

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

First edition
2012-08-01

Petroleum and natural gas industries — Site-specific assessment of mobile offshore units —

Part 1: Jack-ups

*Industries du pétrole et du gaz naturel — Évaluation spécifique au site
d'unités mobiles en mer —*

Partie 1: Plates-formes auto-élévatrices



Reference number
ISO 19905-1:2012(E)

© ISO 2012

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 19905-1:2012". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword	v
Introduction.....	vii
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Symbols and abbreviated terms	13
4.1 Symbols.....	13
4.2 Abbreviated terms	14
5 Overall considerations.....	15
5.1 General	15
5.2 Assessment approach	16
5.3 Selection of limit states	18
5.4 Determination of assessment situations	18
5.5 Exposure levels	20
5.6 Analytical tools	23
6 Data to assemble for each site.....	24
6.1 Applicability	24
6.2 Jack-up data.....	24
6.3 Site and operational data.....	24
6.4 Metocean data.....	24
6.5 Geophysical and geotechnical data	25
6.6 Earthquake data.....	26
7 Actions.....	26
7.1 Applicability	26
7.2 General	26
7.3 Metocean actions	27
7.4 Functional actions.....	28
7.5 Displacement dependent effects	28
7.6 Dynamic effects	28
7.7 Earthquakes	28
7.8 Other actions	28
8 Structural modelling.....	28
8.1 Applicability	28
8.2 Overall considerations.....	28
8.3 Modelling the leg	29
8.4 Modelling the hull	30
8.5 Modelling the leg-to-hull connection.....	30
8.6 Modelling the spudcan and foundation	31
8.7 Mass modelling.....	32
8.8 Application of actions	32
9 Foundations	35
9.1 Applicability	35
9.2 General	35
9.3 Geotechnical analysis of independent leg foundations	36
9.4 Other considerations	39
10 Structural response.....	41
10.1 Applicability	41

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

10.2	General considerations	41
10.3	Types of analyses and associated methods.....	41
10.4	Common parameters	42
10.5	Storm analysis	44
10.6	Fatigue analysis	47
10.7	Earthquake analysis	47
10.8	Accidental situations.....	47
10.9	Alternative analysis methods	48
11	Long-term applications	48
11.1	Applicability.....	48
11.2	Assessment data	48
11.3	Special requirements	49
11.4	Survey requirements	50
12	Structural strength.....	50
12.1	Applicability.....	50
12.2	Classification of member cross-sections	51
12.3	Section properties of non-circular prismatic members.....	52
12.4	Effects of axial force on bending moment	53
12.5	Strength of tubular members	53
12.6	Strength of non-circular prismatic members.....	53
12.7	Assessment of joints.....	53
13	Acceptance criteria.....	54
13.1	Applicability.....	54
13.2	General formulation of the assessment check.....	55
13.3	Leg strength assessment	55
13.4	Spudcan strength assessment.....	56
13.5	Holding system strength assessment.....	56
13.6	Hull elevation assessment.....	56
13.7	Leg length reserve assessment	56
13.8	Overturning stability assessment	57
13.9	Foundation integrity assessment	57
13.10	Interaction with adjacent infrastructure	58
13.11	Temperatures	59
Annex A (informative) Additional information and guidance		60
Annex B (normative) Summary of partial action and partial resistance factors		238
Annex C (informative) Additional information on structural modelling and response analysis.....		240
Annex D (informative) Foundations — Recommendations for the acquisition of site-specific geotechnical data.....		250
Annex E (informative) Foundations — Additional information and alternative approaches.....		256
Annex F (informative) Informative annex on Clause A.12 — Structural strength		269
Annex G (informative) Contents list for typical site-specific assessment report.....		283
Annex H (informative) Regional information		290
Bibliography.....		299

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 19905-1 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 7, *Offshore structures*.

ISO 19905 consists of the following parts, under the general title *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units*:

- *Part 1: Jack-ups*
- *Part 2: Jack-ups commentary and detailed sample calculation* [Technical Report]

The following part is under preparation:

- Part 3, dealing with the site-specific assessment of mobile floating units.

ISO 19905 is one of a series of International Standards for offshore structures. The full series consists of the following International Standards:

- ISO 19900, *Petroleum and natural gas industries — General requirements for offshore structures*
- ISO 19901-1, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 1: Metocean design and operating considerations*
- ISO 19901-2, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 2: Seismic design procedures and criteria*
- ISO 19901-3, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 3: Topsides structure*
- ISO 19901-4, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 4: Geotechnical and foundation design considerations*
- ISO 19901-5, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 5: Weight control during engineering and construction*
- ISO 19901-6, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 6: Marine operations*

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

- ISO 19901-7, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 7: Stationkeeping systems for floating offshore structures and mobile offshore units*
- ISO 19901-8¹⁾, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 8: Marine soils investigations*
- 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*
- ISO/TR 19905-2, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 2: Jack-ups commentary and detailed sample calculation*
- ISO 19905-3²⁾, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 3: Floating units*
- ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*

1) Under preparation. It is also expected that there will be further parts of ISO 19901.

2) Under preparation.

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

Introduction

The series of International Standards applicable to types of offshore structure, ISO 19900 to ISO 19906, addresses design requirements and assessments for 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 type of structure and the nature or combination of the materials used.

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

The series of International Standards applicable to the various types of offshore structure is intended to provide a wide latitude in the choice of structural configurations, materials and techniques, without hindering innovation. Sound engineering judgement is therefore necessary in the use of these International Standards.

This part of ISO 19905, which has been developed from SNAME Technical & Research Bulletin 5-5A^[7], states the general principles and basic requirements for the site-specific assessment of mobile jack-ups; it is intended to be used for assessment and not for design.

NOTE For the exposure level 1(L1) assessment and, where appropriate, the exposure level 2 (L2) assessment prior to evacuation being effected, this part of ISO 19905 requires the use of 50 year independent or 100 year joint probability metocean extremes, together with associated partial action factors. It is based on extensive benchmarking and best practice in the international community.

Site-specific assessment is normally carried out when an existing jack-up unit is to be installed at a specific site. The assessment is not intended to provide a full evaluation of the jack-up; it assumes that aspects not addressed herein have been addressed using other practices and standards at the design stage. In some instances, the original design of all or part of the structure could be in accordance with other standards in the ISO 19900 series, and in some cases, different practices or standards could have been applied.

The purpose of the site assessment is to demonstrate the adequacy of the jack-up and its foundations for the assessment situations and defined limit states, taking into account the consequences of failure. It is important that the results of a site-specific assessment be appropriately recorded and communicated to those persons required to know or act on the conclusions and recommendations. Alternative approaches to the site-specific assessment can be used, provided that they have been shown to give a level of structural reliability equivalent, or superior, to that implicit in this part of ISO 19905.

Annex A provides background to and guidance on the use of this part of ISO 19905. The clause numbering in Annex A is the same as in the normative text in order to facilitate cross-referencing. ISO/TR 19905-2 provides additional background to some clauses and a detailed sample 'go-by' calculation.

Annex B summarizes the partial factors. Supplementary information is presented in Annexes C to H.

To meet certain needs of industry for linking software to specific elements in this part of ISO 19905, a special numbering system has been permitted for figures, tables, equations and bibliographic references.

In International Standards, the following verbal forms are used:

- “shall” and “shall not” are used to indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted;

This is a preview of "ISO 19905-1:2012". [Click here to purchase the full version from the ANSI store.](#)

- “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” is 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.