ICE Specification for Piling and Embedded Retaining Walls

Third edition

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Institution of Civil Engineers

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Foreword

Welcome to this latest edition of the Institution of Civil Engineers *Specification for Piling and Embedded Retaining Walls*, the third in a highly successful series. It comes some nine years after the second edition and 28 years after the original ICE *Specification for Piling*.

The authors would like this specification to continue to be instrumental in raising standards for piling and embedded retaining walls and exhort users to develop future revisions to keep the standard current, relevant and progressive.

The great majority of UK piling and embedded wall contracts use this specification, making specific project specification changes where appropriate. This specification is now adopted by Network Rail, Highways England and is well known and respected by consultants and contractors alike.

The third edition of the specification has been produced by a number of expert working groups with wide consultation and cross-industry support. The working groups were drawn from consultants, specialist geotechnical contractors and employer organisations. The revisions that have been introduced reflect the many developments in piling and retaining walls and

- enshrine best practice in the industry and update some of the testing techniques that have evolved in recent years
- reflect the development of the relevant Eurocodes and so bring the document up to date
- ensure tolerances are better understood for the various techniques
- provide better guidance on concrete specification and testing.

Changes have been necessary to all the sections so even experienced readers will need to study the full document and not just sections that are new to this edition, which include

- a section on micropiling
- a section on helical (or screw) piling
- updates on 'new' techniques such as cased CFA piling
- guidance on the use of polymer fluids for excavation support.

This edition retains the three-part approach of the second edition. Part A is an introduction to the essential concepts necessary to procure a piling or retaining wall contract. Part B is the specification and is still the only part of this document intended for incorporation in contracts. Part C provides guidance for use of the specification and essential background information for specifiers and contractors alike. Unlike the second edition, Part 3 guidance notes immediately follow the relevant Part 2 specification requirements. The three sections provide the reader with a full compendium without being overly prescriptive.

In my capacity as Chairman of the British Geotechnical Association, I offer my sincere thanks to the many individuals who have contributed so much time, effort and expertise to the development of the specification, both this edition and earlier editions from which it has been developed, for the benefit of the very many future users.

Professor Stephan Jefferis
Chairman, British Geotechnical Association

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Finally, the group acknowledges all those that work on site, often in testing conditions, meeting and often exceeding this standard.

Introduction

The Institution of Civil Engineers (ICE) *Specification for Piling and Embedded Retaining Walls* 2016 (SPERWall) is the latest version of what is the pre-eminent document for piling and embedded walling works. Earlier versions were published in 1988, 1996 and 2007.

SPERWall has been revised in response to developments in piling techniques and changes to European Standards, and also takes into account modern forms of contract and procurement methods. It is written primarily for use in the United Kingdom but may be relevant in other jurisdictions too. SPERWall is intended for use as a technical specification for piling and embedded walling works, either on land or near to shore. It is not intended for offshore works.

The document comprises three parts divided into two

Part A – General requirements

Parts B and C – Specification requirements and accompanying guidance notes.

Part A describes the requirements typically necessary for the successful construction of piling and embedded retaining walls. Information is given on the tendering process, design responsibility and on the non-technical issues, such as safety, quality and sustainability.

Part B is the main technical specification advocated for use on piling and embedded walling works in the UK. Part B comprises 21 sections covering the main piling and embedded walling methods, and the most common testing methods and materials used in these types of foundation works.

Part C provides guidance on the use of each of the 21 sections within the specification Part B. In a departure from previous revisions, each individual guidance section immediately follows its associated Part B. The document has been organised in this way to assist the reader, but it is nevertheless important to realise the distinction between the Part B requirements (the specification) and the Part C, which is still considered guidance. The latter collates the experiences of contractors and consultants involved for many years with piling and embedded retaining walls and is written for designers and contractors alike to minimise the risks associated with their geotechnical works.

It is intended that this document continues to be used as the UK national standard specification for piling and embedded retaining walls and that specifiers will continue to refer only to SPERWall so that its standard clauses need not be reproduced for every contract. Specifiers can make specific amendments to SPERWall with the use of the project specification containing the details described within each of the sections.

It is anticipated that in many contracts for geotechnical works SPERWall will be a listed document of the contract. Every effort has been made to avoid conflict between this specification and common forms such as the NEC and the JCT conditions. However, contract drafters are advised to check the consistency of all their documents, in particular the project specific technical specifications, as a lack of clarity between competing requirements will lead to confusion and disputes.

There are many European standards, both design and execution codes, that work in parallel with SPERWall. The development of these standards is constantly evolving and therefore those involved in geotechnical works are advised to keep up to date to ensure they remain in line with best practice. Table 1 sets out some of the standards relevant for piling and embedded retaining walls.

This document has been designed for use with common practices, but is not intended to inhibit innovation. Novel solutions can be used with this specification provided that additional clauses are included in the project specification, which will ensure the final product is constructed in accordance with the design requirements.

Table 1.1 Some Standards relevant for piling and embedded retaining wall works

Type of standard	BS EN no.	Title
Execution	1536	Execution of special geotechnical work – bored piles
Execution	1537	Execution of special geotechnical work – ground anchors
Execution	1538	Execution of special geotechnical work – diaphragm walls
Execution	12063	Execution of special geotechnical work – sheet piles
Execution	12699	Execution of special geotechnical work – displacement piles
Execution	12715	Execution of special geotechnical work – grouting
Execution	12716	Execution of special geotechnical work – jet grouting
Execution	14199	Execution of special geotechnical work – micropiles
Execution	14475	Execution of special geotechnical work – reinforced fill
Execution	14490	Execution of special geotechnical work – soil nailing
Execution	14679	Execution of special geotechnical work – deep mixing
Execution	14731	Execution of special geotechnical work – ground treatment deep vibro
Execution	15237	Execution of special geotechnical work – vertical drainage
Testing ISO (various Parts)	22477	Testing of piles – various types of pile testing
Manufacture	12794	Precast concrete products – foundation piles