role. All design consultants' appointments should make clear the requirement that designers co-operate with each other and with the planning supervisor.

- Advise client of CDM implications for construction programme and site selection.

- Check with professional indemnity insurance before accepting additional duties in relation to CDM.

References The RIBA job book (18. 1), the RIBA standard forms of agreement, the CDM Regulations (11. 13,) the ACOP(11. 14) and the CONIAC guidance “Designing for health and safety in construction” (11.102) and “A guide to managing health and safety in construction” (11.48) are the basic references at this stage. When the job book is amended, there will no doubt be specific references to the designer’s duties under CDM. At present they can only be inferred from the general recommendations relating to the architect’s appointment (18.2 and 18. 3) and the preliminary discussions with the client.

Background information on health and safety is available in many publications. A good introduction is the CIRIA book ‘Site Safety’ (8.7) or HSE’S ‘Blackspot construction’ (11 .7), ‘Deadly maintenance’ (11.21) or ‘Health and safety on small construction sites’ (11. 103).

For reference there are several wide ranging books and binders. The most comprehensive is the BEC two volume manual ‘Construction Safety’ (4.1). Others are from CITB (9.1), from ROSPA (19. 1) from Tolley (23. 1) and from Butterworth-Heinemam (6,1).

The full range of legislation for sites is given in the reference publications above. Part 3 includes references for regulations on: Safety signs (11 .37), Noise (1 1.51), Control of substances hazardous to health (1 1,44), Asbestos (11.16) and Lead (11.17).

B Feasibility

This is the stage at which data is assembled to allow a decision to be made on whether to pursue a project (and possibly on which project or which approach to pursue). Some site information and information on the proposed use of the site may have health and safety implications which need to be examined before the feasibility of the project is confirmed.

- Issues for designers**
- Examine existing site information for possible hazards e.g.
 - contaminated soil;
 - unstable slopes, unfilled basements, swallow holes and mineworkings;
 - overhead cables;
 - underground gas and electricity services;
 - accident hazards for vehicles and pedestrian;
 - unsafe trees;
 - high water table and risk of sudden flooding;
 - adjoining properties, including their position, construction and foundations;
 - need to work over (or adjacent to) water, trains, traffic;
 - security and trespass;
 - sensitivity of adjacent uses to construction noise;
 - sensitivity of adjacent uses to uses and fumes;
 - space for site welfare facilities and storage.
 - Consider the use of the site during construction and maintenance operations and whether hazards will be increased:
 - underground accommodation (stability of adjoining properties, flooding, access to remove spoil);
 - multi storey accommodation (restrictions on the use of cranes, protection over adjacent public ways and people working in adjacent properties).
 - See what additional information is required to confirm feasibility, eg site surveys, soil surveys, existing building records.
 - Consider the need for specialist contractors and specific methods of procurement that can involve the contractor's specialist knowledge at an early stage. Also review whether specific health and safety expertise is needed to deal with design for the site conditions.
- Additional issues for existing buildings**
- When work is likely to involve the alteration repair or maintenance of an existing building also consider e.g.
 - existing managements safety policy;
 - areas to be allocated for work - including access and rubbish removal;
 - protection of building users:

effect of work on means of escape and fire safety;
safe installation of temporary and rerouted services.

- At this stage the designer may not be in a position to know what hazards will be discovered when the structure is opened up (eg presence of asbestos insulation). In such cases make a health and safety record of investigations that could not be done as well as those that were done. Clients have a duty to provide information which is reasonable for someone in their position to obtain by making reasonable enquiries. In many cases it will be reasonable to expect them to commission surveys on the advice of a designer or the planning supervisor.

References There are several sources of guidance on site investigation: BS 5930:1981 (2.8) gives recommendations for all types of project, BRE digests 318,322 and 348 (5.6) are specially for low rise building.

Other references deal with identification of specific hazards inherent in sites such as:

Contaminated land Contaminated land investigation BS DD 175:1988 (2.19), BRE information paper 2/1 987 (5.2) and from HSE (11.64) on protection of the public, There is an HSE database for air and biological monitoring on floppy disk (24.7).

Noise The standard for noise control is E3S 5228 (2.3) and there is the HSE Noise in construction series (11.51- 55). BEC have a publication and assessment forms (4.4) and CIRIA produce a guide on planning to reduce noise exposure (8.4) and information on noise screens (8.6).

Site planning The BEC looseleaf manual on Construction Safety (4.1) discusses site planning and layout in chapter 3.

Services HSE produce information on avoiding danger from overhead cables (1 1.4) and underground services (1 1.5,11.5, 11.9) There is a CITB video on overhead cables (25.2).

There are also publications that deal with specific types of building project and works such as:

Demolition BS 6187: 1982 (2.12) is the code of practice for demolition. HSE have a four part publication (1 1.39) and a film (26.2).

Earthwork BS 6031:1981 (2.11) is the code of practice for earthworks

Explosives BS 5607:56071988 (2,6) is the code for safe use of explosives
Ground water CIRIA have a publication on ground water control for temporary works (8. 1).

Maintenance	BS 8210:1986 (2.16) is a guide to building maintenance management. HSE discuss maintenance fatalities in(11.21) and provide a video on precautions in maintenance (25.11).
Petrol stations	Petrol filling stations (11 .58).
Pools	Maintenance in swimming pools (22.1).
Renovation and refurbishment	The BEC and LPC joint publication (4.6) Fire prevention on construction sites includes guidance for buildings undergoing renovation. The BEC construction safety manual (4.1) deals with safety and health in refurbishment in chapter 27.HSE publish the regulations, ACOP and guidance on asbestos (11. 16).
Schools	Building contracts on education premises (1 1.8).
Tree work	BS 3998:1989 gives recommendations for tree work. There is also a publication by the Arboricultural Safety Council (1.5).

c Outline proposals

Alternative concepts (or approaches) can be assessed at this stage. As the limitations and opportunities inherent in different solutions become apparent a more detailed brief can be developed. Site safety should be taken into account in the selection of an outline proposal.

Issues for designers

- By the beginning of this stage a planning supervisor should be appointed and the method of recording health and safety information should be set up. Items in the brief that affect health and safety should be recorded. The planning supervisor should have ensured that details of the project have been notified to HSE.

The Regulations do not give the client duties in respect of work on his or her own house, appointment of a planning supervisor or principal contractor is not required in these circumstances (but designers and contractors do still have duties).

- When considering each option decide whether any part of the construction programme, any operation or any combination of circumstances on the site will create unusually hazardous conditions which require special attention during design and construction (for example such items as deep excavation, removal of asbestos, chemical cleaning of masonry or high level work immediately adjacent to a school playground).

- If unusually hazardous conditions can be foreseen consider alternative approaches that would avoid them. If avoidance seems impossible within the constraints of the project then look for ways to reduce risk by measures that protect the whole workplace (for example a perimeter guard rail to a high level roof). Only when such measures are not feasible should protection of individuals be considered (for example by attachment of lifelines and safety harnesses).

- Include the cost of health and safety measures in budgets when alternative options are costed.

- When a health and safety issue is considered it will be useful to make a record so that:

1. the issue is picked up and dealt with at later stages;
2. there is a reminder on file in case an option that has been rejected on health and safety grounds is adopted at a later stage by a designer who is unaware of the safety issue and

3. measures are not overlooked when the time comes for the planning supervisor to prepare the health and safety file.

- Check the resources available within the office to develop the design and to run the job. Are the staff allocated competent in health and safety? Is additional training or preparation required? These matters will have been discussed with the client and planning supervisor when appointments were made.

- If constructing the selected option involves health and safety issues for which the designer judges specialist advice is needed, the client should have been asked to appoint a specialist or arrangements for access to specialist advice should have been agreed when appointments were made. Examples where specialists may be required to help develop specific proposals are:

basements or boreholes on contaminated sites;
buildings for industrial processes involving risk of explosion or use of toxic chemicals,
work in large building complexes with sophisticated safety systems installed;
work over deep or fast flowing water.

- Detailed aspects of the brief with health and safety implications may need to be clarified. Examples are:

space for working (feasibility of temporary use of highway or of adjoining land);
vehicle and pedestrian access (opportunity to provide temporary entrance and exit to the site during construction);
protection of the public and of adjoining users (feasibility of rerouting roads and paths away from working areas or of fencing off adjacent areas);
requirements for handover, including access for partial completions, commissioning plant and training personnel;
feasibility of temporary or permanent rerouting of services.

- Consider the maintenance implications of design options. The same principles of avoiding and minimising hazards apply to maintenance operations implied by a design as it does to the initial building operation.

Additional issues for existing buildings

- Consult the building's management when selecting options, advise on the health and safety implications of the construction work and agree procedures to avoid conflict with the normal work activities at the premises.

- Consider welfare aspects of working in the existing building are existing washing and toilet facilities suitable? Can they be used?

-Is additional information on existing construction and services needed to confirm feasibility of options being considered? Consider whether additional surveys are required.

- References** The CDM ACOP(11. 14) and the CONIAC guidance (11.48 and 11.102) explain the principles of prevention and protection.
- BEC publish a guide to preparing a health and safety statement for a small business in construction (4.3).
- In addition to the information on site surveys, overhead and underground services, site layout and specific types of building project already referred to in stage B, other information may be needed on hazards implied by a particular design approach:
- Confined Spaces** Confined space working is covered in BS 8313:1989 (2.14) in an HSE summary sheet (11.27) and in chapter 23 of the BEC construction safety manual. There is also an HSE video (25. 12).
- Excavations** Groundwork and excavation is covered in BS6187: 1982(2.11) the code of practice for earthworks, BS 5573:1978 (2,4) the code for safety precautions in the construction of large diameter boreholes, the HSE summary sheet on safety in excavations (11.68) and in chapter 8B of the BEC manual (4.1).
- Access and working platforms** Access for working above ground is covered in many publications on scaffolding and access appliances. BS 5973:1990 (2.9) and BS 5974:1990 (2.10) deal with scaffolding and access equipment. HSE publish a sheet (11.34) on general access scaffolds, (11.92 & J 1.93) on suspended access equipment, suspended cradles and small lifting appliances and (11 .94) on tower scaffolds. The National Association of Scaffolding Contractors produces a guide for scaffolders and users (1 5.9 1) and the BEC manual deals with scaffolds in chapter 7 (4. 1). There are HSE publications on hoists (11. 15) and inclined hoists (11 .42). BS 8093:1992 (1.16) deals with safety nets and containment nets.
- Demolition** HSE cover the preparation and planning of demolition work in Part 1 of (11.39) and the techniques for demolition in Part 3; there is also an HSE film (26.2). BS 5607:1988 (2.6) is the code for safe use of explosives. BS 6187:1982 (2. 12) is the main code. Chapter 8A of the BEC manual is on demolition (4.1).
- Maintenance & Cleaning** BS 8210:1986 (2.17) is on maintenance management. BS 8213 Part 1:1991 (2,18) covers window, door and rooflight cleaning, BS 8200:1985 (2.16) deals with cladding design. BS 6548:Pt 21992 (2.13) deals with maintainability of equipment. HSE have a publication on fatal accidents in maintenance (11.21) and a video on precautions against accidents in maintenance (25.11).

- Structures** Safe erection of structures is dealt with in an HSE four part publication (1 1.76) and in chapter 16 of the BEC manual (4.1), HSE also produce a guide for small contractors on site safety and concrete construction (11.36) and on pre-stressed concrete (11.62).
- Roofs** Roofwork is dealt with by HSE in (1 1.70, 11.72 & 11 .29& 11.83) BEC cover roofwork in chapter 15. (4.1). BS 5803 (2.7) deals with installing different materials as thermal insulation in pitched roofs. HSE publish GNW146 on exposure to mineral wool (11,49 & 11.87).
- Water** Chapter 8E of the BEC manual (4.1) details the precautions to be taken when working over, on, or near water.
- Welfare** A construction sheet (11 .65) published by HSE deals with welfare arrangements for small fixed sites. The National Joint Council publish a health and welfare guide (16.1)

D Scheme design

This is a key stage in design after which different approaches to many health and safety issues become increasingly difficult to implement. By the end of this stage a full design proposal, construction programme and method of procurement should have been agreed. All the design consultants and most major component designers will be involved. It should therefore be possible by working through the construction process, from when work starts on site to handover, to consider the health and safety aspects of each operation.

Issues for designers

- For the operations at each stage of construction consider what health and safety issues are involved paying particular attention to:
entrapment in excavations - eg manual work in deep trenches;
risk of falling - eg when roof edge protection cannot be fitted;
risk of vehicle accidents - eg when traffic routes conflict;
electrocution - eg from power lines adjacent to work;
exposure to dust or chemicals - eg from cleaning masonry;
gas explosions - eg horn pipework in unventilated spaces, and
fire hazards - eg from welding and cutting operations near to flammable materials.

-When a hazard is identified examine the opportunities for avoiding it altogether. If it cannot be avoided decide how to minimise and manage the risk. Measures that provide general protection should be preferred to measures which only protect individual workers.

-Ensure that any health and safety precautions required are noted in the safety records and that costs are allowed for in the budget. Ensure that the QS has an opportunity to assess whether the design is “cost safe effective” (i.e. that the cost of the measures necessary to build a particular feature safely will not be totally out of proportion with the costs that would normally be expected).

- Involve all other design consultants, the QS and component designers in the identification of hazards and the health and safety measures required.

Additional issues for existing buildings

- Plan out the working space needed for each stage of the job and check with the client that the space can be made available and secure.

- See that access to the work does not create avoidable hazards for users of the building. Consider vehicle and pedestrian routes and access for fire and ambulance services. Make sure that emergency escape, fire alarms, security systems etc are not interfered with. Liaison with the occupier is essential.

- In an occupied building consider the effect of each operation on the users of the building. Check particularly:

noisy operations;

operations that create fumes and dust;

operations that could interrupt existing services (water supply, heating, ventilation, lighting, cooling of storage areas);

waste storage and disposal (from the existing building and from the works);

use of welfare facilities for existing users and for construction workers. (washing, changing, toilets, first aid, rest rooms).

It may also be necessary to consider if there are any hazards arising from the normal operations at the site. For example where work is being done in an operating factory the factory process or machinery may create hazards.

Barriers, permits to work etc. to allow the two activities to go on in parallel may have to be considered. Again liaison with the occupier is essential.

Note solutions to be adopted in health and safety records.

Figure 7 is an illustrative health and safety checklist for use at this stage.

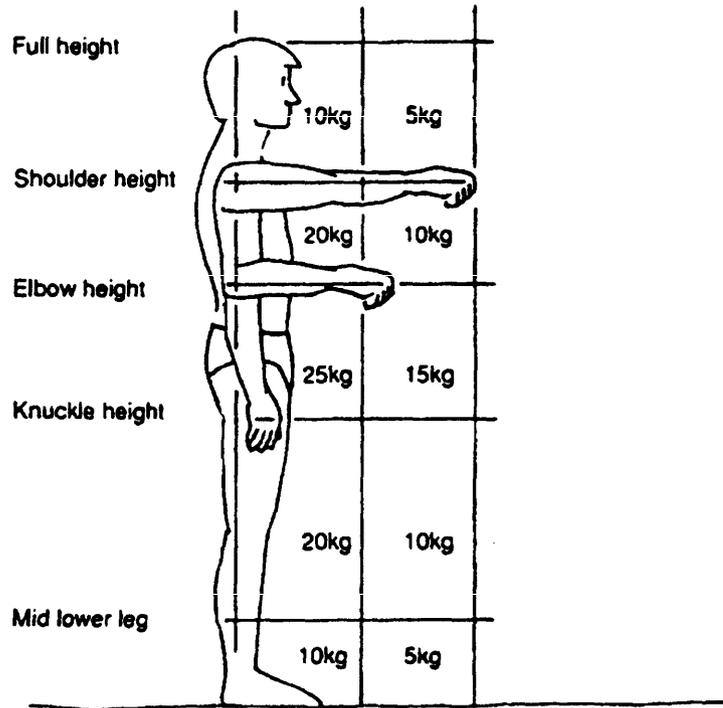
Figure 7 Scheme Design check list

This table is not a comprehensive listing - it is intended as a prompt to help designers build their own listings for particular types of work.

CAWS work section	Hazards	Some references (see reference Nos. in Part 3)
- Preliminaries/ general conditions	falls, falling objects. vehicles, dust, toxic substances, (site welfare)	temporary work 2.9, 11.69, contaminated land 11.64, dust 11.24, welfare 11.14, 11.65 overhead and underground services 11.4, 11.6
- Complete buildings	falling objects, machinery	transport 11.20
- Demolition/ alteration/ renovation	falls, falling objects, respiratory, toxic substances, musculo skeletal, fire, entrapment, electrocution	demolition 2.12, 11.39,26.2, explosives 2.6, contaminated land 5.2, fire 4.6, wood preservatives 5.4, 11.66 replacing lintels 5.5, cleaning brick and stone 21.1 streetworks 27.1, rootwork 11.83
- Groundwork	electrocution, entrapment, machinery, falling objects, asphyxiation, musculo skeletal, hearing, toxic substances, microbiological	underground services 11.6, groundwork 2.11, 11.68, trenches 11.68, contaminated land 11.64, boreholes 2.4 weil's disease 11.46, noise 84
E- In situ concrete/large precast concrete	respiratory, skin contact, musculo skeletal, machinery, falling objects	cement 11.10, musculo skeletal 11.47 concrete 11.36, striking times 8.2
F - Masonry	falls, musculo skeletal, respiratory, skin contact, falling objects, vision	heavy blocks 11.38, protective clothing 11.63, dust 11.24, scaffolding 15.1
G-Structural/ carcassing metal/ timber	falls, musculo skeletal, falling objects, fire, entrapment	erection of structures 11.76 welding 11.100
H - Cladding/covering	falls, skin contact, toxic substances	lead 11.17, nailing guns 11.74, 11.60, adhesives 11.59
J - Waterproofing	falls, falling objects, cuts, fire, skin contact machine	roofwork 11.70, pitch and tar 11.84
K - Linings/sheathing/dray partitioning	falls, musculo skeletal, machinery, hearing, entrapment	portable tools 11.61, noise 2.3, access to ducts 2.14
L - Windows/doors/stairs	musculo skeletal, falls, skin contact	cleaning 2.17, 11.92, glass 10.1
M - Surface finishes	respiratory, falls, skin contact, fire, asphyxiation	painting 5.3, 14.1, flammable sprays 11.88, dust 11.99, 11.24
N - Furniture/equipment	musculo skeletal	manual handling 11.101
P - Building fabric sundries	cuts, skin contact, respiratory	toxic substances 11.95
Q - Paving/planting/fencing/site furniture	falls, falling objects, machinery	free work 1.5,2.2, public safety 20.1, children on sites 11.1
R - Disposal systems	microbiological, toxic substances, entrapment	Weil's disease 11.46, excavations 11.86
S- Piped supply systems	toxic substances, fire	COSH.H 11.89, fire prevention 4. 6
T & U - Mechanical heating/cooling refrigeration systems and ventilation and air conditioning	machinery, toxic substances, microbiological, fire	gas cylinders 11.90, air conditioning heating and ventilation 25.6, COSHH 11.89
V&W - Electrical/supply/Power/lighting systems and communications/security/ control systems	falls, electrocution, respiratory, hearing	fibres 11.87,2.7 exposure limits 11.56
X - Transport systems	falls, machinery, falling objects, musculo skeletal, electrocution	lifting appliances 11.93

References	The additional references at this stage deal with specific health or safety issues related to particular tools, equipment, operations and processes (publications on substances and components are listed under references in stage E).
Chainsaws	Safety guides for chainsaws and hedgecutters by the Arboricultural Safety Council (1.2), and Chainsaws by HSE (11. 11).
Tools	There are HSE publications on: portable electric tools and equipment (11,61 & 11.6 1), pneumatic nailing and stapling tools (11 .60) and pneumatic breakers (1 1.54), cartridge operated tools (11 .74) and the use of abrasive wheels (11.73) and from ASC (1.1).
Protective clothing and equipment	Protective clothing and footwear in the construction industry (11 .63) and Respiratory protective equipment: a practical guide for users (1 1.67) are available from HSE.
Dumpers transport	HSE publish Safe working with small dumpers (11.8 1) and Danger with transport at work (11.20). DoT publish Safety at street works and road works (27.1).
Specialist services	Chapter 30 of the BEC construction safety manual (4.1) covers hazards associated with the following specialist services: High pressure water jetting Grit blasting Thermic lancing Lasers Site radiography Pipe and cable freezing Ground treatment Stressing operations Site investigation.
Fire	Prevention of fires on construction sites is covered in two BEC publications (4.2 & 4.6). HSE have publications on: spraying flammable liquids (11.88), using flammable liquids (11.33), flammable materials on sites (1 1.40) and on hot work, welding and cutting, where there are flammable materials (1 1.41).
Falsework	BRE Good Building Guide 1 deals with safety in repairing or replacing lintels (5.5), Safety in falsework for in-situ beams and slabs is an HSE publication (11.69).
Manual handling	Two HSE publications deal with musculo-skeletal disorders (11.47 & 11 .98). Handling of building blocks is dealt within an HSE leaflet (11 .38). There is an HSE film on manual handling (26.3) detailed guidance on the manual handling regulations is also available from HSE. (11. 101).

Figure 8 Safety limits for manual handling - lifting heavy items



Manual Handling Regulations - The illustration does not show the maximum loads allowed but gives guidelines to be used as an initial filter to identify operations which should be considered in detail

Painting

A BRE miscellaneous leaflet (5.3) deals with hazards from interior painting using solvent borne paints. The HSE publication (11.86) also deals with solvents. A more general booklet on Health and Society in painting is produced by The National Federation of Painting and decorating contractors (14.1).

Welding & cutting

Flame cutting and welding with compressed gases (11.32), Hot work: welding and cutting on plant containing flammable materials (11.41), Electrical safety in arc welding (11.25) and Welding (11.100) are available from HSE.

E Detail design

The detail design stage involves the final choice of many construction details and specification items and the working methods involved. At this stage the health and safety records can be used as a basis for drawing up a draft of the health and safety plan that the contractor will be provided with when pricing and tendering for the work.

Issues for designers

- When production information is being drafted and the input from other consultants is being co-ordinated, the health and safety records should be reviewed and additional health and safety aspects should be considered. Particular attention should be given to detailing and specification of
 - fixing methods and processes that are likely to be attempted from unsafe work places;
 - the unloading, moving and locating of heavy or awkwardly shaped components where access for lifting appliances and vehicles is restricted
 - materials that can present health hazards (eg paint solvents, lead, lime, timber treatments, UF foam, isocyanates);
 - materials and components that can cause injury (eg heavy masonry units, sharp edged wall ties, corrosive cleaning agents);
 - processes and waste disposal arrangements that produce dust (eg grinding, sanding, grit blasting, chasing, cutting holes, dropping rubbish, removing plaster, demolition, installing glassfibre and mineral Wool) and
 - noisy operations (eg breaking concrete, pile driving, shot fixing, pumps and compressors running for long periods).

For each item identified the risks should be assessed. If avoidance of risk is not feasible measures to minimise and manage the risk should be noted in the safety records, giving priority to those that protect the whole work place over those that only protect individuals.

- Check that details do not introduce maintenance hazards such as:
 - inaccessible filters and lamps that require routine maintenance;
 - inaccessible heavy machinery that requires manhandling to replace;
 - roof edges with no permanent protection and no means of securing temporary protection;
 - glazing that is not accessible to conventional cleaning methods;
 - confined spaces with inadequate dimensions for predictable maintenance and replacement operations, and
 - remedial surface treatments requiring use of solvents in occupied buildings.

- Consider the competence and resources required by contractors and sub-contractors to carry out the work safely and what selection

procedure should be adopted. Should there be specific requirements for experience and resources? - if so make reference in the health and safety records.

Check that you have passed all necessary health and safety information to the planning supervisor for inclusion in the pre-tender health and safety plan.

- Consider and obtain approval for cost of health and safety measures.

Additional issues for existing buildings

- Design and or specify protective screens, temporary enclosures and platforms to protect existing building users.

- Co-ordinate work with activities in the building (eg school holidays, seasonal production runs, public events).

- Assess building security and fire protection at each stage of the work.

References

Publications dealing with work processes and equipment were referred to under stage E, Those listed below cover substances and components:

Substances generally

HSE publish: Toxic substances, a precautionary policy (1 1.95), Monitoring strategies for toxic substances (11. 50). Assessment of substances hazardous to health is dealt within (1 1.89 & 11.44) The BEC construction safety manual (4. 1) deals with hazardous substances in chapter 25. A comprehensive guide to control of hazardous substances is produced by CELIA (8.3).

Asbestos

The control of asbestos at work regulations, Approved code of practice (11. 16) and Asbestos exposure limits (1 1.3) are produced by HSE who also publish a summary sheet for small contractors on working with asbestos (11.97).

Cement

Cement, Health Hazard Information Sheet 1 (11.10) is from HSE.

Dust

Dust in the workplace: general principles of protection (11.24), exposure to mineral wools (11 .49) and Control of hardwood dust (11.18) and Wood dust (1 1.99) are from HSE.

Eyebolts

There is an HSE publication on Eyebolts (1 1.30).

Isocyanates

Toxic hazards and precautions related to these substances are covered by (11.45) from HSE.

Lead

Control of lead at work is the approved code of practice (11.17) from HSE who also publish (11 .2) on lead. The Lead Sheet Association publish (13.1).

Lime	The draft revision of BS 890, Specification for building limes has a section on safety (2. 1).
Masonry units	HSE publish a sheet on handling building blocks (1 1.38).
Pitch and tar	Skin cancer caused by pitch and tar is published by HSE(11.84).
Wood	BS 5589:1989 (2.5) is the code of practice for wood preservatives, BILE digest (5.4) deals with the safe use of remedial wood preservatives, HSE have two publications on this subject (11.43 & 11.66).

F Production information

The information produced at this stage is used by the contractor for planning and construction. The pre-tender stage health and safety plan will usually be produced at this stage. It should contain all essential health and safety information on the site and construction work needed to complete the work.

Issues for designers - Review all items noted in the health and safety records with the planning supervisor, identify the information that the contractor will need and decide in conjunction with the QS and other design consultants how each item of information is to be made available to tenderers.

Items assessed as major health or safety risks (particularly those that are specific to the project) must be made a part of the pre-tender stage health and safety plan. Suggested construction methods may be referred to in the plan leaving tenderers to propose alternatives. Items referred to in the health and safety plan should, where relevant, be shown on drawings and in the specification.

- Some health and safety issues may not become apparent until the specification (or specification notes for incorporation in bill items) are being prepared. For example:

- procedure for approval of changes in method statements;
- need for confirmation of satisfactory test results on concrete to be confirmed before temporary supports are removed;
- risks of use and refilling of petrol driven power tools if operation is in a confined space.

Besides setting down requirements in the specification such issues should be noted in the health and safety records and possibly also in the pre-tender stage health and safety plan.

- Check that standard specifications to be used have been updated to take account of designers' responsibilities under the CDM Regulations.

- If the method of procurement decided on requires selected lists of tenderers for main or sub-contracts, consider how to ensure that those selected are competent and adequately resourced to deal with the health and safety issues on site. Contractors may be asked for details of previous experience of similar work, for information on their firm's health and safety policy. When contractors are interviewed the person responsible for health and safety may be asked to attend the interview.

- A final health and safety review of the design can be carried out paying particular attention to:

co-ordination of health and safety measures in the work of the different design consultants (eg will access equipment be available for fixing services);

required sequence of construction (eg underpinning adjacent structures and excavation for drainage);

procedure for handover - to ensure that parts handed over early are safe to use (eg means of escape, security, isolation from noise, dust and fumes, safe power and gas supplies).

Additional issues for existing buildings

- Consider the need to specific control points in the progress of the work when inspection and approval of the exposed structure is needed before the work is allowed to proceed.

- See that the direction of existing spans is clearly shown on the drawings from which the contractor will work (ie production drawings as well as survey drawings).

- Specific the access and guarding required before other operations, such as stripping out, are started.

References

References listed under previous stages can be used for the health and safety review of production information.

G Bills of quantities

The bills draw together the information prepared by the design consultants and can provide an additional check on health and safety issues. They also provide an opportunity to ensure that some important issues are considered by contractors when the work is priced so that adequate resources can be allocated.

Issues for quantity surveyors

- Use the health and safety records and plan to ensure that issues referred to are reflected in specific bill items and in the descriptions of work, materials and components.
- Make specific references in bills to health and safety issues relating to operations, components and materials (eg refer to manufacturer's safety data sheets rather than simply to manufacturer's recommendations).
- To encourage the contractor to allow adequate resources, consider whether safety items, such as access platforms, use of mechanical lifting appliances or provision of secure storage need to be separate bill items rather than being covered in a general preliminary
- Consider the need to include items requiring the contractor to include for additional survey or investigations to confirm ground conditions, service runs or condition of existing structures.
- In preparing the bills of quantities the QS may become aware of items that are not "cost safe effective" (see I) or are likely to be expensive to "maintain safely. Such items should be discussed with the planning supervisor and other designers to see whether the health and safety aspects can be improved. Where safety measures are seen by those having to execute the work as unreasonably costly the precautions are more likely to be bypassed or implemented half heartedly.

Additional issues for existing buildings

- Ensure that adequate screening and protection of the work space is included if the work is in an occupied building. The use of existing welfare facilities (or the need for temporary facilities) may need to be included as a bill item.

H Tender action

At this stage the health and safety issues identified in previous stages should be transmitted to the tenderers. The cost of health and safety measures can then be included in tenders, avoiding claims later on.

Issues for designers -Information about the site needs to be made available to tenderers. Where health or safety issues have been identified tenderers should be made aware of the relevant documents (eg surveys, record drawings, restrictions on use, sensitivity of adjoining uses to noise, dust etc., security).

The pre-tender stage health and safety plan should be included in the tender documentation and successful tenderers must be able to satisfy the planning supervisor that adequate provision has been made to deal with the hazards identified. If the principal contractor foresees problems implementing the plan alternative methods may be proposed.

- When drawing up tender lists consult the planning supervisor on the means to ensure that tenderers are competent and adequately resourced for the work. Specific aspects of management, experience, training etc. may need to be checked. Preelection meetings may be required.

- The planning supervisor should advise the client of the steps necessary to ensure that the successful contractor is competent and adequately resourced. Any comments or proposed amendments by tenderers that affect the health and safety plan should be discussed between the planning supervisor and the relevant designers.

- See that relevant health and safety measures are specified in contracts for preliminary work (eg demolition, boreholes, tree felling and lopping).

Additional issues for existing buildings - Tenderers should be provided with all relevant information on the condition and use of existing buildings, including relevant details of the managements health and safety policy.

References The references under stage C to contractors' safety policies and CONIAC guidance "A guide to managing health and safety in construction" (11.48) are relevant to this stage.

J Project planning

At this stage the principal contractor will be appointed. The principal contractor should notify the planning supervisor of information affecting the health and safety file. Procedures will need to be established for dealing with health and safety issues affecting design that arise on site.

Issues for designers

- Remind the client that formal appointment of a principal contractor is a requirement of the CDM Regulations. The planning supervisor should ensure that the HSE is notified of the contractors involved in the project and any further required information not already notified to HSE.
- Check that the client and the principal contractor know that work must not start on site until the principal contractor's health and safety plan has been agreed by the planning supervisor - if work does start before there is a plan the client may be prosecuted.
- Consider briefing for resident engineers, clerks of works, job architects and other consultants visiting the site about steps they need to take to comply with safety requirements on site. This will normally be done by the principal contractor for all site visitors.
- Establish regular reviews of health and safety issues as a standard item on the agenda of project meetings.
- Agree procedures for dealing with health and safety issues arising from amendments to the design. Where amendments affect the health and safety file the planning supervisor needs to be kept informed.
- Remind the contractor of the need for sub-contractors to be competent and adequately resourced to ensure health and safety on site.

Additional issues for existing buildings

- Check that procedures for liaison on health and safety matters between the management of an occupied building and the principal contractor are working as set out in the pre-tender stage health and safety plan.

References

Many references previously listed are relevant to planning the work and the use of the site, in particular, access and working platforms (see stage C).

K Operations on site

The site will operate under the principal contractor's health and safety plan. Designers visiting the site should conform with the procedures in this plan. Designers do not have responsibility for the safe operation of the site once the work has started, nevertheless they will wish to draw attention to unsafe conditions that they become aware of when visiting the site.

Issues for designers

- See that design staff know to report when arriving at and when leaving the site, use appropriate protective clothing and equipment, only make unaccompanied inspections where risks are low and when the contractor's site management knows the route they will take.

- Design staff will gain knowledge of safe (and unsafe) working procedures as they visit sites. Site experience should feed back into the consideration of health and safety in design work. This will help to create an active safety culture within the business. While visiting sites design staff may identify:
 - non-conformity with procedures relating to the health and safety plan that the contractor was provided with when tendering;
 - unsafe access (eg scaffolding, hoists, ladders, stairs);
 - unsafe work places (unguarded roofs, unshored trenches);
 - unventilated spaces (with high dust and fume concentrations);
 - work below unprotected from work above;
 - operatives without appropriate protective clothing or equipment;
 - unsafe use of vehicles;
 - unsafe use of power tools;
 - lack of basic precautions when carrying out potentially dangerous operations (eg not turning off power when working on cables, an operative working alone and unattended at the bottom of a deep excavation) andother unsafe work practices.

When unsafe conditions are identified, staff should know how to bring the condition to the contractors attention and when appropriate how to record what was seen and reported for office reference. However the maintenance and review of site conditions is the responsibility of the principal contractor.

- When site instructions and amended drawings are issued health and safety implications should be assessed. The design office procedure should ensure that:
 - risks are assessed before the work is started and principles of risk control are followed (ie avoid when possible, protect the workplace as a first preference rather than adopting protection for individuals);
 - measures proposed to reduce risk are agreed by the planning supervisor and the principal contractor.

References	Most previously listed references are likely to be relevant once work starts on site. HSE publish a Construction site safety check list, 1988. The additional publications listed below deal with aspects that may not have been considered at previous stages:
Scaffold boards	Timber scaffold boards - reducing the incidence of site injury, BRE Information paper (5.7).
Electricity	Electricity on construction sites, (1 1.26, 11.80, 11.96) from HSE and (5.1) from BRE.
Safety signs	Guide to safety signs regulations 1980, (1 1.37) from HSE.
Stacking Materials	Safety in stacking materials, (1 1.72) from HSE.
Ladder	Safe use of ladders,(11.77, 11.78) from HSE.
LPG	Storage and use of LPG on construction sites, (1 1.90) from HSE.
Site Inspection	There is an article in RIBA practice (18.4) on inspecting sites safely.

L Completion

The handover of the completed work means a transfer of responsibility for health and safety in the building from the principal contractor to the client. Whatever information is needed to operate the building safely should be collected together by the planning supervisor and passed to the client as the health and safety file.

Issues for designers

- See that the principal contractor provides the planning supervisor with information for the health and safety file to be transmitted to the client on completion of the project. Discuss the contents of the file with the planning supervisor to ensure that it contains:
 - up-to-date details of the work actually carried out (as built drawings and specification);
 - information from and contact names, addresses and telephone numbers of contractors, sub-contractors and suppliers;
 - safety information on materials and components used in the work;
 - information on safe use of the building, including aspects of use agreed relating to safety that were agreed in the brief (eg use of storage space);
 - information on safety aspects of cleaning, maintenance and repair.

- See that, when appropriate, the client's staff are involved in the commissioning of the services in the building and advise the client on the need for further training for staff who will be operating the building.

- The commissioning phase may involve a range of hazards as services become live. Snagging and remedial works may be needed when the normal construction phase site supervision has left the site. The arrangements for the principal contractor to ensure these works are properly managed should be clear. If the remedial works are extensive, notification to HSE as a new CDM project may be required. The original project will usually have been completed when the building was handed over for occupation.

- Consider whether specific information needs to be provided for inclusion in the Health and Safety File to warn of health and safety issues that could arise in extension, alteration or demolition of the building.

References

Chapters 27 and 28 of the BEC Construction Safety Manual (4. 1) deal with refurbishment and maintenance. References for demolition are given under stages B and C. The Building Centre publish a maintenance manual and job diary (3. 1) which, although not specifically concerned with health and safety, provides useful check lists of items under which health and safety issues may need to be considered.

M Feedback

Lessons learned from the project should be fed back into the future work of the design office.

Issues for designers

- Review project with design team. Give particular consideration to:
 - any accidents or dangerous occurrences on site;
 - safety queries that have arisen and how they were resolved;
 - clauses introduced for health and safety reasons into contracts or specifications or contracts;
 - cost of safety measures where these have been separately identified;
 - the working of office procedures related to health and safety;
 - information that came to light as a result of research for the project.

- Discuss with the planning supervisor the health and safety aspects of the project and whether there are any lessons to be learned.

Part 3 REFERENCES

3.1 Alphabetical Title Index

The references are listed in alphabetical order of titles under the publishing organisation (also given in alphabetical order at 3.2). The letters before the publication refer to the RIBA work stages. For publications on particular subjects see the alphabetical subject index (3.2).

1. **Arboricultural Safety Council**

- 1.1 **Abrasive wheels safety ASC46(Nov91) - Free**
- 1.2 **Chainsaws - petrol driven, safety guide ASC47 (Aug91) - Free**
- 1.3 **Cleaning saws, brush cutters and strimmers, safety guide ASC43 (NOv91) - Free**
- 1.4 **Hedge Cutters, safety guide ASC44 (Nov91) - Free**
- 1.5 **Tree climbing operations, safety guide ASC 1 (Aug91) - Free**

Publications available from, Forrestry and Aboricultural Safety Training Council,
231 Corstorphine Road, Edinburgh EH127AT (Tel: 0131-334 8083).

2. **British Standards Institution**

389 Chiswick High Road, LondonW44AL
(Tel: 0181-996 9000)

- 2.1] **BS 890: Specification for building limes -**
Revision of this publication is due in 1994 and will contain a section or safe use of limes.
- 2.2 **BS 3998: 1989 Recommendations for tree work -**
AMD 6549, Dec 1990-
£44.00 (Non-Members), £20.80 (Members).
- 2.3 **BS 5228 Noise control on construction and open sites -**
Part 1: 1984 Code of practice for basic information and procedures for noise control on site -
£68.00 (Non-Members) £34.00 (Members).
Part 2: 1984 Guide to noise control legislation for construction and demolition, including road construction and maintenance - £11. 50 (Non-Members) £5.75 (Members).
Part 3: 1984 Code of practice for the noise control applicable to surface coal extraction by open cast methods - £11. 50 (Non-Members) £5.75 (Members).
Part 4: 1992 Code of practice for noise and vibration control applicable to piling operations -
AMD 7787 July 1993

- £57.50 (Non-Members) £28.75 (Members)
- 2.4 BS 5573: 1978 Code of practice for safety precautions in the construction of large diameter boreholes for piling and other purposes -
£24.50 (Non-Members) £12.25 (Members)
- 2.5 BS 5589: 1989 Code of practice for preservation of timber -
£57.50 (Non-Members) £28.75 (Members)
- 2.6 BS 5607: 1988 Code of practice for safe use of explosives in the construction industry -
£57.50 (Non-Members) £28.75 (Members)
- 2.7 BS 5803: Thermal insulation fix use in pitched roof spaces in dwellings -
Part 1: 1985 Specifications for man-made mineral fibre thermal insulation mats -
AMD 7351, October 1992- £24.50 (Non-Members) £12.25 (Members)
Part 2: 1985 Specifications for man-made mineral fibre thermal insulation in pelleted or granular form for application by blowing -
\$30.50 (Non-Members) 215.25 (Members)
Part 3: 1985 Specifications for cellulose fibre thermal insulation for application by blowing -
AMD 5829, June 1989 £30.50 (Non-Members) £15.25 (Members)
Part 4: 1985 Methods for determining flammability and resistance to smouldering -
£24.50 (Non-Members) £12.25 (Members)
Part 5: 1985 Specifications for installation of man-made mineral fibre and cellulose insulation
£44.00 (Non-Members) £20.80 (Members)
- 2.8 BS 5930: 1981 Code of practice for site investigations - £83.00 (Non-Members)
£41.50 (Members)
- 2.9 BS 5973: 1993 Code of practice for access and working scaffolds, and special scaffold structures in steel - £86. 50 (Non-Members) 243.25 (Members)
- 2.10 BS 5974: 1990 Code of practice for temporarily installed suspended scetiolds and access equipment - AMD 7068, July 1992 £57.50 (Non-Members) £28.75 (Members)
- 2.11 BS 6031: 1981 Code of practice for earthworks -
AMD 4251 April 1993-
£81.00 (Non-Members) £40.53 (Members)
- 2.12 BS 6187: 1982 Code of practice for demolition -
£57.50 (Non-Members) £28.75 (Members)
- 2.13 BS 6548 Maintainability of equipment
Part 1: 1984 (1993) Guide to specifying and contracting for maintainability
£57.50 (Non-Members) £20.80 (Members)
Part 2: 1992 Guide to maintainability studies during the design phase
£44.00 (Non-Members) £20.80 (Members)

- 2.14 BS 8313: 1989 Code of practice for accommodation of building services in ducts -
£57.50 (Non-Members) £28.75 (Members)
- 2.15 BS 8093: 1991 Code of practice for use of safety nets, containment nets and sheets
on constructional works -
£57.50 (Non-Members) £28.75 (Members)
- 2.16 BS 8200: 1985 Code of practice for non-load bearing external vertical enclosures for
buildings -
£68.00 (Non-Members) £34.00 (Members)
- 2.17 BS 8210: 1986 Guide to building maintenance management -
£57.50 (Non-Members) £28.75 (Members)
- 2.18 BS 8213: Windows Doors and Rooflights -
Part 1: 1991 Code of practice for society in use and during cleaning of windows and
doors (including guidance on cleaning materials and methods) -
£44.00 (Non-Members) £22.00 (Members)
- 2.19 DD 175: 1988 Code of practice for the identification of potentially contaminated land
and its investigation -
£44.00 (Non-Members) £22.00 (Members)

All publications available from BSI Standards, Linford Wood, Milton Keynes MK14
6LE (Tel: 01908-221166 Fax 01908 322484)

3. **The Building Centre**

26 Store Street, London WC 1 E7BT (Tel: 171-637 1022)

- 3.1 Building Centre Maintenance and Job Diary, Jacob Blacker, 1981 £6.50

Publication available from Building Centre Bookshop
(Tel: 0171-6373151)

4 **Building Employers Confederation**

82 Cavendish Street, London W1M 8AD
(Tel: 0171-5805588 Fax: 0171-631 3872)

- 4.1 Construction Safety, regularly updated 2 Volume publication
Ref: S/MANS £130 pa (Non-Members) £115 pa (Members)
- 4.2 Fire prevention on construction sites, 1993
Ref: S/96 £5.00 (Non-Members) £2.50 (Members)
- 4.3 Safety Policies for Construction, including digest of relevant legislation - a guide to
preparing a health and safety statement for the small business in construction Feb
1993
Ref: S/Pol £10.00 (Non-Members) £5.00 (Members)

- 4.4 Noise in Construction, May 1990
 Ref: S/93 £6.00 (Non-Members) £3 .00 (Members)
 Ref: S/93a BEC Assessment Forms in pads of 25
 £7.00 (Non-Members) £3.50 (Members)
- 4.5 Risk Assessment in Construction, Jan 1993
 Ref: S/RA £10.00 (Non-Members) £5.00 (Members)
- 4.6 Fire prevention on construction sites: the joint code of practice on the protection born fire of construction sites and buildings undergoing renovation, co-pubiished with the Loss Prevention Council 1992
 Ref: S/96 £5 .00 (Non-Members) £2.50 (Members)

4.1 obtainable from Construction Safety, Crompton Way, Crawley, Sussex
 (Tel: 01293-52691 1) or over the counter at the BEC Bookshop, 82 Cavendish Street,
 London W 1

Other publications obtainable over the counter at the BEC Bookshop or from BEC Publications, Federation House, 2309 Coventry Road, Sheldon, Birmingham B263PL
 - Discounts available for large orders (Tel: 0121-742 0824)

5. **Building Research Establishment**

Garson Watford WD27JR
 (Tel: 01923-664664 Fax: 01923-664098)

- 5.1 **Electricity distribution on sites, BRE Digest 179, 1975**
 £4.50 ISBN 085125133
- 5.2 Fire and Explosion Hazards associated with the redevelopment of contaminated land, by D Crowhurst and P F Beever, Information paper 2,] 987, £3.50
- 5.3 Hazards from interior painting with solvent-borne paint, BRE Miscellaneous leaflet XL6, 1991, £2.00
- 5.4. Remedial wood preservatives: use them safely,
 BRE Digest 371: 1992, E4.50, XISBN 0851255345
- 5.5 Repairing or replacing lintels, Good Building Guide 1, 1990 (revised 1992), £4.50
- 5.6 Site investigation for low rise building -
 Desk studies, BRE Digest 318, 1987,
 £4.50 ISBN 0851252407
 Procurement, BRE Digest 322, 1987
 £4.50 ISBN 085125254 O
 The walk over survey, BRE Digest 348, 1989
 £4.50 ISBN 085125424 1

- 5.7 Timber scaffold boards - reducing the incidence of site injury, by JM Dinwoody and A R Fewell,
Information paper 20, 1988, £3.50

All publications available from BRE Bookshop at the address above
(Tel: 01923-664444 Fax: 01923-664400)

6. **Butterworth-Heinemann**

Linacre House, Jordan Hill, Oxford OX2 8DP
(Tel: 01865-3 10366)

- 6.1 Safety at work by J R Judley, 4th revised edition 1994- £65.00 MBN 0750607467

7. **Commission of the European Communities**

(Tel: Luxemburg 010 352 43 01 34 634)

- 7.1 Four guides for the Temporary or Mobile Construction Sites Directive

8. **Construction Industry Research and Information Association**

6 Storey's Gate, London SW1F 3AU (Tel: 0171-222 8891)

All publications available from CIRIA Publications Department at the above address
(Tel: 0171-222 1708)

- 8.1 Control of ground water for temporary works by S H Somerville, 1986
Ref R113 £35.00 (Non-Members) £1 0.00 (Members)

- 8.2 Formwork striking times - methods of assessment, by T A Harrison, 1987
Ref R73 £18.00 (Non-Members) +9.00 (Members)

- 8.3 Guide to the Control of Substances Hazardous to Health in Construction, 1993
(published in conjunction with Thomas Telford)
Ref RI 25 £45.00 (Non-Members) £22. 50 (Members)

- 8.4 Planning to reduce noise exposure in construction, by R A Wailer, CIRIA technical
note 138, 1990
£30.00 (Non-Members) £1 5.00 (Members)

- 8.5 Role and responsibility in site investigation, by J F Uff and C R I Clayton, 1991
Ref 73 +30.00 (Non-Members) £15.00 (Members)

- 8.6 Simple noise screens for site use, 1985
Ref SP38 £2.00 (Non-Members) £1.00 (Members)

- 8.7 Site safety: a handbook for young professionals, by S C Bielby, 1992, Reprinted 1993
Refl SP90 £20.00 (Non-Members) £1 5.00 (Members)

9. **Construction Industry Training Board**
Bircham Newton Training Centre, Bircham Newton, Nr. King's Lynn, Norfolk PE31 6RH (Tel: 01553 776677)
- 9.1 Construction site safety, 40 modules in a ring binder, 1994 £32.50
- 9.2 Safety of piling sites, booklet prepared with the Federation of Piling Specialists £5.00
10. **Glass and Glazing Federation**
44-48 Borough High Street, London SE1 IXB
(Tel: 0171-4037177 Fax: 0171-357 7458)
- 10.1 Glass Handling, Storage and Transport code of practice
Feb 1992, £3 .50 (Non-Members) £1 .00 (Members)
11. **Health and Safety Executive (and Health and Safety Commission)**
- 11.1 Accidents to children on construction sites, GS7, 1977
ISBN O 11 885416X, £2.00
- 11.2 Approved Code of Practice: Control of Lead at Work
June 1985, ISBN O 11 883780X, £3.90
- 11.3 Asbestos: exposure limits and measurement of airborne dust concentrations, 1988
ISBN O 118855522, £2.50
- 11.4 Avoidance of danger from overhead electric lines, GS6, 1991, ISBN O 118856685,
£2.50
- 11.5 Avoiding danger from underground services HS(G)47
- 11.6 Avoiding danger from underground services, Construction Summary Sheet - Out of Print
- 11.7 Blackspot construction, a study of five years fatal accidents in the building and civil engineering industries, 1988, ISBN O 118839926, £4.00
- 11.8 Building contracts undertaken on education premises: strategies for the health and safety of staff and pupils, 1989, ISBN O 118859471, 12.25
- 11.9 Buried cables: beware, IND(G)30(L), 1985, Free
- 11.10 Cement, Health Hazard Information Sheet 1, 1985, SS26, Free
- 11.11 Chain saws, guidance note, plant and machinery 31, 1982, Out of Print
(See however, 'Safety with Chain Saws' - AS20, Free)

- 11.12 Cleaning and gas freeing of tanks containing flammable residues, 1985, ISBN O 11 8835181, £2.50
- 11.13 Construction (Design and Management) Regulations (SI 1994 No 3 140) KMSC) 1994
- 11.14 Managing construction for health and safety - Approved Code of Practice L54 ISBN O 717607925 price £7.95 (includes regulations)
- 11.15 Construction hoists, GNP& M27, 1981 ISBN O 118833944, £2.50
- 11.16 Control of asbestos at work regulations 1987 and Approved Code of Practice 1988, ISBN O 118820370, £5.00
- 11.17 Control of lead at work: Approved Code of Practice: revised June 1985 (in support of S1 1980 NO. 1248) COP2, ISBN O 11 883780X, £3.90
- 11.18 Control of hardwood dust IND(S)21 C, 1987, Out of Print
- 11.19 Control of Substances Hazardous to Health in the Construction Industry ISF3N O 11 8855263, £2.00
- 11.20 Danger: Transport at Work, 131D(G)22(L), 1985- Out of Print
- 11.21 Deadly maintenance: Study of Fatal Accidents at Work, 1985, ISBN O 118838067, £5.00
- 11.22 Deadly maintenance: roofs: a study of fatal accidents at Work 1985, ISBN O 11 8838040 £4.00
- 11.23 Design loadings for temporary roof and floor edge protection, (specialist inspector report No.15) 1988- Free
- 11.24 Dust: General principles of protection, 2nd Revision 1991, ISBN O 118855956, £2.50
- 11.25 Electrical safety in arc welding, BNP & M64, 1985, ISBN O 118839381, £2.50
- 11.26 Electricity on construction sites, GS24, - Out of Print (reprint likely late 1995)
- 11.27 Entry into confined spaces, Summary sheet for small contractors, 1988, SS15, - Free
- 11.28 Essentials of health and safety at work, 1994, ISBN O 71760716 X, £5.95
- 11.30 Eyebolts, BNP & M16, 1978, ISBN O 118831879, £2.50
- 11.31 First aid at work, ISBN O 118855360, £3.00

- 11.32 Flame cutting and welding with compressed gases, summary sheet for small contractors, SS12, - Out of Print
- 11.33 Flammable liquids on construction sites, IND(G)56P, Free
- 11.34 General access scaffolds, summary sheet for small contractors SS3, - Free
- 11.35 Guidance on the implementation of safety policies, IAC/LI, 1987, - Free
- 11.36 Guide for Small Contractors: Site safety and concrete construction HS(G)46, MBN O 118854755, £2.50
- 11.37 Guide to the Safety Signs Regulations 1980, HS(R)7, 1981, - Out of Print
- 21.38 Handling building blocks, construction sheet No.37, 1993 SS37, - Free
- 11.39 Health and safety in demolition work. GS29.
 Part 1: 1984 Preparation and planning
 Part 2: 1984 Legislation
 Part 3: 1984 Techniques
 Pm 4: 1985 Health hazards
 (All parts priced at £2.50 each:)
- 11.40 Highly flammable materials on construction sites, HS(G)3, - Out of Print
- 11.41 Hot work: welding and cutting on plant containing flammable materials, HS(G)5, 1979, ISBN O 118832298, £4.00
- 11.42 Inclined hoists used in building and construction work, E3NP & M63, 1987, KBN O 11 8839454, £2.50
- 11.43 In-situ timber treatment using timber preservatives: Health, safety and environmental precautions, 1989 (guidance note general series/46) ISBN O 118854135, £2.25
- 11.44 Introducing assessment (a simplified guide for employers - related to COSHH regs), 1988 (Ind (G)64(L)), - Free
- 11.45 Isocyanates: toxic hazards and precautions, GNEH16, 1984, ISBN O 118835815, £2.50
- 11.46 Leptospirosis: are you at risk? 1990, (IND(G)84(L)), - Free
- 11.47 Lighten the load: guidance for employers on musculoskeletal disorders, 1991 (IND(G)I09 & 110(L))
- 11.48 A guide to managing health and safety in construction (CONIAC) 1995- ISBN O 7176 07550
- 11.49 Man made mineral fibres, GN (EH46), 1990, ISBN O 118855719, £2.50

- 11.50 Monitoring strategies for toxic substances, BNEH 42, 1989- ISBN O 11 8854127, £2.50
- 11.51 Noise at work: Guidance on regulations, 1989, ISBN 0717604543, £3.50
- 11.52 Noise at work: Noise assessment, information and control, noise guides 3-8, 1990, ISBN O 118854305, £3.00
- 11.53 Noise from pneumatic systems, GNP & M56, 1985, ISBN O 118835297, £52.50
- 11.54 Noise from portable breakers, IAC/L21, 1986, - Free
- 11.55 Noise in construction: guidance on noise control and hearing conservation measures, 1986- ISBN O 11883876, £3.00
- 11.56 Occupational exposure limits 1994 (GN: EH40/94)ISBN O 7176 07224, £6.50
- 11.57 Our health and safety policy statement: Guide to preparing a safety policy statement for a small business, 1990, ISBN O 7176 04241, £3.00
- 11.58 Petrol filling stations: construction and operation, HS(G)41, ISBN O 717660461 6, £6.00
- 11.59 Petroleum based adhesives in building operations, (advice on solvent concentrations and precautions), EH7, 1977- Out of Print
- 11.60 Pneumatic nailing and stapling tools, GNP & MI 7, 1979- ISBN O 118831925, £2.50
- 11.61 Portable electric tools and equipment, Construction Summary Sheet, - Out of Print
- 11.62 Pre-stressed concrete, (GN: GS;49) ISBN O 118855972, £2.00
- 11.63 Protective clothing and footwear in the construction industry, IAC/L16, 1986, - Out of Print
- 11.64 Protection of workers and the general public during the development of contaminated land, 1991 HS(G)66 - ISE3N O 11 885657X, £3.00
- 11.65 Provision of toilet, washing and general welfare arrangements at small fixed sites, Construction sheet 18, Ott 91, SS 18, - Free
- 11.66 Remedial timber treatment in buildings, HSE booklet - ISBN O 118859870, £4.00
- 11.67 Respiratory protective equipment: a practical guide for users, HS(G)53, ISBN O 11 8855220, £4.00
- 11.68 Safety in excavations, construction summary sheet, - Out of Print

- 11.69 Safety in falsework for in-situ beams and slabs, 1987, ISBN O 118839004, £4.00
- 11.70 Safety in roofwork, Summary sheet for small contractors, SS4, 1987, - Free
- 11.71 Safety in roofwork, HS(G)33, 1987, - Out of Print (reprint likely late 1995)
- 11.72 Safety in the stacking of materials, HSW47, 1971, ISBN O 118808397, £3.50
- 11.73 Safety in the use of abrasive wheels, 1984, HS(G)17, - ISBN O 7176604667, £7.00
- 11.74 Safety in the use of cartridge operated tools, GN(PM14), 1979, ISBN O 118831836, - Out of Print
- 11.75 Safety in working with power operated mobile work platforms, HS(G)I9 1982, - Out of Print
- 11.76 Safe erection of structures - GS28
 Part 1: 1984 initial planning and design
 ISBN O 11 883584X, £2.50
 Part 2: 1985 site management and procedures
 MBN O 118836056, £2.50
 Part 3: 1986 working places and access
 ISBN O 118835300, \$2.50
 Part 4: 1986 legislation and training
 ISBN O 118835319, £2.50
- 11.77 Safe use of ladders, summary sheet for small contractors, SS2, 1988, - Free
- 11.78 Safe use of ladders, step ladders and trestles 1984HS(G)31, ISBN O 118838911, £3.50
- 11.79 Safe use of petrol - mobile workers, 1987, Ind(G)51 C - Out of Print
- 11.80 Safe use of portable electrical apparatus: (electrical safety) GNP& M32, 1983, ISBN 0118835637, £2.50
- 1.81 Safe working with small dumpers, 1983, ISBN O 118836935, £3.50
- 11.82 Save your skin, occupational contact dermatitis, MS(B)6rev, 1987- Free
- 11.83 Short duration work on pitched roofs: Protection against falls, Construction Information Sheet SS20, 1992- Free
- 11.84 Skin cancer caused by pitch and tar, 1984, MS(B)4 - Free
- 11.85 Small lifting appliances, summary sheet for small contractors, SS14, 1988- Out of Print
- 11.86 Solvents, HHIS5, 1987- Free

- 11.87 Some occupational hygiene aspects of man-made mineral fibres and new technology fibres, (Specialist inspector report No.27) 1991- Free
- 11.88 Spraying of highly flammable liquids, 1977, GNEH9, ISBN O 118830341, £2.50
- 11.89 Step by step guide to COSHH assessment, HSE booklet, MBN O 118863797, £5.00
- 11.90 Storage and use of LPG on construction sites, GNCS6, 1981, ISBN O 11883391 X, £1.50
- 11.91 Survey of exposure to hand-arm vibration in Great Britain (research paper 26) 1988, ISBN 0717603156, £11.50
- 11.92 Suspended access equipment, BNP & M30, 1983, ISBN O 118835777, £2.50
- 11.93 Suspended cradles and small lifting appliances, summary sheet for small contractors, SS5, 1988- Free
- 11.94 Tower scaffolds, summary sheet for small contractors, SS 10, 1987- Free
- 11.95 Toxic substances: a precautionary policy, GNEHI 8, 1978- Out of Print
- 11.96 Use of portable electrical equipment on construction sites, summary sheet for small contractors, 1987- Out of Print
- 11.97 Work with asbestos, summary sheet for small contractors, SS9 - Out of Print
- 11.98 Work related upper limb disorders: a guide to prevention, 1990, ISBN O 118855654, £3.75
- 11.99 Wood dust: hazards and precautions, 1990 (Woodworking sheet No. 1), - Free
- 11.100 Welding, GNMS 15, 1978- Out of Print
- 11.101 Manual Handling, Manual Handling Operations Regulations 1992, Guidance on regulations L23, ISBN O 118863355
- 11.102 Designing for health and safety in construction (CONIAC) 1995, ISBN 0717608077 £7.95
- 11.103 Health and safety for small construction sites HS(G)130 ISBN 0717608069\$5.95

HSC/E Free or Priced Publications including journals - available from HSE Books, PO Box 1999, Sudbury, Suffolk, CC)10 6FS (Tel: 01787-881165 Fax: 0787-3 13995)
 Priced Publications are also available from Dillons the Bookstore, Ryman the Stationer and Ryman Computer stores.

Out of print HSC/E Publications are available through the British Library Document Supply Centre.

12. **Heating and Ventilating Contractors Association**
ESCA House, 34 Palace Court, London W24JG (Tel: 0171-2292488 Fax: 0171-727 9268)

- 12.1 **Heating and Ventilation Safety Guide, fourth edition 1991 £4.00 (Non-Members)**
£2.50 (Members)

Publication available from Publications Dept. Old Mansion House, Eamont Bridge, Penrith, Cumbria CA1 0 2EX (Tel: 01768-864771)

13. **Lead Sheet Association**
St. John's Road, Tunbridge Wells, Kent TN49XA (Tel: 01892 513553)

- 13.1 Control of lead at work, July 1993- Free

14. **National Federation of Painting and Decorating Contractors**
82 New Cavendish street, London W 1M 8AD (Tel: 0171-5805588 Fax: 0171-631 3872)

- 14.1 Health and Safety in Painting, 1991 (Revised May 1993) Ref: S/87a £4.50
(Non-Members) £3.50 (Members)

Publication available from BEC Publications, Federation House, 2309 Coventry Road, Sheldon, Birmingham B263PL., (Tel: 0121-7420824 Fax: 0121-722 2529)

15. **National Federation of Scaffolding Contractors**
82 New Cavendish street, London W1M 8AD, (Tel: 0171-5805588 Fax: 0171-631 3872)

- 15.1 **Scaffolders and Users Guide to Safe Access Scaffolding, March 1987, Ref S/80a**
£7.50 (Non-Members) £5.00 (Members)

Publication available from BEC Publications, Federation House, 2309 Coventry Road, Sheldon, Birmingham B263PL (Tel: 0121-7420824 Fax: 0121-722 2529)

16. **National Joint Council for the Building Industry**
18 Mansfield Street, London W1M 9FG (Tel: 0171-580 1740)

- 16.1 Site safety and your health, A guide to health and welfare practices for the site team
1989, Ref S/88 £2.00

Publication available from BEC Publications, Federation House, 2309 Coventry Road, Sheldon, Birmingham 1326 3PL (Tel: 0121-7420824 Fax: 0121-722 2529)

17. **Office for Official Publications of the European Community**
C/O HMSO Publications Centre, PO Box 276, Nine Elms Lane, London SW8 5DT
(Tel: 0171-8730011 and 0171-8739090 Fax: 0171-873 8200)
- 17.1 From Drawing Board to Building Site, HMSO, 1991, ISBN O 117015768,28.95
18. **Royal Institute of British Architects**
66 Portland Place, London WIN 4AD, (Tel: 0171-5805533 Fax: 0171-255 1541)
- 18.1 Architect's Job Book: Volume 1, Job Administration, Fifth edition 1988 Bound version £32. 50 Loose leaf £37.50
- 18.2 Standard Form of Agreement for the Appointment of an Architect (SFA/92) - £4.50 + VAT
- 18.3 Historic Buildings: Repairs and Conservation Work, Alternative Schedule of Services (SFA/92) - £1 .25 + VAT
- 18.4 **Safety on Site**, Practice Supplement to RIBA Journal - May 1989- £5 .00 for first one, £4.50 for subsequent copies
- AH publications available from RIBA Publications Department, Finsbury Mission 39 Moreland Street, London EC1V 8BB (Tel: 0171-25] 0791)
19. **Royal Society for Prevention of Accidents**
Cannon House, The Priory, Queensway Birmingham B46BS (Tel: 0121-233 2461)
- 19.1 Construction Regulations Handbook, 1991 edition, Ref : IS 13 £12.50 Non-Members) £8.00 (Members)
- 19.2 A Site Safer, Ret 1S313 £1 .00 (Non-Members) £0.65 (Members)
20. **Safety and Health Practitioner**
Paramount Publishing Ltd, 17-21 Shenley Road, Borehamwood, Herts WD6 1ET
(Tel: 0181-207 5599)
- 20.1 Public safety in construction, by L. Golob, Volume 8 No.6 1990, Pages 9-12
21. **Society for the protection of ancient buildings**
37 Spital Square, London E1 611Y (Tel: 0171-377 1644)
- 21.1 Cleaning Stone and Brick, by John and Nicola Ashurst, Technical pamphlet 4, 1991, £2.00
22. **Sports Council**
16 Upper Woburn Place, London WC 1H OPQ, (Tel: 0171-3881277 Fax: 0171-383 5470)

- 22.1 Safety in swimming pools, 1988, £5.50
23. Tolley Publishing
Tolley House, 2 Addiscombe Road, Croydon, Surrey CR9 5AF, (Tel: 0181-686914 1)
- 23.1 Tolleys health and safety at work handbook, M. Dewis anti J. Stranks, ISBN O 85459 3098, 1988, £48.00
24. Journals, Databases and Microfiche Services
- 24.1 Fire Prevention
Published by Fire Protection Association, 140 Aldergate Street, London EC1A 4HX,
(Tel: 0171-6063757 Fax: 0171-600 1487)
- 24.2 Health and Safety Monitor
Published by Monitor Press, Rectory Road, Great Waldingfield, Sudbury, Suffolk
CO10 OTL, (Tel: 01787-378607 Fax: 01787 880201)
- 24.3 Safety and Health
Published by National Safety Council, Industrial Section, 1121 Spring Lake Drive,
Itasca, IL 60143, USA, (Tel: 800-621 7619)
- 24.4 HSE Line
Computerised source of health and safety at work references from HSE - available on
Preste! and compact disc - also through other host databases
- 24.5 Health and Safety Executive News Bulletin
Published by HSE Books, PO Box 1999, Sudbury, Suffolk, C019 6FS (Tel:
01787-881165 Fax: 01787-3 13995)
- 24.6 Safety and Health Practitioner
Published by Paramount Publishing Ltd, Paramount House, 17-21 Shenley Road,
Borehamwood, Hertfordshire WD6 1RT (Tel: 0181-2075599 Fax: 0181-207 2598)
- 24.7 Workplace air and biological monitoring database, 1991 update on floppy disk from
FISE, \$ 100.00
- 24.8 Occupational health and safety microfile microfiche information service, updated
regularly and compiled in conjunction with the RIBA - soon to be available on CD
Rom discs with HASCCM consultancy providing a helpline, from Technical Indexes,
Willoughby Road, Bracknell, Berks RG12 8DW (Tel: 0134 4 263 11)
- 24.9 Health and Safety Microfile microfiche service, updated regularly, from Babrou Index
plc, New Lodge, Drift Road, Windsor, Berks SL4 4RQ (Tel: 01344884121
Fax: 01344-884845)

25 **VIDEOS**

- 25.1 Be alive to safety, 20 reins. CITB

- 25.2 Danger of death - overhead electric cables, 20 reins. CITB
- 25.3 Mobile towers, 15 reins. CITB
- 25.4 Protection for you (A head, foot and respiratory protection. B eye, hand and hearing protection) 2 x 18 mins. CITB
- 25.5 Safety in gas installations, 15 reins. CITB
- 25.6 Safety in HV (heating and ventilating) and AC (air conditioning), 15 reins. CITB
- 25.7 Safety in plumbing, 15 reins. CITB
- 25.8 Short fall, 10 reins. CITB
- 25.9 Rooftop roulette, 14 reins. CITB
- 25.10 Stay alive to safety, 20 tins. CITB
- 25.11 Too much trouble: safety precautions and maintenance, 20 mins. HSE
- 25.12 Watch that space: confined space hazards in the construction industry, 16 reins. HSE
26. **HSE 16 mm Films**
Sale or hire from CFL Vision, PO Box 35, Wetherby, West Yorks, LS23 7EX (Tel: 01937 541010)
- 26.1 Building sites bite (deals with hazards to children) colour, 23 mins.
- 26.2 Knock down price (covers planning for demolition work) colour, 23 reins.
- 26.3 Lighten the load (covers musculoskeletal disorders) colour, 12 reins.
- 26.4 One step away (covers accidents caused by falling off or through roofs) colour, 15 tins.
27. **Department of Transport**
- 27.1 Safety at street works and road works: a code of practice DoT publication NBN O 11 SS1144X (HMSO £3.95)