INTERNATIONAL STANDARD

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Third edition
2021-11

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

Part 5: Weight management

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

Partie 5: Gestion des poids

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Contents

Page

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document 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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 19901-5:2016), which has been technically revised.

The main changes are as follows:

— part title changed to "Weight Management";

— document restructured and columnization removed;

— weight control classes removed;

— requirements for weight management for all project phases implemented;

— annexes deleted or relocated to body of document:

  — previous Annex A “Weight data sheets – tagged equipment” combined with previous Annex B “Weighing certificates” to create new joined into a new Annex B “Weighing certificates”;

  — previous Annex C “Weight and load budget (WLB) formats and levels” replaced with new Annex C “Control weights”;

  — deleted previous Annex D “Major elements of the weight displacement”;

  — information in previous Annex E “Supplier weighing procedure” relocated to Clause 8;

  — deleted previous Annex F “Guidelines for displacement measurement of floating facilities”;

  - information in previous Annex G “Requirements for weight control during operations” relocated to Clause 7;
  - information in previous Annex H “Requirements for topsides weight estimation — New builds/green field” relocated to Clause 7;
  - information in previous Annex I “Executive summary description” relocated to Clause 7;
  - replaced previous Annex J “Weighing result uncertainty” with Annex F “Weighing result uncertainty”;
  - previous Annex K “Weight control database structure” replaced with new Annex G “Weight database structure”.
- Annexes added:
  - Annex A “Commentary”;
  - Annex D “Variable weight”;
  - Annex E “Example decision-making RAPID matrix”;
  - Annex H “Weight of concrete structures”;
  - Annex I “Coordinate systems”;
  - Annex J “Weight allowances and reserves”;
  - Annex K “Weight management competencies”.

A list of all parts in the ISO 19901 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The International Standards on offshore structures prepared by TC 67/SC 7 (ISO 19900, the ISO 19901 series, ISO 19902, ISO 19903, ISO 19904-1, the ISO 19905 series, and ISO 19906) constitute a common basis covering those aspects that address design requirements and assessments of all offshore facilities 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 facilities, whatever the type of structure and the nature of the materials used.

It is important to recognize that structural integrity is an overall 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 or structural system. The implications involved in modifications, therefore, need to be considered in relation to the overall reliability of all offshore structural systems.

The International Standards on offshore structures prepared by TC 67/SC 7 are 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.

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

Part 5: Weight management

1 Scope

This document specifies requirements for managing and controlling the weight and centre of gravity (CoG) of offshore facilities by means of mass management during all lifecycle phases including; conceptual design, front end engineering design (FEED), detail engineering, construction and operations. These can be new facilities (greenfield) or modifications to existing facilities (brownfield).

Weight management is necessary throughout operations, decommissioning and removal to facilitate structural integrity management (SIM). The provisions of this document are applicable to fixed and floating facilities of all types.

Weight management only includes items with static mass.

Snow and ice loads are excluded as they are not considered to be part of the facility. Dynamic loads are addressed in ISO 19904-1, ISO 19901-6 and ISO 19901-7.

This document specifies:

a) requirements for managing and controlling weights and CoGs of assemblies and entire facilities;

b) requirements for managing weight and CoG interfaces;

c) standardized terminology for weight and CoG estimating and reporting;

d) requirements for determining not-to-exceed (NTE) weights and budget weights;

e) requirements for weighing and determination of weight and centre of gravity (CoG) of tagged equipment, assemblies, modules and facilities;

This document can be used:

f) as a basis for costing, scheduling or determining suitable construction method(s) or location(s) and installation strategy;

g) as a basis for planning, evaluating and preparing a weight management plan and reporting system;

h) as a contract reference;

i) as a means of refining the structural analysis or model.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
approved variation
approved scope change affecting the *predicted weights* (3.32) and changing the *control weights* (3.11)

3.2
assembly
designed and fabricated group of *discipline bulks* (3.12) and *tagged equipment* (3.34) that form one unit

EXAMPLE Deck, module, living quarters, bridge, flare, substructure.

3.3
brownfield
modifications made to an existing *facility* (3.16)

3.4
budget weight
weight and *centre of gravity* (3.5) reference values as part of the *control weights* (3.11)

3.5
centre of gravity
CoG
point in a body or system of bodies at which the entire weight is considered to act

Note 1 to entry: For assemblies, the aggregate CoG is the mathematical weighted mean of the CoGs of the individual items (comprising the completed assembly) measured from a common reference point.

3.6
centre of gravity envelope
CoG envelope
defined volume within which the *centre of gravity* (3.5) of an *assembly* (3.2) is constrained for a specified *loading condition* (3.23)

3.7
conceptual design
phase of design during which several concepts are evaluated, and preferred concepts are selected

3.8
conceptual design weight
sum of the *predicted weight* (3.32) and the *conceptual design weight reserve* (3.9)

Note 1 to entry: This weight is used for engineering purposes and for checking fabrication/installation strategies during conceptual design.

3.9
conceptual design weight reserve
provision during conceptual design to allow for reserves when control weights are determined

EXAMPLE Management reserve, planned future reserve and unplanned future reserve.