

DIN EN ISO 19905-1:2025-10 (E)

Oil and gas industries including lower carbon energy - Site-specific assessment of mobile offshore units - Part 1: Jack-ups: elevated at a site (ISO 19905-1:2023, Corrected version 2024-07 + Amd.1:2025); English version EN ISO 19905-1:2023 + A1:2025

Contents		Page
Foreword.....		viii
Introduction.....		xi
1	Scope.....	1
2	Normative references.....	1
3	Terms and definitions	2
4	Symbols and abbreviated terms	15
4.1	Symbols.....	15
4.1.1	General.....	15
4.1.2	Symbols used in A.6.....	17
4.1.3	Symbols used in A.7.....	19
4.1.4	Symbols used in A.8.....	21
4.1.5	Symbols used in A.9 and Annex E.....	22
4.1.6	Symbols used in A.10	25
4.1.7	Symbols used in A.11	26
4.1.8	Symbols used in A.12	27
4.2	Abbreviated terms.....	31
5	Overall considerations.....	32
5.1	General.....	32
5.1.2	Competency.....	33
5.1.3	Planning.....	33
5.1.4	Assessment situations and associated criteria	33
5.1.5	Reporting	33
5.1.6	Regulations.....	33
5.1.7	Classification of unit.....	34
5.2	Assessment approach.....	34
5.3	Selection of assessment situations	36
5.4	Determination of assessment situations.....	37
5.4.1	General.....	37
5.4.2	Reaction point and foundation fixity	37
5.4.3	Extreme storm event approach angle.....	37
5.4.4	Weights and centre of gravity.....	37
5.4.5	Hull elevation	37
5.4.6	Leg length reserve.....	38
5.4.7	Adjacent structures	38
5.4.8	Other	38
5.5	Exposure levels	38
5.5.1	Determination of exposure level.....	38
5.5.2	Exposure level L1	38
5.5.3	Exposure level L2	38
5.5.4	Exposure level L3	39
5.5.5	Exposure level for earthquake.....	39
5.6	Analytical tools	39

6	Data to assemble for each site	39
6.1	Applicability.....	39
6.2	Jack-up data.....	39
6.3	Site and operational data	40
6.4	Metocean data	40
6.5	Geophysical and geotechnical data	41
6.6	Earthquake data.....	42
6.7	Ice data	42
7	Actions	42
7.1	Applicability	42
7.2	General	42
7.3	Metocean actions	43
7.3.1	General	43
7.3.2	Hydrodynamic model.....	43
7.3.3	Wave and current actions.....	43
7.3.4	Wind actions.....	43
7.4	Functional actions	44
7.5	Displacement dependent effects.....	44
7.6	Dynamic effects	44
7.7	Earthquakes.....	44
7.8	Ice actions.....	44
7.9	Other actions	44
8	Structural modelling	44
8.1	Applicability	44
8.2	Overall considerations	45
8.2.1	General	45
8.2.2	Modelling philosophy.....	45
8.2.3	Levels of FE modelling	45
8.3	Modelling the leg.....	46
8.3.1	General	46
8.3.2	Detailed leg	46
8.3.3	Equivalent leg (stick model).....	46
8.3.4	Combination of detailed and equivalent leg	46
8.3.5	Stiffness adjustment	46
8.3.6	Leg inclination	46
8.4	Modelling the hull.....	46
8.4.1	General	46
8.4.2	Detailed hull model.....	46
8.4.3	Equivalent hull model.....	46
8.5	Modelling the leg-to-hull connection	47
8.5.1	General	47
8.5.2	Guide systems	47
8.5.3	Elevating system	47
8.5.4	Fixation system	47
8.5.5	Shock pad — floating jacking systems	47
8.5.6	Jackcase and associated bracing.....	47
8.6	Modelling the spudcan and foundation	47
8.6.1	Spudcan structure	47
8.6.2	Seabed reaction point	47
8.6.3	Foundation modelling.....	48
8.7	Mass modelling.....	48
8.8	Application of actions	49
8.8.1	Assessment actions	49
8.8.2	Functional actions due to fixed load and variable load	50

8.8.3	Hull sagging	51
8.8.4	Metoccean actions	51
8.8.5	Inertial actions	51
8.8.6	Large displacement effects.....	51
8.8.7	Conductor actions.....	51
8.8.8	Earthquake actions.....	51
8.8.9	Ice actions	51
9	Foundations	52
9.1	Applicability.....	52
9.2	General.....	52
9.3	Geotechnical analysis of independent leg foundations.....	52
9.3.1	Foundation modelling and assessment.....	52
9.3.2	Leg penetration during preloading	53
9.3.3	Yield interaction	54
9.3.4	Foundation stiffnesses	54
9.3.5	Vertical-horizontal foundation capacity envelopes	54
9.3.6	Acceptance checks	55
9.4	Other considerations	56
9.4.1	Skirted spudcans.....	56
9.4.2	Hard sloping strata	57
9.4.3	Footprint considerations	57
9.4.4	Leaning instability	57
9.4.5	Leg extraction difficulties	57
9.4.6	Cyclic mobility, liquefaction and liquefaction-induced lateral flow.....	57
9.4.7	Scour	58
9.4.8	Spudcan interaction with adjacent infrastructure	58
9.4.9	Geohazards.....	58
9.4.10	Carbonate material.....	58
10	Structural response.....	58
10.1	Applicability.....	58
10.2	General considerations.....	59
10.3	Types of analyses and associated methods	59
10.4	Common parameters	60
10.4.1	General.....	60
10.4.2	Natural periods and related considerations	60
10.4.3	Damping	61
10.4.4	Foundations	61
10.4.5	Storm excitation	61
10.5	Storm analysis.....	61
10.5.1	General.....	61
10.5.2	Two-stage deterministic storm analysis	62
10.5.3	Stochastic storm analysis.....	63
10.5.4	Initial leg inclination.....	64
10.5.5	Limit state checks	64
10.6	Fatigue analysis	64
10.7	Earthquake analysis.....	64
10.8	Ice.....	66
10.8.1	General.....	66
10.8.2	ULS.....	66
10.8.3	ALS	66
10.8.4	Assessments in the area types.....	67
10.8.5	Additional factors for arctic and cold regions	67
10.9	Accidental situations	67
10.10	Alternative analysis methods	67
10.10.1	Ultimate strength analysis.....	67

10.10.2	Methodology	67
11	Long-term applications.....	68
11.1	Applicability.....	68
11.2	Assessment data	68
11.3	Special requirements	68
11.3.1	Fatigue assessment	68
11.3.2	Weight control	68
11.3.3	Corrosion protection.....	69
11.3.4	Marine growth	69
11.3.5	Foundations.....	69
11.4	Survey requirements.....	69
12	Structural strength.....	69
12.1	Applicability	69
12.1.1	General	69
12.1.2	Truss type legs.....	70
12.1.3	Other leg types.....	70
12.1.4	Fixation system and/or elevating system.....	70
12.1.5	Spudcan strength including connection to the leg	70
12.1.6	Overview of the assessment procedure	71
12.2	Classification of member cross-sections	71
12.2.1	Member types	71
12.2.2	Material yield strength	71
12.2.3	Classification definitions	71
12.3	Section properties of non-circular prismatic members	72
12.3.1	General	72
12.3.2	Plastic and compact sections.....	72
12.3.3	Semi-compact sections	72
12.3.4	Slender sections	72
12.3.5	Cross-section properties for the assessment	72
12.4	Effects of axial force on bending moment.....	73
12.5	Strength of tubular members.....	73
12.6	Strength of non-circular prismatic members.....	73
12.7	Assessment of joints	73
13	Acceptance criteria	73
13.1	Applicability	73
13.1.1	General	73
13.1.2	Ultimate limit states	74
13.1.3	Serviceability and accidental limit states.....	74
13.1.4	Fatigue limit states.....	74
13.2	General formulation of the assessment check	74
13.3	Leg strength assessment.....	75
13.4	Holding system strength assessment.....	76
13.5	Spudcan strength assessment.....	76
13.6	Hull elevation assessment.....	76
13.7	Leg length reserve assessment.....	76
13.8	Overturning stability assessment.....	77
13.9	Foundation integrity assessment	78
13.9.1	Foundation capacity check.....	78
13.10	Displacement check.....	79
13.11	Interaction with adjacent infrastructure.....	79
13.12	Temperatures	79
	Annex A (informative) Additional information and guidance	80

Annex B (normative) Summary of partial action and partial resistance factors	281
Annex C (informative) Additional information on structural modelling and response analysis.....	283
Annex D (informative) Foundations — Recommendations for the acquisition of site-specific geotechnical data	293
Annex E (informative) Foundations — Additional information and alternative approaches	299
Annex F (informative) Guidance on Clause A.12 — Structural strength.....	325
Annex G (informative) Contents list for typical site-specific assessment report	339
Annex H (informative) Regional information	346
Bibliography	355