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Code of practice for ground investigations

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 318, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 July 2015. It was prepared by Subcommittee B/526/3, *Site investigation and ground testing*, under the authority of Technical Committee B/526, *Geotechnics*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 5930:1999+A2:2010, which is withdrawn.

Information about this document

The first edition of this British Standard (published as CP2001:1957) covered basic guidance on effective ground investigation. This was replaced by full editions in 1981 and 1999, which covered the subject matter in greater detail and each of which was brought up to date at the time of publication.
The 1999 edition was amended twice to incorporate changes necessary to maintain compliance with BS EN 1997-1 and BS EN 1997-2 and their related standards.

This is a full revision of the standard, and introduces the following principal changes:

- The majority of changes arise from the further implementation into UK practice of BS EN 1997-1 and BS EN 1997-2 and the related test standards cited therein and the need to conform to these standards.
- The revision of material that is now out of date. There is new information on geophysical surveying and ground testing and updated guidance on ground investigations on contaminated ground, changes to accommodate the requirements of data capture in the field and the inclusion of this in reporting as well as other amendments throughout the code.

Product certification. Users of this British Standard are advised to consider the desirability of third-party certification with this British Standard. Appropriate conformity attestation arrangements are described in BS 22475-3. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Test laboratory accreditation. Users of this British Standard are advised to consider the desirability of selecting test laboratories that are accredited to BS EN ISO/IEC 17025 by a national or international accreditation body.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word "should" is used to express recommendations of this standard. The word "may" is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word "can" is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

The ground is naturally variable and often the nature of these variations is not known. A ground investigation is a process starting with initial documentation about the site and its environs followed by continuous exploration and interpretation, with the scope of the investigation requiring regular amendment in the light of the data being obtained.

This British Standard is set out to follow, in broad terms, the sequence of a ground investigation from initial considerations through the phased design and implementation of an investigation programme and its reporting, to the continuing investigation during and after construction.

Section 1 of this British Standard deals with those matters of a technical, legal or environmental character that need to be taken into account in selecting the site (or in determining whether a selected site is suitable) and in preparing the design of the works. The safety of all those involved in investigation, including the general public and the environment, is also introduced here to emphasize its fundamental importance in the execution of all aspects of the investigation; this coverage is referred to but not repeated throughout the standard.

Section 2 outlines the procedures that should be followed and the information that should be collected in desk studies and field reconnaissance.

Section 3 discusses general aspects of planning investigations, including the factors that influence the selection of methods of investigation.

Section 4 discusses methods of intrusive investigation, including overwater investigations (i.e those carried out using land-based methods), sub-divided into excavations and boreholes, sampling, and groundwater observations.

Section 5 outlines the methods of geophysics that can be used for ground mapping, characterization and testing, from the ground surface, boreholes, crosshole and surface to borehole and overwater.

Section 6 deals with the terminology and systems recommended for use in describing and classifying soil and rock materials and soil and rock masses.

Section 7 describes the range of field tests that can be considered to measure appropriate geotechnical parameters.

Section 8 outlines the instrumentation that can be used to measure parameters or monitor field conditions.

Section 9 describes the range of laboratory tests on samples that can be used to measure a range of geotechnical parameters for material classification and use in design.

Section 10 provides details of the information that is to be included in field reports, the presentation and evaluation of factual information in the investigation report and in the interpretation of the data obtained from the investigation and the preparation of the design report.

Section 11 describes the requirements of investigation that continues into and beyond the construction phase, including the requirements for monitoring and maintenance of the structure.

Users of this British Standard, particularly those with limited experience, are advised to study the preliminary considerations in Section 1 and Section 2 before referring to the methods of ground investigation in Section 3 to Section 10. Development continues to take place, and this is likely to involve changes in some of the methods. For this reason it is important to ensure that the planning, supervision and interpretation of results of any investigation is carried out by suitably qualified and experienced specialists (see Clause **6**).

It might be noted that there is an imbalance of treatment between tests; in some cases more comprehensive treatment has been given to tests less frequently used. This is because many of the common tests are described extensively elsewhere in national and international standards whereas there is a paucity of reference to other tests.

This British Standard has been drawn up mainly in relation to conditions existing in the United Kingdom, but reference is made to technical and professional practice in other countries where relevant.

In this British Standard the term ground investigation (previously called site investigation in the UK) is used in the wider sense of investigation of the site, which includes desk studies, field reconnaissance and field and laboratory work within the broad geographical, geological, hydrogeological and environmental contexts.

1 Scope

This British Standard gives recommendations for the investigation of sites for the purposes of assessing their suitability for the construction of civil engineering and building works and of acquiring knowledge of the characteristics of a site that could affect the design and construction of such work and the security of neighbouring land and property.

NOTE The use of soil and rock as construction materials is treated only briefly; further information is given in BS 6031.

This British Standard provides guidance on the application of BS EN 1997-1 and BS EN 1997-2 and the related test standards cited therein.

It does not provide guidance on investigations for contamination or naturally elevated concentrations of potentially hazardous substances (these are dealt with in BS 10175). Nor does it provide guidance on investigations for ground gas (these are dealt with in BS 8576). However, it does provide guidance on the integration of geotechnical investigations with investigations for contamination or ground gas and other types of investigations (e.g. archaeological).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

BS 1377-1:1990, *Methods of test for soils for civil engineering purposes – Part 1: General requirements and sample preparation*

BS 1377-2:1990, *Methods of test for soils for civil engineering purposes – Part 2: Classification tests*

BS 1377-3:1990, *Methods of test for soils for civil engineering purposes – Part 3: Chemical and electro-chemical tests*

BS 1377-4:1990, *Methods of test for soils for civil engineering purposes – Part 4: Compaction-related tests*

BS 1377-5:1990, *Methods of test for soils for civil engineering purposes – Part 5: Compressibility, permeability and durability tests*

BS 1377-6:1990, *Methods of test for soils for civil engineering purposes – Part 6: Consolidation and permeability tests in hydraulic cells and with pore pressure measurement*