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Petroleum and natural gas industries — Specific requirements for offshore structures —

Part 8: Marine soil investigations

*Industries du pétrole et du gaz naturel — Exigences spécifiques
relatives aux structures en mer —*

Partie 8: Investigations des sols en mer



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, SC 7, *Offshore structures*.

ISO 19901 consists of the following parts, under the general title *Petroleum and natural gas industries — Specific requirements for offshore structures*:

- *Part 1: Metocean design and operating considerations*
- *Part 2: Seismic design procedures and criteria*
- *Part 3: Topsides structure*
- *Part 4: Geotechnical and foundation design considerations*
- *Part 5: Weight control during engineering and construction*
- *Part 6: Marine operations*
- *Part 7: Stationkeeping systems for floating offshore structures and mobile offshore units*
- *Part 8: Marine soil investigations*

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Introduction

The series of International Standards applicable to offshore structures, ISO 19900 to ISO 19906, constitutes a common basis covering those aspects that address design requirements and assessments of all offshore structures used by the petroleum and natural gas industries worldwide. Through their application, the intention is to achieve reliability levels appropriate for manned and unmanned offshore structures, whatever the nature or combination of the materials used.

It is important to recognize that structural integrity is a concept comprising models for describing actions, structural analyses, design rules, safety elements, workmanship, quality control procedures and national requirements, all of which are mutually dependent. The modification of one aspect of design in isolation can disturb the balance of reliability inherent in the overall concept of structural integrity. The implications involved in modifications, therefore, need to be considered in relation to the overall reliability of all offshore structural systems.

This part of ISO 19901 is applicable for marine soil investigation, which is only one of many possible marine site investigations as illustrated in [Figure 1](#). The terminology used in [Figure 1](#) and other important terminology are defined and given in [Clause 3](#).

The scope of a marine soil investigation, such as field programme, equipment to be used, laboratory testing programme, soil parameters to be established and reporting should be defined in project specifications based on important factors such as type of structures involved, type of soil conditions expected, regional or site-specific investigation, preliminary or final soil investigations.

The reporting can comprise anything from field data only to reporting of soil parameters. An example report format is given in [Annex G, Table G.1](#), but for each project the final reporting structure can be adjusted by deleting inapplicable sections, or by adding new sections.

This part of ISO 19901 gives requirements, recommendations and guidelines for the planning and execution of marine soil investigations and is applicable from the planning phase to reporting of soil parameters. It is important to use documented methods when soil parameters are established, and to refer to these methods in the report.

In situ and laboratory testing methods included in this part of ISO 19901 are selected based on their importance in marine soil investigation practice, availability in commercial geotechnical laboratories and the existence of an accepted testing procedure.

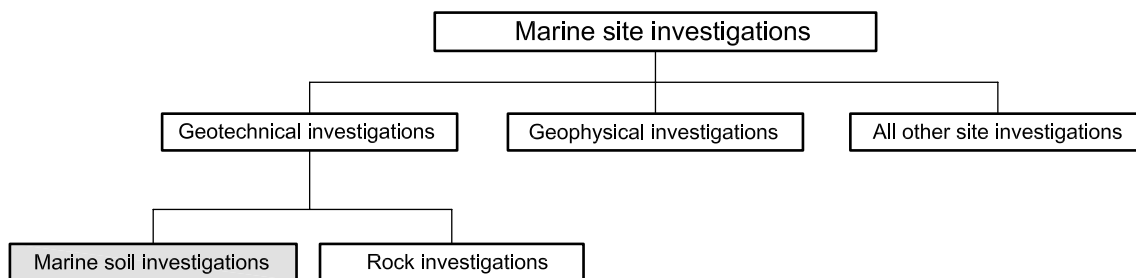


Figure 1 — Marine soil investigations shown as one of many types of marine site investigations

Seabed characterization can require several types of site investigations, for example marine soil investigations and geophysical investigations including geological and geohazard evaluations. For each project, the types of site investigations required are usually defined in project specifications. Also of importance for proper seabed characterization is consideration of required investigation equipment and its deployment mode(s) and methods, in order to acquire adequate quality soil data to the target depth.

This part of ISO 19901 is applicable for marine soil investigations at any water depth and to any depth below seafloor which can be reached with the tools used.

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Use of this part of ISO 19901 is based on the assumptions that:

- adequate communication takes place between geotechnical personnel involved in marine soil investigations and the personnel responsible for foundation design, for construction and for installation of the offshore structures;
- soil parameters are collected, recorded and interpreted by qualified personnel;
- the project-specific scope of work for marine soil investigations is defined by one or more project specifications.

Seabed soils can vary widely, and experience gained at one location is not necessarily applicable at another. The scope of a soil investigation for one type of structure is not necessarily adequate for another. Extra caution is therefore necessary when dealing with unconventional soils or unconventional foundation concepts. Marine soil investigations include both offshore and nearshore soil investigations, which can provide very different challenges.

The detailed requirements for equipment and methods given in this part of ISO 19901 are only applicable if relevant for the scope of work defined in the project specifications.

This part of ISO 19901 is intended to provide flexibility in the choice of soil investigation techniques without hindering innovation.

The primary objectives of this part of ISO 19901 are to provide requirements and guidance for how the most important aspects of a marine soil investigation should be performed to obtain reliable soil parameters based on documented methods.

In this part of ISO 19901, in accordance with the latest edition of the ISO/IEC Directives, Part 2, the following verbal forms are used:

- 'shall' and 'shall not' are used to indicate requirements strictly to be followed in order to comply with the document and from which no deviation is permitted;
- 'should' and 'should not' are used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited;
- 'may' and 'need not' are used to indicate a course of action permissible within the limits of the document;
- 'can' and 'cannot' are used for statements of possibility and capability, whether material, physical or causal.

This part of ISO 19901 includes informative annexes. Informative annexes give additional information intended to assist the understanding or use of the document. They do not contain requirements, except that informative annexes may contain optional requirements (for example a test method that is optional can contain requirements), but there is no need to comply with these requirements to claim compliance with this part of ISO 19901.

The following International Standards are also relevant to offshore structures for the petroleum and natural gas industries:

- ISO 19900, *Petroleum and natural gas industries — General requirements for offshore structures*
- ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*
- ISO 19903, *Petroleum and natural gas industries — Fixed concrete offshore structures*
- ISO 19904-1, *Petroleum and natural gas industries — Floating offshore structures — Part 1: Monohulls, semi-submersibles and spars*
- ISO 19905-1, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 1: Jack-ups*

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- ISO/TR 19905-2, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 2: Jack-ups commentary*
- ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*
- ISO 13623, *Pipeline transportation systems*
- ISO 13628-1, *Design and operation of subsea production systems — Part 1: General requirements and recommendations*