

# Healthy Design for Construction –Knowledge Transfer of Effective Health Issues during Design

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# **Occupational Health Guidance and Policies for Construction Designers**

## **Review of Existing Documentation**

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### **References**

# **Occupational Health Guidance and Policies for Construction Designers**

## **Review of Existing Documentation**

### **1. Introduction**

This review of existing documents will be supplemented by a literature review on matters relating to CDM issues and designers from literature that is available. The review of existing policies helps identify what is already in existence, what areas are well covered and what areas still need attention. It also hopefully identifies key areas of the CDM regulations that designers should be paying particular attention too. In the context of the overall project it is a vital starting point to establish what is already in existence.

The CDM regulations define “designers” as ‘organisations or persons who undertake to carry out design work for a construction project. This includes the preparation of drawings, design details, specifications and bills of quantities as design work, this also covers temporary works design.’ The duties of the designer should be applied whenever a designer prepares a design for the purpose of construction work, irrespective of the existence of a client. (Nanayakkara ‘97). The regulations require the designer to alert the client to their duties under the regulations.

Almost all companies have their own health and safety policies that must be adhered too. With the introduction of the CDM regulations many companies now have their own specific health policies that relate specifically to designers.

This report provides a review of the health policies covering design aspects that are in place within the organisations on the Healthy Design project steering group (PSG) and a number of other key organisations. The aim is to establish what currently exists in terms of occupational health guidance for designers in construction. This report identifies the salient points from each policy document and then discusses the learning points that arise.

### **2. Review of Policy and Guidance Documentation**

#### **2.1 Channel Tunnel Rail Link (CTRL)**

The Channel Tunnel Rail Link is being built by London & Continental Railways Limited. It will be Britain's first major new railway for over a century - a high-speed line running for 109km (68 miles) between St Pancras station in London and the Channel Tunnel. The project was authorised by Parliament with the passage of the Channel Tunnel Rail Link Act, 1996.

The new high speed line is being built in 2 Sections. Section 1 has been under construction since October 1998 and runs between the Channel Tunnel and Fawkham Junction in north Kent. The first Section is on schedule for opening in October 2003.

The CTRL developed an Occupational Health Management Review. The scope of the project was to consider the extent to which Occupational Health Management was integrated into the planning and daily management aspects of civils and rail specialised contracts. The aims and objectives was to review current methodology and health management against recognised, current UK practices in construction. The purpose was to examine the occupational health policies and procedures of contractors and identify the areas of excellence as well as those requiring further improvement.

The method concentrated on identifying key health methods and principals that were found to be effective in a typical construction setting. It also highlighted potential problem areas or obstacles for controlling health risks in the construction environment.

Four areas in each contract were considered:

- First aid
- Medical fitness
- Prevention of work-related ill health (primary and secondary)
- Health management.

These issues were then discussed in greater depth. Other areas covered include, team working, information and training, management, competence, external liaison, sub-contracted workers and performance review.

The key recommendations considered the main issues that if implemented through the strategy would provide the CTRL with what they suggest would be a first class health management model within the construction industry. They include such issues as:

- Formulation of a specialist Occupational Health Working Group
- Health and safety personnel training
- Encouragement of multidisciplinary learning
- Project wide health promotion campaigns
- Consideration of subcontractors in health and safety planning before the main construction phase starts
- Development of objective qualitative measurement tool covering health performance within all construction contracts
- Networking with appropriate external agencies and industry bodies in the development of occupational health policies and campaigns
- Occupational research and other key initiatives
- Establish project wide medical fitness standard for safety critical posts

The Appendix contains greater detail on medical fitness for safety critical posts, first aid, prevention of work related ill health and health management.

A matrix of the implementation plan for occupational health review is included giving the implementation dates, who is responsible, review date and whom is responsible for the review of the deliverable.

Although a lot of on depth detail is given in the policy, it tends to focus on occupational health rather than design based health issues.

## **2.2 ALSTEC Group**

Alstec has almost 50 years experience in the provision of engineered solutions and services to a world-wide customer base. Alstec has acquired its global status operating in five key areas:

- Airports
- Logistics
- Defence Systems
- Nuclear
- Thermal Power

The company is equipped with a support structure that includes control systems, manufacturing, construction and site services. Alstec employ a large number of people.

Alstec submitted the following documents:

- The CDM Regulations as they Affect the Designer - Engineering Guidance Notes
- Health and Safety Management Manual, Design Control

### **2.2.1 Engineering Guidance Notes**

The Engineering Guidance Notes state that although they are just guidance notes they should be used wherever possible. They outline a number of questions relating to the CDM regulations that the designers need to answer in relation to their particular design project. These questions range from 'Do the CDM regulations apply to my project?' To 'What parts of my project are subjected to CDM regulations?' Suggested answers to the questions are given.

Flow charts are provided to illustrate primary interactions between duty holders. These act as a quick reference guide.

Designer's duties are defined and explained including what design includes, i.e. drawings, design details etc. Health and safety considerations are mentioned as something that the designers must address when devising a safe system of work.

The issue of competence is discussed, including the importance of checking that not only must the in-house designers be competent but that also the competence of the subcontractor designers is to the required level.

The fundamental principals that underlay the regulations are outlined in a series of bullet points.

The key duties of the designers are outlined, including such things as, alerting clients to their duties and approved codes of practice. A definition of construction work is also given.

Section 3.4 mentions the Health and Safety Plan and states that a pre-tender health and safety plan should be prepared in time so that it is available for prospective principal contractors and lower tier contractors tendering or making similar arrangements to carry out or manage tenders. Outlines of what should be included in the pre-tender Health and Safety Plan are given with the main emphasis being on ensuring the health and safety of all those who may be affected by the construction work. Mention is also given to the keeping of a health and safety file as a record of health and safety information, including a note of who is responsible for what risks.

### **2.2.2 Health and Safety Management Manual, Design Control**

A list of what the health and safety procedures provide is given in the introduction. The management system is then discussed; this includes a definition of the lead engineer and design engineer and a breakdown of their roles.

Design verification is allocated to the Lead Engineer and states matters that should be addressed along with mentioning the preferred methods of reviewing it. Design changes are mentioned as being subject to design control measures, and design records must be stored and maintained. The document then goes on to discuss ARM (Availability, Reliability and Maintainability) which is a design analysis system. It suggest that is ARM is done early enough then it can influence the design and produce a better system.

The document then goes on to discuss tools available to carry out reliability analysis, the main ones being Failure Modes and Effects (FMEA), Reliability Block Diagrams (RBD) and Fault Tree Analysis (FTA). FMEA is carried out on equipment and requires considering each item in turn and deciding what failures could occur. It can be carried out at a system, sub-system or component level depending on the overall requirements for the analysis. RBD permits the analysis of the configuration of a particular system with regard to its inherent redundancy. FTA involves the preparation of a logic diagram, which traces the events, or combinations of events, that lead to an undesirable occurrence.

## 2.3 BNFL

BNFL is an international knowledge based business. Their focus is to serve their two main customer groups: global nuclear utilities and governments.

They manufacture fuel, provide reactor services, generate electricity and offer spent fuel management capabilities. They also decommission nuclear power plant. BNFL operate in 16 countries and employ more than 23,000 people.

Ten separate policies have been produced covering different aspects of design safety. A basic outline of these documents is given below.

### 2.3.1 General Policy

BNFL produce a general policy, with a subsection for Engineering Design, the purpose of which is to define the key principles which must be adopted when considering the design of new plant modification to the design of the existing plant.

The first section is a general policy that covers requirements for design, such as taking account of SHE standards and the inclusion of feedback and auditing.

Section two states the responsibilities of the business group, with the emphasis being on design.

No real mention is made of design in relation to health in the general policy.

Appendix 1 contains a flow chart entitled 'design process related to safety significant Plant and equipment for 'a UK nuclear licensed site'. The safety issue is related to HAZOPS rather than the designing out of health and safety problems.

Appendix two contains a checklist for design verification, which must be ticked once the item has been satisfactorily addressed.

### 2.3.2 Designer Specific Guidelines

BNFL have produced an extensive detail design hazard check list which asks questions such as 'Have all the cutting/severing hazards been eliminated?' then has yes, no or N/A boxes the designer has to tick. It is stated that the checklist must not be regarded as either complete or exhaustive, and is intended for guidance only. The designer is responsible for identifying and assessing relevant hazards. The checklist covers:

- Mechanical Aspects
- Acceleration and Deceleration
- Vibrations and Sound
- Electrical Systems
- Layout & Installation
- Pressure
- Temperature
- Explosion
- Flammability
- Contamination
- Other Hazards

The guidelines include a Design Hazard Inventory Form and extensive eight page Design Change Application Form, which must be filled in order for a design change to be accepted are available.

### 2.3.3 Engineering Delivery Organisation Design Policy

This follows on from the company's health and safety policy and outlines, by function, the principals following from it. The design principals are outlined in this section.

#### CDM Regulations

An overview of the CDM regulations including roles is given in the first part of the document. The second part of the document deals with CDM implementation within BNFL. This includes specific roles within the company, project planning and a specific section for designers.

**Designers Role**

The process of design, to ensure that the health and safety of those involved with construction is considered, is a staged approach.

Details of how to carry out a staged approach are outlined in the document including considerations of various risks and categorising likely severity of harm and likelihood that harm will occur by assigning them either as High (H), Medium (M) or Low (L). Design review meetings are also part of the staged approach.

For construction projects to which CDM applies, the pre-tender H&S Plan forms part of the tender enquiry documents. The minimum contents of the pre-tender H&S plan are outlined. Existing drawings/reports relevant to the site or existing structure must be made available. The design must be described and any particular methods or sequences of installation. Hazards, which cannot be avoided in the design, must also be described by the designer, as must materials that have been identified by the designer as presenting a health hazard.

**Health and Safety File**

Details are given on what should be included in the health and safety file is given. At the end of the document several examples of different forms are given, including the design hazard inventory and a general hazard checklist.

**Basis of Civil, Structural & Architectural Design**

This document outlines the parameter and procedure for the production of the civil, structural & architectural (CS&A) basis of design. A flow chart of the basis of civil, structural & architectural design covering class 'C' the estimate, class 'B', design development stage and class 'A' sanction point.

**CDM Design Responsibilities**

This is a guidance note issued to ensure that all machinery designed and/or supplied or put into service by BNFL Engineering complies with the CDM regulations for designer. It includes a description of the designers role under CDM at all stages of the design. Details of responsibilities of the CDM design review team are given.

A staged approach to compliance with the CDM regulations within BNFL engineering is presented in the form of a flow chart. This involves the involvement of risk assessments and reviews of hazards within the structure of the team leader, mechanical department and CDM review team.

Under the duties of designers within the mechanical department, projects should be divided into five phases and designers will have duties under each of these phases:

- Concept and tender/class C
- Design confirmation/ class B/A
- Detail design & engineering
- Construction
- Commissioning & handover

A flow chart of these duties is outlined for each of the phases.

A table outlining the regulations that cover various items such as machinery, piping and supports and plant layout is given as a quick checklist.

Extracts of the CDM regulation 13 are given in appendix A. Appendix B is a list of hazards to be considered during design. Appendix C contains sample forms such as design hazard inventory, risk assessment form and an outline installation method statement.

The final section defines the activities and actions required to produce hazard schedules that identify conventional safety hazards during the project lifetime. Flow charts of the hazard schedule of class A, B and C are given.

Details gleaned from the hazard schedules are used to provide a central register for all hazards identified during all stages of a project and to maintain the register to record the actions taken to eliminate or mitigate those hazards and quantify the remaining hazards. Details of how to identify, record, what action must be taken and how the review must be taken are given.

A conventional safety hazard schedule and a checklist are given in the appendices.

## **2.4 Foster and Partners**

Foster and Partner is an international studio for architecture, planning and design led by Norman Foster and four partners - Spencer de Grey, David Nelson, Ken Shuttleworth and Graham Phillips.

The practice's work ranges in scale from Hong Kong's new airport - the largest construction project in the world - to its smallest commission, a range of door furniture. The scope of its work includes masterplans for cities, the design of buildings, interior and product design, graphics and exhibitions. These can be found throughout the world, from the United Kingdom Europe and Scandinavia to the United States, Hong Kong, Japan, Malaysia, Saudi Arabia and Australia.

### **2.4.1. General Statement**

Foster and Partners are currently in the process of reviewing their new health and safety policy, thus what is available is only a skeleton outline of the final document.

A general statement is issued outlining health and safety issues that should be considered and accepting statutory duty of care. Their policy includes:

- Implementing systems of work designed to take account of health and safety
- Appointing competent people
- Ensure information, instruction and training is supplied to employees as is necessary to enable safe performance of work activities.
- Provide adequate facilities and maintain arrangements to enable employees to raise issues of health and safety

Who has responsibility is also outlined and it is stated that the policy is regularly monitored to ensure objectives are achieved.

The CDM regulations are discussed, stating that the good practice principles have been applied to all construction projects.

Objectives are to consider health and safety of those who construct, maintain or repair the building, avoiding risks wherever possible through safety by design. Information or other effective measures are included if risks cannot be reduced. The inclusion of quality management system procedures and CDM specific training is also touched on.

## **2.5 Stone & Webster**

Stone & Webster, a Shaw Group Company, was founded in Boston in 1889 as an electrical testing laboratory and consulting firm, Stone & Webster has evolved into a global organisation employing more than 5000 people world-wide.

Stone & Webster state that they meet the needs of clients, public and private, in virtually every sphere of activity. Stone & Webster are a full service engineering and construction organisation, offering the managerial and technical resources to help solve complex energy, environmental, infrastructure and industrial challenges world-wide.

Products and services includes engineering, design, procurement, project management, construction / construction management, environmental consulting, management consulting, quality assurance/quality control, information management, operations and maintenance and process technology development.

### **2.5.1 Health, Safety and Environment Policy**

The health, safety and environment policy is an extensive document that details health and safety responsibilities of people within the company.

Details of the health safety and environment general policy statement are supplied at the beginning of the document, this includes a general statement to pursue high standards of health safety and environmental management as an integral part of efficient management of the business.

It goes on to mention other health and safety priorities including a section on design which states it must provide designs which recognise, include and apply safe practice during both preparation, construction, commissioning and subsequent operational use and maintenance after completion of the project, and which considers the environmental impact.

The managing director states they retain overall responsibility for the policy.

A Health, Safety and Environment (HSE) organisation control Flow chart outlining operational HSE responsibility shows a breakdown of the flow of responsibility and gives details of page numbers where more information can be found on that particular persons role.

The following pages outline the individual responsibilities for HSE matters for each role within the company from Managing Director to employee, in bullet point format.

The designers are expected to:

- Read, understand and implement the HSE policy, organisation and arrangements
- Know the broad requirements of the relevant law in HSE matters and take whatever action is necessary to achieve compliance when designing and planning projects. Seek advice of the company Manager of HSE
- Ensure that HSE risks are taken into account when selecting design solutions and that they are eliminated or minimised.
- Co-ordinate design interfaces to ensure that the project can be carried out with minimum risk to persons and environment.
- Be aware of any hazards relating to the premises, plant or materials to be used and where such hazards exist, bring these to the notice of the appropriate management.
- Liaise with the company manager of HSE during design, tender and planning stages.
- Ensure plant suggested for work in hand is adequate and suited to the project

A health, safety and environmental responsibilities Matrix is provided to facilitate designers access to the experts.

## 2.6 Jacobs Engineering Group Inc.

Jacobs Engineering Group Inc. is one of the world's largest and most diverse providers of professional technical services. They offer full-spectrum support to industrial, commercial and government clients across multiple markets. Services include scientific and speciality consulting as well as all aspects of engineering and construction, and operations & maintenance. Their primary markets include:

- Automotive and Industrial
- Basic Resources
- Buildings
- Chemicals and Polymers
- Defence and Aerospace
- Federal Programmes
- Food and Consumer Products
- Infrastructure
- Oil and Gas
- Pharmaceutical and Biotechnical
- Pulp and Paper
- Refining
- Technology

Jacobs have produced six standard operating procedure documents covering design safety review, constructability review, the executive health safety and environment policy, engineering for construction and maintenance, Hazard and operability (HAZOP) and Control hazard and operability (CHAZOP), although HAZOP and CHAZOP are outside the limit of this review.

### 2.6.1 The Executive Health and Safety and Environment Policy

This document sets out Jacobs Engineering's HSE policy and how this policy will be applied by defining the organisation, responsibilities, systems and methods used to manage HSE. The policy goes on to give the responsibilities of each position in the company.

The document defines the role of the engineering manager who is in charge of design safety to include:

- Will act on design safety and loss prevention matters brought to their attention and ensure that effective design safety procedures are in place and carried out on projects
- Ensure that design safety is applied in a consistent manner by engineers on all projects
- Will make all personnel include in design on projects aware of their responsibilities regarding the incorporation of safety into design and of residual risk information into the safety plan and the necessity to co-operate with the Project/Planning supervisor.

Section 4.3 mentions that Jacobs is setting up HSE Committees, including a Design Safety Committee (Operations) which shall provide the focus for reviewing implementation of the HSE policy, and ongoing improvement in HSE related Design activities.

Section 4.5 is entitled Safety in Design and states that the Engineering Manager shall ensure HSE considerations in design are integrated into the activities of the Engineers and Designers who are responsible, and is supported by the appointment of a Design Safety Lead.

### 2.6.2 Constructability Review

The purpose of this document is to define the actions and responsibilities with respect to constructability on the applicable projects executed by Jacobs.

Construction considerations should contain a list of actions that should be considered during the engineering and design phases. They should be used in the initial layout through preliminary engineering and detailed design, at progress meetings, formal constructability reviews and interdiscipline checks.

It also notes that the design disciplines shall be trained in contributing construction ideas during the planning engineering and procurement phase.

Attachment 7.2 outlines a typical training plan for design disciplines and attachment 7.3 is a constructability application matrix for industrial projects which includes determining whether a concept is of High, Moderate or Low priority. Concepts include designed to enable efficient and safe construction, specifications are developed for safe construction and procurement efficiency and designed for accessibility of personnel, materials and equipment.

Attachment 7.8 in entitles constructability concepts design and procurement phase and states:

- Project constructability is enhanced with design and procurement schedules which are construction sensitive
- Designs are configured to enable efficient construction
- Constructability is enhanced when design elements are standardised
- Project constructability is enhanced when construction efficiency is considered in specification development
- Construction is enhanced when module/pre assembly designs are prepared to facilitate fabrication, transportation and installation
- Design promote construction under adverse weather conditions
- Design and construction sequencing should facilitate system turn-over and start up.

### 2.6.3 Design Safety Review

The objects of design safety activities are to ensure that the health and safety aspects of the proposed design with regard to personnel, property and the environment are maintained at the relevant acceptable levels.

Section 4.4 contains the Design Safety Plan which will reflect the size and complexity of the project including:

- Safety objectives in terms of risk reduction, loss reduction, environmental impact
- List of national statutory, legislative, or client requirements including relevant codes, standards and statutory instruments
- List of safety reviews to be undertaken, Safety review/audit requirements

Section 4.5 is the main section in the document and is entitled design safety and assessments. It states that it's necessary to undertake reviews and assessments throughout various phases of the project to demonstrate that the design safety objectives are being achieved.

Section 4.5.1 is the review phase that is completed during the process design development phases, the object of which is to:

- Define the possible hazards and environmental problems
- Specify the safety and environmental criteria to be met
- Specify broad design requirements so that the initial design can achieve the required criteria and so require little major change
- Identify any significant hazards in the design proposed
- Eliminate hazards by the introduction of inherent safety in the design process
- Introduce appropriate measures to ensure that the relevant design criteria for safety, health and environmental aspects of the plant are satisfied

It states that the phase two review is intended to identify significant hazards so it must be completed early enough to ensure that any redesign required does not adversely affect the project programme. It goes on to identify Hazards categorised as either immediate, or long term.

Section 4.6 implements a design safety concern register on which any design safety concerns emanating from the proposed design should be noted.

Attachment 7.2 and 7.3 contains a design and Environmental Phase 1 – Checklist where concerns can be noted and attachment 7.4 contains a design safety concern report.

### 2.6.4 Engineering for Construction and Maintenance

This procedure defines the actions and responsibilities for engineering in risk evaluation of construction and maintenance activities associated with the proposed design.

It defines the Design Safety Lead as the engineer who is responsible for ensuring that the relevant engineering discipline leads conduct and record the required risk assessment and satisfactorily complete any actions required.

Section 4.3 is the risk assessment review that is required to ensure that designers of construction work:

- Avoid foreseeable risks to health and safety of any person carrying out construction work or maintenance work, at any time
- Combat risk at source
- Give priority to measures that protect the whole workforce rather than the individual

Other key areas in this section are

- Timing of risk assessments,
- Information requirements and the use of utilising documents that describe the proposed design
- Risk assessment review applied at the appropriate project phases
- Hazard Identification, the designer need only identify those hazards that are significant and relevant to the scope of the design

### **2.6.5 Hazard-Risk Evaluation**

This identifies the activities/elements that may present a significant hazard. Once hazard is identified it is necessary to quantify two factors that identify the degree of risk posed by the hazard:

- The severity of harm that would arise if the hazard occurred
- The likelihood that harm will occur, this relates to the frequency of a hazardous circumstance.

An evaluation of this risk is given as:

Risk Arising = severity of harm x likelihood of occurrence.

The severity of the risks are classified as high, medium or low.

Likelihood of harm is treated in a similar way with a matrix of likelihood of severity generated.

Section 4.3.4.4. covers risk prevention/protection. It suggests that the design be developed and risks addressed using the hierarchy of:

- Eliminate the risk, modifying or altering the proposed design to eliminate the risk completely
- Reduce the Risk at Source, when not practical to avoid risk provisions should be made to overcome the risk rather than leaving contractors to take action.
- Identifying preventative Measures for the risk, when actions are implemented for risk reduction all people in the work place must be protected, not just the individual.

Attachment 7.2 A) contains an extensive checklist entitles Risk Assessment Review Construction Hazard Checklist: Site and Activity Wide. This includes a description of the activity or element, a description of the potential hazard and the action required at the design stage.

Further attachments cover the same description but is applied to demolition and earthworks, cladding and finishes, engineering services and systems, future maintenance, cleaning, repair, alteration, refurbishment and demolition hazard checklist. A worksheet is also provided that can be photocopied.

## **2.7 Bluestone**

Bluestone is a member of construction brands group Morgan Sindall plc, which operates a network of regional construction, affordable housing, fit out and infrastructure services divisions.

For clients, Bluestone brings huge benefits in the form of greater construction capability at local and national levels, professionally trained teams with an enormous skills base and industry-setting standards of best practice designed to deliver construction products.

### 2.7.1 Health Safety and Welfare Policy

This contains an outline of the responsibilities of each position within the company, although there is no responsibilities assigned to the designer.

The General Arrangements of the Health Safety and Welfare Policy explain what should be done to deal with such problems as Manual Handling, Safe systems of work, how to ensure health and safety of visitors to the site and young people. Details are also included of what should be done to ensure that the correct procedures are carried out when working with or using items such as:

- Scaffolding
- Ladders
- Electricity
- Overhead Power Lines
- Portable electric Tools
- Roof Work
- Buried Services
- Excavations
- Lifting Equipment
- Work Equipment
- Mobile Plant
- Confined Spaces
- Asbestos
- Control of Waste
- PPE

Polices are also given for:

- Communication/consultation
- Sub-contractors
- Temporary Staff
- Drugs and Alcohol
- Information
- Training
- Safety Monitoring and Inspections
- Housekeeping
- Display Screen Equipment

### 2.7.2 Construction Phase Health and Safety Plan

Mentions the CDM Regulations and states that all projects must fall within their scope. It states that the pre tender plan is formulated to convey relevant health and safety information to those undertaking the project and must be consulted during the development of the construction phase health and safety plan. Once completed the development plan must be approved then submitted to the planning supervisor prior to work commencing. The Client must also be advised. The plan must contain measures to ensure the health and safety of all those working on or affected by the project works.

The plan is classed as a living document that can be added to if necessary as the project progresses.

Also included are a number of forms, checklists and additional information that can be copied and used. These include:

- Contact details
- Contract directory
- Initial Risk Assessment Evaluation
- Schedules of RAs and Method Statements
- Emergency procedures and contact numbers
- Accident/Incident reporting and investigation
- Welfare Arrangements
- Site Rules
- Consultation on Safety matters
- Health and Safety Management

### 2.7.3 Risk Assessments

This section covers what should be covered when carrying out risk assessments. It states that it is essential to take into account the site-specific circumstances in order to tailor the Risk Assessments to ensure that they are legally compliant. This includes the competency of workers carrying out the task or using particular tools to machinery, how the task is carried out, control measures in place and the actual workplace and any adjacent activities.

Site specific circumstances must be taken into account in order to tailor the risk assessments to ensure they are legally compliant. Risks not included within the topic index must be assessed using pro-forma and must include the principles of protection to enable risk to be reduced to the lowest level practicable.

Tailored Risk Assessments can be used to fulfil the following responsibilities:

- The development of site-specific Risk Assessments
- The provision of Risk Assessments at the pre-qualification to contract stage to demonstrate to the Planning supervisor that adequate provision is made for safety.
- Checking health and safety conditions on site
- Developing safe systems of work and method statements
- Information on hazards in the workplace to all workers and to other contractors and workers in the vicinity

The procedure of risk assessments is given in section 1.2. It covers what information must be collected to carry out a proper risk assessment and then specifies what order everything must be done in.

Mention is also given in section 1.3 to pre-contract start-up risk assessments and a specific risk assessment checklist has been designed to be used at a small works (section 1.4).

The rest of the section contains all the forms needed to carry out risk assessments.

### 2.7.4 Sub-Contractor Assessment

Section 4 states that organisations acting as Principal Contractor are required (as part of CDM regulations) to assess all Sub-Contractors, including all parties with a design input, with regards to health and safety matters.

It goes on to cover:

- General health and safety conditions
- Contractor Health and Safety Questionnaire
- Sub-Contractors Questionnaire Pre-qualification questionnaire for designers

Section 4.3 specifies in depth requirements for a variety of operations including the removal of asbestos, demolition and board piling.

It also gives requirements for:

- Installation and Commissioning of lifts
- Safe working on roofing operations
- Scaffolding
- Structural Steel Operations

The following sections comprises of checklists, outline procedures, log sheets, permits and general info

- Method Statements
- Site induction
- Accident and Near Miss Reporting and Investigation
- Statutory Inspections and Registers
- Site Safety Inspection and Non-compliance Forms
- Work Permits
- COSHH Assessments
- Manual Handling, noise and HAV Assessments
- Tool box talks

### **3. Discussion on policies and guidance documentation**

The Matrix very clearly illustrates the strengths and weaknesses of all the companies who took part. One of the most important areas identified was that of hazard identification and hazard risk evaluation, both of which are missing from some of the company policies. No Company can be singled out as a perfect model though some have identified the key points and these are addressed in their policies.

A wide variety of topics were found to be covered in the health and safety policies. Some of the policies were more in-depth than others, covering every aspect of health and safety in design whereas others were more like general health and safety policies that had a subsection for designers, though these tended to not go into much depth.

One of the key themes in all the reports was that of assigning health and safety responsibility to all members of the company from the Managing Director to general employees. Again some of these went into more depth than others, ranging from general bullet points to in-depth documents covering several sections. The more detailed documents went on to discuss how health design should be carried out, going through the motions and all areas that should be covered. They included checklists, tables and matrixes that were easy for the designers to access and simple to use.

Litigation is an area that designers are very aware of and this is where the issue of responsibility becomes vitally important. If a company document clearly states what each member of the company is responsible for then it is easier in a litigious situation to find where to point the blame and find the individual who is responsible. This in turn puts a lot of pressure on the individuals assigned the responsibility, especially designers who may not have a lot of experience in designing out health and safety problems and this is an issue that needs particular attention.

Another issue that was mentioned in some of the policies was that of competence, in particular making sure that designers are competent and that they in turn make sure that the subcontractors have satisfactory competence levels to carry out the job. Again this raises the issue of responsibility and who the blame should fall on if a problem should occur. This is why roles and responsibilities must be clearly defined and the responsible people must clearly understand that they have these responsibilities placed on them that must be carried out properly in order to prevent litigation problems. One of the key questions that must be asked is "Is the inclusion of responsibility for company members actually a working document or is it just for show to prevent litigation in the case of an accident?" This is something that must be addressed as many would argue that although litigation is an inevitable driver it should not be the main driver for a policy that affects the lives of individuals involved in the construction process.

Many of the policies mention the CDM regulations and readers are told that they should follow these regulations and implement them when they are at the design stage of a project. This is on the assumption that the designer knows all about the CDM regulations and is familiar enough with them that they come as second nature. They do not specifically state how the CDM should be implemented or at what stage, merely that designers should be aware of their existence and include them in their plans. This could create a difficulty for the project as often there appears to be little to back up the implementation.

One way that implementation of CDM can be controlled is to have a nominated person who's sole responsibility is to check that designers are including health and safety matters in their designs before the plans get off the drawing board and into the construction phase. At least one of the companies has assigned a person within the company to be responsible to check that implementations are carried out properly. This ensures that designers properly consider health and safety matters at the planning stage. It also makes sure that there is design consistency, which reflects well on the company and can become a selling point for future projects.

Another way that checks whether designers are actually implementing health into designs is to set up an auditing/assessment/review process. Many of the companies include these in their policies in some shape or form. The simplest way of doing this is to include checklists that designers can use to ensure that they have covered all aspects of health in the design phase. Auditing is another way but is a more expensive option and must be carried out throughout all stages of design for it to be effective. Reviews of design processes are not much immediate use if they only take place at the end of the project but if

they are carried out after certain stages of the design process they could point out any problems that may have emerged.

A pre tender health and safety plan is useful as it takes account of designing out health problems and works them into the tender bid. Sufficient time and money is allocated to the project to allow health matters to be taken seriously rather than as an afterthought. If health design is taken into account at the procurement stages the suitable build time can be introduced for any redesign that may need to take place. This should be a key part of designing for health and safety.

Method statements are not mentioned in many of the reports. Clearly it is an issue of some debate whether method statements are part of the design process. Nevertheless, the designers must assure themselves that their design is buildable in a manner that does not endanger the construction operatives. It would be useful to have a section on how to complete method statements for different projects to prevent the same method statement being copied and used for every project as this is of little use.

#### **4. Conclusion**

In conclusion, one of the main issues arising from the policy review is that health and safety tend to be lumped together and treated as the one entity. This may make it difficult for designers to identify specific health issues that they should be focusing on. This can lead to health often being overshadowed by safety concerns as safety is often seen as being the easiest to deal with. For example, it is well known that the inclusion of guard rails around scaffolding edges will help prevent falls. They are relatively cheap to install and immediately anyone can see that the issue has been addressed. Health matters often can prove to be more complicated to control as they may not immediately be apparent as a hazard, they also may involve more cost and time to rectify.

Occupational health issues such as set-up requirements for VDU users often overshadow health issues that are more likely to affect construction workers, such as dermatitis, HAVS etc. This that can lead to confusion as to what actually constitutes a health issue. One way of combating this is to have clearly defined descriptions of what is meant by health and what is meant by safety.

This review has led to the development of a questionnaire that is currently at the pilot stage with preliminary interviews being undertaken with designers. After the piloting stage is complete any changes will be made to the questions and interviewing will take place using the final questionnaire with around thirty designers in order to collect enough data to analyse. Currently there are 19 questions in various sections although this may change after preliminary findings.

#### **References**

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