INTERNATIONAL STANDARD

ISO 19902

First edition
2007-12-01

AMENDMENT 1
2013-08-01

Petroleum and natural gas industries — Fixed steel offshore structures

AMENDMENT 1

Industries du pétrole et du gaz naturel — Structures en mer fixes en acier

AMENDEMENT 1

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ISO 19902:2007/Amd 1:2013
https://standards.iteh.ai/catalog/standards/sist/d6ab40e1-a82e-42e5-9264-f36563410e18/iso-19902-2007-amd-1-2013

Reference number
ISO 19902:2007/Amd.1:2013(E)

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Published in Switzerland

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

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Petroleum and natural gas industries — Fixed steel offshore structures

AMENDMENT 1

Page 14, Clause 5

Delete:

PLS progressive collapse limit state

Replace with:

PLS progressive collapse limit states

Page 15, 6.1.1

Delete:

NOTE There have been historical differences in the usage and understanding of the terms "jacket" and "tower", particularly between the USA and Europe. The difference in such understanding of the terms has no significant impact on the application of this International Standard as long as the differences in structural behaviour are considered in the analyses of the different structures.

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Replace with:

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NOTE 1 There have been historical differences in the usage and understanding of the terms "jacket" and "tower", particularly between the USA and Europe. The difference in such understanding of the terms has no significant impact on the application of this International Standard as long as the differences in structural behaviour are considered in the analyses of the different structures.

NOTE 2 There have been historical differences, which continue to exist, in the use and understanding of the term "caisson". In the offshore oil and gas industry this term, together with its variants "braced caisson" or "free-standing caisson" (see, respectively, 3.7 and 3.22), has traditionally been used to refer to a particular type of minimum fixed structure, where the main component is a relatively large diameter tubular member, with or without additional lateral support, intended to satisfy various functional requirements such as supporting one or more wells, or supporting small decks and associated facilities. Conversely, in the geotechnical arena the term "caisson" has traditionally been used to refer to "foundation caisson", i.e. foundation component /system consisting of shorter and more rigid chamber of larger diameter or larger lateral dimensions than the caisson structures described above.

Clause 17 covers the geotechnical design of long slender piles (i.e. satisfying the condition $L/D \geq 10$, where L is the length embedded in the soil, and D is the outside diameter) for fixed steel structures. The provisions of that clause apply also to braced or free-standing caisson structures with $L/D \geq 10$. However, the content of Clause 17 does not apply to the design of short and rigid, large diameter foundations with $L/D < 10$. Guidance on the geotechnical design of this type of foundations is within the scope of ISO 19901-4.

Page 20, 6.6.2

Renumber the existing list as: a) b) c).

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Page 23, 7.1

Delete:

The general principles on which structural design requirements are based are documented in ISO 19900. ISO 19900 requires that structural design be performed with reference to a specified set of limit states. For each limit, state design situations shall be determined and an appropriate calculation model shall be established

Replace with:

The general principles on which structural design requirements are based are documented in ISO 19900. ISO 19900 requires that structural design be performed with reference to a specified set of limit states. For each limit state, design situations shall be determined and an appropriate calculation model shall be established

Page 23, 7.2

Renumber the existing list as: a) b) c) d).

Page 27, Clause 8

Add the following below "Actions for pre-service and removal situations":

IMPORTANT — Users of this document should be aware of the publication of ISO 19901-6, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 6: Marine operations*, which followed publication of the first edition of ISO 19902. Where the provisions in ISO 19901-6 now overlap with ISO 19902, ISO 19901-6 may be used in preference.

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Page 31, 8.3.2

Renumber the existing list as: a) b) c).

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Page 31, 8.3.5

Renumber the existing list as: a) b).

Page 81, 12.4.4.6

Delete:

b) where foundation failure occurs before structural failure, structural failure should be determined by assuming a foundation capacity based on upper bound estimates of soil properties. The upper bound approach, b) above, provides an assessment of the steel structure strength.

Replace with:

b) where foundation failure occurs before structural failure, structural failure should be determined by assuming a foundation capacity based on upper bound estimates of soil properties.

The upper bound approach, b) above, provides an assessment of the steel structure strength.

Page 83, 12.5.6

Delete:

— Quasi-static analysis, in which static non-linear analysis procedures are used, with the environmental actions enhanced by a set of equivalent quasi-static inertial actions representing the dynamic response. The set of equivalent quasi-static inertial actions may be determined in a manner analogous to the procedures in 9.8 and A.9.8. A static pushover analysis can then be performed using the procedure suggested in 12.5.4.

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Replace with:

— Quasi-static analysis, in which static non-linear analysis procedures are carried out using the environmental actions enhanced by a set of equivalent quasi-static inertial actions representing the dynamic response. The set of equivalent quasi-static inertial actions may be determined in a manner analogous to the procedures in 9.8 and A.9.8. A static pushover analysis can then be performed using the procedure suggested in 12.5.4.

Page 86, 13.1

After the first paragraph, add:

— For structural shapes, other than circular tubulars, the requirements and recommendations given in ISO 19901-3 are applicable. ISO 19901-3 provides for specific guidance on detailing and dimensioning to be taken from an onshore building standard and describes a methodology in which a correspondence factor is introduced to address any differences in the derivation of the action and resistance factors of different standards.

Page 92, 13.2.6.2, Equation (13.2-28)

Delete:

$$C_h = 0{,}44t/D + 0{,}21(D/t)^3 \mu^4$$

Replace with:

$$C_h = 0{,}44t/D + 0{,}21(D/t)^3 / \mu^4$$

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Page 102, Figure 13.6-1

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Delete the figure title:

Typical unstiffened and stiffened conical transition

Replace with:

Typical unstiffened and stiffened conical transitions

Page 128, Figure 14.2-2 h)

Reverse the direction of the arrow corresponding to “500” on the axis of brace “3”, at right of the drawing, so that the arrowhead points to the right.

Page 132, Figure 14.2-4

Delete:

$d_2 \geq 600$

Replace with:

$\geq d_2$,

≥ 600

Delete:

$d_2 /4 \geq 150$

Replace with:

$\geq d_2/4$,

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≥ 150

Page 139, 14.5

Renumber the existing list as: a) b) c) d).

Page 143, 15.1.4

Renumber the existing list as: a) b) c).

Equation (15.1-2)

Delete:

$$\sigma_t = \frac{M_t}{\pi D_p^2 L_e}$$

Replace with:

$$\sigma_t = \frac{2M_t}{\pi D_p^2 L_e}$$

Page 154, 15.3.6.2

Renumber the existing list as: a) b) c) d) e).

Page 171, 16.8.1

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Delete the second paragraph:

A deterministic fatigue analysis method is not recommended for final checking of structures in harsh fatigue environments. It can find application for screening evaluations during the initial design stages, or for a final fatigue assessment of structures for which dynamic effects can be neglected and that are not critically fatigue sensitive. It is included in this International Standard only in order to cover such general applications. Guidance on dynamically responding structures is given in 16.4.3 and 16.6.4.

Replace with:

A deterministic fatigue analysis method is not recommended for final checking of structures in harsh fatigue environments. It can find application for screening evaluations during the initial design stages, or for a final fatigue assessment of structures for which dynamic effects can be neglected and that are not critically fatigue sensitive. It is included in this International Standard only in order to cover such general applications. Guidance on dynamically responding structures is given in 16.4.4 and 16.6.3.

Page 182, 17.1.1

Delete the first paragraph:

This clause establishes requirements for foundation design. Pile foundations and, more specifically, steel cylindrical (pipe) pile foundations are addressed in 17.1 to 17.11. Considerations for the design of shallow foundations are given in 17.12, while design requirements and guidance can be found in ISO 19901-4. A.17 contains discussion and guidance on the requirements of Clause 17.

Replace with:

This clause establishes requirements for foundation design. Pile foundations and, more specifically, foundations consisting of steel cylindrical (pipe) piles or structural caissons (see 6.1.1) with slenderness ratio $L/D \geq 10$, where L is the embedded length and D is the outside diameter, are addressed in 17.1 to 17.11. Guidance for pile foundations with $L/D < 10$ can be found in ISO 19901-4. Considerations for the design of shallow foundations are given in 17.12, while design requirements and guidance can be found in ISO 19901-4. A.17 contains discussion and guidance on the requirements of Clause 17.

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Page 194, 17.8.2, Equation (17.8-1)

Delete:

$$p_r = 3 \cdot c_u \cdot D = p_0' D + J c_u X$$

Replace with:

$$p_r = 3 \cdot c_u \cdot D + p_0' D + J c_u X$$

Page 212, Figure 19.1-1

Delete:

Specific material selection to be shown on design drawing and specifications

Replace with:

Specific material selection to be shown on design drawings and specifications

Page 216, 19.6.1

Delete the first and second paragraphs:

High sulphate-resisting Portland cement or API standard oilwell cement grouts, mixed with fresh water should be used. Sea water shall not be used in cement and grout mixes due to chemical attacks, potential corrosion and other potential adverse durability effects.

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Water should be freshly drawn and be free of hydrocarbons and other deleterious matter.

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Replace with:

In general, Portland cement grouts should be used with or without inert fillers mixed with either seawater or fresh water. However, there may be special circumstances where the use of seawater is undesirable because of corrosion or other durability effects.

Any water used to mix grout should be free of hydrocarbons and other deleterious matter.

Page 219, 20.2.1

Delete:

s) production weld joint details and tolerances, including

   9) welding of single-sided T-, Y- and K-joints,

   10) other welds;

t) post-weld heat treatment;

u) heat straightening limits;

v) weld size/profile limits;

w) environmental limitations for welding;

x) back-gouging/backing/runoff tab criteria;

y) preparation of base metal (cleaning, bevelling, etc.);

z) fatigue improvement techniques (if applicable);

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aa) NDT procedures;

bb) NDT discontinuity acceptance criteria;

cc) repairs.

Replace with:

h) production weld joint details and tolerances, including

1) welding of single-sided T-, Y- and K-joints,

2) other welds;

i) post-weld heat treatment;

j) heat straightening limits;

k) weld size/profile limits;

l) environmental limitations for welding;

m) back-gouging/backing/runoff tab criteria;

n) preparation of base metal (cleaning, bevelling, etc.);

o) fatigue improvement techniques (if applicable);

p) NDT procedures;

q) NDT discontinuity acceptance criteria;

r) repairs.

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Page 221, 20.2.2.4.2

Renumber the existing list as: a) b) c) d).

Page 234, 21.8

Renumber the existing list as: a) b) c) d) e) f) g).

Page 242, 22.5.8

Renumber the existing list as: a) b) c).

Page 243, 22.5.9

Delete the second paragraph:

Any change in the hammers to be used for pile driving shall be assessed, in order to ensure that the consequences of the change are acceptable (including pile drivability, pile capacity, pile and structure strength and fatigue).

Replace with:

Any change in the hammers to be used for pile driving shall be assessed, in order to ensure that the consequences of the change are acceptable (including pile driveability, pile capacity, pile and structure strength and fatigue).

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Page 252, 23.4.3

Delete:

1) Special

Special inspections are conducted to monitor repairs, remediation programmes, known damage and defects, or known areas of vulnerability (underdesign, scour, etc.). Special inspections can also be needed for structure reuse (see Clause 25). The key features of special inspections are definition of the objectives, selection of appropriate tools and techniques, scopes of work, and inspection intervals.

Replace with:

3) Special

Special inspections are conducted to monitor repairs, remediation programmes, known damage and defects, or known areas of vulnerability (underdesign, scour, etc.). Special inspections can also be needed for structure reuse (see Clause 25). The key features of special inspections are definition of the objectives, selection of appropriate tools and techniques, scopes of work, and inspection intervals.

Page 252, 23.4.4

Delete:

a) scheduling flexibility, including

— intervals between periodic inspections, and

— promptness of post-event and post-incident inspections;

nn) cost, capability and availability of inspection equipment and services, including

— inspection tools and specialized equipment,

— personnel,

— deployment and support vessels and equipment,

— seasonal weather windows;

oo) regional differences, such as those resulting from environmental differences, including

— the severity and frequency of storms,

— conditions relevant for fatigue,

— seismicity levels,

— wind speeds, and/or

— the presence of sea ice and icebergs;

pp) reliability and applicability of inspection technique(s), e.g. probability of detection and accuracy of sizing, which should be considered with due regard to the type of data required and the sensitivity of the structure to a particular form of damage.

Replace with:

a) scheduling flexibility, including

— intervals between periodic inspections, and

— promptness of post-event and post-incident inspections;

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