

DIN EN ISO 19901-9:2019-12 (E)

Petroleum and natural gas industries - Specific requirements for offshore structures - Part 9: Structural integrity management (ISO 19901-9:2019); English version EN ISO 19901-9:2019

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	4
5 Abbreviated terms	5
6 SIM fundamentals	6
6.1 General	6
6.2 Limit states and performance levels	6
6.3 Fitness-for-service assessment	6
6.4 Management framework	7
6.5 Design	8
6.6 Topsides	9
6.7 Continued service	9
6.8 Structural integrity interfaces	9
7 SIM process	9
8 SIM data	10
8.1 General	10
8.2 Missing data	11
8.3 Data management	11
9 SIM evaluation	12
9.1 General	12
9.2 Data evaluation	12
9.3 Hazards, hazardous events and degradation mechanisms	12
9.4 Critical structure (CS)	12
9.5 Risk	12
9.5.1 General	12
9.5.2 Consequence	13
9.5.3 Likelihood	13
9.5.4 Risk presentation	13
9.6 Demonstrating fitness-for-service	13
9.7 Assessment	14
9.7.1 General	14
9.7.2 Assessment motive	14
9.7.3 Assessment initiators	15
9.8 Mitigation measures	15
9.8.1 General	15
9.8.2 Consequence reduction	16
9.8.3 Likelihood reduction	16

10	SIM strategy	16
10.1	General	16
10.2	Inspection strategy	17
10.2.1	General	17
10.2.2	Inspection motives	18
10.2.3	Inspection type	18
10.2.4	Inspection method	18
10.2.5	Inspection interval	18
10.2.6	Inspection scope	20
10.2.7	Pre-selected inspection areas	20
10.3	Maintenance strategy	21
10.4	Monitoring strategy	21
10.4.1	General	21
10.4.2	Weight and centre of gravity (CoG) monitoring	22
10.4.3	Deck elevation monitoring	22
10.4.4	Natural frequency monitoring	22
10.4.5	Corrosion protection monitoring	22
10.4.6	Metoccean monitoring	22
10.5	Evacuation strategy	22
10.6	Marine site investigations	23
11	SIM Program	23
11.1	General	23
11.2	Inspection program	23
11.2.1	General	23
11.2.2	Specifications	23
11.2.3	Inspection method	24
11.3	Maintenance program	25
11.4	Monitoring program	25
12	Assessment	26
12.1	General	26
12.2	Assessment information	26
12.3	Assessment method	26
12.3.1	General	26
12.3.2	Qualitative method	27
12.3.3	Semi-quantitative method	28
12.3.4	Quantitative methods	29
12.3.5	Fatigue analysis	31
12.4	Assessment model	31
12.4.1	General	31
12.4.2	Tubular members	31
12.4.3	Connections	32
12.4.4	Conductors	32
12.4.5	Damage	32
12.4.6	Repaired and strengthened elements	33
12.4.7	Foundation model	33
12.4.8	Material strength	34
12.5	Assessment for gravity hazard	34
12.5.1	General	34
12.5.2	Design level method (DLM)	35
12.5.3	Ultimate strength method (USM)	35
12.6	Assessment for metoccean hazard	35
12.6.1	General	35
12.6.2	Metoccean criteria	35
12.6.3	Crest elevation	35
12.6.4	Metoccean action combinations — Jacket	36
12.6.5	Metoccean action combinations — Deck	36

12.6.6	Directionality of metocean hazards.....	36
12.6.7	Design level method (DLM).....	37
12.6.8	Linear-elastic redundancy method.....	37
12.6.9	Ultimate strength method (USM).....	37
12.7	Assessment for seismic hazard.....	38
12.7.1	General.....	38
12.7.2	Seismic criteria.....	38
12.7.3	Seismic action combinations.....	38
12.7.4	Directionality of seismic hazards.....	39
12.7.5	Design level method (DLM).....	39
12.7.6	Ultimate strength method (USM).....	40
12.8	Assessment for collision hazard.....	40
12.8.1	General.....	40
12.8.2	Collision zone.....	41
12.8.3	Collision criteria.....	41
12.8.4	Directionality of collision hazards.....	41
12.8.5	Collision assessment method.....	41
12.9	Assessment for ice hazard.....	41
12.10	Assessment for explosion hazard.....	42
12.11	Assessment for fire hazard.....	42
13	Reuse.....	42
13.1	General.....	42
13.2	Fatigue in reused structures.....	42
13.3	Steel in reused structures.....	42
13.4	Inspection of reused structures.....	43
13.4.1	General.....	43
13.4.2	Initial condition assessment of structural members and connections.....	43
13.4.3	Extent of weld inspection.....	43
13.4.4	Corrosion protection systems.....	44
13.5	Removal and reinstallation.....	44
14	Decommissioning and removal.....	44
14.1	General.....	44
14.2	Decommissioning process.....	44
14.3	Pre-decommissioning data gathering.....	44
14.4	Planning and engineering.....	44
14.5	Well decommissioning.....	45
14.6	Facilities decommissioning.....	45
14.7	Pipeline decommissioning.....	45
14.8	Conductor removal.....	45
14.9	Structure removal.....	45
14.10	Site clearance.....	45
	Annex A (informative) Additional information and guidance.....	46
	Bibliography.....	141