



**Revision of the
Construction (Design and Management) Regulations 1994
Response to HSE's Proposed CDM 2006 Regulations**

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General

Issue: Designers are in a unique position to eliminate or reduce the risks that arise during construction work and have a key role to play in the design and management of construction projects. The earliest design decisions can fundamentally affect safety and health. It is the designers who are best placed and sufficiently competent to advise the client on the feasibility of his project and the resource requirements to make it work.

Comment: The success of any construction process begins with the Client and his willingness to commission a project that will bear the test of time and stand acknowledged by present and future generations as a symbol of excellence in the built environment. The translation of that desire into preliminary drawings, detailed plans, construction and eventually to the finished project will fall to designers (engineers, architects etc.), constructors and appropriate advisors. Establishing a professional relationship between these players is crucial to the successful implementation of the client's wishes.

Construction

Issue: Behind any project there are fundamental principles that are universally applicable and which the designers must keep to the fore from the outset. Construction projects, whether public works or private developments must demonstrate adherence to the key engineering principles.

Comment: Buildability or constructability is an assessment of the construction sequencing and key actions involved in building operations and works of engineering construction that enable efficient and safe management of the construction process, without detriment to occupational safety and health or the environment. A successful project has to be buildable. The factors here to be considered are primarily engineering, but also ones into which the principal contractor must input his knowledge and expertise. The desires of a client and designs of his architect must not be allowed to take off in flights of fancy without the engineer's sober assessment of the safety of those designs.

Maintenance, beyond construction

Issue: Designing for and safely completing the construction phase is not the total extent of the designers and engineers role in a structure. In the life span of any project construction only accounts for a small proportion of time and cost. The substantial proportion relates to the useable life of the building or structure. Associated with this is the need for properly planned maintenance, which needs to be addressed at the outset by the designer. Up to now maintenance issues have often focussed on the 'trivial', e.g. can the windows be cleaned? Can a light bulb be changed? While the circumstances may judge whether these activities are trivial there are many major long-term maintenance issues that the designer needs to address and the guidance needs to emphasise.

Comment: Once the client has accepted responsibility of the completed project its maintainability is a central consideration in both the short and long-term use of it. Maintenance requirements can give rise to substantial hazards that have the potential to injure workers and the public, to damage the primary structure as well neighbouring structures, to interrupt industry and commerce, disrupt the functioning of urban and rural transport systems and infrastructure and cause public and political discontent.

Engineers have been criticized for developing ingenious solutions to problems but have a tendency to fail to take account of the safety issues that will be faced by maintenance technicians who may have to climb to unsafe heights, traverse fragile surfaces or enter restricted crawl ways in order to carry out basic maintenance activities on pipelines, cables, switch points, light fittings etc. This may be an unfair generalisation but it indicates that health, safety and welfare issues occur throughout the whole life of the structure and must be considered integral to and an essential requirement of the design process.

Issue: Emergency preparedness

Comment: Client, designers and engineers must give due consideration to emergency preparedness at the feasibility and design phases of the project. All the safety issues for keeping the structure functional throughout its life, for responding to emergency events, large or small, and for upgrading and improving the structure must be on the table from the outset. Hazards are identified at this stage and are engineered out as far as is technologically possible, and appropriate alternative control mechanisms build into the design to prevent employee and public exposure to harm.

Issue: Demolition

Comment: It is not appropriate for the client or designers to assume that demolition will be a problem for future generations to solve. If they fail to take it into consideration it will be such a problem, but it is incumbent upon the generators of a project of this nature to foresee the problems and to design out the hazards associated with demolition and disposal, or engineer in effective controls that will ensure that the structure can be taken down and removed in a safe and healthy manner.

Design Safety Analysis and Control (DSAC):

Issue: The proposed ACoP and Guidance emphasises risk management as the means for ensuring safety in design, however risk management is a failed paradigm.

Comment: Risk management is a failed paradigm since it posits an acceptable level of risk and proceeds to manipulate the circumstances to increase the odds in favour of a non-injurious outcome. Ultimately, by accepting and acting on any level of risk we are gambling with the safety of workers. On the contrary we should not be interested in reducing the risk, rather in making the case for managing any operation in hazardous environments such that there is no risk. If safety, not the risk, is managed and we can control the safety of the operation then it does not matter how hazardous the environment is since the operation itself is non-hazardous and the outcome will always be non-injurious.

In applying this approach to design safety analysis and control the designer is focussed on thorough analysis of his designs taking account of anything that can cause harm during the whole life of the project. The following solution is offered as an alternative to the integrated risk management approach presented in Appendix 3.

DSAC Core Principle

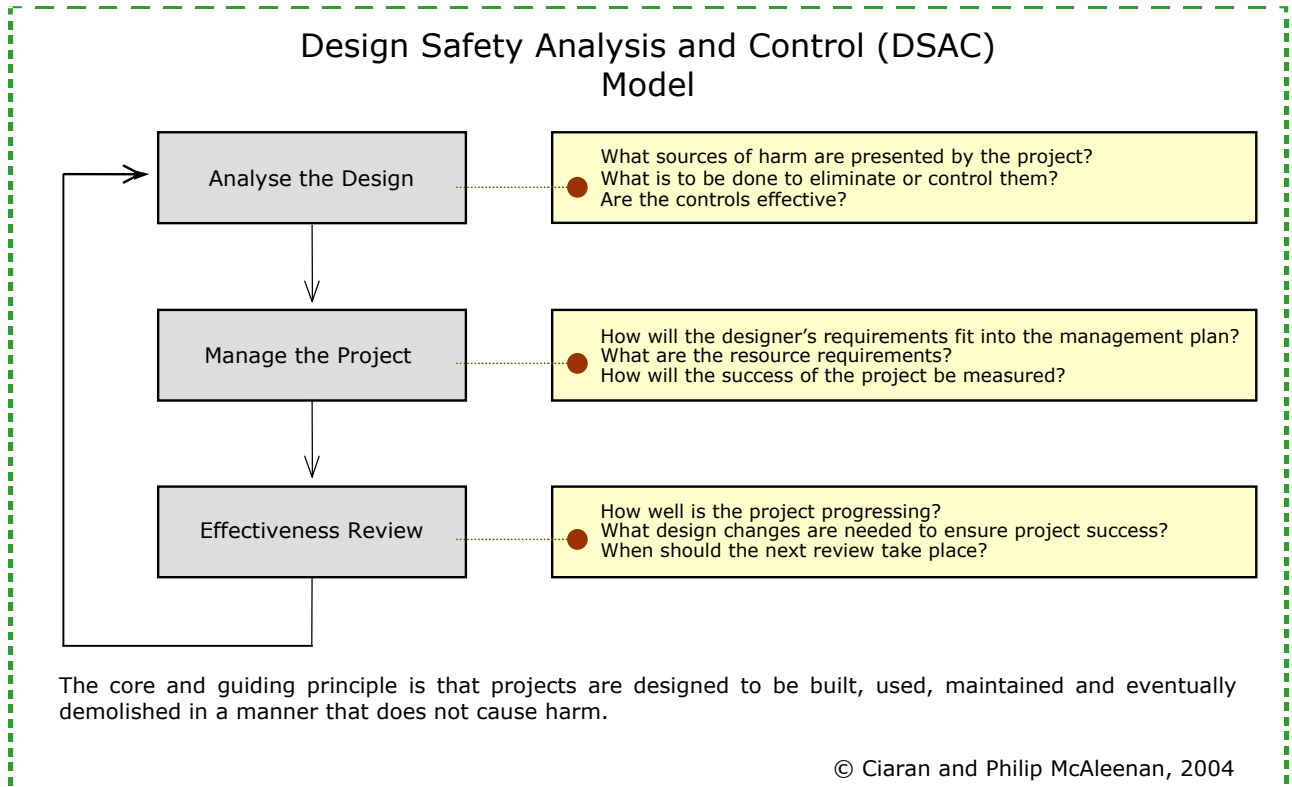
Construction projects must be designed to be built, used, maintained and eventually demolished in a manner that does not cause harm to construction personnel, end users, maintenance operatives, demolition specialists, and others who may come into contact with the project. On the interface between client, designer, engineer and contractor this requires the acceptance of project objectives that include tasks/ activities being completed on time and in a manner that does not cause harm to the employees, customers, other non-employees, or the company.

Some hazards can be eliminated or contained through good engineering design solutions and others, inherent in the process, have to be worked around. In all cases it is essential to identify at the earliest opportunity what hazards exist, the harm that can result and how it does so.

Fundamentally this necessitates a full analysis of the design safety issues and the development of appropriate controls to ensure that work operations during the construction phase proceed in a manner that make certain that people, plant and property are protected from harm prior to, during and after the work operation, regardless of the nature of the hazards faced.

The design safety analysis and control process (below), derived from the Operational Analysis and Control (OAC) model integrates all aspects of the project process including those associated with the design elements in construction. Underpinning this approach to safety is the elimination of risk through the absolute control of all stages of the process.

The model suits the requirements of European Council Directive 92/57/EEC on the implementation of minimum safety and health requirements at temporary or mobile construction sites with particular reference to project preparation.



Competence

Issue: Competence of all the key players is central to the success of construction projects.

Comment: Importantly, the thread of competence extends throughout a construction project team, each member skilfully applying their knowledge and skills to the successful completion of their particular work areas (Figure 2, below). Ultimately, in the design process, competence begins with the client who must ensure, through reasonable enquiry and by seeking advice, that the designers he engages are themselves competent to assess his project and to advise him accordingly on the health and safety issues. The client must also be assured the people he engages are well enough resourced to undertake the duties he requires of them, that they can demonstrate a successful track record in similar work and that they can and will act in compliance with their legal duties for health and safety.

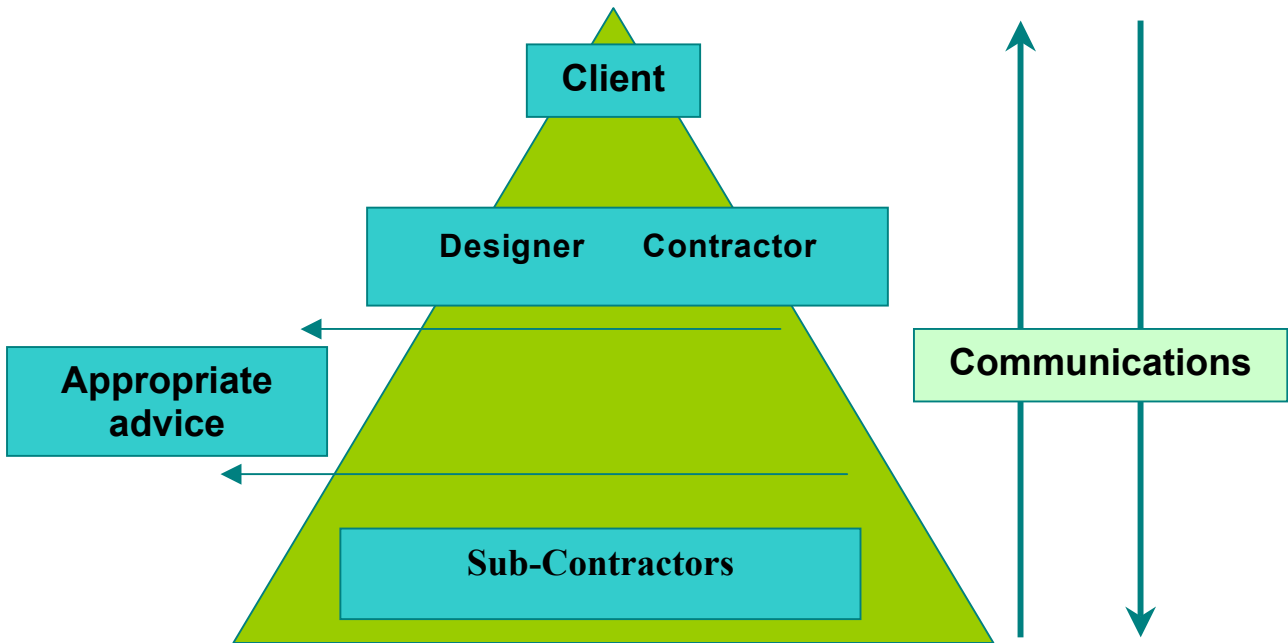


Figure 2: Relationships

Issue: We welcome the requirement on the individual not to accept an appointment unless they are competent to perform the function for which they are to be engaged, although guidance in this area would need to be enhanced.

Comment: In the first stage, when preparing the project brief the core skills/competences needed to perform the design and construct tasks should be outlined in a “competences matrix” (Note: The matrix needs to be dynamic). At the establishment of the team the skills of individuals should match the skills identified as essential for the safe execution of the construction project. In that way the client has the necessary assurances and individuals can fulfil their obligations under the new requirements.

Thus the process of identifying and selecting on the basis of task requirements and competence applies throughout the project whether selecting designers or contractors. It applies to all parties in the process and requires a sufficient degree of managerial competence itself to make is successful. Anything less will introduce hazards to the project and the higher up the system it occurs the greater the harm to the project.

This approach should underpin the clients’ ability to set the correct tone for safety and health in the project. It is useful to note that competency is incomplete without resources and the authority to act, therefore the legislation should make the clear link and require clients to identify all of this in the project brief (skills, knowledge, ability, resources and level of authority to act).

Competent Matrix

An example “competence matrix is shown below:

Skill, Knowledge and Ability	Lead Designer	Designer(s)	Principal Contractor	Contractor(s)
Construction Project Co-ordination	CM	K	CM	K
Civil Engineering Design	CM	CA	K	
Specialist Design (e.g. structural steel)	K	CA	K	
Construction	K	K	CM	CM
Specialist construction/ demolition	K	K		
Asbestos removal	K	K	CM	CA
Another skill	Etc.	Etc.	Etc.	Etc.
And another skill	Etc.	Etc.	Etc.	Etc.

CM = Competent to Manage
 CA = Competent to Act
 K = Knowledge and understanding

Co-ordinating Function

Issue: Rather than thinking of a name for the co-ordinator, which appeared to preoccupy many attendees at the July 7th “The Future of CDM” conference. Organised by NCE, the focus needs to be firmly placed on the function of co-ordinating not a co-ordinator role.

Comment: Designers and constructors are the two essential roles in any construction project that, between them, must possess the necessary competence and skills to successfully and safely realise their client’s vision. It should go without saying (although saying it might help) that the project will not be successfully delivered unless the two parties (designer and constructor) in tandem with the Client, properly co-ordinate their activities, communicate their requirements and co-operate in the delivery of the project.

Since we have always had (CDM Version 1) a principal (or Lead) contractor with responsibility to co-ordinate all aspects of the construction phase it should stand to reason that projects should have principal or lead designers (You will probably find that this is the practice is most design houses anyway) with specific responsibility to co-ordinate all aspects of the design of the project, extending into overseeing its successful construction.

CDM2006 could easily place a duty on lead designers and principal contractors to co-ordinate safety and health issues, communicate relevant or significant findings and to co-operate with each other to ensure a safe and healthy outcome. This would meet the spirit of the Temporary Workers Directive, remove any unnecessary bureaucracy presented by the addition of a separate co-ordinator and ensure that control and influence of the designer and constructor are not neutered.

Co-ordinator: The Clients' Friend?

Issue: The argument has been presented that a co-ordinator could be the clients' friend but this works directly against the partnering approach and questions the ethics of designers and constructors.

Comment: In this era of construction partnering the Client does not need a separate 'friend' to ensure that he gets a safe and healthy project delivered. Professional codes of conduct themselves do not allow professionals to design anything that is unsafe or unhealthy to construct. This is perhaps an area where professional institutions could play a bigger role and have a greater impact. Ultimately there may be scope for a General Engineering Council, akin to the General Medical Council.

CDM2006 needs to firmly stamp the authority of a lead designer as the person responsible for co-ordinating all aspects of the construction project, including ensuring that designs have correctly addressed all appropriate health and safety matters.

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