INTERNATIONAL STANDARD

Second edition 2014-12-15

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

Part 3: Topsides structure

iTeh STIndustries du pétrole et du gaz naturel — Exigences spécifiques relatives aux structures en mer — (standards iteh ai) Partie 3: Superstructures

<u>ISO 19901-3:2014</u> https://standards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014



Reference number ISO 19901-3:2014(E)

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 19901-3:2014</u> https://standards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested 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

Contents

Introduction vii 1 Scope 1 2 Normative references 2 3 Terms and definitions 2 3 Terms and definitions 2 4 Symbols and abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 6 5.0 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structures 11 5.8 Reuse of topsides structures 11 6.1 General 11 6.2 Materials selection structures 12 6.3 Design for ultimate limit states (ILS) 12 6.4 Design for attigue limit states (ILS) 15 6.9 Robustress 15	Fore	eword		v	
1 Scope 1 2 Normative references 2 3 Terms and definitions 2 4 Symbols and abbreviated terms 6 4.1 Symbols and abbreviated terms 6 4.2 Abbreviated terms 6 5.0 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck clevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 11 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Selecting the design environmental conditions 11 6.1 Besign conditions and refurbishment 11 6.1 General 11 6.2 Materials selection (standards.iteh.ai) 11 6.3 Design for acriceability limit states (US) 12 6.4 Design for acriceability limit states (US) 12 6.4 Design for fabrication and	Intr	oductio	n	vii	
2 Normative references 2 3 Terms and definitions 2 4 Symbols and abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 6 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 6.1 Design requiriements STANDARD PREVIEW 11 6.1 Design conditions 11 12 6.3 Design on ditting therefaces 150 12 6.4 Design for dittimet faces 150 150 6.5 Design for ditting thing tates (ILS) 121 126 6.6 <t< th=""><th>1</th><th>Scop</th><th>е</th><th>1</th></t<>	1	Scop	е	1	
3 Terms and definitions 2 4 Symbols and abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 6 4.3 Symbols 6 4.4 Symbols 6 4.2 Abbreviated terms 8 5 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 11 5.6 Selecting the design environmental conditions 11 5.7 Nodifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 11 6.3 Design for attrikes selection (Standards.itele).attrikes 12 6.4 Astrict attrikes (FLS) 12 12 6.5 Design for fatigue limit states (FLS) 12 12 6.6 Design for fatigue limit states (FLS)<	2	Norn	native references	2	
3 Terms and definitions 6 4 Symbols and abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 8 5 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 6 Design requirencets 11 6.1 General 11 6.2 Materials selection (Standards.iteh.ai) 11 6.3 Design for litimate limit states (ICIS) 12 6.4 Structural interfaces 150 6.4 Structural limit states (ICIS) 12 6.5 Design for litimate limit states (ICIS) 12 6.6 Design for fabrication and inspection 16	2	Толи	a and definitions	<u>ມ</u> ວ	
4 Symbols and abbreviated terms 6 4.1 Symbols 6 4.2 Abbreviated terms 8 5 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.8 Reuse of topsides structures 11 6.1 General 11 6.2 Materials selection stan ferbishment 11 6.3 Design for actidental limit states (ILS) 127.766.462.9066 7 Materials selection states (FLS) 127.766.462.9066 6.4 Design for fabrication and inspection 16 6.11 Design for actidental limit states (ILS) 15 6.8 Design for structural integrity management 17 7	3	Term			
4.1 Symbols. 6 4.2 Abbreviated terms. 8 5 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 6.1 General 11 6.2 Materials selection (Standards.iteh.at) 11 6.3 Design conditions 11 6.4 Structural interfaces ISO 19901-3014 12 6.5 Design for ultimate limit, states (SLS) 12047-6664 402-9086 12 6.6 Design for accidental limit states (SLS) 12047-6664 402-9086 12 6.6 Design for accidental limit states (SLS) 12047-6664 402-9086 12 6.6 Design for fabrication and inspection 16 6.11 Design for fabrication and inspectio	4	Symb	Symbols and abbreviated terms		
5 Overall considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structures 11 5.9 Modifications and refurbishment 11 6.1 General 11 6.2 Materials selection (Standards.ifeh.al) 11 6.3 Design conditions 11 6.4 Structural interfaces ISO 1901.32014 12 6.5 Design for serviceability limit states (SLS) 312077 eof 462-0866 12 6.6 Design for fatigue limit states (SLS) 312077 eof 462-0866 12 6.6 Design for fatigue limit states (ALS) 15 6.7 Design for accidental limit states (ALS) 15 6.8 Design for accidental limit states (ALS) 15 6.10 Corros		4.1	Abbreviated terms	0	
5 Overal considerations 9 5.1 Design situations 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6.1 General 11 6.2 Materials selection Standards.iteh.at) 11 6.3 Design conditions 11 6.4 Structural interfaces 180 1901.3014 6.5 Design for altimate limit states (ULS) 10474 F664402-086 12 6.6 Design for accidental limit states (ULS) 10474 F664402-086 12 6.6 Design for accidental limit states (ULS) 10474 F664402-086 12 6.6 Design for accidental limit states (ULS) 10474 F664402-086 12 6.7 Design for accidental limit states (ULS) 10474 F664402-086 12	_	0			
5.1 Design studutors 9 5.2 Codes and standards 9 5.3 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structures 11 5.9 Modifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 11 6.3 Design conditions 11 11 6.4 Structural interfaces ISO 19901-2014 12 6.5 Design for agenciceability limit states (SLS) 1247-6664602-9086 12 6.6 Design for agenciceability limit states (SLS) 1247-6664602-9086 12 6.6 Design for fatigue limit states (FLS) 15 6.8 Design for fabrication and inspection 16 6.10 Corrosion control 16 6.11 Design for decommissioning, removal and disposal 17	5	Uvera			
5.1 Deck elevation and green water 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structures 11 5.9 Modifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 11 6.3 Design for serviceability limit states (SLS) 12 12 6.5 Design for serviceability limit states (SLS) 12 12 6.4 Structural interfaces 120 12 15 6.5 Design for accidental limit states (SLS) 12 15 6.4 Design for accidental limit states (ALS) 15 15 6.9 Robustness 15 16 16 6.11 Design for fabrication and inspection 16 16 11 17 7 Actions 17 7 17 17 17 17		5.1	Codes and standards		
5.3 Exposure level 10 5.4 Exposure level 10 5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 11 6.2 Design conditions 111 12 6.3 Design conditions 111 12 6.4 Structural interfaces 150 (1001-2014) 12 6.5 Design for serviceability limit states (SLS) 1207-166 (400-9066) 12 6.6 Design for latigue limit states (SLS) 1207-166 (400-9066) 12 6.7 Design for latigue limit states (SLS) 1207-166 (400-9066) 12 6.6 Design for accidental limit states (ALS) 15 6.7 Design for fabrication and inspection 16 6.10 Design for fabrication and inspection 16 6.11 Design co		53	Deck elevation and green water		
5.5 Operational considerations 10 5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6.1 General 11 6.1 General 11 6.2 Materials selection Standards.iteh.al) 11 6.3 Design conditions 11 6.4 Structural interfaces 180 (1991-32014) 12 6.5 Design for serviceability. limit states (SLS) 3:12077 667 460-9086 12 6.6 Design for serviceability. limit states (SLS) 3:12077 667 460-9086 12 6.6 Design for accidental limit states (FLS) 15 6.7 Design for fatigue limit states (FLS) 15 6.8 Design for fabrication and inspection 16 6.11 Design for fabrication for structural integrity management 17 6.12 Design for decommissioning, removal and disposal 17 7 Actions 20 20 7.4 Vortex-induced vibrations		5.4	Exposure level	10	
5.6 Selecting the design environmental conditions 11 5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 6.2 Materials selection Standards.itch.ai 11 6.3 Design conditions 11 6.4 Structural interfaces 150 19901-32014 12 6.5 Design for serviceability limit states (SLS) 312974 664 662 9086 12 6.6 Design for serviceability limit states (SLS) 312974 664 662 9086 12 6.6 Design for accidental limit states (SLS) 312974 664 662 9086 12 6.6 Design for accidental limit states (SLS) 312974 664 662 9086 12 6.7 Design for accidental limit states (SLS) 312974 664 662 9086 12 6.8 Design for accidental limit states (ALS) 15 6.9 Robustness 15 6.10 Design for fabrication and inspection 16 6.11 Design for fabrication and inspection 16 <td></td> <td>5.5</td> <td>Operational considerations</td> <td>10</td>		5.5	Operational considerations	10	
5.7 Assessment of existing topsides structures 11 5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6 Design requirements. STANDARD PREVIEW 11 6.1 General 11 6.2 Materials selection (standards.itch.ai) 11 6.3 Design conditions 11 6.4 Structural interfaces 1901-32014 6.5 Design for serviceability limit states (SLS) 312974 #664602-9086 12 6.6 Design for ultimate limit states (ULS) 901-3-2014 14 6.7 Design for accidental limit states (ULS) 901-3-2014 14 6.7 Design for fatigue limit states (ULS) 901-3-2014 14 6.7 Design for accidental limit states (ULS) 901-3-2014 15 6.8 Design for accidental limit states (ULS) 901-3-2014 14 6.7 Design for accidental limit states (ULS) 901-3-2014 14 6.8 Design for accidental limit states (ULS) 901-3-2014 15 6.8 Design for fabrication and inspection 16 6.10 Design for accidental limit states (ALS) 15 <t< th=""><td></td><td>5.6</td><td>Selecting the design environmental conditions</td><td></td></t<>		5.6	Selecting the design environmental conditions		
5.8 Reuse of topsides structure 11 5.9 Modifications and refurbishment 11 6 Design requirements STANDARD PREVIEW 11 6.1 General 11 6.2 Materials selection Standards.iteh.ai 11 6.3 Design conditions 11 6.4 Structural interfaces 150,1991,32014 12 6.5 Design for serviceability limit states (SLS) = 12474,666,4662,9086 12 6.6 Design for fatigue limit states (FLS) 15 6.8 Design for accidental limit states (FLS) 15 6.9 Robustness 15 6.10 Corrosion control 16 6.11 Design for fabrication and inspection 16 6.12 Design for decommissioning, removal and disposal 17 7 Actions 17 7.1 General 17 7.2 In-place actions 21 7.3 Action factors 22 7.4 Vortex-induced vibrations 21 7.5 Deformations 22 7.6		5.7	Assessment of existing topsides structures		
5.9 Modifications and refurbishment. 11 6 Design requirements. STANDARD PREVIEW 11 6.1 General 11 6.2 Materials selection Standards.itch.al) 11 6.3 Design conditions 11 6.4 Structural interfaces 150 1991.32014 12 6.5 Design for serviceability limit states (SLS) 124171.661.462-986 12 6.6 Design for ultimate limit states (ULS) 001.3-2014 14 6.7 Design for accidental limit states (ULS) 001.3-2014 14 6.7 Design for accidental limit states (ULS) 001.3-2014 14 6.7 Design for accidental limit states (ULS) 001.3-2014 14 6.7 Design for accidental limit states (ULS) 001.3-2014 15 6.8 Design for accidental limit states (ALS) 15 6.9 Robustness 15 6.10 Corrosion control 16 6.11 Design for fabrication and inspection 16 6.12 Design for decommissioning, removal and disposal 17 7.1 General 17 7.2 In-place actions 21		5.8	Reuse of topsides structure		
6 Design requirements. STANDARD PREVIEW 11 6.1 General 11 6.2 Materials selection Standards.ifeh.ai) 11 6.3 Design conditions 11 6.4 Structural interfaces 120 6.5 Design for serviceability limit states (SLS) 121 6.6 Design for altimate limit states (SLS) 126 6.6 Design for fatigue limit states (ULS) 15 6.8 Design for accidental limit states (LLS) 15 6.9 Robustness 15 6.10 Corrosion control 16 6.11 Design for fabrication and inspection 16 6.12 Design for decommissioning, removal and disposal 17 7 Actions 17 7.1 General 17 7.2 In-place actions 18 7.3 Action factors 20 7.4 Vortex-induced vibrations 21 7.5 Deformations 22 7.7 Wind actions 22 7.8 Seismic actions 22 7.		5.9	Modifications and refurbishment		
6.1 General 11 6.2 Materials selection Standards.itch.al) 11 6.3 Design conditions 11 6.4 Structural interfaces 150 (1990) 32014 12 6.5 Design for serviceability limit states (SLS) 3120476 666 460-9086 12 6.6 Design for accidental limit states (SLS) 15 6.7 Design for accidental limit states (ALS) 15 6.8 Design for accidental limit states (ALS) 15 6.9 Robustness 15 6.10 Design for fabrication and inspection 16 6.11 Design for fabrication sfor structural integrity management 17 6.11 Design for decommissioning, removal and disposal 17 7 Actions 17 7.1 General 17 7.2 In-place actions 21 7.5 Deformations 21 7.6 Wave and current actions 22 7.8 Seismic actions 22 7.8 Seismic actions 22 7.9 Action fabrication and installation 24	6	Design requirements STANDARD PREVIEW			
6.2 Materials selection (standards.ifeh.ai) 11 6.3 Design conditions 11 6.4 Structural interfaces 12 6.5 Design for serviceability limit states (SLS) 12 6.6 Design for altimate limit states (SLS) 12 6.6 Design for altimate limit states (FLS) 12 6.7 Design for accidental limit states (FLS) 15 6.8 Design for accidental limit states (ALS) 15 6.10 Corrosion control 16 6.11 Design for fabrication and inspection 16 6.12 Design for fabrication sfor structural integrity management 17 7.1 General 17 7.1 General 17 7.2 In-place actions 21 7.5 Deformations 21 7.6 Wave and current actions 22 7.7 Wind actions 22 7.8 Seismic actions 22 7.9 Actions factors 22 7.9 Actions during fabrication and installation 24 7.10 Accidental	U	6.1	General		
6.3Design conditions116.4Structural interfaces150 19901 32014126.5Design for serviceability limit states (SLS) 312977 666 462-9086126.6Design for limate limit states (ULS) 901-3-2014146.7Design for actidental limit states (FLS)156.8Design for actidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions227.9Actions247.10Other actions227.9Actions227.9Actions227.9Actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.4Connections378.5Castings389Structural systems39		6.2	Materials selection standards.iteh.ai)		
6.4Structural interfaces126.5Design for serviceability limit states (SLS)126.6Design for ultimate limit states (ULS)146.7Design for fatigue limit states (ULS)156.8Design for accidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design for fabrications for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions247.10Accidental situations247.11Other actions227.2North actions217.5Deformations217.6Wave and current actions227.7Wind actions247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical sections378.4Connections378.5Castings38 </th <td></td> <td>6.3</td> <td>Design conditions</td> <td></td>		6.3	Design conditions		
6.5Design for serviceability limit states (SLS) 11247F 466F46D-9086-126.6Design for ultimate limit states (ULS) 001-3-2014146.7Design for fatigue limit states (FLS)156.8Design for accidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Action fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.4Connections378.5Castings389Structural systems39		6.4	Structural interfaces		
6.6Design for ultimate limit states (ULS) Design for fatigue limit states (FLS)146.7Design for accidental limit states (FLS)156.8Design for accidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design for decommissioning, removal and disposal176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action fators207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Other actions348Strength and resistance of structural components368.1Use of local building standards368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.5	Design for serviceability limit states (SLS) 3121471-666-4612-9086-		
6.7Design for fatigue limit states (FLS)156.8Design for accidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.6	Design for ultimate limit states (ULS) 901-3-2014		
6.8Design for accidental limit states (ALS)156.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.7	Design for fatigue limit states (FLS)		
6.9Robustness156.10Corrosion control166.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions217.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.8	Design for accidental limit states (ALS)		
6.10Corrosion control166.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Occidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.9	Robustness		
6.11Design for fabrication and inspection166.12Design considerations for structural integrity management176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.10	Lorrosion control		
6.12Design considerations for structural integrity management.176.13Design for decommissioning, removal and disposal177Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.3Design for non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.11 6.12	Design considerations for structural integrity management		
7Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		6.12	Design for decommissioning removal and disposal		
7Actions177.1General177.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions368Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39					
7.1General1/7.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39	7	Actio	ns		
7.2In-place actions187.3Action factors207.4Vortex-induced vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.1	General		
7.3Action factors.207.4Vortex-induced vibrations.217.5Deformations.217.6Wave and current actions.227.7Wind actions227.8Seismic actions.227.9Actions during fabrication and installation247.10Accidental situations.247.11Other actions.348Strength and resistance of structural components368.1Use of local building standards.368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections.378.5Castings.389Structural systems.39		/.Z	In-place actions		
7.4Vortex-inducted vibrations217.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.3	Action ractors		
7.5Deformations217.6Wave and current actions227.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.4	Deformations		
7.7Wind actions227.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.5	Wave and current actions		
7.8Seismic actions227.9Actions during fabrication and installation247.10Accidental situations247.11Other actions247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.7	Wind actions	22	
7.9Actions during fabrication and installation247.10Accidental situations247.11Other actions348Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.8	Seismic actions		
7.10Accidental situations.247.11Other actions.348Strength and resistance of structural components.368.1Use of local building standards.368.2Cylindrical tubular member design368.3Design of non-cylindrical sections.378.4Connections.378.5Castings.389Structural systems.39		7.9	Actions during fabrication and installation		
7.11Other actions.348Strength and resistance of structural components368.1Use of local building standards.368.2Cylindrical tubular member design368.3Design of non-cylindrical sections.378.4Connections.378.5Castings.389Structural systems.39		7.10	Accidental situations		
8Strength and resistance of structural components368.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		7.11	Other actions		
8.1Use of local building standards368.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39	8	Strength and resistance of structural components			
8.2Cylindrical tubular member design368.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39	~	8.1	Use of local building standards		
8.3Design of non-cylindrical sections378.4Connections378.5Castings389Structural systems39		8.2	Cylindrical tubular member design		
8.4 Connections 37 8.5 Castings 38 9 Structural systems 39		8.3	Design of non-cylindrical sections		
8.5 Castings 38 9 Structural systems 39		8.4	Connections		
9 Structural systems		8.5	Castings		
	9	Struc	tural systems		

	9.1	Topsides design	
	9.2	Topsides structure design models	
	9.3	Support structure interface	
	9.4	Flare towers, booms, vents and similar structures.	
	9.5	Helicopter landing facilities (helidecks)	
	9.6	Crane support structure	
	9.7	Derrick design	
	9.8	Bridges	
	9.9	Anti vibration mountings for modulos and maior aquinment alrida	
	9.10	Anu-vioration mountings for mountes and major equipment skids	
	9.11	System methods assumptions	
	9.12	Panatrations	
	9.13	Difficult_to_inspect areas	49
	9.14	Drainage	
	9.15	Actions due to drilling operations	4.9
	917	Strength reduction due to heat	49
	9.18	Walkways, laydown areas and equipment maintenance	50
	9.19	Muster areas and lifeboat stations	50
10	Mato	riale	50
10	10.1	Canaral	30
	10.1	Carbon steel	50 51
	10.2	Stainless steel	52
	10.5	Aluminium allows I of the ND ADD DDDD VIDY	54
	10.1	Fibre-reinforced composites ANDARD PREVIEW	55
	10.6	Timber (stor doud a itak ai)	55
11	Fabri	(Stanuarus.iten.al)	EE
11	FADI 11 1	Assombly	
	11.1	ASSEIIDIY	
	11.2	Fabrication inspection	
	11.3 11.4	Quality control quality assurance and documentation	
	11.4	Corrosion protection	
10	Corre	correston protection	E7
12	12 1	Conoral	
	12.1	Generation according to a correction rates and correction damage	
	12.2	Design of corresion control	
	12.3 17 <i>A</i>	Eabrication and installation of corrosion control	58
	12.4	In-service inspection monitoring and maintenance of corrosion control	
10	Load	and transportation and installation	E0
13	Load	out, transportation and installation	
14	In-se	rvice inspection and structural integrity management	60
	14.1	Derticular considerations applying to tonsides structures	
	14.2	Tonsides structure default inspection scores	
15	11.5 Accor	report of existing tensides structures	۲۵ دریا
15	Asses	ssment of existing topsides structures	
16	Reus	e of topsides structure	63
Anne	x A (inf	ormative) Additional information and guidance	64
Anne	x B (inf	ormative) Example calculation of building code correspondence factor	
Anne	x C (inf	ormative) Regional information	
Bibli	ograph	y	

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 19901-3 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.

This second edition cancels and replaces the first edition (ISO 19901-3:2010), which has been technically revised. iTeh STANDARD PREVIEW

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 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

A future Part 9 dealing with structural integrity management is under preparation.

The first edition of ISO 19901-3:2010 included a number of serious typographical errors. A 'Corrected' version of the first edition was issued in December 2011. This 'Corrected' version first edition was subsequently issued by some national standards organisations. To ensure all national standards bodies issue a 'Corrected' version of the document, TC 67/SC 7 decided to produce a second edition of 19901-3 which incorporates the following changes from the original issue in 2010:

- in <u>4.1</u>, the symbol S_d for design internal force or moment has been added;
- in 8.1, Formulae (7), (8) and (9) have been amended to include symbol S_d and the second paragraph has been reworded to reflect the changes in the equations;
- in <u>9.18</u>, first paragraph, new values have been given for variable action for the grating and plating as well as for the contribution of personnel to the total variable action allowance;

- in <u>A.7.10.4.2.2</u>, the text has been reworded and Formula (A.1) has been amended, in line with the modifications in <u>8.1</u>;
- in <u>A.8.1</u>, Formula (A.5) has been corrected by changing "max" to "min";
- in <u>B.2</u>, <u>Table B.1</u>, the value of Young's modulus has been amended so as to be in accordance with the default value recommended in ISO 19902;
- in <u>Tables B.3</u>, <u>B.4</u>, <u>B.5</u>, <u>B.7</u>, <u>B.8</u> and <u>B.9</u>, some values have been updated to reflect the change in Young's modulus;
- in <u>B.3.3</u>, <u>Table B.4</u>, the symbol for utilization has been corrected;
- in <u>B.4.5</u>, <u>Table B.10</u>, all values for compression and for compression and bending have been amended, as well as the value for the minimum ratio;
- in <u>B.4.5</u>, first and second paragraphs, the building code correspondence factor has been amended and a sentence about its applicability has been added;
- in <u>Annex C</u>, <u>Table C.1</u>, the existing building code correspondence factor has been amended and a second correspondence factor, relating to CSA S16-09, has been added;
- in the Bibliography, Reference^[3] has been updated with a more recent edition; references in the text (see A.5.2, A.8.3.1, A.8.3.2, A.8.3.3 and A.8.3.4) have been updated accordingly.

In producing the second edition the following additional minor corrections have been applied to the 2011 'Corrected' version of the first edition: **ANDARD PREVIEW**

- in <u>9.5.3.4</u> the units of the area-imposed action corrected to kN/m²;
- in <u>9.6.2</u> the description of off-lead and side-lead in <u>Table 5</u> improved;
 - <u>ISO 19901-3:2014</u>
- in A.7.10.4.2.3 the reference/to_section Ai7.10.2.4 changed/to Ai7.10:4.244;2-9086-1026ff7b169e/iso-19901-3-2014
- in <u>A.11.3</u> minor text correction;
- in <u>Annex B Table B.1</u>, symbols for bending amplification reduction factor corrected to C_{m,v} and C_{m,z}

ISO 19901 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 (all parts), Petroleum and natural gas industries Specific 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
- 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 19906, Petroleum and natural gas industries Arctic offshore structures

Introduction

The series of International Standards applicable to types of offshore structure, 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 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 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 series of International Standards applicable to types of offshore structure is intended to provide 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 19901 has been prepared for those structural components of offshore platforms which are above the wave zone and are not part of the support structure or of the hull. Previous national and international standards for offshore structures have concentrated on design aspects of support structures, and the approach to the many specialized features of topsides has been variable and inconsistent, with good practice poorly recorded. D PREVIEW

Historically, the design of struct**ural components in topsides has** been performed to national or regional codes for onshore structures, modified in accordance with experience within the offshore industry, or to relevant parts of classification society rules. While this part of ISO 19901 permits use of national or regional codes, and indeed remains dependent on them for the formulation of component resistance equations, it provides modifications that result in a more consistent level of component safety between support structures and topsides structures.

In some aspects, the requirements for topsides structures are the same as, or similar to, those for fixed steel structures; in such cases, reference is made to ISO 19902, with modifications where necessary. Annex A provides background to, and guidance on, the use of this part of ISO 19901, and is intended to be read in conjunction with the main body of this part of ISO 19901. The clause numbering in Annex A follows the same structure as that in the body of the normative text in order to facilitate cross-referencing.

<u>Annex B</u> provides an example of the use of national standards for onshore structures in conjunction with this part of ISO 19901.

Regional information on the application of this part of ISO 19901 to certain specific offshore areas is provided in <u>Annex C</u>.

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;
- "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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 19901-3:2014</u> https://standards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014

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

Part 3: **Topsides structure**

1 Scope

This part of ISO 19901 gives requirements for the design, fabrication, installation, modification and structural integrity management for the topsides structure for an oil and gas platform. It complements ISO 19902, ISO 19903, ISO 19904-1, ISO 19905-1 and ISO 19906, which give requirements for various forms of support structure. Requirements in this part of ISO 19901 concerning modifications and maintenance relate only to those aspects that are of direct relevance to the structural integrity of the topsides structure.

The actions on (structural components of) the topsides structure are derived from this part of ISO 19901, where necessary in combination with other International Standards in the ISO 19901 series. The resistances of structural components of the topsides structure can be determined by the use of international or national building codes, as specified in this part of ISO 19901. If any part of the topsides structure forms part of the primary structure of the overall structural system of the whole platform, the requirements of this part of ISO 19901 are supplemented with applicable requirements in ISO 19902, ISO 19903, ISO 19904-1, ISO 19905-1 and ISO 19906.

This part of ISO 19901 is applicable to the topsides of offshore structures for the petroleum and natural gas industries, as follows: standards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014

- topsides of fixed offshore structures;
- discrete structural units placed on the hull structures of floating offshore structures and mobile offshore units;
- certain aspects of the topsides of arctic structures.

This part of ISO 19901 is not applicable to those parts of the superstructure of floating structures that form part of the overall structural system of the floating structure; these parts come under the provisions of ISO 19904-1. This part of ISO 19901 only applies to the structure of modules on a floating structure that do not contribute to the overall integrity of the floating structural system.

This part of ISO 19901 is not applicable to the structure of hulls of mobile offshore units.

This part of ISO 19901 does not apply to those parts of floating offshore structures and mobile offshore units that are governed by the rules of a recognized certifying authority and which are wholly within the class rules.

Some aspects of this part of ISO 19901 are also applicable to those parts of the hulls of floating offshore structures and mobile offshore units that contain hydrocarbon processing, piping or storage.

This part of ISO 19901 contains requirements for, and guidance and information on, the following aspects of topsides structures:

- design, fabrication, installation and modification;
- in-service inspection and structural integrity management;
- assessment of existing topsides structures;

- reuse;
- decommissioning, removal and disposal;
- prevention, control and assessment of fire, explosions and other accidental events.

This part of ISO 19901 applies to structural components including the following:

- primary and secondary structure in decks, module support frames and modules;
- flare structures;
- crane pedestal and other crane support arrangements;
- helicopter landing decks (helidecks);
- permanent bridges between separate offshore structures;
- masts, towers and booms on offshore structures.

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.

ISO 2631-1, Mechanical vibration and shock A Evaluation of human exposure to whole-body vibration — Part 1: General requirements (standards.iteh.ai)

ISO 2631-2, Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 2: Vibration in buildings (1 Hz to 80 Hz) ISO 19901-3:2014

ISO 13702, Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines

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 19901-6, Petroleum and natural gas industries — Specific requirements for offshore structures — Part 6: Marine operations

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 19906, Petroleum and natural gas industries — Arctic offshore structures

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19900, ISO 19902 and the following apply.

3.1

abnormal value

design value of a parameter of abnormal severity used in accidental limit state checks in which a structure is intended not to suffer complete loss of integrity

Note 1 to entry: Abnormal events are typically accidental and environmental (including seismic) events having probabilities of exceedance of the order of 10^{-3} to 10^{-4} per annum.

[SOURCE: ISO 19900:2013, definition 3.1]

3.2

accidental situation

design situation involving exceptional conditions of the structure or its exposure

EXAMPLE Impact, fire, explosion, loss of intended differential pressure.

[SOURCE: ISO 19900:2013, definition 3.2]

3.3

active fire protection

system of fire protection that reacts to a fire by discharging water or an inert or reactive substance in the vicinity of the fire to extinguish it

Note 1 to entry: There is a possibility that such a system fails to operate as designed.

3.4

caisson appurtenance used for abstracting water from the sea or as a drain (standards.iteh.ai)

3.5

conductor

tubular pipe extending upward from or beneath the sea floor containing pipes that extend into the petroleum reservoir tips://standards.iteh.ai/catalog/standards/sist/3312147f-166f-46f2-9086-

1026ff7b169e/iso-19901-3-2014

[SOURCE: ISO 19900:2013, definition 3.12]

Note 1 to entry: A conductor is generally vertical, and is continuous from below the sea floor to the wellbay in the topsides and can be laterally supported in both the support structure and topsides structure. The vertical support is in the seabed.

Note 2 to entry: In a few cases, conductors are rigidly attached to the topsides or to the support structure above sea level. In these cases, the conductor's axial stiffness can affect the load distribution within the overall structure.

3.6

critical component

structural component, failure of which would cause failure of the whole structure, or a significant part of it

Note 1 to entry: A critical component is part of the primary structure.

[SOURCE: ISO 19902:2007, definition 3.12]

3.7

design accidental action

accidental action with a probability of occurrence greater than 10⁻³ to 10⁻⁴ per year

3.8

design service life

assumed period for which a structure is used for its intended purpose with anticipated maintenance, but without substantial repair being necessary

[SOURCE: ISO 19900:2013, definition 3.16]

3.9

design situation

set of physical conditions representing real conditions during a certain time interval, for which the design demonstrates that relevant limit states are not exceeded

[SOURCE: ISO 19900:2013, definition 3.17]

3.10

design value

value derived from the representative value for use in the design verification procedure

[SOURCE: ISO 19900:2013, definition 3.18]

3.11

explosion

rapid chemical reaction of gas or dust in air

Note 1 to entry: An explosion results in increased temperatures and pressure impulses. A gas explosion on an offshore platform is usually a deflagration in which flame speeds remain subsonic.

[SOURCE: ISO 19902:2007, definition 3.17]

3.12

exposure level

classification system used to define the requirements for a structure based on consideration of life safety and consequences of failure

Note 1 to entry: An exposure level 1 platform is the most critical and exposure level 3 the least. A normally manned platform which cannot be reliably evacuated before a design event will be an exposure level 1 platform.

[SOURCE: ISO 19900:2013, definition 3.20]

ISO 19901-3:2014 https://standards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014

extreme value

value of a parameter used in ultimate limit state checks, in which a structure's global behaviour is intended to stay in the elastic range

Note 1 to entry: Extreme values and events have probabilities of exceedance of the order of 10^{-2} per annum.

[SOURCE: ISO 19902:2007, definition 3.19]

3.14

3.13

load case

compatible load arrangements, sets of deformations and imperfections considered simultaneously with permanent actions and fixed variable actions for a particular design or verification

[SOURCE: ISO 19902:2007, definition 3.29]

Note 1 to entry: Load arrangements are the identification of the position, magnitude and direction of a free action.

3.15

mitigation

action taken to reduce the consequences of a hazardous event

EXAMPLE Provision of fire or explosion walls; use of water deluge on gas detection; structural strengthening.

3.16

nominal value

value assigned to a basic variable determined on a non-statistical basis, typically from acquired experience or physical conditions

[SOURCE: ISO 19900:2013, definition 3.29]

3.17

owner

representative of the company or companies owning or leasing a development

[SOURCE: ISO 19900:2013, definition 3.34]

3.18 passive fire protection

PFP

coating on the surface of a structural component that improves the structural component's resistance to fire

Note 1 to entry: Some PFP can produce toxic fumes in fires.

3.19

platform

complete assembly including structure, topsides, foundations and stationkeeping systems

[SOURCE: ISO 19900:2013, definition 3.35]

3.20

regulator

authority established by a national governmental administration to oversee the activities of the offshore oil and natural gas industries within its jurisdiction, with respect to the overall safety to life and protection of the environment

Note 1 to entry: The term *regulator* can encompass more than one agency in any particular territorial waters.

Note 2 to entry: The regulator can appoint other agencies, such as marine classification societies, to act on its behalf, and in such cases, *regulator* as it is used in this International Standard includes such agencies.

Note 3 to entry: In this International Standard, the term *regulator* does not include any agency responsible for approvals to extract hydrocarbons, unless such agency also has responsibility for safety and environmental protection.

[SOURCE: ISO 19902:2007, definition 3.40]

3.21

representative value

value assigned to a basic variable for verification of a limit state

[SOURCE: ISO 19900:2013, definition 3.38]

3.22

return period

average period between occurrences of an event or of a particular value being exceeded

Note 1 to entry: The offshore industry commonly uses a return period measured in years for environmental events. The return period in years is equal to the reciprocal of the annual probability of exceedance of the event.

[SOURCE: ISO 19900:2013, definition 3.40]

3.23

riser

tubular used for the transport of fluids between the sea floor and a termination point on the platform

Note 1 to entry: For a fixed structure the termination point is usually the topsides. For floating structures, the riser can terminate at other locations of the platform.

[SOURCE: ISO 19900:2013, definition 3.41]

Note 2 to entry: A riser can be supported both laterally and vertically in the topsides structure and transmit actions from thermal effects, wave action, permanent and variable actions and variations in fluid flow to the topsides structure.

3.24

robustness

ability of a structure to withstand accidental and abnormal events without being damaged to an extent disproportionate to the cause

[SOURCE: ISO 19900:2013, definition 3.42]

3.25

safety-critical element

SCE

item of structure, piping or equipment, the failure of which can result in major accidents or which is provided to prevent or mitigate against them

EXAMPLE Primary structure, pressure-containing equipment, blow-down and other safety systems, vessels and pipework containing hazardous materials, fire and gas detection systems, supports for SCE.

3.26

structural component

physically distinguishable part of a structure

EXAMPLE Column, beam, stiffened plate, tubular joint, or foundation pile/

[SOURCE: ISO 19900:2013, definition 3.46tandards.iteh.ai)

3.27

support structure

ISO 19901-3:2014

structure supporting the topsides and ards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-

1026ff7b169e/iso-19901-3-2014

Note 1 to entry: The support structure can take many forms including fixed steel (see ISO 19902), fixed concrete (see ISO 19903), floating (see ISO 19904-1), mobile offshore units (see ISO 19905-1), or the various forms of arctic structures (see ISO 19906).

3.28

topsides

structures and equipment placed on a supporting structure (fixed or floating) to provide some or all of a platform's functions

Note 1 to entry: For a ship-shaped floating structure, the deck is not part of the topsides.

Note 2 to entry: For a jack-up, the hull is not part of the topsides.

Note 3 to entry: A separate fabricated deck or module support frame is part of the topsides.

[SOURCE: ISO 19900:2013, definition 3.52]

4 Symbols and abbreviated terms

4.1 Symbols

- a acceleration
- A accidental action
- *b* spacing of stiffeners

- $D_e \qquad equivalent quasi-static action representing dynamic response effects to the extreme environmental action, <math display="inline">E_e$
- $D_{\rm o}$ equivalent quasi-static action representing dynamic response effects to the operating environmental action, $E_{\rm o}$
- E quasi-static environmental action
- E_e extreme quasi-static environmental action due to wind, waves and current
- E_o quasi-static environmental action due to wind, waves and current for an operating condition under consideration (see <u>7.3.4</u>)
- F_d design action
- F_G vertical action due to self-weight of a crane
- F_H horizontal action due to off-lead and side-lead on a crane
- F_r representative action
- F_{rhl} representative hook load of a crane
- F_W maximum operating wind action on a crane
- F_{W,ext} extreme wind action on a crane DARD PREVIEW
- g acceleration due to gravity and ards.iteh.ai)
- G permanent action
- I explosion impulsendards.iteh.ai/catalog/standards/sist/3312f47f-f66f-46f2-9086-1026ff7b169e/iso-19901-3-2014
- l span or length
- *K*_c building code correspondence factor
- p instantaneous explosion overpressure
- p(t) variation of overpressure with time
- P probability
- Q variable action
- R resistance
- R_D design resistance
- R_K representative resistance
- S internal force or moment
- S_d design internal force or moment
- t time from ignition of an explosion
- t_d duration of explosion pressure pulse
- T fundamental period of vibration of a component or structure