

CDM 2007 – Safety in Design for Pile Foundations and Embedded Retaining Walls

Designers of pile foundations and embedded retaining walls can contribute tremendously to safer working conditions on any project that they are involved with by: -

- minimizing hazards as part of the design process;
- engaging in effective communication with other members of the project team.

These designers possess particular skills of foresight and vision, usually borne out of experience, which can be used to bring about beneficial changes to the culture of the foundations sector of the construction industry and improve conditions for everyone involved throughout the complete lifecycle of any structure. It is important to realize that engineering skills must be underpinned with an understanding of how design decisions can affect the health and safety of people during construction, use, maintenance, re-use or demolition.

This guidance note is aimed at designers of pile foundations and embedded retaining walls to help them fulfill their responsibilities, using advice from appropriate and suitably competent sources as necessary.

This document and the associated list of possible hazards relates to the consideration of risk management during the design process as distinct to risk management during the execution of civil engineering works. This combined aide memoir has been produced to assist designers but given the unique nature of each individual project can not be considered exhaustive. The designer must consider the issues relevant to every new situation when engaging in the risk management process.

Hazards and Risks

- A hazard is something that has the potential to cause harm.
- A risk is a product of the likelihood of that harm occurring and the severity of the harm resulting from the hazard
- It naturally follows that, if the hazard can be eliminated within the design process, then the risk is reduced to zero.

CDM2007 and its Approved Code of Practice

The Construction (Design and Management) Regulations 2007 (CDM2007) came into force on 6th April 2007, replacing the Construction (Design and Management) Regulations 1994 (CDM94) as well as the Construction (Health, Safety and Welfare) Regulations 1996 (CHSW). The Approved Code of Practice (ACOP) published in February 2007 replaced the ACOP to the Construction (Design and Management) Regulations 1994 on 6th April 2007 and provides practical guidance on how to comply with the duties and responsibilities set out in the new regulations.

Key aims of CDM2007

These are described in the introduction to the ACOP and set out to integrate health and safety into project management by encouraging teamwork that will: -

- **improve planning and project management from the outset;**
- **identify hazards early enough to allow them to be eliminated or reduced at the design and/or planning stage of the project, so that the residual risks can be managed properly;**
- **target effort where it will be most beneficial in health and safety terms;**
- **actively discourage unnecessary bureaucracy.**

Duties and Responsibilities of Designers

Regulation 7 of CDM2007 confers certain duties on Clients (excluding domestic clients), CDM co-ordinators, Designers, Principal Contractors, Contractors and (for good measure) Everyone.

For all construction projects Designers must: -

- **check that the client is aware of their duties;**
- **eliminate hazards and reduce risks during design;**
- **provide information about remaining risks that could be reasonably foreseen by a competent designer.**

Additionally, where projects are notifiable under Part 3 of the Regulations (most projects involving piling will fall into this category), Designers must: -

- **check that a CDM co-ordinator has been appointed;**
- **provide any information that is needed for inclusion in the project health and safety file.**

In common with all other members of the project team Designers must: -

- **check their own competence;**
- **co-operate with others and co-ordinate work so as to ensure the health and safety of construction workers and others who may be affected by the work;**
- **report all obvious risks;**
- **comply with the requirements of schedule 3 of the ACOP Appendix 1 and part 4 of the regulations for any work under their control;**
- **take account of and apply the general principles of prevention when carrying out their duties.**

Foundation/Pile/Wall Designers

CDM 2007 does not differentiate between the designer of a foundation and the designer of the piles that form a part of and support that foundation; in the case of an embedded retaining wall these two aspects of design may or may not be executed by the same designer. **Consequently the duty to co-operate with other members of the project team and co-ordinate design work, thereby eliminating hazards and reducing risks during design and providing information about remaining risks is of paramount importance.**

The ICE specification for piling and embedded retaining walls (Second edition 2007) requires that the design (and construction) of the works shall be carried out in accordance with CDM 2007 and advocates that a practical risk assessment process is undertaken by both the (Employer's) Engineer and the (Principal or Main) Contractor. In the specification guidance notes section C1.4 Design, there is a strong recommendation for the incorporation of a table in the enquiry and contract documents that defines the designer who is responsible for: -

- **Design of the foundation scheme including safe working loads and pile locations**
- **Choice of piling or walling method**
- **Design of piles or wall elements to carry specified loadings**

Section C1.4 goes on to advise that unless stated otherwise in the contract, whoever is responsible for selecting the piling or walling method will become also become responsible for associated and reasonably foreseeable risks such as installation induced ground movement (settlement and heave) and their impacts on nearby structures, noise, dust and vibration, impacts on pile trimming.

Embedded Retaining Walls

Basement construction generally comprises three activities: -

- **Wall construction**
- **Excavation**
- **Substructure construction**

These are then followed by the construction of the superstructure. Section B1.4.1 of the ICE specification now requires the Contractor to provide a Wall Manual; the concept of which is to encourage effective communication between the Engineer, Contractor and Designer of the key safety and technical issues related to the first three stages of the basement construction. Sections C1.4 and C1.4.1 provide extensive guidance in these matters.

Disclaimer

Although every effort has been made to check the accuracy of the information and validity of the guidance given in this document, neither the FPS or its members accept any responsibility for mis-statements contained herein or misunderstanding arising herefrom.

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