



UNIVERSITY OF  
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## PRE-CONSTRUCTION STAGE RISK MANAGEMENT

*Models of practice in the management of occupational safety and health risks*



FINAL  
REPORT

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## EXECUTIVE SUMMARY

### BACKGROUND

It is considered that most accidents are preventable with better management of health and safety (H&S) risk at the pre-construction stage of construction projects. Under the Construction (Design and Management) 2015 Regulations (CDM 2015), a transposition of European Council Directive 1992/57/EEC on the implementation of minimum safety and health requirements at temporary or mobile construction sites (TMCS) into UK law, a pre-construction phase coordinator (PCPC), referred to under CDM 2015 as a “Principal Designer” (PD), is required to be appointed to take responsibility for coordination of H&S risk management during the design and project preparation stage of projects. This dutyholder must possess the skills, knowledge and experience (SKE), or organisational capability (OC) where the dutyholder is an organisation, necessary to discharge this role. The CDM 2015 also require various arrangements to be made in respect of the supply, coordination and management of information to secure improved H&S performance, and adoption of the principles of prevention throughout the supply chain.

The aim of this study, dubbed ‘Pre-COSH’ (Pre-Construction Occupational Safety and Health), was to examine current industry practice and procedures for H&S risk management and to develop a flexible model for simulating effective CDM 2015 compliance during the pre-construction phase of projects. The specific research questions the study sought to answer were: what are the appropriate categories of individual SKE and measures of organisational H&S management capability and how are they appropriately assessed? What are the different arrangements and related professional backgrounds for exercising the PD role and relative effectiveness of the different arrangements? What is best practice in relation to coordination and the preparation of CDM documents? How are CDM duties translated into obligations under the relevant contracts?

Fourteen focus group discussion (FGD) workshops with over eighty industry stakeholders and practitioners were held to collect and synthesize knowledge of the range of specific practices and procedures through which CDM 2015 are implemented with specific emphasis on H&S risk management during the pre-construction stage of construction projects, and to develop recommendations for: (a) improvement actions; (b) policy review; and (c) changes in regulation that could facilitate more effective H&S performance. This generated 1,018 pages of textual data from which the following findings have emerged.

### FINDINGS

#### 1. Clients’ general health and safety arrangements

The research identified six general approaches adopted by CDM Clients to complying with their duties under Regulations 4 and 5 to make arrangements for effective management H&S risk: (i) use of third party H&S professional service providers such as Principal Designers (PDs), CDM advisors, and general H&S consultants; (ii) use of in-house H&S teams and systems; (iii) early project collaboration meetings; (iv) H&S agenda setting through a Client Brief; (v) reliance on project managers; and (vi) use of contractual arrangements with dutyholders that impose obligations designed to support discharge of Client duties. A combination of these approaches may be adopted on the same project, for instance use of in-house H&S teams and structures with support from external H&S consultants.

## **2. Assembling project supply chains with right focus on health and safety**

Securing H&S on construction projects requires good decision-making as to who ultimately gets on board the project and their H&S competences. The Regulations espouse this as a key element. Workshop participants reported four main categories of approaches to ensuring that dutyholders have appropriate SKE/OC: (i) adoption of assessments by third party organisations (the most common approach); (ii) administration of H&S pre-qualification questionnaire (may be additional to third party assessment to capture special features of the particular project); (iii) use of collaborative working and relational contracting arrangements e.g., framework contracts or alliancing contractual systems in which supply chain members are assessed once and used on multiple projects; and (iv) bespoke use of repeat appointment of dutyholders already assessed for relevant SKE/OC on past projects.

## **3. Assessment of prevention through design (PtD) skills, knowledge, experience, behaviours (SKEB) and organisational capability (OC) of project parties**

Assembling the project supply chain with the right focus on H&S requires an ascertainment of the H&S competence of the project parties. The empirical insights are that the burden of having to complete pre-qualification questionnaire on competence for every project has been reduced by adoption of third party assessments such as that of SSIP. However, concerns remain regarding the efficacy of the SSIP regime. As stated in finding 2, this is sometimes supplemented by bespoke H&S questionnaires designed to address special project features. Four theoretical models or frameworks have been developed through this investigation to provide a lens for understanding the attributes of the skills, knowledge, experience as well as behaviours and organisational capability constructs in relation to the PtD competence of project team members. The recently published BSI competence framework which should be adopted by industry sits very well with these models.

## **4. Health and safety design coordination**

The PD undertakes the H&S design coordination role at the pre-construction stage of the project development process as required by the CDM 2015. PDs discharge the role by performing four categories of functions: (i) review and communication; (ii) information management; (iii) Client awareness creation and support; and (iv) checking competence of other dutyholders. These categories focus on the everyday activity of organising, in both its routine and improvised forms, and highlight what happens in practice on a day-to-day basis.

## **5. Nature of PD appointments**

PDs are often organisations rather than individuals. The tendency to appoint organisations is a reflection of the fact that the competences required to fulfil the PD role effectively are multifaceted and dispersed among design, H&S, and project leadership disciplines. The PD role thus requires a reservoir of multiple capabilities and resources to discharge the H&S coordination duties effectively.

## **6. Preparation of Pre-construction information (PCI)**

A variety of surveys are often carried out for the purpose of assembling the information that should be in the PCI. However, information on asbestos is often missing from such surveys. Health and Safety Files for existing built assets are incorporated where they are available and are of reasonably good quality. However, very often this is not the case. Workshop participants reported that the predominant approach to the structuring of the PCI is based on adoption of industry templates, regulatory guidance documents and use of available visualisation tools and systems. The PCI is used in a variety of ways: identification of constraints that must be taken

account of by designers; inclusion of extracts from it in tender documents for the appointment of the main contractor and sub-contractors, with signposting to the full PCI; and inclusion of extracts in documents making up contracts for the appointment of other CDM dutyholders. Information visibility and accessibility are therefore key attributes of PCI required by project parties on construction projects and these explain the pervasive adoption of common data environments or centralised information sharing platforms.

### **7. Preparation of Construction Phase Plan (CPP)**

Three strategies for preparing the CPP are discernible from the workshop discussions: (i) emphasis on significant H&S risks; (ii) Principal Contractor starts preparation of CPP early and in tandem with the design process; and (iii) use of industry wizards and templates. There is no express requirement in the Regulations for assessment of the CPP for fitness for purpose before construction is permitted to start on site. However, such assessment may be carried out by the PD or other Client agent at the Client's request but not usually as a formal contractual obligation. Some participants were of the view that the absence of express regulatory requirement for such assessment often undermines the quality of the CPP.

### **8. Preparation of Health and Safety File (HSF)**

Four main categories of approaches are adopted in the preparation of the HSF: use of templates; third party supervision arrangements; use of contractual tools; and design analysis report that morphs into an HSF. Important information often missing from it include: hazardous materials; operation and maintenance (O&M) manuals and information; and external and significant services information. The finding of this investigation is that, as expected by the Regulations, PDs make significant contributions to the preparation of the HSF.

### **9. Collaborative risk management (CRM) at pre-construction stage**

The principal ingredients of CRM on projects include: project team meetings; visualisation techniques; residual risk reconciliation; early contractor involvement; Client leadership; and collaborative working arrangements. The most important element to CRM is the holding of project team meetings. This is akin to approaches of constructability review meetings in the US and construction hazard assessment and implication review (CHAIR) process in Australia for managing H&S risks on construction projects. Similar to the PCI preparation, centralised information platforms are commonly employed to manage information, highlighting again the information visibility and timeliness requirements among project parties in CRM. The main challenges to CRM on construction projects are: ineffective Designer and PD role; siloed project team formation; and inappropriate insurance systems.

### **10. Attitudes of Clients to PD Appointments**

Clients under the 2015 Regulations are generally appointing PDs much earlier than was the practice under CDM2007. However, the attitudes some clients adopt in the appointment process result in PDs whose influence on H&S is anaemic. Explanations for this outcome include: Clients impose fee constraints that the more competent organisations and individuals find unacceptable; some Clients treat the obligation to appoint the PD as a tick-box exercise; the PDs appointed do not always have the confidence from experience necessary to challenge the designs of designers generally and designs of lead designers in particular; and PDs resource the role only to the extent possible with the fee the Client is prepared to pay. The combined effect of all these factors is that the appointed PD concentrates on coordination of the preparation and sharing of the PCI and the collation of the HSF to the exclusion of leadership

of CRM. In extreme cases, PDs accept the reality imposed by the Client by treating their engagement as just an extra income generation opportunity with very little real responsibility.

### **11. Contracts for the appointment of PDs**

The RIBA and APS have developed standard form contracts for the engagement of PDs. The philosophy of flexibility underlying the NEC contracts also enables use of the NEC Professional Services Contract for the same purpose.

### **12. Contractor's design and specialist subcontractor design**

It was noted that, as a result of the way commercial risks are managed on projects, there are often significant amounts of design left to the main contractor in the form of performance specified work and specified portions of the design expressly left by the design team to be provided by the contractor (e.g., Contractor Designed Portion under the JCT contracts). Contracts for the engagement of specialist contractors as subcontractors also often require the specialist to provide the associated design (e.g., structural steelwork, proprietary roofing or cladding systems, and M&E works). It is often the case that such designs are provided by different entities and at different locations during the construction phase. The research found that termination of the PD's appointment at the end of the pre-construction stage hampers coordination of such designs and integrating them with that of the design of the overall project. Termination of the PD appointment in such circumstances would therefore be in breach of the Regulations unless appropriately reassigned to another dutyholder.

### **13. Fragmented approaches to projects**

In the CDM 2015, a project is defined as that "which includes or is intended to include construction work and includes all planning, design, management or other work involved in a project until the end of the construction phase." In reality, a substantial amount of enabling or ancillary works such as ground investigations, demolition and site remediation might be necessary on the site prior to the substantive project. Such work can sometimes take place over several years before the actual development and implementation of the substantive project. Such fragmentation can create a problem as it is not always clear whether work of this kind forms part of the substantive project or is a project in its own right and how the PD needs to engage with such elements that could potentially also have H&S implications. Consideration should be given to the possibility that such ancillary works could be separate projects to which the CDM Regulations would apply, even without the main construction element, thereby ensuring that a PD is engaged for risk management of conditions on the site where there will be more than one contractor.

### **14. An analysis of health and safety provisions in standard form contracts**

Some dutyholders expend the effort and resources necessary for compliance with their obligations because of a belief that it is the morally right thing to do or out of adherence to corporate social responsibility. However, enforcement is still necessary. Unlike the HSE, the CDM Client has no power to prosecute failure to comply with the Regulations. The only levers available to the Client to manage performance can be found in contract. Unfortunately, the importance of the contract in ensuring compliance with the Regulations is not fully appreciated. The promoters of the industry's standard form contracts have engaged with this contract thesis in relation to H&S generally to varying degrees. The JCT *Standard Building Contract* makes the most extensive provisions on the CDM duties of the Client and the Contractor. The NEC ECC contract makes only skeletal provision for H&S in the standard form, leaving detailed provision for CDM related matters to the drafter of the Scope, which must be drafted for the

particular project. The effectiveness of this arrangement depends on the competence of the drafter, particularly knowledge and understanding of not only the Regulations but also the NEC contract.

### **15. Impediments from insurance regime**

There was feedback from the workshops that the current insurance regime puts impediments against CRM in two ways. First, designers identified a lack of PI insurance cover for the PD role as one of the reasons for their hesitancy in taking on this role. Second, the contracting system and project management approaches with extensive use of responsibility matrices create siloes, isolating teams and organisations. There is therefore an unwillingness to take any risks or contribute to the management of risks outside of the contractual parameters. Indeed, PI insurers and other insurance companies decline to provide cover where there is involvement in CRM on account of perceived conflict of interests between dutyholders. In other cases, some project participants are not insured to manage certain project H&S risks such as fire.

### **16. Building safety reforms**

This project was designed and approved by the EU before the Grenfell Tower fire disaster, but commenced after it. The research has therefore overlapped the initiatives taken in response to it. The Hackitt Report commissioned by Government provided an opportunity to stand back and rethink the whole issue of building safety right from design and construction to occupation. A Building Safety Bill was the outcome of the Government's acceptance of the recommendations. The interventions that the Bill seeks to achieve most relevant to the design and construction stages are: (i) strategic review of competence; (ii) holding dutyholders more to account; (iii) gateway system; (iv) golden thread of information; (v) certification and completion. The findings of the research echo aspects of the Hackitt Report. Some of the recommendations that can be taken forward through exercise of powers in the Bill include: (i) catching domestic and small one-off clients sufficiently earlier and ensuring that they develop reasonably good understanding of their CDM obligations; (ii) ensuring competence of designers and PDs; (iii) current assessment of SKEs; (iv) better enforcement of compliance by Clients; (iv) reviewing quality of the CDM documents to be prepared by the dutyholders, particularly the HSF.

## **RECOMMENDATIONS**

In view of the results of this investigation, the following recommendations are proffered.

### **1. Empowering Clients**

With the exception of the large infrastructure organisations and some enlightened Clients, there are often deficits in Client leadership of H&S. Clear gains can be made by taking steps to ensure reasonable Client H&S competence. The assumption underlying the Regulations is that the Client will buy in the necessary competence by engaging CDM dutyholders and other supply chain members with the appropriate SKE/OC. For commercial reasons, Clients do not always do this enough whilst dutyholders appointed, for similar reasons, are not always prepared to challenge robustly Clients not putting in sufficient resources. Just as other dutyholders are required to evidence their H&S competence on projects, there is a strong case for encouraging Clients also to evidence possession of reasonable H&S awareness. We recommend review of the HSE guidance documents targeted at Clients to include a framework of core criteria against which Clients are to assess their H&S awareness and to take appropriate remedial action.

## **2. Attention to Matters of Health**

The “health” component of H&S is not accorded the importance it deserves, particularly in relation to the contents of the PCI. It will therefore be necessary to create greater designer awareness of the importance of considering more overtly the health risk consequences of their design decisions (including long-term or remote effects). This should not just be in terms of what is specified, but also what exists before the project commences and design choices that impact on delivery and operational methods and processes.

## **3. Evaluation of CPP before Site Commencement**

There needs to be an express requirement that the CPP is reviewed for fitness for purpose before commencement of operations on site. As there is already a practice of PDs undertaking this task on behalf Clients, consideration should be given to imposing an express review obligation on the PD. This will require standards or benchmarks to be defined.

## **4. Improving the Quality of HSFs**

There should be a mechanism in place for policing the quality of the HSF. Such a policing mechanism could be augmented by insurance companies who can incentivise high quality HSFs by reflecting their quality in premiums for their building insurance products.

## **5. Digital Tools**

There are advantages to be gained by employing digitisation tools to overcome the challenges of poor quality CDM documents (PCI, CPP and HSF) on many projects and making them accessible to all concerned. BIM and related artificial intelligence technology tools have potential for use in authoring and validating these documents.

## **6. Practice Guidance on Collaborative Risk Management (CRM)**

Whilst effective CRM is achieved on some projects, there is hardly any guidance available in the public domain on best practice in CRM. Research into this subject is therefore needed. This finding is consistent with the conclusion in the Hackitt Report that building safety risk management competence is patchy.

## **7. Monitoring and Remedial Action by Clients**

The Client’s duty is not only to appoint CDM dutyholders with appropriate SKE/OC but also to review the effectiveness of arrangements for the management of H&S and to take appropriate remedial action. There are no systems available to Clients in the public domain for monitoring and controlling performance. Further research on this subject is needed.

## **8. H&S Content of Contracts**

The contract drafting committees of the promoters of the industry’s standard form contracts need to revisit the adequacy of CDM related provisions in their contracts. In particular, the NEC policy of having only skeletal H&S provisions as part of the conditions of contract for its contracts and leaving details on CDM to be drafted by the parties as part of the Scope document of their project should be reviewed by the Contract Board or drafting team for the NEC contracts.

## **9. Resourcing Performance of the PD Role and other CDM Obligations**

The difficult task of ensuring that the Client not only makes a timely appointment of the PD but also provides sufficient resources for the discharge of the role cannot be achieved without the availability of cost standards for the role. Such standards could be in the form of cost or



person days per pound of the contract price on a sliding scale. Such standards could be put to good use in the following ways: estimating the PD services component of project budgets; and evaluation of the adequacy of the resources for prosecution purposes. As such cost standards are not available in the public domain, remedial research aimed at developing them is sorely needed.

#### **10. Ensuring Adequacy of Client Action within Gateway Regime**

There is a good case for imposing a statutory duty on the Client/PD to submit a form similar to Form F10 before work can be commenced on site. The information to be stated should include: evidence that the Client has taken reasonable steps to develop understanding of its CDM duties; evidence that dutyholders have been assessed for appropriate SKE/OC; the contract price for the project; the identity and contact information for the PD (if not already in Form F10); when the PD was appointed; and contract price for the PD service. This intervention may be built into the forthcoming gateway system whereby the information is assessed at Gateway 2. The provision of this information would also enable dutyholders to be held more accountable during design and construction as recommended by actions on the Hackitt Report.

#### **11. Quality of CDM Documents**

The Golden Thread agenda contemplated by the Building Safety Bill represents an opportunity to take strategic action to improve the quality of the CDM documents not only for content but also accessibility. It is recommended that the HSF structure should be revised to take account of the special requirements of high-risk buildings.

#### **12. Project insurance models**

One of the innovations of the government construction strategy a decade ago was the introduction of Integrated Project Insurance (IPI) which was subsequently trialled on a number of demonstration projects. This approach offers the potential of removing the insurance impediment to CRM and facilitating a whole project approach. Further development and roll out of the IPI approach is therefore recommended.