

ISO 19904-1:2019 (E)

Petroleum and natural gas industries — Floating offshore structures — Part 1: Ship-shaped, semi-submersible, spar and shallow-draught cylindrical structures

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Symbols and abbreviated terms
4.1	Symbols
4.2	Abbreviated terms
5	Overall considerations
5.1	General
5.2	Safety requirements
5.3	Planning requirements
5.3.1	General
5.3.2	Exposure level
5.3.3	Basis of design
5.3.4	Design practices
5.3.5	Inspection and maintenance philosophy
5.3.6	Documentation
5.3.7	Extreme weather preparedness
5.3.8	Disconnectable floating platforms
5.4	Additional standards and specifications
5.4.1	General
5.4.2	Use for project application
5.5	General requirements
5.5.1	Functional requirements
5.5.2	Structural design philosophy
5.5.3	Design criteria
5.5.4	Hydrostatic stability and compartmentation
5.5.5	Weight control
5.5.6	Global response
5.5.7	Stationkeeping
5.5.8	Materials
5.5.9	Topsides layout — safety considerations
5.6	Independent verification
5.7	Analytical tools
5.8	In-service inspection and maintenance
5.9	Assessment, re#use and life extension
6	Basic design requirements
6.1	General
6.2	Limit states
6.2.1	General
6.2.2	Limit states for floating structures
6.3	Design situations
6.3.1	General
6.3.2	ULS situations

6.3.3	SLS situations
6.3.4	FLS situations
6.3.5	ALS situations
6.3.6	Temporary phases
7	Actions and action effects
7.1	General
7.2	Permanent actions (G)
7.3	Variable actions (Q)
7.4	Environmental actions (Ee)
7.4.1	General
7.4.2	Environmental site-specific data
7.4.3	Wind actions
7.4.3.1	General
7.4.3.2	Mean wind action
7.4.3.3	Dynamic wind actions
7.4.3.4	Wind-induced instability
7.4.4	Current actions
7.4.5	Wave actions
7.4.5.1	General
7.4.5.2	Actions on large-volume bodies
7.4.5.3	Actions on slender components
7.4.5.4	Slamming on slender components
7.4.5.5	Higher-order non-linear wave actions
7.4.5.6	Wave enhancement effects
7.4.5.7	Shallow water effects
7.4.5.8	Slamming and green water actions
7.4.6	Vortex-induced vibrations and motions
7.4.7	Direct ice action
7.4.8	Temperature effects
7.4.9	Tidal effects
7.4.10	Geotechnical hazards
7.5	Accidental actions (A)
7.5.1	General
7.5.2	Collision
7.5.3	Dropped objects
7.5.4	Fire and blast
7.6	Other actions
7.6.1	Stationkeeping actions
7.6.2	Sloshing actions
7.7	Repetitive actions
7.8	Action combinations
8	Global analysis
8.1	General
8.2	Static and mean response analyses
8.2.1	General
8.2.2	Static equilibrium in still-water condition
8.2.3	Mean response analysis
8.3	Global dynamic behaviour
8.3.1	General
8.3.2	Analysis models
8.3.3	Mass
8.3.4	Damping
8.3.5	Stiffness
8.3.6	Action classification
8.3.7	Turret moored systems
8.4	Frequency domain analysis
8.5	Time domain analysis
8.6	Uncoupled analysis
8.7	Coupled analysis
8.8	Resonant excitation and response
8.9	Platform offset
8.10	Air gap and wave crest assessment

- 8.10.1 Air gap
- 8.10.2 Wave crest effects
- 8.11 Platform motions and accelerations
- 8.12 Model tests
- 8.13 Structural analysis
 - 8.13.1 General
 - 8.13.2 Short-term response analysis
 - 8.13.3 Long-term response analysis
 - 8.13.4 Design wave analysis
- 9 Structural modelling, analysis and design
 - 9.1 General
 - 9.2 Representative values of actions
 - 9.2.1 General
 - 9.2.2 Representative values of actions for operating phases
 - 9.2.3 Representative values of actions for temporary phases
 - 9.2.4 Actions at interfaces
 - 9.3 Scantlings
 - 9.4 Modelling
 - 9.4.1 General
 - 9.4.2 Global models
 - 9.4.3 Local models
 - 9.4.4 Response evaluation
 - 9.4.5 Model verification
 - 9.5 Structural analysis
 - 9.5.1 General principles
 - 9.5.2 Linear analysis
 - 9.5.3 Non-linear analysis
 - 9.5.3.1 General
 - 9.5.3.2 ULS analysis
 - 9.5.3.3 ALS analysis
 - 9.5.4 Vibration analysis
 - 9.6 Structural strength
 - 9.6.1 Representative strength values
 - 9.6.2 Yield strength
 - 9.6.3 Buckling strength
 - 9.7 Design verification
 - 9.7.1 General
 - 9.7.2 SLS deflection limits
 - 9.7.3 Partial factor design format
 - 9.7.3.1 General
 - 9.7.3.2 Partial action factors
 - 9.7.3.3 Partial resistance and material factors
 - 9.7.4 Working stress design format
 - 9.7.4.1 General
 - 9.7.4.2 Action combination factors
 - 9.7.4.3 Acceptable safety factors and allowable utilization factors
 - 9.7.5 Reliability-based methods
 - 9.8 Special design issues
 - 9.8.1 General
 - 9.8.2 Slamming
 - 9.8.3 Green water
 - 9.8.4 Sloshing
 - 9.8.5 Wave impact on deck
 - 9.8.6 Local structure and components
 - 9.9 Materials
 - 9.9.1 General
 - 9.9.2 Material selection
 - 9.9.3 Through-thickness tension
 - 9.9.4 Aluminium substructures
 - 9.9.5 Cement grout
 - 9.9.6 Elastomeric material
 - 9.10 Corrosion protection of steel
 - 9.10.1 General

- 9.10.2 Electrical bonding and isolation
- 9.11 Fabrication and construction
 - 9.11.1 General
 - 9.11.2 Inspection and testing during fabrication and construction
 - 9.11.3 Fabrication details
 - 9.11.4 Welding
- 9.12 Marine operations
- 9.13 Topsides/hull interface
- 10 Fatigue analysis and design
 - 10.1 General
 - 10.2 Fatigue damage factors
 - 10.3 Outline of approach
 - 10.4 Metocean data for fatigue
 - 10.5 Structural modelling
 - 10.6 Hydrostatic analyses
 - 10.7 Response amplitude operators and combinations of actions
 - 10.8 Stresses and SCFs
 - 10.9 Stress range counting and distribution
 - 10.10 Fatigue resistance
 - 10.11 Damage accumulation
 - 10.12 Fracture mechanics methods
 - 10.13 Fatigue-sensitive components and connections
- 11 Ship-shaped structures
 - 11.1 General
 - 11.2 General design criteria
 - 11.2.1 Collision protection
 - 11.2.2 Deckhouse requirements
 - 11.2.3 Sloshing
 - 11.2.4 Green water
 - 11.3 Structural strength
 - 11.3.1 General
 - 11.3.2 Scantlings
 - 11.3.3 ULS-a and ULS-b longitudinal strength design verification
 - 11.3.3.1 General
 - 11.3.3.2 Partial factor design format
 - 11.3.3.3 Working stress design format
 - 11.3.4 Local strength and details
 - 11.3.5 Topsides structural support
 - 11.3.6 Load monitoring
- 12 Semi-submersibles
 - 12.1 General
 - 12.2 General design criteria
 - 12.2.1 General
 - 12.2.2 Limitations
 - 12.2.3 Damage tolerance
 - 12.3 Structural strength
 - 12.3.1 Critical connections
 - 12.3.2 Structural detailing
- 13 Spars
 - 13.1 General
 - 13.2 General design requirements
 - 13.2.1 Model testing
 - 13.2.2 Static equilibrium position
 - 13.2.3 Global action effects
 - 13.2.4 Local action effects
 - 13.3 Structural strength
 - 13.3.1 Critical interfaces
 - 13.3.2 Fatigue
 - 13.3.3 Structural details

- 14 Shallow-draught cylindrical structures**
 - 14.1 General
 - 14.2 General design criteria
 - 14.2.1 Collision protection
 - 14.2.2 Deckhouse requirements
 - 14.2.3 Global response
 - 14.2.4 Local action effects
 - 14.2.5 Model testing
 - 14.2.6 Temporary phases
 - 14.2.6.1 General
 - 14.2.6.2 Fabrication site activities
 - 14.2.6.3 Transit/transport conditions
 - 14.2.7 In-service conditions
 - 14.2.7.1 ULS
 - 14.2.7.2 ALS
 - 14.3 Structural strength
 - 14.3.1 Global strength
 - 14.3.2 Local strength
 - 14.3.3 Capacity verification
 - 14.3.4 Fatigue
 - 14.4 Damage stability
- 15 Conversion and re-use**
 - 15.1 General
 - 15.2 Minimum design, construction and maintenance standards
 - 15.3 Pre-conversion structural survey
 - 15.4 Effects of prior service
 - 15.4.1 General
 - 15.4.2 Ship-shaped structures
 - 15.4.3 Semi-submersibles
 - 15.4.4 Fatigue damage from prior service
 - 15.4.5 Repair of defects, dents, pitting, grooving and cracks
 - 15.5 Corrosion protection and material suitability
 - 15.5.1 Corrosion protection
 - 15.5.2 Material suitability
 - 15.6 Addition of new components
 - 15.7 Inspection and maintenance
- 16 Stability, watertight integrity and compartmentation**
 - 16.1 General
 - 16.2 Inclining test
 - 16.3 Compartmentation
 - 16.4 Watertight and weathertight appliances
 - 16.5 Damage stability
- 17 Mechanical systems**
 - 17.1 General
 - 17.2 Hull systems
 - 17.2.1 General
 - 17.2.2 Bilge system
 - 17.2.2.1 General
 - 17.2.2.2 Arrangement
 - 17.2.2.3 Valves
 - 17.2.2.4 Pumps
 - 17.2.2.5 Piping
 - 17.2.2.6 Chain lockers
 - 17.2.2.7 Void compartments
 - 17.2.2.8 Bilge suction from hazardous areas
 - 17.2.2.9 Special considerations for semi-submersibles
 - 17.2.2.10 Special considerations for spars
 - 17.2.3 Ballast system
 - 17.2.3.1 General
 - 17.2.3.2 Arrangement

- 17.2.3.3 Valves
 - 17.2.3.4 Piping
 - 17.2.3.5 Special considerations for semi-submersibles
 - 17.2.3.6 Special considerations for spars
 - 17.2.4 Tank sounding and venting system
 - 17.2.5 Cargo handling system
 - 17.2.5.1 General
 - 17.2.5.2 Atmospheric tanks
 - 17.2.5.3 Water displaced tanks
 - 17.2.5.4 Arrangement
 - 17.2.5.5 Pumps
 - 17.2.6 Inert gas system
 - 17.2.6.1 General
 - 17.2.6.2 Piping system
 - 17.2.7 Crude oil washing system
 - 17.2.8 Production vent/flare systems
 - 17.2.9 Electrical systems
 - 17.3 Import and export systems
 - 17.3.1 General
 - 17.3.2 Riser functions
 - 17.3.3 Export systems
 - 17.3.3.1 General
 - 17.3.3.2 Pipeline export
 - 17.3.3.3 Tanker export
 - 17.3.3.3.1 General
 - 17.3.3.3.2 Tanker stationkeeping systems
 - 17.3.3.3.3 Alongside transfer
 - 17.3.3.3.4 Tandem transfer
 - 17.3.3.3.5 Direct transfer
 - 17.3.3.4 Tandem transfer
 - 17.3.3.5 Direct transfer
 - 17.3.4 Material handling
 - 17.3.5 Lifting appliances
- 17.4 Fire protection systems
 - 17.4.1 General
 - 17.4.2 Structural fire protection systems
 - 17.4.3 Firewater systems
 - 17.4.4 Fixed fire-extinguishing systems
 - 17.4.5 Alarms
- 18 Stationkeeping systems
- 18.1 General
 - 18.2 Mooring equipment
 - 18.2.1 Winches
 - 18.2.2 Fairleads and chain stoppers
 - 18.2.3 Monitoring and control equipment
 - 18.3 Turret
 - 18.3.1 General
 - 18.3.2 Turret structure
 - 18.3.3 Bearing system
 - 18.3.3.1 General
 - 18.3.3.2 Forces on the bearing system
 - 18.3.3.3 Alternative bearing designs
 - 18.3.3.4 Inspection, maintenance and repair
 - 18.3.4 Turning and locking systems
 - 18.4 Disconnectable structures
 - 18.4.1 General
 - 18.4.2 Categorization
 - 18.4.3 Threshold events
 - 18.4.4 Operational mode
 - 18.4.5 Connected mode
 - 18.4.5.1 General
 - 18.4.5.2 Design criteria
 - 18.4.6 Disconnected mode
- 19 In-service inspection, monitoring and maintenance

- 19.1 General
- 19.2 Structural integrity management system philosophies
- 19.2.1 General
- 19.2.2 Database development and data acquisition
- 19.2.3 Evaluation
- 19.2.4 Planning
- 19.2.5 Implementation
- 19.3 Planning considerations
- 19.3.1 General
- 19.3.2 Inspection categories
- 19.3.2.1 General
- 19.3.2.2 Scheduled inspections
- 19.3.2.3 Unscheduled inspections
- 19.4 Implementation issues
- 19.4.1 Personnel qualifications
- 19.4.2 Equipment certification
- 19.4.3 Inspection programmes
- 19.4.4 Preparations for inspections
- 19.4.4.1 Access
- 19.4.4.2 Cleaning
- 19.4.5 Inspection results and actions
- 19.4.6 Maintenance programmes
- 19.4.7 Monitoring programmes
- 19.5 Minimum requirements
- 19.5.1 General
- 19.5.2 Minimum inspection requirements for main structure
- 19.5.2.1 General
- 19.5.2.2 General visual inspection (GVI)
- 19.5.2.3 Close-up visual inspection (CVI)
- 19.5.2.4 Thickness measurements (TM)
- 19.5.2.5 Weld inspections (WI)
- 19.5.2.6 Cathodic protection (CP) system inspection
- 19.5.3 Minimum inspection requirements for structural and non-structural attachments
- 19.5.4 Inspection results and actions
- 19.5.5 Tank testing and watertightness
- 20 Assessment of existing floating structures
- 20.1 General
- 20.2 Assessment procedures
- 20.2.1 Scope of assessment
- 20.2.2 Assessment conditions
- 20.2.3 Assessment procedure
- 20.2.4 Acceptance criteria
- 20.3 Mitigation
- 21 Other hulls
- 21.1 General
- 21.2 Structural steel design
- 21.3 Stability and watertight integrity
- Annex A (informative) Additional information and guidance
- A.1 Scope
- A.2 Normative references
- A.3 Terms and definitions
- A.4 Symbols and abbreviated terms
- A.5 Overall considerations
- A.5.1 General
- A.5.2 Safety requirements
- A.5.3 Planning requirements
- A.5.3.1 General
- A.5.3.2 Exposure level
- A.5.3.3 Basis of design
- A.5.3.4 Design practices
- A.5.3.5 Inspection and maintenance philosophy

A.5.3.6	Documentation
A.5.3.7	Extreme weather preparedness
A.5.3.8	Disconnectable floating platforms
A.5.4	Additional standards and specifications
A.5.5	General requirements
A.5.5.1	General
A.5.5.2	Structural design philosophy
A.5.5.3	Design criteria
A.5.5.4	Hydrostatic stability and compartmentation
A.5.5.5	Weight control
A.5.5.6	Global response
A.5.5.7	Stationkeeping
A.5.5.8	Materials
A.5.5.9	Topsides layout – safety considerations
A.5.6	Independent verification
A.5.7	Analytical tools
A.5.8	In-service inspection and maintenance
A.5.9	Assessment, re#use and life extension
A.6	Basic design requirements
A.6.1	General
A.6.2	Limit states
A.6.3	Design situations
A.6.3.1	General
A.6.3.2	ULS situations
A.6.3.3	SLS situations
A.6.3.4	FLS situations
A.6.3.5	ALS situations
A.6.3.6	Temporary phases
A.7	Actions and action effects
A.7.1	General
A.7.2	Permanent actions (G)
A.7.3	Variable actions (Q)
A.7.4	Environmental actions (Ee)
A.7.4.1	General
A.7.4.2	Environmental site-specific data
A.7.4.3	Wind actions
A.7.4.4	Current actions
A.7.4.5	Wave actions
A.7.4.5.1	General
A.7.4.5.2	Actions on large-volume bodies
A.7.4.5.3	Actions on slender components
A.7.4.5.4	Slamming on slender components
A.7.4.5.5	Higher-order non-linear wave actions
A.7.4.5.6	Wave enhancement effects
A.7.4.5.7	Shallow water effects
A.7.4.5.8	Slamming and green water actions
A.7.4.6	Vortex-induced vibrations and motions
A.7.4.6.1	Simplified assessment of vortex-induced vibrations and fatigue
A.7.4.6.2	Multi-modal response analysis based on empirical models
A.7.4.6.3	Modal response in the frequency domain
A.7.4.6.4	Response in the time domain
A.7.4.6.5	Methods based on solution of the Navier-Stokes equations
A.7.4.6.6	Methods for reduction of VIV
A.7.4.7	Direct ice action
A.7.4.8	Temperature effects
A.7.4.9	Tidal effects
A.7.4.10	Geotechnical hazards
A.7.5	Accidental actions (A)
A.7.5.1	General
A.7.5.2	Collision
A.7.5.3	Dropped object
A.7.5.4	Fire and blast
A.7.6	Other actions
A.7.6.1	Stationkeeping actions

A.7.6.2	Sloshing actions
A.7.7	Repetitive actions
A.7.8	Action combinations
A.8	Global analysis
A.8.1	General
A.8.2	Static and mean response analyses
A.8.2.1	General
A.8.2.2	Static equilibrium in still-water condition
A.8.2.3	Mean response analysis
A.8.3	Global dynamic behaviour
A.8.4	Frequency domain analysis
A.8.5	Time domain analysis
A.8.6	Uncoupled analysis
A.8.7	Coupled analysis
A.8.8	Resonant excitation and response
A.8.9	Platform offset
A.8.10	Air gap and wave crest assessment
A.8.11	Platform motions and accelerations
A.8.12	Model tests
A.8.13	Structural analysis
A.9	Structural modelling, analysis and design
A.9.1	General
A.9.2	Representative values of actions
A.9.2.1	General
A.9.2.2	Representative values of actions for operating phases
A.9.2.3	Representative values of actions for temporary phases
A.9.2.4	Actions at interfaces
A.9.3	Design scantlings
A.9.4	Modelling
A.9.4.1	General
A.9.4.2	Global models
A.9.4.3	Local models
A.9.4.4	Response evaluation
A.9.4.5	Model verification
A.9.5	Structural analysis
A.9.5.1	General principles
A.9.5.2	Linear analysis
A.9.5.3	Non-linear analysis
A.9.6	Structural strength
A.9.7	Design verification
A.9.7.1	General
A.9.7.2	SLS deflection limits
A.9.7.3	Partial factor design format
A.9.7.4	Working stress design format
A.9.7.5	Reliability-based methods
A.9.8	Special design issues
A.9.9	Materials
A.9.9.1	General
A.9.9.2	Material selection
A.9.9.3	Through-thickness tension
A.9.9.4	Aluminium substructures
A.9.9.5	Cement grout
A.9.9.6	Elastomeric material
A.9.10	Corrosion protection of steel
A.9.11	Fabrication and construction
A.9.12	Marine operations
A.9.12.1	General
A.9.12.2	Site survey
A.9.12.3	Installation plan
A.9.12.4	Installation of mooring system
A.9.12.5	Installation of riser systems
A.9.12.6	Well production, utility, process, and export systems
A.9.12.7	Commissioning and start-up
A.9.13	Topsides/hull interface

A.10	Fatigue analysis and design
A.10.1	General
A.10.2	Fatigue damage factors
A.10.3	Outline of approach
A.10.4	Metocean data for fatigue
A.10.5	Structural modelling
A.10.6	Hydrostatic analyses
A.10.7	Response amplitude operators and combinations of actions
A.10.8	Stresses and SCFs
A.10.9	Stress range counting and distribution
A.10.10	Fatigue resistance
A.10.11	Damage accumulation
A.10.12	Fracture mechanics methods
A.10.13	Fatigue-sensitive components and connections
A.11	Ship-shaped structures
A.11.1	General
A.11.2	General design criteria
A.11.2.1	Collision protection
A.11.2.2	Deckhouse requirements
A.11.2.3	Sloshing
A.11.2.4	Green water
A.11.3	Structural strength
A.11.3.1	General
A.11.3.2	Scantlings
A.11.3.3	ULS–a and ULS–b longitudinal strength design verification
A.11.3.3.1	General
A.11.3.3.2	Partial factor design format
A.11.3.3.3	Working stress design format
A.11.3.4	Local strength and details
A.11.3.5	Topsides structural support
A.11.3.6	Load monitoring
A.12	Semi-submersibles
A.12.1	General
A.12.2	General design criteria
A.12.3	Structural strength
A.13	Spars
A.13.1	General
A.13.2	General design requirements
A.13.3	Structural strength
A.14	Shallow-draught cylindrical structures
A.14.1	General
A.14.2	General design requirements
A.14.3	Structural strength
A.14.4	Damage stability
A.15	Conversion and re#use
A.15.1	General
A.15.2	Minimum design, construction and maintenance standards
A.15.3	Pre-conversion structural survey
A.15.4	Effects of prior service
A.15.4.1	General
A.15.4.2	Ship-shaped structures
A.15.4.3	Semi-submersibles
A.15.4.4	Fatigue damage from prior service
A.15.5	Corrosion protection and material suitability
A.15.6	Addition of new components
A.15.7	Inspection and maintenance
A.16	Stability, watertight integrity and compartmentation
A.16.1	General
A.16.2	Inclining test
A.16.3	Compartmentation
A.16.4	Watertight and weathertight appliances
A.16.5	Damage stability
A.17	Mechanical systems
A.17.1	General

- A.17.2 Hull systems
 - A.17.2.1 General
 - A.17.2.2 Bilge system
 - A.17.2.3 Ballast system
 - A.17.2.4 Tank sounding and venting system
 - A.17.2.5 Cargo handling system
 - A.17.2.5.1 General
 - A.17.2.5.2 Atmospheric tanks
 - A.17.2.5.3 Water displaced tanks
 - A.17.2.5.4 Arrangement
 - A.17.2.5.5 Pumps
 - A.17.2.6 Inert gas system
 - A.17.2.6.1 General
 - A.17.2.6.2 Piping system
 - A.17.2.7 Crude oil washing system
 - A.17.2.8 Production vent/flare systems
 - A.17.2.9 Electrical systems
- A.17.3 Import and export systems
 - A.17.3.1 General
 - A.17.3.2 Riser functions
 - A.17.3.3 Export systems
 - A.17.3.3.1 General
 - A.17.3.3.2 Pipeline export
 - A.17.3.3.3 Tanker export
 - A.17.3.3.3.1 General
 - A.17.3.3.3.2 Tanker stationkeeping systems
 - A.17.3.3.3.3 Alongside transfer
 - A.17.3.3.3.4 Tandem transfer
 - A.17.3.3.3.5 Direct transfer
 - A.17.3.3.4 Tandem transfer
 - A.17.3.3.5 Direct transfer
 - A.17.3.4 Material handling
 - A.17.3.5 Lifting appliances
- A.17.4 Fire protection systems
 - A.17.4.1 General
 - A.17.4.2 Structural fire protection systems
 - A.17.4.3 Firewater systems
 - A.17.4.4 Fixed fire extinguishing systems
 - A.17.4.5 Alarms
- A.18 Stationkeeping systems
 - A.18.1 General
 - A.18.2 Mooring equipment
 - A.18.2.1 Winches
 - A.18.2.2 Fairleads and chain stoppers
 - A.18.2.3 Monitoring and control equipment
 - A.18.2.4 Disconnectable mooring
 - A.18.3 Turret
 - A.18.3.1 General
 - A.18.3.2 Turret structure
 - A.18.3.3 Bearing system
 - A.18.3.3.1 General
 - A.18.3.3.2 Forces on the bearing system
 - A.18.3.3.3 Alternative bearing designs
 - A.18.3.3.4 Inspection, maintenance and repair
 - A.18.3.4 Turning and locking systems
 - A.18.4 Disconnectable structures
- A.19 In-service inspection, monitoring and maintenance
 - A.19.1 General
 - A.19.2 Structural integrity management system philosophies
 - A.19.2.1 General
 - A.19.2.2 Database development and data acquisition
 - A.19.2.3 Evaluation
 - A.19.2.4 Planning
 - A.19.2.5 Implementation
 - A.19.3 Planning considerations
 - A.19.3.1 General

- A.19.3.2 Inspection categories**
 - A.19.3.2.1 General**
 - A.19.3.2.2 Scheduled inspections**
 - A.19.3.2.3 Unscheduled inspections**
- A.19.4 Implementation issues**
 - A.19.4.1 Personnel qualifications**
 - A.19.4.2 Equipment certification**
 - A.19.4.3 Inspection programmes**
 - A.19.4.3.1 General**
 - A.19.4.3.2 General visual inspection (GVI)**
 - A.19.4.3.3 Close-up visual inspection (CVI)**
 - A.19.4.3.4 Thickness measurements (TM)**
 - A.19.4.3.5 Weld inspection (WI)**
 - A.19.4.3.6 Flooded member detection (FMD)**
 - A.19.4.3.7 Cathodic protection (CP) system inspection**
 - A.19.4.4 Preparations for inspections**
 - A.19.4.4.1 Access**
 - A.19.4.4.2 Cleaning**
 - A.19.4.5 Inspection results and actions**
 - A.19.4.6 Maintenance programmes**
 - A.19.4.7 Monitoring programmes**
- A.19.5 Minimum requirements**
 - A.19.5.1 General**
 - A.19.5.2 Minimum inspection requirements for main structure**
 - A.19.5.2.1 General**
 - A.19.5.2.2 General visual inspection (GVI)**
 - A.19.5.2.3 Close-up visual inspection (CVI)**
 - A.19.5.2.4 Thickness measurements (TM)**
 - A.19.5.2.5 Weld inspections (WI)**
 - A.19.5.2.6 Cathodic protection (CP) system inspection**
 - A.19.5.3 Minimum inspection requirements for structural and non-structural attachments**
 - A.19.5.4 Inspection results and actions**
 - A.19.5.5 Tank testing and watertightness**
- A.20 Assessment of existing floating structures**
- A.21 Other hulls**

Page count: 199