



**RULES FOR BUILDING AND CLASSING**

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**MOBILE OFFSHORE DRILLING UNITS  
2012**

**PART 7  
SURVEYS**

**American Bureau of Shipping  
Incorporated by Act of Legislature of  
the State of New York 1862**

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## Rule Change Notice (2012)

The effective date of each technical change since 1993 is shown in parenthesis at the end of the subsection/paragraph titles within the text of each Part. Unless a particular date and month are shown, the years in parentheses refer to the following effective dates:

(2000) and after	1 January 2000 (and subsequent years)	(1996)	9 May 1996
(1999)	12 May 1999	(1995)	15 May 1995
(1998)	13 May 1998	(1994)	9 May 1994
(1997)	19 May 1997	(1993)	11 May 1993

### Listing by Effective Dates of Changes from the 2008 Rules

The reference date which is indicated in the parentheses following the title of the requirement in this Part is the date that the requirement becomes effective [e.g., 6-2-1/3 “Definitions” (2010) is to apply for vessels undergoing survey on or after 1 January 2010]

Notice 3 (effective on 1 January 2010), and Notice No. 4 (effective on 1 January 2011) which are incorporated in the 2012 Rules, are summarized below.

Note that the requirements for surveys were in Part 6 until the 2012 edition of the Rules, in which a new Part 6 for equipment and machinery certification has been added. The survey requirements in the former Part 6 are now in Part 7.

#### EFFECTIVE DATE 1 January 2010 – shown as (2010)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
<b>PART 6</b>	<b>Surveys</b>	
6-1-1 (New)	General	To better outline ABS' general requirements for surveys during construction/fabrication at Vendor's Facility and Builder's Yard, for initial Classification. (Incorporates Notice No. 3)
6-1-2/9.1	Applications	To document that rotating machines for services indicated in 4-3-4/Table 11 require ABS certification. (Incorporates Notice No. 3)
6-1-2/23.1	Applications	To document that switchboards, motor controllers, and motor control centers for services indicated in 4-3-4/Table 11 require ABS certification. (Incorporates Notice No. 3)
6-2-1/1 (New)	Application	To align the <i>MODU Rules</i> with the <i>Steel Vessel Rules</i> . (Incorporates Notice No. 3)
6-2-1/3	Definitions	To clarify the definitions. (Incorporates Notice No. 3)
6-2-1/13	Incomplete Surveys	To align the <i>MODU Rules</i> with the <i>Steel Vessel Rules</i> . (Incorporates Notice No. 3)
6-2-1/15	Lay-up and Reactivation	To align the <i>MODU Rules</i> with the <i>Steel Vessel Rules</i> . (Incorporates Notice No. 3)
6-2-2 (New)	Survey Intervals	To align the <i>MODU Rules</i> with the <i>Steel Vessel Rules</i> and to clarify the intervals applicable to MODUs classed for Unrestricted Service versus MODUs operating in Great Lakes Service. (Incorporates Notice No. 3)
6-2-3/1	Special Surveys	To clarify that the planning document is to require review by the attending Surveyor, and not ABS head offices. (Incorporates Notice No. 3)
6-2-4/1.1.9 (New)	<No Title>	To provide specific requirements regarding how to handle “Substantial Corrosion” during Annual Survey of Hull. (Incorporates Notice No. 3)
6-2-4/1.3	Corrosion Control Systems	To clarify the mandatory requirements for Annual Surveys. (Incorporates Notice No. 3)
6-2-4/1.5	Alterations and Position of Load Lines	To clarify the mandatory requirements for Annual Surveys. (Incorporates Notice No. 3)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
6-2-4/3	Annual Survey – Machinery and Electrical Systems	To clarify the mandatory requirements of Annual Survey of Machinery and Electrical Systems. (Incorporates Notice No. 3)
6-2-4/3.5 (New)	Preventative Maintenance Techniques	To incorporate requirements for preventative maintenance techniques. (Incorporates Notice No. 3)
6-2-4/3.7 (New)	Examination during Overhaul	To incorporate requirements for examination during overhaul. (Incorporates Notice No. 3)
6-2-4/3.9 (New)	Examination at Shorter Intervals	To incorporate requirements for examination at shorter intervals. (Incorporates Notice No. 3)
6-2-4/5 (New)	Thrusters and Dynamic Positioning Systems	To incorporate requirements for thrusters and dynamic positioning systems. (Incorporates Notice No. 3)
6-2-5/1.1.9	<No Title>	To provide specific requirements regarding how to handle “Substantial Corrosion” during Special Periodical Survey – Hull. (Incorporates Notice No. 3)
6-2-5/1.5.6	<No Title>	To clarify that cans/mats would require internal and external examination. (Incorporates Notice No. 3)
6-2-5/3.5	Column-Stabilized Units	To clarify that the close visual examination and NDT is required during SPS, not every DD/UWILD, and that NDT requirements for rigs over 15 years of age (>SPS #3) would be subjected to more extensive close visual examination and NDT. To clarify that Record Keeping is mandatory but Inspection Manual is not. (Incorporates Notice No. 3)
6-2-5/5	Special Periodical Survey – Machinery	To clarify the mandatory requirements of SPS of Machinery. (Incorporates Notice No. 3)
6-2-5/7 (New)	Special Periodical Survey – Electrical Equipment	To clarify the mandatory requirements of SPS of Electrical Systems. (Incorporates Notice No. 3)
6-2-5/9	Special Periodical Survey – Special Features (All Types)	To clarify the mandatory requirements of SPS of Special Features (mandatory for all rigs). (Incorporates Notice No. 3)
6-2-5/11	Thrusters and Dynamic Position Systems	To clarify the requirements for thrusters and dynamic position systems. (Incorporates Notice No. 3)
6-2-5/13	Units with Retractable Propulsion Thrusters	To clarify ABS acceptance of waiving internal examination of retractable thrusters. (Incorporates Notice No. 3)
6-2-6/1.3	Self-Elevating Units	To clarify items subjected to close visual examination and NDT during UWILD, and introduced a new Note, which states conditions for postponing the underwater survey until next rig move. (Incorporates Notice No. 3)
6-2-6/1.9.3	External Portions of Propulsion Units	To clarify that survey of external portions of propulsion units is applicable to all units. (Incorporates Notice No. 3)
6-2-A1/3.3.2v)	<No Title>	To include verification of weathertight doors. (Incorporates Notice No. 3)
6-2-A1/3.3.2x)	<No Title>	To remove requirements for radio installation and include verification of helideck. (Incorporates Notice No. 3)

**EFFECTIVE DATE 1 January 2011 – shown as (2011)**

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
<b>PART 6</b>	<b>Surveys</b>	
6-2-5/9.15	Self-Elevating Drilling Units – Leg Jacking Systems	To clarify the mandatory survey requirements of Jacking Systems. (Incorporates Notice No. 4)

**EFFECTIVE DATE 1 January 2012 – shown as (2012)**

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
<b>PART 7</b>	<b>Surveys</b>	
7-1-1/1	General	To emphasize that requirements of subsequent Sections are to be done to the satisfaction of the Surveyor.
7-1-1/5	Certification and Classification	To explain issuance of the initial class certificate to a drilling unit and its validity.
7-1-2/3	Survey of Hull Structure and Outfitting	To explain the main survey and testing items required for hull structure and outfitting.
7-1-2/5 (New)	Material	To reemphasize that traceability and selection of material is required to be verified by the Surveyor, and Part 3 is to be used to reference application of different structural categories on various types of drilling units.
7-1-2/11	Nondestructive Testing (NDT)	To include newly defined NDT requirements.
7-1-2/11 Second Paragraph (New)	Nondestructive Testing (NDT)	To clarify that the NDT plan is reviewed by the attending Surveyor, not an ABS Technical Office, must be accepted before NDT is commenced, and the Surveyor may witness NDT as deemed necessary.
7-1-2/11.5 (New)	NDT of Surface-Type Drilling Units	To cover drill ships and requirement to specifically NDT within 0.6L matched the area subjected to gauging when the vessel is surveyed after construction.
7-1-2/11.9 (New)	NDT Personnel and Records	To clarify the objective of the NDT department, minimum NDT qualification of NDT personnel, and maintenance of records.
7-1-2/Table 1 (New)	Nondestructive Testing (NDT) of Steel Structure Welds	To define extent and type of NDT required for each type of structural member.
7-1-2/13.1	Performance Standards for Protective Coatings (PSPC)	To explain the difference between optional Class service and new IMO requirements associated with ballast tanks on drilling units.
7-1-2/15	Survey of Load Line	To explain the process for obtaining the Load Line Certificate.
7-1-2/17.1 (New)	Damage Conditions for Self-Elevating Units	To define where the assumed damage is assumed on self-elevating units.
7-1-2/Figure 1 (New)	Damage Conditions for Self-Elevating Units	To define where the assumed damage is assumed on self-elevating units.
7-1-2/17.3 (New)	Damage Conditions for Column-Stabilized Drilling Units	To define where the assumed damage is assumed on column-stabilized units.
7-1-2/Figure 2 (New)	Damage Conditions for Column-Stabilized Units	To define where the assumed damage is assumed on column-stabilized units.
7-1-2/17.5 (New)	Surface-Type Drilling Units	To define where the assumed damage is assumed on surface-type units.
7-1-2/Figure 3 (New)	Damage Conditions for Surface-Type Units	To define where the assumed damage is assumed on surface-type units.
7-1-2/23.3	Testing of Watertight Boundaries, Tanks and Sliding Doors	To clarify how the testing of watertight sliding doors is to be carried out and accepted.
7-1-2/23.9	Air Testing	To clarify how the air test procedure should be carried out while safety is maintained during test preparation and that alternative tests are to be agreed by the Surveyor.
7-1-2/23.11	Hose Testing	To clarify where alternative test procedure may be allowed.
7-1-2/23.13	Flood Testing	To clarify where flood testing is to be done and its alternative.
7-1-2/27 (New)	Hull Inspection and Maintenance Program (HIMP) (Optional)	To highlight the existence of ABS Hull Inspection and Maintenance Program.
7-1-3/3 (New)	Survey of Machinery, Piping, Pressure Vessels, and other Outfitting Items	To require the builder to have a Quality Control Program that covers all phases of the construction, testing and trials.
7-1-3/5.1 (New)	Material Tests and Inspection	To clarify references to material tests and inspection requirements.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-1-3/5.5 (New)	Minimum Angle of Inclination for Machinery	To remind the Surveyor of the limitation on angle of inclination.
7-1-3/5.7 (New)	Ambient Temperature for Machinery	To remind the Surveyor of the limitation on ambient temperature.
7-1-3/7 (New)	Internal Combustion Engines	To highlight the main items to be verified after installation of an engine certified in accordance with Part 6 of these Rules.
7-1-3/9 (New)	Piping	To highlight the main items to be complied with for piping installed onboard.
7-1-3/11 (New)	Piping Installation Details	To provide a listing of items that are required to be verified during survey of piping systems.
7-1-3/13 (New)	Metallic and Plastic Pipes	To describe survey requirements for verifying compliance with 4-2-2/5 and 4-2-2/7.
7-1-3/15 (New)	Valves	To describe the Surveyor's verification of compliance with 4-2-2/9.
7-1-3/17 (New)	Pipe Fittings	To describe the Surveyor's verification of compliance with 4-2-2/11.
7-1-3/19 (New)	Flanges	To describe the Surveyor's verification of compliance with 4-2-2/15.
7-1-3/21 (New)	Fluid Power Cylinders	To describe the Surveyor's verification of compliance with 4-2-2/19.
7-1-3/23 First Paragraph (New)	Sea Inlets and Overboard Discharges	To clarify that all inlets and overboard discharges are to be tested.
7-1-3/25 First Paragraph (New)	Scuppers and Drains on Surface-Type and Self-Elevating Drilling Units	To clarify that testing to be done preferably before launching of the hull.
7-1-3/27 First Paragraph (New)	Cooler Installations External to the Hull	To clarify that coolers are to be tested.
7-1-3/29 First Paragraph (New)	Penetrations Through Watertight Boundaries	To clarify that watertight penetrations are to be tested.
7-1-4/3 (New)	Jacking and Associated Systems	To clarify that the certified jacking system is to be surveyed upon installation and before subjected to jacking trials.
7-1-4/5 (New)	Tank Vents and Overflows	To clarify that all tank vents and overflows are required to be surveyed and tested when testing the tanks they are fitted on.
7-1-4/5.1	Progressive Flooding Consideration	To emphasize the importance of verifying measures against progressive flooding during the survey of tanks/spaces after they are outfitted particularly with vents and overflows.
7-1-4/7 (New)	Sounding	To clarify that sounding pipes are required to be surveyed and tested when examining and testing the tanks they are fitted on.
7-1-4/9 (New)	Bilge System	To clarify that the bilge system is to be surveyed and tested.
7-1-4/11 (New)	Ballast System	To clarify that the ballast system is to be surveyed and tested.
7-1-4/13 (New)	Fuel Oil System	To clarify that the fuel oil system is to be surveyed and tested.
7-1-4/15 (New)	Low Flash Point Fuels	To clarify that if low flash point fuel is used, verification for compliance with 4-2-5/9 of these Rules is required.
7-1-4/17 (New)	Lubricating Oil System	To clarify that the lubricating oil system is to be surveyed and tested.
7-1-4/41.1.6 (New)	High Pressure Industrial Piping	To clarify that the high pressure piping is a class requirement and not CDS.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-1-4/41.1.7	All Piping Systems	To indicate that verification of the piping working under normal operational condition can be done during the sea trials while verifying normal operation of the machinery of the drilling unit.
7-1-5/5.13	Deck and Bulkhead Penetrations	To clarify that cable penetrations are to be examined and tested.
7-1-6/3	Main Source of Power	To clarify that all power sources are subjected to examination and testing after installation.
7-1-6/9 (New)	Circuit Protection System	To clarify that the Surveyor is to be satisfied with circuit protection system covered under Part 4 of these Rules.
7-1-6/11 (New)	Systems for Steering Gear Installed in Self-Propelled Units	To clarify that the steering gear is to be tested alongside (dockside) before commencement of the sea trial.
7-1-6/13 First Paragraph (New)	Lighting and Navigation Light Systems	To clarify that all lighting should be verified operational before commencement of the sea trial.
7-1-6/13.5 (New)	Obstruction Light System	To clarify that all obstruction lights installed on the derrick and top of cranes are to be verified.
7-1-6/15 First Paragraph (New)	Interior Communication Systems	To clarify that communication system is to be verified operational before commencement of the sea trial.
7-1-6/17 First Paragraph (New)	Manually Operated Alarms	To clarify that all alarm systems are in satisfactory operational order before commencement of the sea trial.
7-1-6/19 First Paragraph (New)	Fire Protection and Fire Detection Systems	To clarify that all fire protection work is to be completed before commencement of the sea trial, and all fire detection systems should be operational for the sea trial.
7-1-6/21 First Paragraph (New)	Electrical System Testing	To clarify that dockside testing of the entire electrical system should be complete before commencement of the sea trial.
7-1-6/21.13 (New)	Public Address (PA) & General Alarm (GA) Systems	To clarify that the system is operational before commencement of the sea trial.
7-1-6/21.15 (New)	Fire and Gas (F&G) Detection System	To clarify that the system is operational before commencement of the sea trial.
7-1-6/21.17 (New)	Electrical Equipment in Hazardous Areas	To clarify that the entire equipment in hazardous areas are to be surveyed.
7-1-6/21.19 (New)	Hazardous Area Doors, Ventilation and Alarms	To clarify that the survey of the hazardous areas includes verification of doors, ventilation and their associated alarms.
7-1-6/21.21 (New)	Mud Pit Level Alarm	To clarify that the pit level alarms are class (not CDS) and should be tested.
7-1-6/21.23 (New)	Shutdown of Ventilation Fans and Openings	To clarify that the shutdown of ventilation systems are to be tested.
7-1-6/21.25 (New)	Emergency Shutdown System	To clarify that the Emergency Shutdown System (ESD) is to be tested.
7-1-6/21.27 (New)	Helicopter Deck Lighting	To clarify that the helideck lighting system is to be verified and tested.
7-1-6/21.29 (New)	Navigation and Obstruction Lights	To clarify that the obstruction lights are to be verified and tested.
7-1-8/1.1 (New)	Administration Certification	To clarify that approval of passive fire protection may be done directly by the Flag Administration, who will issue the MODU Code Safety Certificate and that in such case, the ABS Surveyors are not required to survey fire protection per Subsection 5 of these Rules.
7-1-8/3 (New)	Survey of Fire and Safety Features	To clarify general requirements of surveying the fire and safety features of the unit.
7-1-8/5.1.1	Construction Materials	To clarify that steel must be certified per these Rules and material other than steel needs manufacturer's affidavit/certificate.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-1-8/5.1.2	Fire Integrity of Bulkheads and Decks	To clarify that all bulkheads and decks must be examined before insulation is installed.
7-1-8/5.1.3 (New)	Fire Resistance of Bulkheads and Decks	To supplement the design review requirements contained in 5-1-1/3.19 of these Rules.
7-1-8/5.1.4	Structural Fire Protection Details in way of Intersections, Joints and Penetrations	To supplement the design review requirements contained in 5-1-1/3.13 of these Rules.
7-1-8/5.1.5 (New)	Windows and Side-scuttles	To supplement the design review requirements contained in 5-1-1/3.15 of these Rules.
7-1-8/5.1.6	Fire Doors	To supplement the design review requirements contained in 5-1-1/3.17 of these Rules.
7-1-8/5.3 (New)	Protection of Accommodation Spaces, Service Spaces and Control Stations	To supplement the design review requirements contained in 5-1-1/5 of these Rules.
7-1-8/7.1 (New)	Fire Control Plan	To clarify how to treat onboard Fire Control Plans.
7-1-8/7.3 (New)	Fire Pumps	To supplement the design review requirements contained in 5-2-2/1.1 of these Rules.
7-1-8/7.5 (New)	Fire Main	To supplement the design review requirements contained in 5-2-2/1.3 of these Rules.
7-1-8/7.7 (New)	Hydrants, Hoses, Nozzles and International Shore Connection	To supplement the design review requirements contained in 5-2-2/1.5 of these Rules.
7-1-8/9.1 (New)	Gas Smothering System	To supplement the design review requirements contained in 5-2-3/3 of these Rules.
7-1-8/9.3 (New)	Foam System	To supplement the design review requirements contained in 5-2-3/5 of these Rules.
7-1-8/9.5 (New)	Fixed Pressure Water Spraying Systems	To supplement the design review requirements contained in 5-2-3/7 of these Rules.
7-1-8/9.7 (New)	Protection of Helicopter Decks	To supplement the design review requirements contained in 5-2-3/9 of these Rules.
7-1-8/9.9 (New)	Paint and Flammable Liquid Lockers	To supplement the design review requirements contained in 5-2-3/11 of these Rules.
7-1-8/11.1 (New)	Portable Fire Extinguishers and Sand	To supplement the design review requirements contained in 5-2-4/1 of these Rules.
7-1-8/11.3 (New)	Firefighter's Outfit	To supplement the design review requirements contained in 5-2-4/3 of these Rules.
7-1-8/13.1 (New)	Testing of Alarm Systems	To supplement the design review requirements contained in 5-2-5/1.1 of these Rules.
7-1-8/15.1 (New)	Hydrogen Sulfide (H <sub>2</sub> S) Detection and Alarm System	To supplement the design review requirements contained in 5-2-5/1.1 of these Rules.
7-1-8/17.1 (New)	Means of Escape	To supplement the design review requirements contained in 5-2-3/1 of these Rules and to clarify use of gratings in way of escape routes.
7-1-8/17.3 (New)	Means of Access and Egress	To supplement the design review requirements contained in 5-2-3/3 of these Rules.
7-1-8/17.5 (New)	Guards and Rails	To supplement the design review requirements contained in 5-2-3/5 of these Rules.
7-1-8/17.7 (New)	Emergency Control Stations	To supplement the design review requirements contained in 5-2-3/7 of these Rules.
7-1-8/17.9 (New)	Arrangements in Machinery Space	To supplement the design review requirements contained in 5-2-3/9 of these Rules.
7-1-8/17.11 (New)	Segregation of Fuel Oil Purifiers	To supplement the design review requirements contained in 5-2-3/11 of these Rules.
7-1-8/17.13 (New)	Fire Precautions for Machinery Spaces	To supplement the design review requirements contained in 5-2-3/15 of these Rules.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-1-8/19.1 (New)	Arrangements and Services	To supplement the design review requirements contained in 5-3-1/7 and 4-3-5/7 of these Rules.
7-1-9/1 (New)	General	To clarify the purpose of Surveyor witnessing a sea trial.
7-1-9/3 (New)	Stability Test	To clarify that a deadweight survey or an inclining experiment is required for every new drilling unit built to ABS class.
7-1-9/5 (New)	Safety	To clarify that a Surveyor must ascertain the safety of the vessel before he/she agrees to board the vessel to witness the sea trial.
7-1-9/7 (New)	Hull Structure Testing	To clarify that hull testing can be done at sea trial and its acceptance criteria.
7-1-9/9.1	Initial Jacking Test	To clarify requirements after the initial jacking trial.
7-1-9/9.3	Moveable Cantilever and Skid Beam Testing	To clarify conditions of the test.
7-1-9/11.11 (New)	Fire Extinguishing System	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.13 (New)	Main Source of Power	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.15 (New)	Emergency Source of Power	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.17 (New)	Distribution System	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.19 (New)	Circuit Protection System	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.21 (New)	Lighting and Navigation Light Systems	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.23 (New)	Public Address (PA) and General Alarm (GA) Systems	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.25 (New)	Fire Protection and Fire Detection Systems	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/11.27 (New)	Gas Detection System	To clarify satisfactory operation of systems to be verified during sea trial.
7-1-9/15.1 (New)	Anchoring/Mooring System Foundations	To include requirements for testing anchoring/mooring systems.
7-1-9/17 (New)	Dynamic Positioning System (DPS)	To clarify the dynamic positioning trials required during new construction.
Appendix 7-1-A1 (New)	Mooring Equipment and Systems	To identify minimum ABS requirements for mooring systems certified based on the requested Symbol.
Appendix 7-1-A2 (New)	Surveys of Computers for Stability Calculations	To provide requirements for surveys and testing to be carried out on onboard computers for stability calculations.
7-2-1/1.1	Chapter 2 Sections 1 through 10	To clarify application of Rules/Guides.
7-2-1/3.13	Survey	To add industry terms “Close Visual Inspection (CVI)” and “General Visual Inspection (GVI)”.
7-2-1/3.21.1 (New)	Splash Zone (for Self-Elevating and Column Stabilized Units)	To add definition of “Splash Zone”.
7-2-1/7.7 (New)	Application of Rules	To clarify application of the Rules when only repair is carried out to the drilling unit without modifying its design.
7-2-1/9.1 (New)	Application of Rules	To clarify what constitutes a major or minor alteration, and the application of respective Rules.
7-2-1/15.3	Units Operating in Fresh Water	To clarify that the requirements apply to drilling units not operating in open sea water as “unrestricted service” but accepted for “restricted service” in lakes or enclosed waters.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-2-1/17 (New)	Onboard Drawings and Manuals	To clarify what documents are required to be available onboard.
7-2-2/1.9.1 (New)	Self-Elevating Drilling Units – Drydocking Survey Interval Exceeding 36 Months	To clarify action to be taken on self-elevating drilling units where intervals between two drydocking period exceed the Rule required interval.
7-2-2/3	Units Operating in Fresh Water	To clarify that the requirements apply to drilling units not operating in open sea water as “unrestricted service” but accepted for “restricted service” in lakes or enclosed waters.
7-2-3/1.1 (New)	Plan for UWILD	To clarify who reviews the UWILD plan, etc.
7-2-3/1.3 (New)	Plan for Out-of-Water Drydocking and Special Periodical Survey	To clarify who reviews the Drydocking and Special Periodical Survey plans.
7-2-3/1.5.1	Critical Structural Areas	To clarify requirements of onboard drawing showing Critical Structural Areas to be referenced during the pre-planning meeting.
7-2-4/1.1.10(a) (New)	Performance Standards for Protective Coatings (PSPC)	To highlight requirements for Corrosion Control Systems and to mention PSPC.
7-2-4/1.1.14 (New)	HIMP Notation (optional)	To require HIMP to be confirmed during Annual Survey – Hull.
7-2-4/1.3	Surface-Type Units	To clarify that this is in addition to general requirement listed under 7-2-4/1.1.
7-2-4/1.5	Self-Elevating Units	To clarify that this is in addition to general requirement listed under 7-2-4/1.1.
7-2-4/1.7	Column-Stabilized Units	To clarify that this is in addition to general requirement listed under 7-2-4/1.1.
7-2-5/1.1.6	Hull Attachments for Anchoring and Mooring System	To correct items to be examined.
7-2-5/1.9 (New)	Onboard Computers for Stability Calculations	To be consistent with Annual Surveys.
7-2-5/3.3	Close-Up Survey and Nondestructive Testing on Self-Elevating Units	To clarify that 100% CVI plus extensive NDT is required and that fatigue analysis is not always required unless otherwise requested by ABS.
7-2-5/3.3iii)	<No Title>	To clarify why such area is to be examined and subjected to NDT.
7-2-5/3.3iv)	<No Title>	To remind that the leg-mat connection is a “Special” unless the modified design has resulted in moving fatigue sensitive area to another location.
7-2-5/3.3.1	Special Survey No. 3 and Subsequent Special Surveys	To make the requirements effective <u>at</u> the 3 <sup>rd</sup> Special Periodical Survey and not <u>after</u> the 3 <sup>rd</sup> Special Periodical Survey and to clarify that the fatigue analysis is not always required unless otherwise requested by ABS.
7-2-5/3.5	Close-Up Survey and Nondestructive Testing on Column-Stabilized Units	To clarify that 100% CVI plus extensive NDT is required.
7-2-5/3.5.1	Special Survey No. 3 and Subsequent Special Surveys	To make the requirements effective <u>at</u> the 3 <sup>rd</sup> Special Periodical Survey and not <u>after</u> the 3 <sup>rd</sup> Special Periodical Survey and to clarify that the fatigue analysis is not always required unless otherwise requested by ABS.
7-2-5/3.9 (New)	Thickness Measurement (Gauging)	To explain requirements of gauging, wastage, etc.
7-2-5/Table 1	Thickness Gauging Requirements for Surface-Type Units	To align the gauging requirement and the definitions of Special, Primary, and Secondary Application Structures.
7-2-5/Table 2	Thickness Gauging Requirements for Self-Elevating Units	To add definition of “Splash Zone”.
7-2-5/Table 3	Thickness Gauging Requirements for Column-Stabilized Units	To add definition of “Splash Zone”.
7-2-5/3.4 (New)	Bilge and Ballast System, and other Systems	To clarify that all bilge and ballast systems are to be operationally tested at each Special Periodical Survey – Machinery.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
7-2-5/5.3.5	Machinery Foundations	To clarify that the not every machinery foundation is a concern for ABS unless it is suspect.
7-2-5/7.3.6 (New)	Accumulator Batteries	To align the requirements with the <i>Steel Vessel Rules</i> .
7-2-6/1.3iii)	<No Title>	To clarify why such area is to be examined and subjected to NDT.
7-2-6/1.3iv)	<No Title>	To remind that the leg-mat connection is a "Special" unless the modified design has resulted in moving fatigue sensitive area to another location.
7-2-6/3.7 (New)	Crediting UWILD on a Self-Elevating Drilling Unit without Completing the Examination of Spudcans/Mat	To clarify how the incomplete UWILD on self-elevating drilling units may be treated by the Surveyor.
7-2-6/3.9 (New)	Incomplete UWILD over a Five-Year Period – Self-Elevating Drilling Units	To what will be required when UWILD of a self-elevating drilling unit located at one site (without any rig move) cannot be completed within a five-year period.
7-2-7/1	Ocean Transit Wet Tow	To clarify the requirements.
7-2-7/3 (New)	Ocean Transit Dry Tow	To introduce requirements for ocean transit dry tow.
Appendix 7-2-A2 (New)	Survey of Temporary Modular Units	To explain what surveys should be performed on temporary modular units.
Appendix 7-2-A3 (New)	Modification of a Self-Elevating Drilling Unit to Become Site-Specific Fixed Offshore Installation	To clarify the minimum amount of surveys to be performed on a unit that is converted into a site-specific fixed offshore unit.

## PART

# 7

## Surveys

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# PART 7

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## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 1 General

#### 1 General

This Chapter pertains to surveys and testing to be carried out during construction of a mobile offshore drilling unit at the builder's yard/facility. The requirements for design review are given in Parts 3, 4, and 5 of these Rules.

The requirements for specific surveys are included in subsequent Sections of this Chapter. Subsequent Sections are titled as follows:

- Section 2 Surveys at Builder's Yard – Hull Structure and Outfitting
- Section 3 Surveys at Builder's Yard – Machinery, Piping, Pressure Vessels, and Outfitting
- Section 4 Surveys at Builder's Yard – Mechanical and Piping Systems
- Section 5 Surveys at Builder's Yard – Electrical Cables and Equipment
- Section 6 Surveys at Builder's Yard – Electrical Systems
- Section 7 Surveys at Builder's Yard – Hazardous Areas
- Section 8 Surveys at Builder's Yard – Fire and Safety
- Section 9 Surveys at Builder's Yard – Sea Trial

Subsection '1' titled "General" of every Section provides a brief explanation regarding purpose of that Section.

All Rule contents covered by subsequent Sections of this Chapter and that require visual examination, verification, testing, etc. are to be carried out in presence of and to the satisfaction of the attending Surveyor.

#### 3 Survey at Builder's Yard

During construction of a drilling unit, the attending Surveyor is to have access to the builder's yard to witness construction and testing, as required by these Rules. The builder is to contact the attending Surveyor to make necessary arrangements. If the attending Surveyor finds reason to recommend repairs or additional surveys, notice will be immediately given to the builder's representative so that appropriate action may be taken.

A Quality Control Program (QCP) is to be developed by the builder and submitted to the Surveyor for review and agreement. Required hold points on the QCP that is to form the basis for all future surveys throughout the contract period at the builder's yard/facilities shall be agreed upon by the attending Surveyor. As a minimum, all of the items enumerated in the following applicable Sections are to be covered by the QCP. Surveyor shall assure that all tests and inspections specified in the QCP are satisfactorily carried out by a competent person, and surveys shall be considered to supplement and not replace inspections that should be carried out by the builder.

## **5 Certification and Classification**

Conditions for Classification are defined in Part 1 of these Rules.

Upon satisfactory completion of all required design review, Surveyor's visual examination, and confirmation/witness of applicable tests, dock-side trials, stability test, and the sea trials, an Interim Class Certificate (ICC) may be issued by the attending Surveyor, recommending the vessel be classed in accordance with the classification and certification agreement contained in the signed Request For Class (RFC) submitted to ABS and applied to the vessel's classification.

### **5.1 Validity of an Interim Class Certificate (ICC)**

Validity of the ICC will depend upon condition of the vessel at time of delivery, but it is not to exceed five (5) months.

An ICC issued without any outstanding item will be valid for five months and will recommend review and acceptance by the ABS Classification Committee. The classification package containing required documents/records, reports and certificates will be reviewed by ABS and processed for classification of the vessel.

An ICC issued with an outstanding item will be valid for less than five months and may be issued provided it is authorized by ABS, including conditions of classification.

### **5.3 Certification of Incomplete Drilling Units**

In general, where the construction or trials of the drilling unit is incomplete and the unit is delivered for towage to another site for completion of all required examination and testing, and trials, an ICC will not be issued.

Issuance of the ICC will depend upon condition of the vessel at time of delivery and to be authorized by ABS. If issuance of an ICC is authorized, its validity may not exceed the period for drilling unit's single direct voyage to the new site.

## **7 Onboard Drawings and Manuals**

All reviewed and endorsed documents referenced in 7-2-1/17 of these Rules, required to be verified by the Surveyor during surveys after construction, are to be placed onboard the drilling unit.

# PART 7

## CHAPTER 1 Surveys During Construction

### SECTION 2 Surveys at Builder's Yard – Hull Structure and Outfitting

#### 1 General

This Section pertains to surveys and testing to be carried out on hull structure and hull outfitting items during construction of a mobile offshore drilling unit at builder's yard/facility. The requirements for design review are given Parts 3, 4, and 5 of these Rules.

For typical surveys required to be carried out, see subsequent Subsections of Section 7-1-2. All surveys and testing is to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial. Testing of the onboard computer (7-1-2/21), and hull structure testing such as hydrostatic testing (7-1-2/23.5) and hull structural testing (7-1-2/23.7) of tanks may be carried out during the sea trial as referenced in Section 7-1-9 of these Rules.

#### 3 Survey of Hull Structure and Outfitting

All items of the hull structure and associated outfitting is to be surveyed during construction, outfitting and at sea trial.

Welding and fabrication of structural components are to be in accordance with Sections 2-4-1 and 2-4-3 of the *ABS Rules for Materials and Welding (Part 2)*, as applicable.

The Quality Control Program (QCP) for the construction of a drilling unit is to at least include the following items, as appropriate:

- i) Material Quality, Suitability, and Traceability
- ii) Welder Performance Qualification and associated Records
- iii) Welding Procedure Specifications and Welding Procedure Qualification Records
- iv) Preparation for welding including: forming, edge preparation, fit-up, alignment, cleanliness, and tack welds
- v) Inspection of production welding including: environmental conditions, welding sequence, pre-heat, post-heat, back gouging, fairing, soundness of welds, and necessary repair procedure
- vi) Nondestructive Testing (NDT)
- vii) Corrosion Control Systems
- viii) Compartment testing

Where structure is assembled in blocks or modules, the Surveyor is to inspect the fit-up, piping and electrical connections, and to witness the required tests on the completed assembly in guidance with the QCP, and in accordance with the approved plans and Rule/Guide requirements. The progress and suitability of structural fit-up and joining of constructed/fabricated blocks/modules are to be to the satisfaction of the attending Surveyor. All erection joints of hull structure are to be visually examined, proven tight, and the extent of Nondestructive Testing (NDT) carried out is to be to the satisfaction of the attending Surveyor. For further details of Surveyor attendance, see 7-1-2/5 through 7-1-2/27.

## 5 Material

### 5.1 Material Traceability

The builder is to maintain a system of material traceability to the satisfaction of the attending Surveyor. Data as to place of origin and results of tests for materials shall be retained and are to be readily available to the attending Surveyor upon request.

### 5.3 Material Selection

When selecting material grades for the classification of drilling units, minimum expected service temperature and structural element category is considered. Various parts of drilling units are grouped according to their material application categories, such as:

- i) *Special Application Structure*, which are normally used for most critical structural areas
- ii) *Primary Application Structure*, which are normally used for critical structural areas
- iii) *Secondary Application Structure*, which are normally used for least critical structural areas

The structural elements falling into these categories are described in 3-1-4/5.3 through 3-1-4/5.7.

### 5.5 Steel Forming

When forming changes base plate properties beyond acceptable limits, appropriate heat treatments are to be carried out to reestablish required properties. Unless approved otherwise, the acceptable limits of the reestablished properties should meet the minimums specified for the original material before forming. Formed members with the forming dimensional tolerances required by the design, are to be examined.

## 7 Qualification of Welders and Welding Specifications

Welders, welding specifications and associated welding procedures are to be qualified in presence of and to the satisfaction of the attending Surveyor. Welders and welding techniques are to be qualified in accordance with Section 2-4-3 of the *ABS Rules for Materials and Welding (Part 2)*.

For qualification of welders and welding procedures, only the applicable ABS Rules are to be used. Other alternative standards will be subject to special consideration and require prior review and approval by ABS.

## 9 Production Welding

Production welding and forming of steel is to be to the satisfaction of the Surveyor and in accordance with Section 2-4-1 of the *ABS Rules for Materials and Welding (Part 2)*

### 9.1 Thickness in Excess of 50 mm (2 in.)

Special precautions with regard to joint preparation, preheat, welding sequence, heat input and interpass temperature are to be taken for welding thick sections. Ultrasonic Testing (UT) to insure the absence of injurious laminations may be required for material used where through-thickness (Z direction) properties are important. Stress relieving, when specified, is to be carried out using an approved method.

### 9.3 Inspection of Welds

All welds are to be subject to visual inspection. Representative Nondestructive Testing (NDT) is to be carried out to the satisfaction of the Surveyor. Such testing is to be carried out after all forming and post weld heat treatment. Welds which are inaccessible or difficult to inspect in service may be subjected to increased levels of NDT.

## 9.5 Fillet Welds

Completed welds are to be to the satisfaction of the attending Surveyor. The gaps between the faying surfaces of members being joined should be kept to a minimum. Where the opening between members being joined exceeds 2.0 mm ( $1/16$  in.) and is not greater than 5 mm ( $3/16$  in.), the weld leg size is to be increased by the amount of the opening. Where the opening between members is greater than 5 mm ( $3/16$  in.), corrective procedures are to be specially approved by the Surveyor.

Where small fillets are used to attach heavy plates or sections, special precautions such as the use of preheat or low-hydrogen electrodes or low-hydrogen welding processes may be required. When heavy sections are attached to relatively light plating, the weld size may be required to be modified.

## 11 Nondestructive Testing (NDT)

Prior to commencement of any NDT, an NDT plan is to be submitted to the attending Surveyor for review and acceptance, and is to conform to 2-4-1/5.17 of the *ABS Rules for Materials and Welding (Part 2)* and 3-2-7/5 of these Rules. NDT is to be carried out in accordance with *ABS Guide for Nondestructive Inspection of Hull Welds*.

All NDT procedures are to be reviewed and accepted by the Surveyor before commencement of NDT. Radiographic Testing (RT), Ultrasonic Testing (UT), Magnetic Particle Inspection (MPI), Penetrant Testing (PT), Eddy Current (EC) or Alternating Current Field Measurement (ACFM) is to be carried out to the satisfaction of the Surveyor. With the exception of RT, the Surveyor may require to witness the NDT carried out by a qualified technician.

### 11.1 NDT of Column-Stabilized Drilling Units

Complete Joint Penetration (CJP) butt welds, tee welds and corner welds, in following areas of a column-stabilized drilling unit are to be specifically subjected to NDT during construction:

- i) Fabrication/erection joints of pontoons, columns, bracings, diagonals, and upper deck structure (forming a box girder)
- ii) Columns to pontoons or lower hulls
- iii) Column to braces
- iv) Columns to upper hull
- v) Braces to upper hull
- vi) Brace-to-brace intersections
- vii) Gussets and brackets in way of the above joints
- viii) Internal continuation or back-up structure of the above joints
- ix) Any temporary access closures or inserts in main structures

### 11.3 NDT of Self-Elevating Drilling Units

Complete Joint Penetration (CJP) butt welds, tee welds and corner welds, in following areas of a self-elevating drilling unit are to be specifically subjected to NDT during construction:

- i) Lattice-type leg structure; including chords, braces, racks and rack attachments
- ii) Lattice-type leg gussets
- iii) Cylindrical-type leg shell structure
- iv) Fabrication/erection joints of spud-cans or mat
- v) Leg to spud-can or mat connections
- vi) Jackcase (Jackhouse) to deck connections
- vii) Any temporary access closures or inserts in main structures

### 11.5 NDT of Surface-Type Drilling Units

Complete Joint Penetration (CJP) butt welds, tee welds and corner welds, within the midship 0.6L of a surface-type drilling unit are to be specifically subjected to NDT during construction:

- i) Intersections of butts and seams in the sheer strakes, bilge strakes, deck stringer plates and keel plates
- ii) Intersections of butts in and about moonpool corners on main deck and bottom platings
- iii) In the vicinity of breaks in the superstructure
- iv) Any temporary access closures or inserts in main structures

At the discretion of the Surveyor, NDT outside the midship 0.6L is to be carried out at random.

### 11.7 Type and Extent of NDT

The percentage of weld joint to be subjected to NDT and type of NDT carried out (e.g., Radiographic Testing (RT), Ultrasonic Testing (UT), Magnetic Particle Inspection (MPI), Penetrant Testing (PT), Eddy Current (EC) or Alternating Current Field Measurement (ACFM)) will depend on the design of the unit and the calculated fatigue life of the joint.

Minimum extent of NDT to be carried out is shown in Table 1 of this Section. Volumetric NDT techniques include RT and UT. Surface NDT techniques include MPI, PT, EC or ACFM.

Additional NDT may be requested by the Surveyor if the quality of fabrication or welds is not in accordance with these Rules and applicable Standards.

### 11.9 NDT Personnel and Records

Builder's NDI department is to be independent from other departments and not working for production.

All NDT records are to be reviewed by a Level 2 NDT technician and signed prior to review and endorsement by the attending Surveyor.

All NDI records are to be properly maintained at least until the delivery of the drilling unit, and be available to the Surveyor upon request anytime during construction.

### 11.11 NDT Acceptance Standards

Class A and Class B acceptance standards of the ABS *Guide for Nondestructive Inspection of Hull Welds* will be applicable as follows:

- i) Class A acceptance criteria are to be used for NDT of welds of hull structure categorized as "Special Application Structure" or "Primary Application Structure" in accordance with 3-1-1/5.
- ii) Class B acceptance criteria are to be used for NDT of welds of hull structure categorized as "Secondary Application Structure" in accordance with 3-1-1/5 and other locations where Class A acceptance criteria do not apply.
- iii) Modified procedures and acceptance criteria are to be specified to reflect the application when radiographic or ultrasonic inspection is specified for other type connections such as partial penetration and groove type Tee or corner welds.

**TABLE 1**  
**Nondestructive Testing\* (NDT) of Steel Structure Welds (2012)**

<i>Structural Member</i>	<i>Extent and Type of NDT</i>
Special Application Structure (Most Critical)	100% Volumetric NDT plus 100% Surface NDT all CJP welds, where welded plate thickness is $\geq 5/16$ inch (8.0 mm); and 10% MPI of all fillet welds, where plate thickness is $\geq 5/16$ inch (8.0 mm).
Primary Application Structure (Intermediate)	20% Volumetric NDT plus 100% Surface NDT of all CJP welds, where plate thickness is $\geq 5/16$ inch (8.0 mm); and 10% Surface NDT of all fillet welds, where plate thickness is $\geq 5/16$ inch (8.0 mm).
Secondary Application Structure (Least Critical)	Random Volumetric NDT of CJP welds and Surface NDT of fillet welds, only if considered suspect by the attending Surveyor during construction.

\* NDT procedures and acceptance criteria is to at least satisfy the ABS *Guide for Nondestructive Inspection of Hull Welds*.

## 13 Corrosion Protection

Unless otherwise approved, all steel work is to be suitably coated. Tanks or preload spaces intended for salt water ballast are to have a corrosion-resistant hard coating on all internal surfaces.

### 13.1 Performance Standards for Protective Coatings (PSPC)

Where requested by the Owner, a unit with protective coatings which are verified by a Surveyor to be in compliance with the ABS Guide for the Class Notation Coating Performance Standard (CPS), will be assigned and distinguished in the Record with the class notation CPS.

## 15 Survey of Load Line

Every drilling unit is to have marks which designate the maximum permissible draft when the unit is in the afloat condition. Such markings are to be placed at suitable visible locations on the structure, to the satisfaction of ABS. On column-stabilized units, where practical, these marks are to be visible to the person in charge of mooring, lowering or otherwise operating the unit.

The load lines are to be established under the terms of the International Convention on Load Lines. Where minimum freeboards cannot be computed by the normal methods laid down by the Convention, they are to be determined on the basis of compliance with the intact or damage stability requirements for afloat modes of operation. The requirement that the draft of the unit not exceed the assigned load line may be considered temporarily not applicable for bottom-supported units when raising, lowering or resting on the sea bed.

The requirements of the International Convention on Load Lines with respect to weathertightness and watertightness of decks, superstructures, deckhouses, doors, hatchway covers, other openings, ventilators, air pipes, scuppers, inlets and discharges, etc., are to be taken as a basis for all units in the afloat condition.

Upon satisfactory completion of the load line survey, an ABS LL-11D report is prepared by the Surveyor, which is to be maintained onboard the unit. Upon satisfactory completion of the deadweight or inclining experiment (as applicable) carried out in presence of the Surveyor, the builder's stability report is to be submitted to ABS for review and issuance of the load line assignment. The Surveyor is to verify load line marking onboard the unit in accordance with the assignment.

## 17 Survey of Spaces (Damage Stability Criteria)

In assessing the damage stability of drilling units, as required by 3-3-2/1.3.2, the following extent of damage is assumed. If damage of a lesser extent results in a more severe condition, such lesser extent is to be assumed.

During the survey of spaces, all piping, ventilating systems, trunks, etc., within the assumed damage area are to be considered damaged. Positive means of closure are to be provided to preclude progressive flooding of other intact spaces. Assumed damage conditions are as follows.

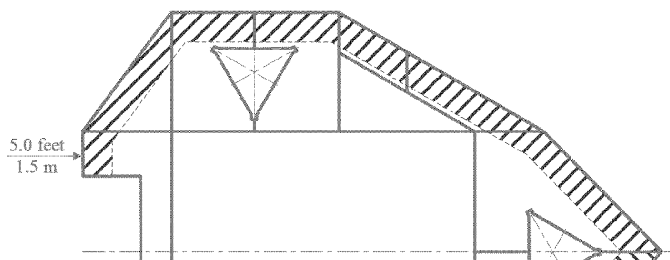
### 17.1 Damage Conditions for Self-Elevating Units

For self-elevating units, the following extent of damage is to be assumed to occur between effective watertight bulkheads:

- i) Horizontal depth of penetration 1.5 m (5 ft) from side shell
- ii) Vertical extent of damage from the bottom plating upwards without limit. Where the unit is mat supported, assumed damage penetration simultaneous to both the mat and upper hull need only be considered when the lightest draft allows any part of the mat to fall within 1.5 m (5 ft) vertically of the waterline, and the difference in horizontal dimension of the upper hull and mat is less than 1.5 m (5 ft) in the area under consideration.

The recessed ends and sides of the drilling slot need not be subject to consideration of horizontal penetration, provided precautions are taken to prevent boats from entering the drilling slot when the unit is afloat (see 7-1-2/Figure 1).

**FIGURE 1**  
**Damage Conditions for Self-Elevating Units**  
(for details see 7-1-2/17.1) (2012)



### 17.3 Damage Conditions for Column-Stabilized Drilling Units

For column-stabilized units, the following assumptions apply at the designated operating drafts:

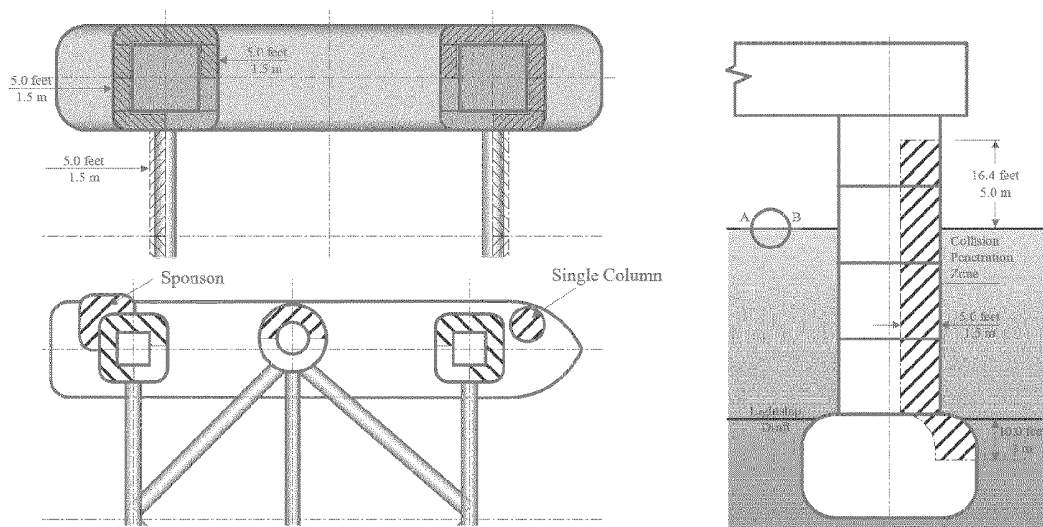
- i) Only those columns on the periphery of the unit are to be assumed damaged with the damage confined to the exposed outer portions of the columns.
- ii) Damage is assumed to occur for a vertical distance of 3 m (10 ft) at any level between 5.0 m (16.4 ft) above and 3.0 m (10 ft) below the draft under consideration. Where a Watertight flat is located within this zone, the damage is to be assumed to have occurred in both compartments above and below the Watertight flat in question.
- iii) No vertical bulkhead is to be assumed damaged, except where bulkheads are spaced closer than a distance one-eighth of the column perimeter at the draft under consideration, measured at the periphery, in which case, one or more of the bulkheads is to be considered as damaged.
- iv) Damage to the columns is to assume a horizontal depth of penetration of 1.5 m (5 ft).
- v) Lower hulls or footings are to be treated as damaged when operating at a light or transit condition in the same manner as indicated in i) through iv).

If damage of a lesser extent results in a more severe final equilibrium condition, such less extent is to be assumed (see 7-1-2/Figure 2).

On certain modified existing units, the columns are exposed to collision in the full periphery outside the lines that connect the center of the main columns. In 7-1-2/Figure 2, showing a modified column-stabilized drilling unit with additional sponsons and single columns, the columns on each side are not aligned. Therefore, the line that connects the center column to the two end columns is not a straight line.

Another notable aspect is the effect of sponsons and single columns that are often added to existing units to enhance their performance. Since the sponsons and single columns are not the main columns, they do not form the boundary of the protected area and they are fully exposed to a collision (see 7-1-2/Figure 2).

**FIGURE 2**  
**Damage Conditions for Column-Stabilized Units**  
(for details see 7-1-2/17.3) (2012)

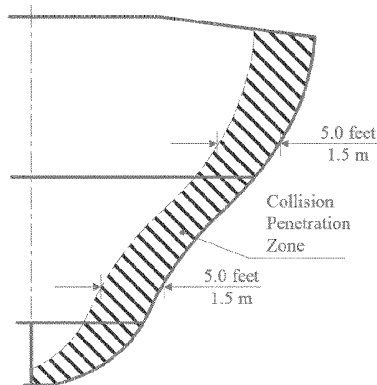


### 17.5 Surface-Type Drilling Units

For surface-type drilling units, the following extent of damage is to be assumed to occur between effective Watertight bulkheads (see 7-1-2/Figure 3):

- i) Horizontal depth of penetration of 1.5 m (5 ft)
- ii) Vertical extent of damage from the bottom shell upwards without limit

**FIGURE 3**  
**Damage Conditions for Surface-Type Units**  
(for details see 7-1-2/17.5) (2012)



## 19 Weathertight/Watertight Integrity

During confirmatory survey of weathertight and watertight integrity of drilling units, following requirements are to be applied and arrangements are to be to the satisfaction of the Surveyor.

### 19.1 Weathertight Integrity

Closing appliances are to be as prescribed by applicable load line requirements. Special consideration will be given to openings in the upper deck of column-stabilized units. In all cases, external openings whose lower edges are below the levels to which weathertight integrity is to be ensured, as shown by the diagrams to be submitted in accordance with 3-1-2/1, are to have weathertight closing appliances. The referenced diagrams may define different extents of weathertight integrity for each mode of operation afloat (see 3-1-1/17). Openings fitted with appliances to ensure weathertight integrity are to be tested. For further details of testing, see 7-1-2/23.

### 19.3 Watertight Integrity

All internal and external openings whose lower edges are below the levels to which watertight integrity is to be ensured, as shown by the diagrams submitted in accordance with 1-1-4/1 of the Supplement to the *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*, are to be fitted with appliances to ensure watertight integrity.

#### 19.3.1 Internal Openings Used for Access While Afloat

Internal openings fitted with appliances to ensure watertight integrity, which are used during operation of the unit while afloat, are to comply with 3-3-2/5.3.1:

All such openings together with their remote controls, warning indicators, signs and their means for closing is to be examined and tested.

#### 19.3.2 Internal Openings Secured Closed While Afloat

Internal openings fitted with appliances to ensure watertight integrity, which are normally to be secured closed while the unit is afloat, are to comply with 3-3-2/5.3.2:

All such openings together with their signs and their means for closing are to be examined.

#### 19.3.3 External Openings Used While Afloat

External openings which are used during operation of the unit while afloat are to comply with 3-3-2/5.3.3:

All such openings together with their warning indicators, signs and their means for closing is to be examined and tested to the satisfaction of the attending Surveyor.

#### 19.3.4 External Openings Secured Closed While Afloat

External openings fitted with appliances to ensure watertight integrity, which are normally to be secured closed while the unit is afloat, are to comply with the requirements of 7-1-2/19.3.2 "Internal Openings Secured Closed While Afloat".

All such openings together with their signs and their means for closing are to be examined to the satisfaction of the attending Surveyor.

### 19.5 Penetrations

All penetrations through watertight and weathertight boundaries are to comply with 3-3-2/5.5 and are to be tested in presence of and to the satisfaction of the Surveyor. For watertight closure requirements, see 4-2-2/29. For further details, see 7-1-2/5.

## 21 Onboard Computers for Stability Calculations

The use of onboard computers for stability calculations is not a requirement of class; it is the Owner's option. However, if stability software is installed onboard, it should cover all stability requirements applicable to the drilling unit and is to be approved by ABS for compliance with the requirements of Appendix 3-3-A2, "Onboard Computers for Stability Calculations" and satisfactory operation of the onboard computer is to be verified by the Surveyor and reported upon.

For functional requirements, operating manual, and installation testing of onboard computers, see Appendix 7-1-A2 "Survey of Computers for Stability Calculations"

## 23 Hull Testing During Construction

Surveyor's attendance is required, typically for the following purposes.

### 23.1 General

Compartments and spaces which are designed to be watertight, gas-tight or fire-tight are to be tested in presence of a Surveyor by a procedure approved by the attending Surveyor. Any access doors, hatches, manholes or closures of such compartments and spaces as well as any type of pipe or electrical penetration pieces through such boundaries is to be completed and tested in similar manner to the satisfaction of the attending Surveyor.

### 23.3 Testing of Watertight Boundaries, Tanks and Sliding Doors

After all hatches and watertight doors are installed, penetrations including pipe connections are fitted, and before cement work, ceiling or special coatings are applied, all watertight bulkheads and flats, as indicated on the watertight compartmentation plan 3-1-2/1 and all tanks are to be tested and proven tight. Shop primer may be applied prior to testing.

After installation and welding of its framing, all watertight sliding doors are to be visually examined to confirm proper fit and operation. Feeler gauges are to be used to verify manufacturer's installation tolerance for maintaining required watertight integrity. Watertight sliding doors will then be subjected to hose testing. Final examination is to include confirmation and operational testing of required warning signs and devices respectively.

### 23.5 Hydrostatic Testing

Unless air testing has been accepted as an alternative, tanks are to be tested with a head of water to the overflow or to the highest point to which the contents may rise under service conditions, whichever is higher. This may be carried out either before or after the drilling unit is launched. Special coating may be applied before hydrostatic testing, provided all welded connections are visually examined to the satisfaction of the Surveyor before application of the special coating.

### 23.7 Structural Testing

In order to demonstrate structural adequacy, tank testing of new or unusual design may be required in connection with the approval of the design. Required structural testing is to be carried out in accordance with the design approval letter issued by the hull structural engineering office. The testing method and the medium used for testing is to be as indicated in the ABS approval letter.

### 23.9 Air Testing

Prior to the application of special coating, air testing by an approved procedure may be accepted as a supplement or alternative to hydrostatic testing. All boundary welds, erection joints and penetrations, including pipe and cable connections, are to be examined in accordance with an approved procedure and under a pressure differential not less than 0.15 bar (0.15 kgf/cm<sup>2</sup>, 2.2 psi) with a leak indicating solution.

It is recommended that the air pressure in the tank be raised to and maintained at 0.20 bar (0.20 kgf/cm<sup>2</sup>, 2.9 psi) for approximately one hour, with a minimum number of personnel around the tank, before being lowered to the test pressure.

A U-tube with a height sufficient to hold a head of water corresponding to the required test pressure is to be arranged. The cross sectional area of the U-tube is to be not less than that of the pipe supplying air. In addition to the U-tube, a master gauge or other approved means is to be provided to verify the pressure.

Other effective methods of testing, such as compressed air fillet weld testing or vacuum testing, may be considered, provided full particulars of the testing procedure is reviewed and agreed by the Surveyor.

### 23.11 Hose Testing

Hose testing is to be carried out under simultaneous inspection of both sides of the joint being tested. The pressure in the hose is to be not less than 2 bar (2 kgf/cm<sup>2</sup>, 30 psi) during the test. The nozzle is to have minimum inside diameter of 12 mm (0.5 in.) and located at a distance to the joint not exceeding 1.5 m (5 ft).

Hose testing is usually applied to access or closures of boundaries. Where hose testing may result in damage to structural outfit, machinery or electrical equipment located close to testing area, chalk testing may be carried out in lieu of hose testing, provided it is carried out to the satisfaction of the attending Surveyor. Chalk testing is not an acceptable substitute for hose testing of watertight and weathertight doors, or other similar closures located along the outside perimeter of the hull.

### 23.13 Flood Testing

Flood testing is to be carried out in tanks that are not enclosed at top. Tank is to be filled to its overflow height, with same density of liquid to be used in the tank during normal drilling operations. Where flood testing is impractical, hose testing may be carried out as an alternative method of testing.

**TABLE 2**  
**Testing of Boundaries, Compartments, Tanks, and Spaces (2012)**

<i>Compartment/Space to be Tested</i>	<i>Type of Testing</i>	<i>Hydrostatic Head or Pressure</i>
CSDU – Bracings, Horizontals, and Diagonals (Void)	Air	
CSDU – Chain Lockers & Chain Pipes	Flood Test	To the top of the chain pipe.
CSDU – Watertight Column Spaces	Air	
Drill Ship – Chain Lockers & Chain Pipes	Flood Test	To the top of the chain pipe.
Drill Ship – Hawse Pipes	Hose	
SEDU – Mat Tanks (Buoyant)	Hydrostatic	To the height equal to deepest operational water depth of the SEDU.
SEDU – Pre-Lead Tanks	Air	
SEDU – Spud-Cans (Buoyant)	Hydrostatic	To the height equal to deepest operational water depth of the SEDU.
Ballast Tanks	Air	
Base Oil Tanks	Hydrostatic	To the height of the tank vent.
Drill Water Tanks	Air	
Fuel Oil Tanks	Hydrostatic	To the height of the tank vent.
Gas-tight Doors	Air or Hose	Tightness of doors may be confirmed whilst the ventilation system is running under normal operating conditions.
Independent Tanks	Hydrostatic	To the height of the tank vent.
Mud Pits	Flood Test	To the top of the overflow.
Oily Water Holding Tanks	Hydrostatic	To the height of the tank vent.
Potable/Fresh Water Tanks	Air	
Voids	Air	
Watertight Boundary Closures/Manholes	Hose	
Watertight Doors	Hose	
Watertight Sliding Doors	Hose	See 7-1-2/23.1.2.
Weathertight Boundary Closures/Manholes	Hose	
Weathertight Doors	Hose	

## 25 Construction Booklet (Construction Portfolio)

A Construction Booklet is to be prepared and be readily available onboard the drilling unit. The booklet is to be reviewed by the Surveyor for completeness, and endorsed to indicate verification.

The construction booklet is to at least contain the following information/documents:

- i) ABS reviewed and stamped drawings showing the location and extent of different grades and strengths of structural materials, together with a description of the material.
- ii) Welding Procedure Specifications primarily employed for welding of Special Application Structures and Primary Application Structures, as defined in 3-1-4/5.
- iii) ABS reviewed and stamped drawings showing Special Application Structures and Primary Application Structures, as defined in 3-1-4/5. This will enable proper identification and wastage allowances of these structures, as required by 7-2-5/3, during each Special Periodical Survey carried out throughout the life of the drilling unit
- iv) ABS reviewed and stamped drawings showing all applicable critical structural areas. This will enable proper record keeping of the results found during close-up survey and Nondestructive Testing (NDT) of these areas, as required by 7-2-5/3, during each Drydocking (or UWILD) and Special Periodical Survey carried out throughout the life of the drilling unit.

## 27 Hull Inspection and Maintenance Program (HIMP) (Optional)

In order to satisfy 7-2-5/3.7, ABS software program "Hull Inspection and Maintenance Program" (HIMP) may be used and incorporate all of the items mentioned in 7-1-2/25.

The "Hull Inspection" module of HIMP helps to track the condition of a vessel's structure throughout its service life. Designed for owners and operators, the program provides a vessel-specific hull maintenance manual that outlines the compartments/spaces to inspect, critical areas to examine and identifies intervals for inspection.

The "Maintenance" module of HIMP records schedules and manages the data pertaining to maintenance work performed on a drilling unit by the crew or outside contractors. The system also provides a complete, planned machinery and vessel compartment maintenance history.

### 27.1 HIMP Notation (Optional)

Drilling units enrolled in the Hull Inspection and Maintenance Program (HIMP), in accordance with the *ABS Guide for Hull Inspection and Maintenance Program*, will receive the **HIMP** notation.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 3 Surveys at Builder's Yard – Machinery, Piping, Pressure Vessels, and Outfitting

#### 1 General

This Section pertains to surveys and testing to be carried out on machinery, piping, pressure vessels, and mechanical outfitting items during construction, installation and testing of mobile offshore drilling units at builder's yard/facility.

The documentation requirements for design review are given Parts 3, 4, and 5 of these Rules.

Surveys and testing of mechanical and piping systems are referenced in Section 7-1-4 of these Rules.

ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing required in subsequent Subsections of this Section are to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

#### 3 Survey of Machinery, Piping, Pressure Vessels, and other Outfitting items

In general, all items of machinery are to be surveyed during onboard installation and at sea trial. Welding and fabrication of piping, pressure vessels, and structural or machinery outfitting items are to be in accordance with Sections 2-4-2 and 2-4-4 of the *ABS Rules for Materials and Welding (Part 2)*.

The quality control program for the construction of a drilling unit is to at least include the following items, as appropriate:

- i) Material Quality and Traceability
- ii) Welder Performance Qualification and associated Records
- iii) Welding Procedure Specifications and Welding Procedure Qualification Records
- iv) Preparation for welding including; forming, edge preparation, fit-up, alignment, cleanliness, and tack welds
- v) Survey of production welding including; environmental conditions, welding sequence, pre-heat, post-heat, back gouging, fairing, soundness of welds, and necessary repair procedure
- vi) Nondestructive Testing (NDT)

*Note:* NDT is to be carried out in accordance with *ABS Guide for Nondestructive Inspection of Hull Welds*. In Class I and Class II piping systems, carbon and carbon-molybdenum steel piping for all diameters where the thickness exceeds 9.5 mm (0.375 in.) and other alloy-steel piping 76 mm (3 in.) in diameter and over regardless of thickness, welds are to be subjected to 100% Radiographic Testing (RT). All NDT records are to be reviewed by a Level 2 NDT technician and signed prior to review and endorsement by the attending Surveyor.

## 5 Materials and Operational Conditions

### 5.1 Material Tests and Inspection

Materials are to be made in accordance with the requirements in Chapter 3 of the *ABS Rules for Materials and Welding (Part 2)* and 4-1-1/7.11, 4-2-1/9, 6-1-4/3 and 6-1-5/3 of these Rules, as applicable.

Copies in duplicate of the purchase orders for material requiring test and inspection at the mills or place of manufacture are to be forwarded to ABS for the information of the Surveyor.

### 5.3 Materials Containing Asbestos

Installation of materials, which contain asbestos, is prohibited.

### 5.5 Minimum Angle of Inclination for Machinery

All machinery, components and systems essential for propulsion or for safe operation of the unit are to be designed and fabricated to operate under the inclinations as indicated for each of the conditions listed in 4-1-1/Table 1.

Operational suitability of machinery per above requirements is to be verified by the installation Surveyor.

### 5.7 Ambient Temperature for Machinery

All machinery, components and systems essential for propulsion or for safe operation of the unit are to be designed and fabricated to operate under the ambient temperature as indicated in 4-1-1/Table 2.

Operational suitability of machinery per above requirements is to be reconfirmed by the Surveyor.

## 7 Internal Combustion Engines

Onboard installation of internal combustion engines are to be to the satisfaction of the attending Surveyor.

### 7.1 Foundation

Satisfactory alignment of the engine skid structure with hull back-up/foundation structure is to be confirmed before commencement of any dock-side testing of the engines.

### 7.3 Warning Notices

Suitable warning notices are to be attached in a conspicuous place on each engine and are to caution against the opening of a hot crankcase for a specified period of time after shutdown based upon the size of the engine, but not less than 10 minutes in any case. Such notice is also to warn against restarting an overheated engine until the cause of overheating has been remedied.

### 7.5 Governor Control

All engines are to be fitted with governors which will prevent the engines from exceeding the rated speed by more than 15%. Governor control is to be verified.

For generator sets, see 4-2-1/7.5.1, 4-2-3/7.5.1 and 4-2-4/7.5.1 of the *Steel Vessel Rules*.

### 7.7 Onboard Testing

Auxiliary and emergency engine/generator sets are to be tested prior to and during sea trial carried out in accordance with an agreed procedure and in compliance with these Rules.

## 9 Piping

All piping is to be installed and tested in accordance with the Rules or recognized standards.

Satisfactory installation and operation of the piping systems are to be verified, as far as practicable, during the sea trial.

Piping systems are divided into three classes (Class I, II and III) according to service, design pressure and temperature, as indicated in 4-2-1/Table 1 of these Rules. Each class has specific requirements for joint design, fabrication and testing.

All piping system is to be visually examined in accordance with ABS approved plans that consist of a diagrammatic drawing of each system, including piping size, wall thickness, maximum working pressure and material of piping as well as the type, size, pressure rating and material of valves and fittings.

Pipe weld details are to comply with Chapter 4 of the ABS *Rules for Materials and Welding (Part 2)*.

Requirements for valves, fittings and flanges are based upon standards of the American National Standards Institute (ANSI).

## 9.1 Piping Standards

A booklet of standard piping practices and details, including such items as bulkheads, deck and shell penetrations, welding details including dimensions, pipe joining details, etc. reviewed by ABS is to be used during survey of piping systems.

## 11 Piping Installation Details

Installation of piping onboard is to be in compliance with 4-2-1/11 of these Rules. Following piping details are to be verified after piping system is installed:

- i) Pipe bending
- ii) Protection of pipes, valves and operating rods
- iii) Pipes installed near switchboards or MCCs
- iv) Pipe expansion joints
- v) Pipe joints
- vi) Mechanical joints
- vii) Pipes penetrating bulkheads and decks. Penetrations are to be subjected to tests similar to the bulkhead or deck is tested to. Alternative testing of penetration welds with suitable NDT is to be to the satisfaction of the Surveyor.
- viii) Pipes penetrating collision bulkhead of surface-type drilling units. Penetrations are to be subjected to tests similar to the bulkhead is tested to.
- ix) Sluice valves and cocks on surface-type drilling units. Satisfactory operation of these valves or cocks together with their indicators is to be confirmed.
- x) Relief valves fitted on Class I and Class II systems are to be tested. Relief valves fitted on Class III systems may be tested if required by the Surveyor.
- xi) Common overboard discharge piping
- xii) Remote operation of valves
- xiii) Instrument wells, similar protection on fuel oil tanks, and valve arrangements allowing isolation and removal of instrument on pressure sensing devices
- xiv) Hose assemblies
- xv) Control of static electricity, testing of resistance between ground points along the length, across joints and from pipe to ground, and verification of bonding straps where used
- xvi) Leakage containment and drain piping

### 11.1 Pipe Bending

Pipe bending is to be in accordance with 2-3-12/25 of the ABS *Rules for Materials and Welding (Part 2)*. Alternatively, bending in accordance with a recognized standard (e.g. ASME B31.1 – Section 129.1 and 129.3) or other approved specification to a radius that will result in a surface free of cracks and substantially free of buckles may be acceptable.

### 11.3 Protection of Pipes

Pipes, valves and operating rods are to be effectively secured and adequately protected. These protective arrangements are to be fitted so that they may be removed to enable examination of the pipes, valves and operating rods protected.

### 11.5 Leading of Pipes near Switchboards, Motor Controllers and Control Centers, Transformers, and all other Electrical Equipment or Panels used for Essential Services

The leading of pipes in the vicinity of switchboards, motor controllers and control centers, transformers, and all other electrical equipment or panels is to be avoided as far as possible. When such leads are necessary, care is to be taken to fit no flanges or joints over or near these equipment or panels unless provision is made to prevent any leakage from injuring the equipment.

### 11.7 Provision for Expansion or Contraction Stresses

Ample provision is to be made to take care of expansion or contraction stresses in pipes due to temperature changes or working of the hull. Suitable provisions include, but are not limited to, piping bends, elbows, offsets, changes in direction of the pipe routing or expansion joints. See 4-2-1/11.5 of these Rules.

Where expansion joints are used, the following are to be verified:

- *Pipe support.* Adjoining pipes are to be suitably supported so that the expansion joints do not carry any significant pipe weight.
- *Alignment.* Expansion joints are not to be used to make up for piping misalignment errors. Misalignment of an expansion joint reduces the rated movements and can induce severe stresses into the joint material, thus causing reduced service life. Alignment is to be within tolerances specified by the expansion joint manufacturer.
- *Anchoring.* Expansion joints are to be installed as close as possible to an anchor point. Where an anchoring system is not used, control rods may be installed on the expansion joint to prevent excessive movements from occurring due to pressure thrust of the line.
- *Mechanical damage.* Where necessary, expansion joints are to be protected against mechanical damage.
- *Accessible location.* Expansion joints are to be installed in accessible locations to permit regular inspection and/or periodic servicing.
- *Mating flange.* Mating flanges are to be clean and usually of the flat faced type. When attaching beaded end flange expansion joints to raised face flanges, the use of a ring gasket is permitted. Rubber expansion joints with beaded end flange are not to be installed next to wafer type check or butterfly valves. Serious damage to the rubber flange bead can result due to lack of flange surface and/or bolt connection.

#### 11.7.1 Molded Expansion Joints

Where molded expansion joints are fitted, compliance with 4-2-1/11.7 is to be verified.

#### 11.7.2 Metallic Bellow Type Expansion Joints

Where metallic bellow type expansion joints are fitted, compliance with 4-2-1/11.9 is to be verified.

### 11.9 Pipe Joints

Where pipe joints are used, compliance with 4-2-1/11.11 is to be verified.

### **11.11 Mechanical Joints**

Where mechanical joints are used, compliance with 4-2-1/11.13 is to be verified.

### **11.13 Bulkhead, Deck or Tank-Top Penetrations**

Where pipes pass through bulkheads, decks or tank tops, the penetrations are to be made by approved methods which will maintain the watertight, firetight or smoketight integrity of the bulkhead, deck or tank top. Bolted connections are to have the bolts threaded through the plating and welded connections are to be welded on both sides or with full-strength welds from one side.

All pipe penetrations are to be verified and tested as necessary.

### **11.15 Collision-Bulkhead Penetrations**

Pipes piercing the collision bulkhead on ship type units are to be fitted with suitable valves operable from above the bulkhead deck and the valve chest is to be secured at the bulkhead generally inside the forepeak. Cast iron is not to be used for these valves. The use of nodular iron, also known as ductile iron or spheroidal-graphite iron will be accepted, provided the material has an elongation not less than 12%.

Tanks forward of the collision bulkhead on surface-type units are not to be arranged for the carriage of oil or other liquid substances that are flammable.

All pipe penetrations are to be verified and tested as necessary.

### **11.17 Sluice Valves and Cocks**

No valve or cock for sluicing purposes is to be fitted on a collision bulkhead on ship type units. Sluice valves or cocks may be fitted only on other watertight bulkheads when they are at all times accessible for examination.

Where sluice valves or cocks are fitted per approved drawings, compliance with 4-2-1/11.19 is to be verified.

### **11.19 Relief Valves**

All systems which may be exposed to pressures greater than that for which they are designed are to be safeguarded by suitable relief valves or the equivalent, and pressure containers such as evaporators, heaters, etc., which may be isolated from a protective device in the line are to have such devices either directly on the shell or between the shell and the cut-off valve.

In pumping systems such as boiler feed, oil piping and fire main, where ordinarily relief valves are required at the pump, such valves need not be fitted when the system is served only by centrifugal pumps so designed that the pressure delivered cannot exceed that for which the piping is designed.

All relief valves are to be confirmed to have been tested prior to installation and marked/tagged accordingly.

### **11.21 Common Overboard Discharge**

In general, various types of systems which discharge overboard are to be verified not to be interconnected without special approval; that is, closed pumping systems, deck scuppers, soil lines or sanitary drains are not to have a common overboard discharge.

### **11.23 Remote Operation**

Where valves of piping systems are arranged for remote control and are power operated, a secondary means for either local or remote-manual control is to be provided.

Remote operation function testing is to be carried out, preferably before sea trial.

### **11.25 Instruments**

Where instruments fitted to measure temperature or pressure of the piping system, compliance with 4-2-1/11.27 is to be verified.

Proper calibration of all instruments is to be verified.

### 11.27 Flexible Hoses

Hose assemblies may be installed between two points where flexibility is required, but are not to be subject to torsional deflection (twisting) under normal operating conditions.

Where flexible hoses are fitted, compliance with 4-2-1/11.29 is to be verified.

### 11.29 Control of Static Electricity

Piping systems that are routed through hazardous areas are to be suitably grounded either by welding or bolting the pipes or their supports directly to the hull of the unit or through the use of bonding straps.

#### 11.29.1 Ground Resistance

In general, the resistance tested between ground points along the length, across joints and from pipe to ground is not to exceed 1 megohm.

#### 11.29.2 Bonding Straps

Where bonding straps are used, they are to be clearly visible, protected from mechanical damage and of a type not affected by corrosive products and paint. Bonding straps are required for tanks and piping systems which are not permanently connected to the hull, including independent tanks, tanks and piping systems which are electrically separated from the hull, and pipe connections arranged for removal of spool pieces.

Components of alarms and level indicating devices located within tanks are to account for conductivity.

### 11.31 Leakage Containment

#### 11.31.1 Oil Leakage

For areas where leakage may be expected such as oil burners, purifiers, drains and valves under daily service tanks, etc., means of containing the leakage are to be provided together with adequate drainage, and compliance with 4-2-1/11.33 is to be verified.

#### 11.31.2 Boiler Flats

Where boilers are located in machinery spaces on tween decks and the boiler rooms are not separated from the machinery space by watertight bulkheads, the tween decks are to be verified to have containment coaming height of at least 200 mm (8 in.). The containment area may be drained to the bilges.

All leakage containment arrangements are to be examined and verified to satisfy above requirements of 7-1-3/11.31, as applicable.

## 13 Metallic and Plastic Pipes

The use of all metallic and plastic pipes in classed piping systems is to be verified to be in compliance with 4-2-2/5 of these Rules.

### 13.1 Steel Pipes

Pipe thicknesses referred to as Standard or Extra Heavy is the equivalent of American National Standards Institute Schedule 40 and Schedule 80 pipe up to a maximum wall thickness of 9.5 mm (0.375 in.) and 12.5 mm (0.5 in.), respectively.

Material specifications for acceptable steel pipes are referenced in Section 2-3-12 of the *ABS Rules for Materials and Welding (Part 2)*.

Application of steel pipes is to be in compliance with 4-2-2/5.1 of these Rules.

### 13.3 Copper and Brass Pipes

Application of copper and brass pipes are to be in compliance with 4-2-2/5.3 of these Rules.

## 13.5 Plastic Pipes

For the purpose of these Rules, “plastic” means both thermoplastic and thermosetting plastic materials, with or without reinforcement, such as polyvinyl chloride (PVC) and fiber reinforced plastics (FRP).

### 13.5.1 Limitations

Pipes and piping components made of thermoplastic or thermosetting plastic materials, with or without reinforcement, may be used in piping systems referred to in 4-2-2/Table 2, subject to compliance with requirements of 4-2-2/7.

### 13.5.2 Marking of Plastic Pipes and other Components

Plastic pipes and other components are to be verified to have permanent marking with identification in accordance with a recognized standard. Identification is to include pressure ratings, the design standard that the pipe or fitting is manufactured in accordance with, and the material with which the pipe or fitting is made and the date of fabrication.

### 13.5.3 Installation of Plastic Pipes

Installation of plastic pipes is to satisfy the following requirements:

- i) Selection and spacing of pipe supports in shipboard systems are to be determined as a function of allowable stresses and maximum deflection criteria. Support spacing is not to be greater than the pipe manufacturer's recommended spacing. Each support is to evenly distribute the load of the pipe and its contents over the full width of the support. Measures are to be taken to minimize wear of the pipes where they contact the supports. Heavy components in the piping system such as valves and expansion joints are to be independently supported. The supports are to allow for relative movement between the pipes and the unit's structure.
- ii) Pipes are to be protected from mechanical damage, where necessary.
- iii) Where pipes are joined, the strength of fittings and joints is not to be less than that of the piping they connect. Pipes may be joined using adhesive-bonded, welded, flanged or other joints. Tightening of flanged or mechanically coupled joints is to be performed in accordance with manufacturer's instructions. Adhesives, when used for joint assembly, are to be suitable for providing a permanent seal between the pipes and fittings throughout the temperature and pressure range of the intended application. Joining techniques are to be in accordance with manufacturer's installation guidelines. Personnel performing these tasks are to be qualified to the satisfaction of ABS, and each bonding procedure is to be qualified before shipboard piping installation commences. Requirements for joint bonding procedures are in 4-2-2/7.11.
- iv) Where electrically conductive pipe is required by 4-2-2/7.5.8, the resistance to earth (ground) from any point in the system is not to exceed 1 megohm. Where used, earthing wires or bonding straps are to be accessible for inspection placed in visible locations.
- v) Where plastic pipes are permitted in systems connected to the shell of the unit, the valves and the pipe connection to the shell are to be metallic. The side shell valves are to be arranged for remote control from outside of the space in which the valves are located. For further details of the shell valve installation, their connections and material refer to 4-2-2/21.
- vi) Integrity of watertight bulkheads and decks is to be maintained where plastic pipes pass through them. Where plastic pipes pass through “A” or “B” class divisions, arrangements are to be made to ensure that the fire endurance is not impaired. If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause inflow for liquid from tank, a metallic shut-off valve operable from above the bulkhead deck is to be fitted at the bulkhead or deck.
- vii) Fire protection coatings are to be applied on the joints, where necessary for meeting the required fire endurance criteria in 4-2-2/7.5.6. Coating is not to be applied until the piping system is satisfactorily pressure tested. The fire protection coatings are to be applied in accordance with the manufacturer's recommendations using a procedure approved in each particular case.

## 15 Valves

Valves in piping systems are to satisfy the following requirements:

### 15.1 Material of Valves

Materials of valves are to meet 4-2-2/17 of these Rules. Manufacturer's material certificates are to be available for verification, as deemed necessary by the Surveyor.

### 15.3 Standard of Valves

Valves that are in compliance with a recognized standard are acceptable to ABS, subject to compliance with 4-2-2/9.5. Valves that are not certified by the manufacturer in accordance with a recognized standard, may be accepted when valve design is reviewed by ABS and accepted.

### 15.5 Construction of Valves

Construction of valves is to be verified as satisfying the following requirements:

- i) All valves are to close with a right hand (clockwise) motion of the hand wheel when facing the end of the stem and are to be either of the rising stem type or fitted with an indicator to show whether the valve is open or closed.
- ii) All valves of Class I and Class II piping systems having nominal diameters exceeding 50 mm (2 in.) are to have bolted, pressure seal or breech lock bonnets and flanged or welding ends. Welding ends are to be butt welding type, except that socket welding ends may be used for valves having nominal diameters of 80 mm (3 in.) or less, up to and including 39.2 bar (40.0 kgf/cm<sup>2</sup>) pressure rating class (ANSI 600 Class), and for valves having nominal diameters of 65 mm (2.5 in.) or less, up to and including 98.1 bar (100 kgf/cm<sup>2</sup>) pressure rating class (ANSI 1500 Class).
- iii) All cast iron valves are to have bolted bonnets or are to be of the union bonnet type. For cast iron valves of union bonnet type, the bonnet ring is to be of steel, bronze or malleable iron.
- iv) Stems, discs or disc faces, seats, and other wearing parts of valves are to be of corrosion-resistant materials suitable for intended service.
- v) Valves are to be designed for the maximum pressure to which they will be subjected. The design pressure is to be at least 3.4 bar (3.5 kgf/cm<sup>2</sup>, 50 psi), except that valves used in open systems, such as vent and drain lines, and valves mounted on atmospheric tanks which are not part of the tank suction or discharge piping (for example, level gauge and drain cocks and valves in inert gas and vapor emission control systems) may be designed for a pressure below 3.4 bar (3.5 kgf/cm<sup>2</sup>, 50 psi), subject to the requirements of 4-2-2/9.1. Large fabricated ballast manifolds which connect lines exceeding 200 mm (8 in.) nominal pipe size may be specially considered when the maximum pressure to which they will be subjected does not exceed 1.7 bar (1.75 kgf/cm<sup>2</sup>, 25 psi).
- vi) All valves for Class I and Class II piping systems and valves intended for use in steam or oil lines are to be constructed so that the stem is positively restrained from being screwed out of the body (bonnet). Plug cocks, butterfly valves and valves employing resilient material will be subject to special consideration.
- vii) Valve operating systems for all valves which cannot be manually operated are to be submitted to ABS engineering for approval.

### 15.7 Rating and Identification of Valves

All valves are to be subjected by the manufacturer to a hydrostatic test at a pressure equal to that stipulated by the American National Standards Institute (ANSI) or other recognized standard. They are to bear the trademark of the manufacturer legibly stamped or cast on the exterior of the valve and also the primary pressure rating at which the manufacturer guarantees the valve to meet the requirements of the standards. This is to be verified during installation.

## **17 Pipe Fittings**

All fittings in Class I and Class II piping are to have flanged or welded ends in sizes over 89 mm O.D. (3 in. N.P.S.). Screwed fittings may be used in Class I and Class II piping systems, provided the temperature does not exceed 496°C (925°F) and the pressure does not exceed the maximum pressure indicated in 4-2-2/11.1

The type of fittings used on Class I, Class II and Class III piping systems are to satisfy 4-2-2/11. See 4-2-2/19 for fluid power cylinders.

### **17.1 Material of Fittings**

Materials of fittings are to meet 4-2-2/17 of these Rules. Manufacturer's material certificates are to be available for verification, as deemed necessary by the Surveyor.

### **17.3 Manufacturer's Testing, Marking, and Certification of Pipe Fittings**

All fittings are to be subjected by the manufacturer to a hydrostatic test at a pressure equal to that stipulated by the American National Standards Institute (ANSI) or other recognized standard. They are to bear the trademark of the manufacturer legibly stamped or cast on the exterior of the fitting and also the primary pressure rating at which the manufacturer guarantees the fitting to meet the requirements of the standards. This is to be verified during installation.

### **17.5 Installation of Pipe Fittings**

The installation of mechanical pipe joints, as covered by 4-2-2/11.1 and 4-2-2/11.5, is to be in accordance with the manufacturer's assembly instructions. Where special tools and gauges are required for installation of the joints, these are to be specified and supplied as necessary by the manufacturer. These special tools are to be kept onboard.

## **19 Flanges**

Flanges are to be in compliance with a recognized national or international standard. The type of flanges and method of attachment used on Class I, Class II and Class III piping systems are to be in compliance with 4-2-2/15.

### **19.1 Material of Flanges**

Materials of flanges are to meet 4-2-2/17 of these Rules. Manufacturer's material certificates are to be available for verification, as deemed necessary by the Surveyor.

## **21 Fluid Power Cylinders**

Fluid power cylinders subject to pressures or temperatures greater than those indicated in 4-2-2/19 are to be in compliance with a recognized standard for fluid power cylinders.

### **21.1 Material of Fluid Power Cylinders**

Materials of fluid power cylinders are to meet 4-2-2/19 of these Rules. Manufacturer's material certificates are to be available for verification, as deemed necessary by the Surveyor.

### **21.3 Manufacturer's Testing, Marking, and Certification of Fluid Power Cylinders**

Acceptance will be based on the manufacturer's certification of compliance and on verification of permanent identification on each cylinder bearing the manufacturer's name or trademark, standard of compliance and maximum allowable working pressure and temperature.

## 23 Sea Inlets and Overboard Discharges

All sea inlet and discharge valves are to be examined and tested, and all shell penetration welds are to be subjected to surface (inboard and outboard) NDT and the welds hose tested, before the drilling unit is launched.

### 23.1 Connections

Piping connections bolted to the shell plating are to have the bolt heads countersunk on the outside and the bolts threaded through the plating. Where a reinforcing ring of sufficient thickness is riveted or welded to the inside of the shell, studs may be used.

Threaded connections outboard of the shell valves are not considered an acceptable method of connecting pipe to the shell.

Pipe connections fitted between the shell and the valves are to have a minimum wall thickness not less than that specified in 4-2-2/21.3 and be as short as possible.

### 23.3 Valves and Fittings

Wafer-type valves are not to be used for any connections to the unit's shell unless specially approved.

All shell fittings and the valves required by 4-2-2/21.9 and 4-2-2/23 are to be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. The use of nodular iron, also known as ductile iron or spheroidal-graphite iron, will be accepted, provided the material has an elongation not less than 12%.

All pipes to which this subsection refers are to be of steel or other equivalent material, subject to special approval.

Overboard discharges are to have spigots extending through the shell plate. Boiler and evaporator blow-off overboard discharges are to have doubling plates or heavy inserts fitted. The spigot is to extend through the doubling and the shell and the external doubling plate, when fitted, but the spigot need not project beyond the outside surface of the unit.

Positive closing valves are to be fitted at the shell in inlet and discharging piping. The controls are to be readily accessible and are to be provided with indicators showing whether the valves are open or closed.

In order to be considered readily accessible, the controls, during normal operating conditions, are to be:

- i) Located in a space normally entered without using tools,
- ii) Clear of or protected from obstructions, moving equipment and hot surfaces that prevent operation or servicing, and
- iii) Within operator's reach.

Materials readily rendered ineffective by heat are not to be used for connection to the shell where the failure of the material in the event of a fire would give rise to danger of flooding.

### 23.5 Power Operated Valves

Arrangement and operation of all power operated valves are to be verified to be in compliance with below requirements.

Power-operated valves are to meet the requirements in 4-2-1/7.19. Position indicating systems for sea-water inlet and discharge valves are to be independent of the valves' control systems. Additionally, sea-water valves necessary for the operation of propulsion machinery or generation of power required in 4-3-2/3.1 are to be designed to remain in the last ordered position upon loss of control power.

Valves for sea-water inlets and discharges are also to be in accordance with the following, as applicable.

- i) *Column-Stabilized Units:* Sea-water inlets and discharges below the assigned load line are to be provided with valves which can be remotely operated from an accessible position outside of the space.

- ii) *Self-Elevating and Surface-Type Units*: Sea-water inlets and discharges in spaces below the assigned load line which are not intended to be normally manned are to be provided with valves which can be remotely operated from an accessible position outside of the space. If the valves are readily accessible, the spaces containing the inlets and discharges may be provided with bilge alarms in lieu of remote operation of the valves.
- iii) *Self-Elevating Units*: Mud pit discharges are to be provided with valves which can be operated from an accessible position. These valves are to be normally closed and a sign to this effect is to be posted near the operating position. Non-return valves need not be provided.

## 25 Scuppers and Drains on Surface-Type and Self-Elevating Drilling Units

All scuppers and drains are to be examined and tested, and all shell penetration welds are to be subjected to surface (inboard and outboard) NDT and the welds hose tested, preferably before the drilling unit is launched.

### 25.1 Connections

Discharges led through the shell either from spaces below the freeboard deck or from within superstructures and deckhouses on the freeboard deck, fitted with doors complying with the requirements of 3-2-11/5 of the *Steel Vessel Rules*, are to be fitted with efficient and accessible means for preventing water from passing inboard.

### 25.3 Valves and Fittings

Normally, each separate discharge is to have one automatic non-return valve with a positive means of closing it from a position above the freeboard deck, or bulkhead deck, whichever is higher. Alternatively, one non-return valve and one positive closing valve controlled from above the freeboard deck may be accepted.

Where the vertical distance from the load waterline to the inboard end of the discharge pipe exceeds  $0.01L$ , the discharge may have two automatic non-return valves without positive means of closing, provided that the inboard valves are always accessible for examination under service conditions. The inboard valve is to be above the deepest load waterline. If this is not practicable, then, provided a locally controlled stop valve is interposed between the two non-return valves, the inboard valve need not be fitted above the deepest load waterline.

Where that vertical distance from the summer load waterline to the inboard end of the discharge pipe exceeds  $0.02L$ , a single automatic non-return valve without positive means of closing may be accepted provided it is located above the deepest load waterline. If this is impracticable, a locally operated positive closing valve may be provided below the single non-return valve in which case the non-return valve need not be located above the specified deepest load waterline. The means for operating the positive-action valve is to be readily accessible and provided with an indicator showing whether the valve is open or closed.

Where sanitary discharges and scuppers lead overboard through the shell in way of machinery spaces, the fitting to shell of a locally operated positive closing valve, together with a non-return valve inboard, will be acceptable.

Scuppers and discharge pipes originating at any level and penetrating the shell either more than 450 mm (17.5 in.) below the freeboard deck or less than 600 mm (23.5 in.) above the summer load waterline is to be provided with a non-return valve at the shell. This valve, unless required by 4-2-2/23.1, may be omitted if the piping has a wall thickness at least equal to the thickness of the shell plating or extra-heavy pipe (see 4-2-1/3.9), whichever is less.

Scuppers leading from superstructures or deckhouse not fitted with doors complying with the requirements of Section 3-2-11/5 of the *Steel Vessel Rules* are to be led overboard.

## 27 Cooler Installations External to the Hull

Cooler installations are to be examined and tested as applicable, welds on integral cooler channels and welds on non-integral watertight enclosures are to be subjected to surface (inboard and outboard) NDT or hose tested as deemed necessary by the attending Surveyor, before the drilling unit is launched.

### 27.1 Connections

The inlet and discharge connections of external cooler installations are to be verified to be in accordance with 4-2-2/21.1, 4-2-2/21.3, 4-2-2/21.5 and 4-2-2/21.9, except that wafer type valves will be acceptable.

### 27.3 Valves and Fittings

The positive closing valves required by 4-2-2/27.1 need not be provided if the keel (skin) cooler installation is integral with the hull. To be considered integral with the hull, the installation is to be constructed such that channels are welded to the hull with the hull structure forming part of the channel. The channel material is to be at least of the same thickness and quality as that required for the hull, and the forward end of the cooler is to be faired to the hull with a slope of not greater than 4 to 1. If positive closing valves are not required at the shell, all flexible hoses or joints are to be positioned above the deepest load waterline or be provided with an isolation valve.

Where fitted, valves and fittings are to be verified.

### 27.5 Not-Fully Welded Shell Penetrations of Non-Integral Keel Coolers

Where non-integral keel coolers are used, if the shell penetrations are not fully welded, the penetration is to be encased in a watertight enclosure.

## 29 Penetrations Through Watertight Boundaries

All penetrations through watertight boundaries are to be tested to prove the integrity of the boundary. For further details of the required testing, see 7-1-2/25.

At the boundaries required to be maintained watertight for damage stability, valves or watertight closures may be required (see 3-3-2/5). Check valves and spring or gravity-actuated, non-return valves are not to be considered effective in preventing progressive flooding.

### 29.1 Ventilation Systems

Non-watertight ducts passing through subdivision bulkheads and watertight ducts servicing more than one watertight compartment or which are within the extent of damage are to be verified to be provided with valves at the subdivision boundary. Valve operators are to be fitted with position indicators. Control of valves is to be either from the ballast control room (or other normally manned spaces), or from a readily accessible location which is above the calculated immersion line in the damaged condition (see 3-3-2/1.3).

### 29.3 Internal Drain Systems

Where internal drain systems are led to a separate, watertight compartment fitted with bilge suction, positive closing valves are to be provided with position indicators. Control of valves is to be verified to be either from the ballast control room (or other normally manned spaces), or from a readily accessible location which is above the calculated immersion line in the damaged condition (see 3-3-2/1.3).

Where the installation of a remote valve operator is impractical, drain lines may be fitted with quick-acting, self-closing valves at the boundary of the space which is equipped with bilge suction.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 4 Surveys at Builder's Yard – Mechanical and Piping Systems

#### 1 General

This Section pertains to surveys and testing to be carried out on mechanical and piping systems during construction, installation and testing of mobile offshore drilling units at builder's yard/facility.

The documentation requirements for design review are given Parts 3, 4, and 5 of these Rules.

Installation surveys and testing of machinery, piping, pressure vessels, and outfitting items are referenced in Section 7-1-3 of these Rules.

ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing is to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

#### 3 Jacking and Associated Systems

All jacking and associated systems of self elevating drilling units, constructed and certified by the Surveyor at the manufacturer's plant, are to be installed in accordance with approved plans. For further details, see 6-1-9/25 of these Rules.

Installation of the jacking or other elevating system is to be verified. Jacking trial is to be carried out in accordance with an agreed procedure. For further details of the jacking trial, see 7-1-9/9 of these Rules.

##### 3.1 Materials

Material certificates, satisfying 6-1-9/9 of these Rules are to be made available to the attending Surveyor.

##### 3.3 Jacking Gear Motors and Motor Controllers

Jacking gear motors and motor controllers is to satisfy 6-1-9/15 of these Rules and verified as being satisfactorily installed.

##### 3.5 Hydraulic System

Hydraulic cylinder material is to satisfy 6-1-9/17 of these Rules. The hydraulic system is to satisfy 6-1-9/17 of these Rules and verified as being satisfactorily installed.

##### 3.7 Instrumentation and Other Components

Instrumentation and other components of the jacking system satisfying 6-1-9/13 and 6-1-9/19 of these Rules respectively, and verified as being satisfactorily installed.

Operation of the jacking system from its control stations are to be verified after installation. This verification is to include the operation of the system by emergency controls (emergency stop) from the jack house.

Satisfactory operation of effective communication system is to be verified.

## 5 Tank Vents and Overflows

Tank vents and overflows are to be examined and tested to confirm compliance with 4-2-3/1 of these Rules. The required examination and testing is to be carried out to verify system's compliance with below specific requirements, prior to the sea trial.

When air/hydrostatic testing of tanks, vents and overflow pipes are to be examined and subjected to air/hydrostatic testing.

### 5.1 Progressive Flooding Consideration

Tank vents and overflows are to terminate above the extent of water-tight integrity. Those terminating within the extent of weather-tight integrity are to be fitted with automatic means of closure such as a ball check valve or equivalent.

Location of tank vents and overflows are to prevent progressive flooding and to satisfy 4-2-3/1.3 of these Rules, and verified as being satisfactorily installed.

Progressive flooding through tank vents and overflows, regardless of the means of closure, is to be considered when tank vents and overflows from intact spaces terminate within a damaged compartment or vice versa (see 7-1-2/19).

### 5.3 Height of Vent Pipes

Height of tank vents and overflows are to satisfy 4-2-3/1.5 of these Rules.

### 5.5 Size of Vent Pipes

Size of tank vents and overflows are to satisfy 4-2-3/1.7 of these Rules.

### 5.7 Termination of Vent Pipes

Termination of vents pipes is to satisfy 4-2-3/1.9 of these Rules.

### 5.9 Overflow Pipes

Arrangement and installation of overflow pipes and applicable alarms of overflow tanks are to satisfy 4-2-3/1.11 of these Rules.

## 7 Sounding

Sounding arrangements are to be examined and tested to confirm compliance with 4-2-3/3 of these Rules. The required examination and testing is to be carried out to verify system's compliance with below specific requirements, prior to the sea trial.

When air/hydrostatic testing of tanks/voids, sounding pipes are to be examined and subjected to air/hydrostatic testing.

### 7.1 Sounding Pipes

Size, installation and termination arrangements of sounding pipes are to satisfy 4-2-3/3.3 of these Rules.

### 7.3 Gauge Glasses and Tank Level Indicators

Installation and closing arrangements of gauge glasses are to satisfy 4-2-3/3.5 of these Rules.

Where a level-indicating device or system is provided for determining the level in a tank containing flammable or combustible liquid, they are also to satisfy 4-2-3/3.7 of these Rules.

## 9 Bilge System

Bilge system is to be examined and tested to confirm compliance with 4-2-4/1, 4-2-4/3, 4-2-4/5, 4-2-4/7, and 4-2-4/9 of these Rules. The required examination and testing is to be carried out to verify system's compliance with below specific requirements, prior to the sea trial.

Bilge system, together with its fitted alarms, is to be examined and tested prior to the sea trial.

Satisfactory operation of the bilge system together with its alarms is to be re-confirmed during the sea trial (see Section 7-1-8).

### 9.1 Bilge System for Surface-Type Units

Minimum number of bilge pumps, arrangement of independent bilge suction, and arrangement of direct bilge suction on ship-type units are to satisfy 4-2-4/1 of these Rules.

### 9.3 Bilge System for Column-Stabilized Units and Self-Elevating Units

Bilge system arrangement of void compartments, chain lockers, and the bilge alarms fitted in propulsion and pump rooms are to satisfy 4-2-4/3 of these Rules.

### 9.5 Bilge Piping (All Units)

Installation and arrangement of the piping, manifolds, cocks and valves, common-main-type bilge system, strainers, gravity drains, and bilge suction from hazardous areas are to satisfy 4-2-4/5 of these Rules.

Bilge system piping is to be examined and tested.

### 9.7 Bilge Pumps (All Units)

Installation and arrangement of the bilge system pumps are to satisfy 4-2-4/7 of these Rules.

All bilge pumps, previously surveyed and certified by ABS at vendor's facility, are to be installed and tested prior to the sea trial.

Satisfactory operation of the bilge pumps together with bilge system alarms are to be re-confirmed during the sea trial.

### 9.9 Size of Bilge Suctions

#### 9.9.1 Surface-Type Units

Sizes of main and branch lines are to be verified in accordance with ABS reviewed P&ID drawings and to comply with 4-2-4/9.1 of these Rules.

#### 9.9.2 Column-Stabilized Units and Self-Elevating Units

Sizes of main and branch lines are to be verified in accordance with ABS reviewed P&ID drawings and to comply with 4-2-4/9.3 of these Rules.

## 11 Ballast System

Examination and testing of the ballast manifolds is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

Ballast control features are to be examined and tested to confirm compliance with below specific requirements, prior to the sea trial. Satisfactory operation of the ballast control features is to be re-confirmed during the sea trial.

### 11.1 Ballast Piping (All Units)

Installation and arrangement of the piping, manifolds, cocks and valves, and the controls for ballast tank valves are to satisfy 4-2-4/11 of these Rules.

The arrangement of the ballast pumping system is to be such as to prevent the possibility of water or oil passing into the machinery spaces, or from one compartment to another, whether from the sea, water ballast or oil tanks. The ballast mains are to have separate control valves at the pumps.

### 11.3 Ballasting Systems for Column-Stabilized Units

Installation and arrangement of the piping, manifolds, pumps, and ballast control features are to satisfy 4-2-4/13 of these Rules.

The ballast system is to be designed and arranged such that the system can take suction from and de-ballast any ballast tank under normal operating and transit conditions.

The system is to be capable of restoring the unit to a normal operating or transit draft and a level trim condition, when subject separately to each of the following:

- i) The assumed damaged conditions as specified in 3-3-1/1.3.2(a) with any one pump inoperable.
- ii) The flooding specified in 3-3-1/1.3.2(b).

In addition, the system is to be capable of raising the unit, starting from a level trim condition at deepest normal operating draft, either a distance of 4.6 m (15 ft) or to the severe storm draft, whichever distance is greater, within three hours (calculations are to be submitted for review).

This capability test is to be carried out during the ballast trial.

## 13 Fuel Oil System

Arrangement of the system, piping, valves and fittings, oil-heating arrangements, and arrangement of fuel-oil purifiers are to satisfy 4-2-5/1 of these Rules.

Examination and testing of the fuel oil system together with its tanks, valves, fittings, heaters, and purifiers (if fitted) is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

Satisfactory operation of the system is to be re-confirmed during the sea trial.

### 13.1 Fuel-oil Transfer and Filling

Examination and testing of the fuel oil transfer and filling system together with its tanks, valves (including their remote operation), fittings, and heaters, is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

Satisfactory operation of the system is to be re-confirmed during the sea trial.

The fuel-oil pumping arrangements are to be distinct from the other pumping systems as far as practicable, and the means provided for preventing dangerous interconnection in service are to be thoroughly effective.

Leakage detection (when heating coils are fitted), piping in oil tanks, control valves or cocks, and valves on oil tanks, are to satisfy 4-2-5/3 of these Rules.

### 13.3 Fuel-oil Service System for Boilers

Where boilers are located in machinery spaces, they are to be fitted with guard plates and drip pans in way of furnaces. Boilers installed for the purpose of providing power for auxiliaries are to have at least two means of feeding and two fuel-oil service pumps. The construction of all boilers is to comply with the requirements of Section 4-4-1 and Appendix 4-4-1A1 of the *Steel Vessel Rules*.

Examination and testing of the fuel oil service system for boilers, is to be carried out to confirm compliance with above specific requirements, prior to the sea trial.

Satisfactory operation of the service system is to be re-confirmed during the sea trial.

### 13.5 Fuel-oil Service System for Internal Combustion Engines

Examination and testing of the fuel oil service system for internal combustion engines, is to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

Satisfactory operation of the service system is to be re-confirmed during the sea trial.

Minimum number and arrangement of fuel-oil pumps, oil tanks and drains for the fuel-oil system, fuel-oil pressure piping, fuel-oil injection system, and piping between booster pump and injections pumps are to satisfy 4-2-5/7 of these Rules.

### 13.7 Shutdown Arrangements for Fuel Oil System Valves

Every fuel oil suction pipe from a storage, settling or daily service tank which emanates at such a level that it will be subjected to a static head of oil from the tank is to be fitted with a positive shutoff valve capable of being closed manually from a readily accessible location outside of the space in which the valve is located and tested (see 5-3-1/9).

## 15 Low Flash Point Fuels

Where used, examination of the low flash point fuels and associated arrangements is to be carried out to confirm compliance with 4-2-5/9 of these Rules.

## 17 Lubricating-Oil Systems

Examination and testing of the lube-oil system is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

The lubricating-oil piping is to be entirely separated from other piping systems. In addition, the requirements of 4-2-5/1.1.2, 4-2-5/1.3, and 4-2-5/1.5 of these Rules are applicable.

The requirements in 4-2-5/3.9 are also applicable for lubricating-oil tanks. However, arrangements for remotely closing the valve from a position outside of the compartment need not be provided if inadvertent valve closure could result in damage to the running machinery due to lack of lubricating-oil. Where the machinery is arranged for automatic shutdown upon loss of lubricating-oil, the valve required by 4-2-5/3.9i) is to be provided with means to close it from a readily accessible and safe location outside of the compartment in which the valve is located.

For ship-type units, the lubricating systems are to be so arranged that they will function satisfactorily under the conditions specified in 4-1-1/7 of these Rules.

### 17.1 Sight Flow Glasses

Sight flow glasses may be used in lubricating systems provided they are fire-resistant.

### 17.3 Turbines and Reduction Gears

For turbines and their reduction gears, see 4-6-6/9.7.1 and 4-6-6/9.3.1 of the *Steel Vessel Rules*.

### 17.5 Internal Combustion Engines and Reduction Gears

Lubricating-oil systems for internal-combustion engines and their reduction gears are to satisfy 4-2-6/1.7 of these Rules.

### 17.7 Electrical Machinery

For electrical machinery, see 4-3-3/3.3, 4-3-3/3.5.1 and 4-3-4/3.13 of these Rules.

## 19 Hydraulic Systems

Examination and testing of the hydraulic systems is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

The arrangements for Class I and II hydraulic piping systems are to be in accordance with the requirements of this section, except that hydraulic systems which form part of an independent device or equipment not covered by these Rules and which does not form part of the unit's piping system (such as a crane) are not covered by this Section, unless it is relevant to an optional notation or certification requested for the unit. The requirements for fuel oil tanks contained in 4-2-5/1.1.2 and 4-2-5/1.3 of these Rules are also applicable for tanks containing hydraulic fluid.

Arrangement and installation of valves, piping, pipe fittings, hoses, accumulators, fluid power cylinders, and the segregation of the high pressure hydraulic units, are to satisfy 4-2-6/3.

## 21 Fixed Oxygen-Acetylene Installations

Where fitted, examination and testing of the fixed oxygen-acetylene installations is to be carried out to confirm compliance with below specific requirements.

### 21.1 Application

Provisions of 4-2-6/5.3 of these Rules apply to fixed oxygen-acetylene installations that have two or more cylinders of oxygen and acetylene, respectively. Spare cylinders of gases need not be counted for this purpose. Provisions of 4-2-6/5.5 and 7-1-4/41.9, of these Rules, as applicable, are to be complied with for fixed installations regardless of the number of cylinders.

### 21.3 Gas Storage

Storage of gas cylinders, ventilation of storage rooms, and electrical installation in the storage rooms are to satisfy 4-2-6/5.3 of these Rules.

### 21.5 Piping System Components

Pipe and fittings, pressure relief devices, and system arrangement are to satisfy 4-2-6/5.5 of these Rules.

#### 21.5.1 Gas Cylinders

Gas cylinders are to be designed, constructed and certified in accordance with the provisions of 4-4-1/1.11.4 of the *Steel Vessel Rules*. Each cylinder is to be fitted with a suitable pressure relief device such as a fusible plug or a rupture disc.

The area within 3 m (10 ft) of the pressure relief device discharge outlet is to be regarded as a hazardous area.

## 23 Fuel Storage for Helicopter Facilities

Examination of the fuel storage facilities for helicopters is to be carried out to confirm compliance with below specific requirements.

### 23.1 General

Isolation of fixed fuel storage and transfer facilities, construction of fuel storage tanks, fuel storage tank vents and valves, are to satisfy 4-2-6/7.1. See 7-1-6/9.11 of these Rules for hazardous areas due to fuel storage for helicopter facilities, and arrangements in enclosed spaces.

### 23.3 Spill Containment

Arrangements for spill containment and drainage are to satisfy 4-2-6/7.3 of these Rules.

## 25 Starting-air Systems

Examination and testing of the starting air system is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

### 25.1 Design and Construction

The design and construction of all air containers and piping systems are to be in accordance with the applicable requirements of Section 4-4-1 and Appendix 4-4-1A1 of the *Steel Vessel Rules* and 4-2-6/9.1 of these Rules.

### 25.3 Starting-air Capacity

Units having internal combustion engines arranged for air starting are to be provided with at least two starting-air containers of approximately equal size. The total capacity of the starting-air containers is to be sufficient to provide, without recharging the containers, at least the number of consecutive starts stated below. If other compressed air systems, such as control air, are supplied from starting-air containers, the aggregate capacity of the containers is to be sufficient for continued operation of these systems after the air necessary for the required number of starts has been used.

Minimum number of consecutive starts as applicable, and as required per following conditions defined in 7-1-4/25.3.1 through 7-1-4/25.3.3, is to be verified prior to the sea trial.

#### 25.3.1 Diesel Propulsion

The minimum number of consecutive starts (total) required to be provided from the starting-air containers is to be based upon the arrangement of the engines and shafting systems as indicated in the following 7-1-4/Table 1.

**TABLE 1**  
**Starting Air Minimum Number of Consecutive Starts (2012)**

	<i>Single Screw Unit</i>		<i>Multiple Screw Unit</i>	
	<i>One engine coupled to shaft directly or through reduction gear</i>	<i>Two or more engines coupled to shaft through clutch and reduction gear</i>	<i>One engine coupled to each shaft directly or through reduction gear</i>	<i>Two or more engines coupled to each shaft through clutch and reduction gear</i>
Reversible Engines	12	16	16	16
Non-reversible Engines	6	8	8	8

For arrangements of engines and shafting systems which differ from those indicated in the table, the capacity of the starting-air containers will be specially considered based on an equivalent number of starts.

#### 25.3.2 Diesel-electric Propulsion

The minimum number of consecutive starts required to be provided from the starting-air containers is to be determined from the following equation.

$$S = 6 + G(G - 1)$$

where

$S$  = total number of consecutive starts

$G$  = number of engines necessary to maintain sufficient electrical load to permit vessel transit at full seagoing power and maneuvering. The value of  $G$  need not exceed 3.

#### 25.3.3 Non Self-Propelled Units

The minimum number of consecutive starts required to be provided from the starting-air containers is three (3) per auxiliary engine, but the total capacity of the starting-air containers dedicated to the auxiliary engines need not exceed eight (8) consecutive starts.

#### 25.3.4 Protective Devices for Starting-air Mains

Installation of protective devices is to satisfy 4-2-6/9.5.

## 27 Cooling-Water Systems for Internal Combustion Engines

Examination and testing of the cooling-water system is to be carried out to confirm compliance with below specific requirements, prior to the sea trial.

### 27.1 General

Means are to be provided to ascertain the temperature of the circulating water at the return from each engine and to indicate that the proper circulation is being maintained. Drain cocks are to be provided at the lowest point of all jackets. For relief valves, see 4-2-1/11.21.

### 27.3 Sea Suctions, Strainers and Circulating Water Pumps

Sea suction, strainers and circulating water pumps for the cooling-water system are to satisfy 4-2-6/11.

## 29 Exhaust System

Examination of the exhaust system is to be carried out to confirm compliance with 4-2-6/13, prior to the sea trial.

## 31 Valves in Atomizing Lines

Where air or steam is used to atomize well bore fluids prior to flaring, a non-return valve is to be fitted in the line. This valve is to be part of the permanently installed piping, readily accessible and as close as possible to the burner boom. Examination of these valves is to be carried out.

## 33 Helicopter Deck Drainage Arrangements

Helicopter decks are to be arranged and provided with means to prevent collection of liquids and to prevent liquids from spreading to or falling on other parts of the unit.

Examination of the helicopter deck drainage is to be carried out.

## 35 Boilers and Associated Piping

Boilers and their associated steam, exhaust and feed systems are to be in accordance with the applicable requirements of Part 4, Chapters 4 and 6 of the *Steel Vessel Rules*.

Examination and testing of the boilers and associated piping system are to be carried out to confirm compliance with above specific requirements, prior to the sea trial.

## 37 Steering Gear Piping

Piping systems associated with steering gear systems are to be in accordance with Section 4-3-4 of the *Steel Vessel Rules*.

Examination and testing of the steering gear piping is to be carried out to confirm compliance with above specific requirements, prior to the sea trial.

## 39 Gas Turbine Piping

Piping systems associated with gas turbines are to be in accordance with 4-2-3/9 of the *Steel Vessel Rules*.

Examination and testing of the gas turbine piping is to be carried out to confirm compliance with above specific requirements, prior to the sea trial.

## 41 Piping System Pressure Test

All piping systems are to be examined and tested after installation.

### 41.1 Metallic Piping System Pressure Tests

In addition to the testing and inspection of materials, as required in Chapter 3 of the ABS Rules for *Materials and Welding (Part 2)*, the following tests on the fabricated piping are to be carried out after satisfactory pipe bending and the attachment of flanges.

Small bore pipes and tubes of less than 15 mm outside diameter may be exempted from the required hydrostatic tests.

#### 41.1.1 Fuel-oil Service System

Pressure lines are to be tested before installation to 1.5 times the design pressure of the system, but not less than 3.4 bar (3.5 kgf/cm<sup>2</sup>, 50 psi).

Record of satisfactory hydrostatic testing is to be available to the Surveyor.

#### 41.1.2 Fuel-Oil Suction and Transfer System

Transfer systems and fuel-oil suction lines are to be tested before installation to 3.4 bar (3.5 kgf/cm<sup>2</sup>, 50 psi).

Record of satisfactory hydrostatic testing is to be available to the Surveyor.

#### 41.1.3 Starting-Air System

Piping in starting-air systems is to be tested, preferably before installation, to 1.5 times the design pressure of the system.

Record of satisfactory hydrostatic testing is to be available to the Surveyor. If the piping could not be tested before installation, Surveyor's witness of testing after installation is required.

#### 41.1.4 Hydraulic Power System

After fabrication, the hydraulic power piping system or each piping component is to be tested to 1.5 times the design pressure.

Record of satisfactory hydrostatic testing is to be available to the Surveyor.

#### 41.1.5 Specific Systems

The following piping systems are to be hydrostatically tested to 1.5P, but not less than 4 bar (4.1 kgf/cm<sup>2</sup>, 58 psi), after installation:

- i) Gas and liquid fuel systems
- ii) Heating coils in tanks

#### 41.1.6 High Pressure Industrial Piping

High pressure industrial piping serving systems other than the marine systems (such as high pressure supply lines for drilling systems), are to be hydrostatically tested to 1.5 times the system's maximum allowable working pressure.

Due to very high working pressure of such systems, it is preferred that an initial low pressure air leak test is carried out. Upon satisfactory completion of the leak test, the hydrostatic testing of the piping is to be carried out preferably using calibrated pressure gauges with pressure chart recording capability, and piping maintained under the hydrostatic pressure for minimum of 15 minutes.

Necessary safety precaution is to be taken by the builder during the high-pressure hydrostatic testing of these piping systems.

#### 41.1.7 All Piping Systems

After installation, all piping is to be tested under working conditions. Where it is not possible to carry out the required hydrostatic tests for all segments of pipes and integral fittings before installation, the remaining segments, including the closing seams, may be so tested after installation. Or, where it is intended to carry out all of the required hydrostatic tests after installation, such tests may be conducted in conjunction with those required by this Paragraph. In both these respects, testing procedures are to be submitted to the Surveyor for acceptance.

Testing of the piping systems under working condition may be carried out during the sea trial, provided the piping installation was visually examined and found satisfactory prior to commencement of the sea trial.

### 41.3 Pneumatic Test in Lieu of Hydrostatic Test

In general, a pneumatic test in lieu of a hydrostatic test is not permitted. Where it is impracticable to carry out the required hydrostatic test, a pneumatic test may be considered. In such cases, the procedure for carrying out the pneumatic test, having regard to safety of personnel, is to be submitted to the Surveyor for review.

#### 41.5 Hydrostatic Tests of Shell Valves

All valves intended for installation on the side shell at or below the load waterline, including those at the sea chests, are to be hydrostatically tested before installation to a pressure of at least 5 bar (5.1 kgf/cm<sup>2</sup>, 72.5 psi).

Manufacturer's record of satisfactory hydrostatic testing is to be available to the Surveyor.

#### 41.7 Plastic Piping System Pressure Tests

Plastic piping systems are to be subjected to a hydrostatic test on board after installation at a pressure of not less than 1.5 times the design pressure.

For plastic piping required to be electrically conductive, earthing is to be checked and random resistance testing is to be conducted.

#### 41.9 Fixed Oxygen-Acetylene Installation Test

Piping on the oxygen high-pressure side is to be tested before installation to at least 207 bar (211 kgf/cm<sup>2</sup>, 300 psi) and the piping on the acetylene high-pressure side is to be tested to 1.5 times its design pressure. Manufacturer's record of satisfactory hydrostatic testing is to be available to the Surveyor.

The entire system is to be leak-tested with nitrogen or a suitable inert gas after installation. Care is to be taken to cleanse the piping with suitable medium to remove oil, grease and dirt and to blow-through with oil-free nitrogen or other suitable medium before putting the system in service. After installation, the system is to be operationally tested under working conditions.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 5 Surveys at Builder's Yard – Electrical Cables and Equipment

#### 1 General

This Section pertains to surveys carried out on electrical cables and equipment during construction, installation and testing of mobile offshore drilling units at builder's yard/facility, including required onboard testing and trial. The documentation requirements for design review are given Parts 3, 4, and 5 of these Rules.

ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing is to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

#### 1.1 Definitions

For definition of various terms, see 4-3-1/3.5.

#### 3 Survey of Electrical Cables and Equipment

All electrical cables and equipment is to be installed and tested in accordance with the Rules or recognized standards.

ABS reviewed booklet of the standard wiring practices and details, including such items as cable supports, earthing details, bulkhead and deck penetrations, cable joints and sealing, cable splicing, watertight and explosion-proof connections to equipment, earthing and bonding connections, etc., as applicable, is to be available to the attending Surveyor. Where cable penetration methods for A- or B-class decks or bulkheads are shown, an evidence of approval by an Administration signatory to 1974 SOLAS as amended is also to be available.

The quality control program for the construction of a drilling unit is to at least include the following items, as appropriate:

- i) Material Quality and Traceability
- ii) Inspection of cable trays, electrical cables, cable supports, and cable fastenings.
- iii) Inspection of electrical cable penetrations through weather-tight, water-tight, fire-tight or gas-tight boundaries. Inspection of Multi-Cable Transits (MCTs).
- iv) Megger Tests.

Where cable splices need to be used, they are to be of an approved type.

Exposed metal parts of electrical machines or equipment which are not intended to be live, but which are liable under fault conditions to become live, are to be earthed (see 4-3-3/7).

Electrical equipment and wiring essential for operational purposes may be installed in hazardous areas (see 7-1-7/9). For certified safe-type equipment, see 7-1-7/9.3.

## 5 Cable Installation

### 5.1 General Considerations

Electric cables are to be installed in continuous lengths between terminations at equipment or in cable junction boxes (see 4-3-3/5.33). However, approved splices will be permitted at interfaces of new construction modules, when necessary to extend existing circuits for a drilling unit undergoing repair or alteration, and in certain cases to provide for cables of exceptional length (see 4-3-3/5.29).

The cross-sectional areas of conductors are to be confirmed to be in accordance with approved drawings.

Cables and wiring are to be installed and supported in such a manner as to avoid chafing or other damage. Cables are to be located with a view to avoiding, as far as practicable, spaces where excessive heat and gases may be encountered; also, spaces where they may be exposed to damage, such as exposed sides of deckhouses. Cables are not to be installed in the bilge area unless protected from bilge water.

Where cables are installed in a cable draw box and horizontal pipes or the equivalent is used for cable protection, means of drainage are to be verified.

Cables serving systems above 1 kV are not to be bunched with cables serving systems of 1 kV and below.

Where paint or any other coating is systematically and intentionally applied on the electric cables, it is to be established that the mechanical and fire performance properties of the cable are not adversely affected.

In this regard:

- i) Fire retardant property is to be confirmed to be in compliance with 4-3-4/7.1.2.
- ii) It is to be confirmed that the paint and the solvent used will not cause damages to the cable sheath (e.g., cracking).

Overspray on cables or painted exterior cables are not subject to the requirements of this section.

### 5.3 Insulation Resistance for New Installation

Each power and each light circuit is to have an insulation resistance between conductors and between each conductor and earth of not less than the following values.

Up to 5 amperes load	2 megohms
10 amperes load	1 megohm
25 amperes load	400,000 ohms
50 amperes load	250,000 ohms
100 amperes load	100,000 ohms
200 amperes load	50,000 ohms
Over 200 amperes load	25,000 ohms

If the above values are not obtained, any or all appliances connected to the circuit may be disconnected for this test.

### 5.5 Protection for Electric-Magnetic Induction

Protection of cables is to be verified. The following cables are to be protected as required by 4-3-3/5.5 of these Rules:

- i) Multiple conductor cables
- ii) Single conductor cables
- iii) Non-shielded signal cables

## 5.7 Joints and Sealing

Cables not having a moisture-resistant insulation are to be sealed against the admission of moisture by methods such as taping in combination with insulating compound or sealing devices. Following are to be verified during installation survey:

- i) Stresses on the cable are not to be transmitted to the conductors.
- ii) Terminations and joints in all conductors are to be so made as to retain the original electrical, flame retarding and, where necessary, fire resisting properties of the cable.
- iii) Terminal boxes are to be secured in place and the moisture-resistant jacket is to extend through the cable clamp.
- iv) Enclosures for outlets, switches and similar fittings are to be flame-resistant and moisture-resistant and of adequate mechanical strength and rigidity to protect the contents and to prevent distortion under all likely conditions of service (see 4-3-3/5.17.1 and 4-3-3/5.29).

## 5.9 Support and Bending

### 5.9.1 Support and Fixing

Where cables are fixed by means of clips, saddles or straps, they are to have a surface area so large and shaped such that the cables remain tight without their coverings being damaged. Metal clips may be screwed directly to deck or bulkhead, except on watertight bulkheads.

The support and fixation measures are to be verified to be in compliance with the following.

*5.9.1(a)* The distances between supports are to be suitably chosen according to the type of cable and the probability of vibration, and are not to exceed 400 mm (16 in.). For a horizontal cable run where the cables are laid on cable supports in the form of tray plates, separate support brackets or hanger ladders, the spacing between the fixing points may be up to 900 mm (36 in.), provided that there are supports with maximum spacing as specified above. This exemption does not apply to cable runs along weather decks when the cable run is arranged so that the cables can be subjected to forces by water washing over the deck.

*Note:* When designing a cable support system for single-core cables, consideration is also to be given to the effects of electrodynamic forces developing on the occurrence of a short-circuit.

The above-given distances between cable supports are not necessarily adequate for these cables. Further, other recognized standards for cable support and fixing will be considered.

*5.9.1(b)* The supports and the corresponding accessories are to be robust and are to be of corrosion-resistant material or suitably treated before erection to resist corrosion.

*5.9.1(c)* Cable clips or straps made from an approved material other than metal (such as polyamide, PVC) may be used.

*5.9.1(d)* When cables are fixed by means of clips or straps referred to in 7-1-5/5.9.1(c) above and these cables are not laid on top of horizontal cable trays or cable supports, suitable metal cable clips or saddles are to be added at regular distances not exceeding 2 m (6.5 ft) in order to prevent the release of cables during a fire. This also applies to the fixing of nonmetallic conduits or pipes.

*Note:* Item 7-1-5/5.9.1(d) does not necessarily apply in the case of cable runs with only one or a few cables with small diameters for the connection of a lighting fitting, alarm transducer, etc.

*5.9.1(e)* Non-metallic clips, saddles or straps, are to be flame retardant in accordance with IEC Publication 60092-101.

### 5.9.2 Bending Radius

For bending radius requirements, see 7-1-5/Table 1 of these Rules.

**TABLE 1**  
**Minimum Bending Radii of Cables (2012)**

<i>Cable construction</i>		<i>Over all diameter, D</i>	<i>Minimum internal bending radius</i>
<i>Insulation</i>	<i>Outer covering</i>		
Thermoplastic or thermosetting with circular copper conductor	Unarmored or unbraided	$D \leq 25 \text{ mm (1 in.)}$	$4D$
		$D > 25 \text{ mm}$	$6D$
	Metal braid screened or armored	Any	$6D$
	Metal wire or metal-tape armored or metal-sheathed	Any	$6D$
	Composite polyester/metal laminate tape screened units or collective tape screening	Any	$8D$
Thermoplastic or thermosetting with shaped copper conductor	Any	Any	$8D$
Mineral	Hard metal-sheathed	Any	$6D$

#### 5.9.3 Plastic Cable Trays and Protective Casings

Where flame retardant plastic cable trays or protective casings are used, following details are to be verified in compliance with 4-3-3/5.9.3:

- i) Installation details
- ii) Safe working load of the trays and covers
- iii) Cables passing through hazardous areas
- iv) Type testing record of trays and casings

Cable trays and protective casings made of plastic materials are to be supplemented by metallic fixing and straps such that, in the event of a fire, they and the cables affixed are prevented from falling and causing an injury to personnel and/or an obstruction to any escape route. See 7-1-5/5.9.1(d).

*Cable occupation ratio in protective casing.* The sum of the total cross-sectional area of all cables on the basis of their external diameter is not to exceed 40% of the internal cross-sectional area of the protective casing. This does not apply to a single cable in a protective casing

#### 5.11 Cable Run in Bunches

Where cables, which may be expected to operate simultaneously, are laid close together in a cable bunch in such a way that there is an absence of free air circulation around them, a reduction factor is applied to the current rating obtained from 4-3-4/Table 10. See 4-3-3/5.11 for details, which is required to be verified.

#### 5.13 Deck and Bulkhead Penetrations

Where cables pass through watertight, fire tight or gas tight bulkheads or decks, the penetrations are to be made through the use of approved stuffing tubes, transit devices or pourable materials which will maintain the integrity of the division. Additionally, each such stuffing tube, transit device or pourable material is to be of a character so as not to damage the cable physically or through chemical action or through heat build-up.

When cables pass through (except collision bulkhead) decks and bulkheads, penetrations are to be verified in compliance with 4-3-3/5.13 of these Rules. In general, where penetrations are designed to maintain water/fire/gas tight integrity, they are to be tested by similar method how the structure is tested.

Where cables pass through deck beams or similar structural parts, all burrs are to be removed in way of the holes and care is to be taken to eliminate sharp edges.

## **5.15 Mechanical Protection**

### **5.15.1 Metallic Armor**

Protection of electric cables installed in locations liable to damage during normal operation of the drilling unit are to be verified during cable installation survey. Cables can either be provided with braided metallic armor or other means to protect them from mechanical injury as appropriate.

### **5.15.2 Conduit Pipe or Structural Shapes**

Protection of electric cables installed in locations in way of hatch openings, tank tops, open decks subject to seas, and where passing through decks, are to be verified and confirmed to be protected by substantial metal shields, structural shapes, pipe or other equivalent means. When expansion bends are fitted, they are to be accessible for maintenance. The protection and its installation are to be in compliance with 4-3-3/5.15 of these Rules.

## **5.17 Emergency and Essential Feeders**

### **5.17.1 Services Required to be Operable under Fire Condition**

At least the following services are required to be operable under a fire condition:

- i)* Fire and general alarm system
- ii)* Fire extinguishing system including fire extinguishing medium release alarms
- iii)* Emergency fire pump
- iv)* Fire detection system
- v)* Control and power systems for all power operated fire doors and their status indicating systems
- vi)* Control and power systems for all power operated watertight doors and their status indicating systems
- vii)* Emergency lighting
- viii)* Public address system
- ix)* Remote emergency stop/shutdown arrangement for systems which may support the propagation of fire and/or explosion

It is to be verified that, as far as practicable, cables and wiring for emergency and essential services, including those listed above are not to pass through high fire risk areas. It is also to be verified that these cables and wiring are run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space (See 4-3-3/5.17).

### **5.17.2 Requirements by the Governmental Authority**

Requirements (if any) of the Flag Administration for installation of emergency circuits required in various types of drilling units, is to be taken into consideration.

## **5.19 Mineral Insulated Cables**

At all points where mineral-insulated, metal-sheathed cable terminates, an approved seal is to be provided immediately after stripping to prevent entrance of moisture into the mineral insulation. In addition, the conductors extending beyond the sheath are to be insulated with an approved insulating material. When mineral-insulated cable is connected to boxes or equipment, the fittings are to be approved for the conditions of service. The connections are to be in accordance with the manufacturer's installation recommendation.

## **5.21 Fiber Optic Cables**

The installation of fiber optic cables is to be in accordance with the manufacturer's recommendations to prevent sharp bends where the fiber optic cables enter the equipment enclosure. Consideration is to be given to the use of angled stuffing tubes. The cables are to be installed so as to avoid abrading, crushing, twisting, kinking or pulling around sharp edges.

### 5.23 Battery Room

Where cables enter battery rooms, the holes are to be bushed as required for watertight bulkheads in 7-1-5/5.13. All connections within battery rooms are to be resistant to the electrolyte. Cables are to be sealed to resist the entrance of electrolyte by spray or creepage.

### 5.25 Paneling and Dome Fixtures

Where cables are installed behind paneling, all connections are to be accessible and the location of concealed connection boxes is to be indicated. Where a cable strip molding is used for cable installation on the incombustible paneling, it is to be of incombustible material. Dome fixtures are to be installed so that they are vented or they are to be fitted with fire-resistant material in such a manner as to protect the insulated wiring leading to the lamps and any exposed woodwork from excessive temperature.

### 5.27 Sheathing and Structural Insulation

Cables may be installed behind sheathing, but they are not to be installed behind nor imbedded in structural fire insulation. They are to pass through such insulation at right angles and are to be protected by a continuous pipe with a stuffing tube at one end. For deck penetrations, this stuffing tube is to be at the upper end of the pipe and for bulkhead penetrations, it is to be on the uninsulated side of the bulkhead. For refrigerated-space insulation, the pipe is to be of phenolic or similar heat-insulating material joined to the bulkhead stuffing tube, or a section of such material is to be inserted between the bulkhead stuffing tube and the metallic pipe. Passage of cables through fire insulation and arrangement of penetration pieces are to be verified.

### 5.29 Splicing of Electrical Cables

In general, splicing of electrical cables is not allowed, especially in wet spaces. Where an electrical cable needs to be spliced, the approved splicing is to be examined and to satisfy the basis of approval (See 4-3-3/5.21.1) and the installation and protection of splices as follows:

#### 5.29.1 Installation

All splices are to be made after the cable is in place and are to be accessible for inspection. The conductor splice is to be made using a pressure type butt connector by use of a one-cycle compression tool. See 4-3-3/9.1.4 for splices in hazardous area.

#### 5.29.2 Protection

Splices may be located in protected enclosures or in open wireways. Armored cables having splices will not be required to have the armor replaced, provided that the remaining armor has been earthed in compliance with 4-3-3/7.9 or provided the armor is made electrically continuous. Splices are to be so located such that stresses (as from the weight of the cable) are not carried by the splice.

### 5.31 Splicing of Fiber Optic Cables

Where fiber optic cables are spliced, the splicing is to be made by means of approved mechanical or fusion methods.

### 5.33 Cable Junction Box

Installation of cable junction boxes throughout the vessel, except for propulsion cables, may be used. Construction, suitability, separation, and the support and connection of cables within all junction boxes are to be examined to be in compliance with 4-3-3/5.25 of these Rules and the following:

Cables are to be supported, as necessary, within junction boxes so as not to put stress (as from the weight of the cable) on the cable contact mountings. The connections are to be provided with locking type connections.

## 7 Equipment Installation and Arrangement

### 7.1 Materials

Material of all electrical equipment is to be in compliance with 4-3-1/11 of these Rules.

### 7.3 Grounding Arrangements

Where not obtained through normal construction, arrangements provided to effectively ground metal structures of derricks, masts and helicopter decks are to be verified. See also 4-2-6/7.1.3 for fuel storage for helicopter facilities.

All grounding arrangements are to be verified before the drilling unit commences its sea trial.

### 7.5 Insulation Material and Operation Temperature

A critical factor in the reduced life of electrical equipment is heat. The type of insulation used in equipment depends on the operating temperature that the equipment will experience. Average insulation life decreases rapidly with increases in internal operating temperatures of the equipment.

For definitions and requirements of cable insulation materials, see 4-3-1/13.

### 7.7 Degree of Protection for Enclosure

The designation to indicate the degree of protection consists of the characteristic letters IP followed by two numerals (the "characteristic numerals") indicating conformity with conditions stated in 4-3-1/Table 2 and 4-3-1/Table 3. The characteristic numerals of equipment are to be verified at random as meeting the design drawings.

### 7.9 Temperature Ratings

Temperature ratings of all electrical equipment are to be in compliance with 4-3-1/17 of these Rules. The ratings of equipment are to be verified at random as meeting the design drawings.

#### 7.9.1 Reduced Ambient Temperature

Where electrical equipment is installed within environmentally-controlled spaces, the ambient temperature for which the equipment is to be rated may be reduced from 45°C and maintained at a value not less than 35°C, provided all of the conditions in 4-3-1/7.3.1 are met, ratings of cables are in compliance with 4-3-1/7.3.2, and the ambient temperature control equipment is verified for its satisfactory function.

The equipment used for cooling and maintaining the lesser ambient temperature is to be classified as a secondary essential service, in accordance with 4-3-1/3.3, and the capability of cooling is to be witnessed at sea trial.

### 7.11 Clearances and Creepage Distances

Clearances and creepage distances of all electrical equipment are to be in compliance with 4-3-1/19 of these Rules. The distances are to be verified at random as meeting the Rules.

### 7.13 Equipment Location, Protection and Accessibility

Equipment location, protection and accessibility of all electrical equipment are to be in compliance with 4-3-3/3 of these Rules. The distances are to be verified at random as meeting the Rules.

#### 7.13.1 Equipment Location

Electrical equipment is to be so placed or protected as to minimize the probability of mechanical injury or damage from the accumulation of dust, oil vapors, steam or dripping liquids. See 4-3-3/Table 1 for required degree of protection for various locations.

Where electrical and electronic equipment is located within areas protected by local fixed pressure water-spraying or water-mist fire extinguishing system and those within adjacent areas exposed to direct spray, equipment is to be verified for having a degree of protection not less than IP44.

#### 7.13.2 Protection from Bilge Water

All generators, motors and electric couplings are to be so arranged that they cannot be damaged by bilge water; and, if necessary, a water-tight coaming is to be provided to form a well around the base of such equipment with provision for removing water from the well. Measures taken for protection are to be verified.

#### 7.13.3 Accessibility

The design and arrangement of electrical apparatus is to provide accessibility to parts requiring inspection or adjustment. Armature and field coils, rotors and revolving fields are to be removable and where air ducts are used, there are to be means of access. Proper accessibility is to be verified.

### 7.15 Generators

In general, all generators on ship-type drilling units are to be located with their shafts in a fore-and-aft direction on the drilling unit and are to operate satisfactorily in accordance with the inclination requirements of 4-1-1/Table 1). Where it is not practicable to mount the generators with the armature shafts in the fore-and-aft direction, their lubrication will require special consideration, and this arrangement will be confirmed onboard.

### 7.17 Main Service Motors

Installation and arrangement of main service motors are to be in compliance with 4-3-3/3.5 of these Rules. The arrangement, in accordance with the reviewed plans, is to be verified at random as meeting the Rules.

#### 7.17.1 Pump Motors

Motors for operating plunger and close-coupled pumps are to be verified to have the driving end entirely enclosed or designed to prevent leakage from entering the motor.

#### 7.17.2 Motors on Weather Decks

Motors for use on weather decks are to be verified to have an enclosure of at least IP56 protection or are to be enclosed in watertight housings.

#### 7.17.3 Motors Below Decks

Motors below decks are to be verified to have been installed at a location as dry as practicable and away from steam, water, and oil piping.

### 7.19 Accumulator Batteries

Permanently installed power, control and monitoring storage batteries of acid or alkaline types are to be so arranged that the trays are accessible and provided with not less than 254 mm (10 in.) headroom. Where a relief valve is provided for discharging excessive gas due to overcharge, arrangements are to be made for releasing the gas to the weather deck away from any source of ignition.

#### 7.19.1 Battery Installation and Arrangements

Installation and arrangement of large storage batteries, moderate size batteries, and small batteries are to be verified in compliance with 4-3-3/3.7.2 of these Rules.

A low-hydrogen-emission battery with a battery charger having a charging rate of a large or moderate battery size installation may be treated as a moderate or small battery installation, respectively, if the following are met and verified:

- i) Calculations under the worst case charging conditions are submitted and reviewed by Engineering; and
- ii) A warning notice is placed to notify maintenance personnel that additional batteries are not to be installed, and batteries are only to be replaced by other batteries of the same or lower hydrogen emission rate.

#### 7.19.2 Battery Trays

Trays for batteries are to be verified as being chocked with wood strips or equivalent to prevent movement and each tray is to be fitted with nonabsorbent insulating supports on the bottom and with similar spacer blocks at the sides or with equivalent provision to secure air-circulation space all around each tray.

#### 7.19.3 Lead-Acid Batteries and Alkaline Batteries In Same Compartment

Lead-acid batteries and alkaline batteries, when placed in the same battery compartment, are to be verified as being effectively identified as to type and segregated.

#### 7.19.4 Ventilation of Battery Rooms, Battery Lockers, and Deck Boxes

Where natural ventilation is employed, the ducts are to be verified as being run directly from the top of the battery room to the open air above. Where natural ventilation is impractical, and instead a mechanical exhaust ventilation is provided with fan intake at the top of the room, the fans are to be verified as being of non-sparking construction in accordance with 4-3-3/9.7 and approved by ABS to be capable of completely changing the air in the battery room substantiating that adequate ventilation is available to maintain the flammable gases within the battery room to a level below the Lower Explosive Limit (L.E.L.) at the maximum battery charging current. Where the ventilation rate is based on low hydrogen emission type batteries, a warning notice to this effect is to be verified as being placed in a visible place in the battery room. Openings for air inlet are to be provided near the floor.

#### 7.19.5 Ventilation of Battery Lockers

Where practicable, battery lockers are to be ventilated similarly to battery rooms by a duct led from the top of the locker to the open air or to an exhaust ventilation duct. The ventilation arrangement as well as provision of louvers or equivalent near the bottom for entrance of air is to be verified.

#### 7.19.6 Ventilation of Battery Deck Boxes

Duct from the top of the box, terminating in a goose neck, mushroom head or equivalent to prevent entrance of water, for a deck boxes is to be verified. Holes for air inlet are to be verified as being provided on at least two opposite sides of the box. The entire deck box, including openings for ventilation, is to be tested as being weathertight to prevent entrance of spray or rain. Boxes for small batteries, not requiring ducted ventilation, are to be verified for having openings near the top to permit escape of gas.

#### 7.19.7 Corrosion Protection

Corrosion protection or alternative arrangement of battery rooms, lining of deck boxes and small batteries are to be verified to be in compliance with 4-3-3/3.7.4 of these Rules.

#### 7.19.8 Maintenance of Batteries

Where batteries are fitted for use for essential and emergency services, a maintenance schedule of such batteries is to be provided and maintained.

The schedule and procedures put in place are to satisfy 4-3-3/3.7.5 of these Rules. Details of the schedule, procedures, and the maintenance records are to be included in the drilling unit's maintenance system and integrated into the drilling unit's operational maintenance routine, as appropriate, and verified.

#### 7.19.9 Replacement of Batteries

Where a vented type battery replaces a valve-regulated, sealed type battery, the requirements in 4-3-3/3.7.6 are to be confirmed.

## 7.21 Switchboards

### 7.21.1 Location and Protection

Arrangement of switchboards are to be confirmed as providing easy access, as may be needed, to apparatus and equipment without danger to personnel. Switchboards are to be located in a dry place so as to provide a clear working space of at least 914 mm (36 in.) at the front of the switchboard and a clearance of at least 610 mm (24 in.) at the rear, which may be reduced to 457 mm (18 in.) in way of stiffeners or frames. Arrangement and location of distribution boards are to be verified to be in compliance with 4-3-3/3.9 of these Rules.

*Note:* Where switchboards are enclosed at the rear and are fully serviceable from the front, clearance at the rear will not be required unless necessary for cooling.

It is to be verified that switchboards are secured to a solid foundation, self-supported or braced to the bulkhead or the deck above. In case the last method is used, means of bracing is to be flexible to allow deflection of the deck without buckling the assembly structure.

Flanged connections of liquid piping are to be avoided over or near switchboards. If a connection was necessary and agreed by the Surveyor, satisfactory provision to prevent any leakage from injuring the switchboard is to be verified.

### 7.21.2 Notice Plate

A notice plate posted either at the entrance to the switchboard room or on the switchboard front panel to state that the floor in the room is of electrically insulated construction is to be verified.

## 7.23 Distribution Boards

### 7.23.1 Location and Protection

Distribution boards are to be located in accessible positions. Location and enclosure of distribution boards are to be verified to be in compliance with 4-3-3/3.11.1 of these Rules.

Flanged connections of liquid piping are to be avoided over or near distribution boards for essential services. If a connection was necessary and agreed by the Surveyor, satisfactory provision to prevent any leakage from injuring the boards is to be verified.

### 7.23.2 Switchboard-Type Distribution Boards

Distribution boards of the switchboard type, unless installed in machinery spaces or in compartments assigned exclusively to electric equipment and accessible only to authorized personnel, are to be verified as being completely enclosed or protected against accidental contact and unauthorized operation.

### 7.23.3 Safety-Type Panels

It is to be verified that safety type panels are used only for controlling branch lighting circuits, provided with dead front type panels where voltage to earth is in excess of 50 volts DC or 50 volts AC r.m.s. between conductors.

## 7.25 Motor Controllers and Control Centers

### 7.25.1 Location and Installation

Motor control centers are to be located in a dry place. It is to be verified that a clear working space is provided around motor control centers to enable doors to be fully opened and equipment removed for maintenance and replacement.

It is to be verified that motor control centers are secured to a solid foundation, be self-supported or be braced to the bulkhead.

Flanged connections of liquid piping are to be avoided over or near motor controllers and control centers. If a connection was necessary and agreed by the Surveyor, satisfactory provision to prevent any leakage from injuring the motor controllers and control centers is to be verified.

#### 7.25.2 Disconnecting Arrangements

Means are to be provided for disconnecting the motor and controller from all supply conductors, except that a manually operated switch or circuit breaker may serve as both controller and disconnecting means (see 4-3-4/7.17.2).

Arrangement of disconnecting devices is to be verified to be in compliance with 4-3-3/3.13.2 of these Rules.

It is to be verified that the disconnect switch, if not adjacent to the controller, is provided with an identification plate.

It is to be verified that the disconnect device indicates by a position of the handle, or otherwise, whether it is open or closed.

#### 7.25.3 Indicating-Light Circuits

Where indicating-light circuits are employed, they are to be verified to be in compliance with 4-3-3/3.13.3 of these Rules.

### 7.27 Resistors for Control Apparatus

Protection of resistors against corrosion, location and mounting of resistors are to be verified to be in compliance with 4-3-3/3.13.4 of these Rules. In addition, arrangement of the electrical equipment and wiring located within these spaces is to be such as to prevent their exposure to ambient temperatures in excess of that for which they have been designed.

### 7.29 Lighting Fixtures

Lighting fixtures are to be verified as being arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

### 7.31 Heating Equipment

Electric radiators, if used, are to be verified as being fixed in position and be so constructed as to reduce fire risks to a minimum. It is to be confirmed that electric radiators of the exposed-element type are not used.

### 7.33 Magnetic Compasses

Precautions taken in connection with apparatus and wiring in the vicinity of the magnetic compass to prevent disturbance of the needle from external magnetic fields, is to be verified.

### 7.35 Portable Equipment and Outlets

It is to be verified that portable equipment is not used in hazardous areas, and portable lights are not used for berth lights in accommodations.

### 7.37 Receptacles and Plugs of Different Ratings

Receptacles and plugs of different electrical ratings are not to be interchangeable. In cases where it is necessary to use 230 volts portable equipment, the receptacles for their attachment are to be verified for being of a type which will not permit attaching 115 volts equipment.

### 7.39 Installation Requirements for Recovery from Dead Ship Condition

Where the emergency source of power is an emergency generator which complies with 4-3-2/5.15 and 4-3-2/3.1.4, this emergency generator may be used for restoring operation of the drilling unit's main propulsion plant, boilers and auxiliary machinery, as applicable.

Where there is no emergency generator installed, the arrangements for bringing main and auxiliary machinery into operation are to be such that the initial charge of starting air or initial electrical power and any power supplies for engine operation can be developed onboard the drilling unit without external aid. If for this purpose an emergency air compressor or an electric generator is required, these units are to be powered by a hand-starting oil engine or a hand-operated compressor.

The arrangement for bringing the main and auxiliary machinery into operation is to be verified. It is also to be verified by testing that recovery capacity is such that the starting energy and any power supplies for propulsion engine operation are available within 30 minutes of a black out condition.

## **9 Earthing**

### **9.1 General**

Unless the machines or equipment are one of the type as listed in 4-3-3/7.1, the exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live are to be earthed. Earthing is to be verified.

### **9.3 Permanent Equipment**

It is to be verified that the metal frames or cases of all permanently installed generators, motors, controllers, instruments and similar equipment are permanently earthed through a metallic contact with the drilling unit's structure. Alternatively, they may be connected to the hull by a separate conductor in accordance with 4-3-3/7.5 of these Rules.

Where outlets, switches and similar fittings are of nonmetallic construction, all exposed metal parts are to be verified as being earthed.

### **9.5 Connections**

It is to be verified that all earthing conductors are of copper or other corrosion-resistant material and are protected against damage. The nominal cross-sectional area of every copper earthing conductor is to be not less than that required by 4-3-3/Table 3.

Earthed distribution system and connections to vessel's hull are to be verified to be in compliance with 4-3-3/7.5.2 and 4-3-3/7.5.3 respectively.

### **9.7 Portable Cords**

Receptacle outlets operating at 50 volts DC or 50 volts AC r.m.s. or more are to be confirmed for having an earthing pole.

### **9.9 Cable Metallic Covering**

It is to be verified that all metal sheaths, armor of cable and mineral-insulated, metal-sheathed cable are electrically continuous and are earthed to the metal hull at each end of the run, except that final sub-circuits may be earthed at the supply end only, and that all metallic coverings of power and lighting cables passing through hazardous area or connected to equipment in such an area are earthed at least at each end.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 6 Surveys at Builder's Yard – Electrical Systems

#### 1 General

This Section pertains to surveys and testing to be carried out on electrical systems during construction, installation and testing of mobile offshore drilling units at builder's yard/facility. The documentation requirements for design review are given Parts 3, 4 and 5 of these Rules.

ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing is to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

#### 3 Main Source of Power

Units are to be provided with at least two main generator sets with combined capacity sufficient to maintain the unit in normal operations (including the drilling mode) and habitable conditions to include at least adequate services for cooking, heating, domestic refrigeration, mechanical ventilation, sanitary and fresh water.

Examination and testing of the main source of power is to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules. For further details, see 4-3-2/3.1.

##### 3.1 Power Supply by Generators

The capacity of the generator sets, their fuel capacity and system arrangement are to satisfy 4-3-2/3.1.

###### 3.1.1 Propulsion Capability with Multiple Generators

For drilling units having multiple generating sets providing power for both propulsion and auxiliary services, the propulsion loads considered for normal operation need only include those necessary to propel the unit at 3.6 m/s (7 kn) or one-half the design speed in calm water, whichever is the lesser. Propulsion capability under these conditions is to be verified during sea trial as referenced in Section 7-1-9 of these Rules.

###### 3.1.2 "Blackout" and "Dead Ship" Start

The "blackout" and "dead ship" start testing is to be demonstrated prior to the sea trial. Same demonstration is to be repeated during the sea trial as referenced in Section 7-1-9 of these Rules.

Examination and testing of the main source of power is to be carried out to confirm compliance with below specific requirements. For further details, see 4-3-2/3.1.

A "Blackout" situation means the loss of the main source of electrical power resulting in the main and auxiliary machinery being out of operation.

A "Dead Ship" condition means a condition under which:

- i) The main propulsion plant, boilers and auxiliary machinery are not in operation due to the loss of the main source of electrical power, and
- ii) In restoring propulsion, the stored energy for starting the propulsion plant, the main source of electrical power and other essential auxiliary machinery is assumed to be not available.

For self-propelled drilling units, the generating sets are to be such that with any one generator or its primary source of power out of operation, the remaining generating sets are capable of providing the electrical services necessary to start the main propulsion plant from a "dead ship" condition, as defined herein, within 30 minutes of the blackout. This is to be verified during sea trial as referenced in Section 7-1-9 of these Rules.

In restoring the propulsion from a dead ship condition for self propelled drilling units, no stored energy is to be assumed available for starting the propulsion plant, the main source of electrical power and other essential auxiliaries. It is assumed that means are available to start the emergency generator at all times.

The emergency source of electrical power may be used to restore the propulsion, provided its capability either alone or combined with that of any other source of electrical power is sufficient to provide at the same time those services required to be supplied by 4-3-2/5.3.1 through 4-3-2/5.3.7.

The emergency generator and other means needed to restore the propulsion are to have a capacity such that the necessary propulsion starting energy is available within 30 minutes of blackout. Emergency generator stored starting energy is not to be directly used for starting the propulsion plant, the main source of electrical power and/or other essential auxiliaries (emergency generator excluded).

### 3.3 Generator Driven by Propulsion Unit

Generator driven by propulsion unit is to satisfy 4-3-2/3.3.

### 3.5 Sizing of AC Generator

Sizing of the AC Generator is to satisfy 4-3-2/3.5.

## 5 Emergency Source of Power

A self-contained emergency source of electrical power together with its associated power transformer, if any, transitional source of emergency power, emergency switchboard, and emergency lighting switchboard is to be installed in a non-hazardous space and is to be located above the worst damage waterline (see 3-3-2/1.3.2), aft of the collision bulkhead, if any, and in a space which is not within the assumed extent of damage defined in 3-3-2/3.5. Its location is to be readily accessible from the open deck. The arrangement is to be such as to insure that a fire, flooding or other failure in a space containing the main source of electrical power, or in any space containing internal combustion machinery for propulsion, any oil-fired or oil-fuel unit, or internal combustion machinery with an aggregate total power of 375 kW (500 hp) or more, will not interfere with the supply or distribution of emergency power.

### 5.1 Boundary and Alternate Arrangements

Boundaries of spaces containing emergency sources of power and associated equipment and alternate arrangements of source of power are to satisfy 4-3-2/5.1.

### 5.3 Emergency Power Supply

The electrical power available is to be sufficient to supply all those services that are essential for safety in an emergency. The emergency source of electrical power is to be capable of supplying simultaneously, at least the following services for the period specified hereafter, if they depend upon an electrical source for their operation.

#### 5.3.1 Emergency Lighting

For a period of 18 hours, emergency lighting:

- i) At every embarkation station on deck and over the sides, their launching appliances and the area of water into which they are to be launched.
- ii) In all service and accommodation alleyways, stairways and exits, personnel elevators and their trunks.
- iii) In the machinery spaces and main generating stations, including their control positions.

- iv) In all control stations, machinery control rooms, and at each main and emergency switchboard.
  - v) In all spaces from which control of the drilling process is performed and where controls of machinery essential for the performance of this process, or devices for emergency switching-off of the power plant are located.
  - vi) At all stowage positions for firemen's outfits.
  - vii) At the sprinkler pump, if any, at one of the fire pumps, if dependent upon emergency generator for its source of power, at the emergency bilge pump, if any, and at the starting positions of their motors.
  - viii) On helicopter landing deck perimeter.
- 5.3.2 Navigation Lights and Signals  
For a period of 18 hours, navigation lights, other lights and sound signals required by the International Regulations for the Prevention of Collisions at Sea in force.
- 5.3.3 Marking of Offshore Structures  
For a period of four days, any signaling lights or sound signals which may be required for marking of offshore structures.
- 5.3.4 Internal Communications  
For a period of 18 hours, all internal communication systems required in an emergency (see Note 1 below).
- 5.3.5 Fire and Gas Detection and Alarm Systems  
For a period of 18 hours, the required fire and gas detection and alarm systems (see Note 1 below).
- 5.3.6 Emergency Signals  
For a period of 18 hours, intermittent operation of the manually operated call points and all internal signals that are required in an emergency (see Note 1 below).
- 5.3.7 Blow-Out Preventer (BOP) and Well Disconnection  
For a period of 18 hours, blow-out preventer control systems and means for disconnecting the unit from the well-head arrangement, if electrically controlled (see Note 1 below).
- 5.3.8 Fire Pump and Fire Extinguishing Systems  
For a period of 18 hours, one of the fire pumps and other fire extinguishing systems, if dependent upon the emergency generator for its source of power.
- 5.3.9 Diving Equipment  
For a period of 18 hours, permanently installed diving equipment necessary for safe conduct of diving operations, if dependent on the drilling unit's electrical power.
- 5.3.10 Column-Stabilized Units  
On column-stabilized units, for a period of 18 hours:
- i) Ballast valve control system, ballast valve position indicating system, draft level indicating system and tank level indicating system.
  - ii) The largest single ballast pump required by 4-2-4/13.5.1. See also 4-3-2/5.11 of these Rules.
- 5.3.11 Self-propelled Drilling Units  
On self-propelled drilling units:
- i) For a period of 18 hours, emergency lighting at the steering gear.
  - ii) For a period of 18 hours, navigational aids as required by Chapter V of the 1974 SOLAS Convention, as amended (see 'Note' below).

- iii) For a period of 18 hours, intermittent operation of the daylight signaling lamp and the unit's whistle (see Note 1 below).
- iv) For a period of at least 10 minutes, continuous operation of the steering gear (see 4-3-2/11.5 of these Rules).

#### 5.3.12 Other Emergency Services

- i) For a period of 30 minutes, operation of watertight doors referred to in 3-3-2/5.3 of these Rules (but not necessarily all of them simultaneously), including their controls and indicators, unless an independent temporary source of stored energy is provided.
- ii) For a period of 30 minutes, free-fall lifeboat secondary launching appliance, if the secondary launching appliance is not dependent on gravity, stored mechanical power or other manual means.
- iii) For a period of 18 hours, intermittent operation of the general emergency alarm system and other manually operated alarms required in 4-3-2/17.

*Note 1* Unless independent supply from an accumulator battery suitably located for use in an emergency and sufficient for the period of 18 hours is supplied.

## 5.5 Emergency Sources

Satisfactory operation and testing of the emergency source of electrical power and its protective devices are to be carried out prior to the sea trial as referenced in Section 7-1-9 of these Rules.

The emergency source of electrical power may be either a generator or an accumulator battery in accordance with 4-3-2/5.5.2 or 4-3-2/5.5.3. The emergency generator and its prime mover and any emergency accumulator battery are to be designed to function at full rated power when upright and when inclined in static condition up to a maximum angle of heel in the intact and damaged condition, as determined in accordance with Section 3-3-2.

In no case need the equipment be designed to operate when inclined in static condition more than:

- 25° in any direction on a column-stabilized unit;
- 15° in any direction on a self-elevating unit, and
- 22.5° about the longitudinal axis and/or when inclined 10° about the transverse axis on a surface unit.

In all cases, the emergency source of electrical power is to be designed to operate as a minimum under the angles of inclination defined in 4-1-1/7.1.

#### 5.5.1 Generator

Where the emergency source of electrical power is a generator, it is to satisfy 4-3-2/5.5.2.

#### 5.5.2 Accumulator Battery

Where the emergency source of electrical power is an accumulator battery, it is to satisfy 4-3-2/5.5.3.

#### 5.5.3 Emergency Generator for Non-emergency Services

Emergency generator used for non-emergency services is to satisfy 4-3-2/5.5.4.

## 5.7 Transitional Source of Power

Satisfactory operation and testing of the transitional source of power is to be carried out prior to the sea trial as referenced in Section 7-1-9 of these Rules.

The transitional source of emergency electrical power, where required by 4-3-2/5.5.2ii), is to consist of an accumulator battery which is to satisfy 4-3-2/5.5.5.

## 5.9 Emergency Switchboard

The emergency switchboard is to be installed as near as is practicable to the emergency source of electrical power.

Satisfactory operation of the emergency switchboard is to be verified prior to the sea trial as referenced in Section 7-1-9 of these Rules.

Installation of the emergency switchboard for generator, installation of accumulator batteries, arrangement of inter-connector feeder between emergency and main switchboards, and arrangements made where necessary to automatically disconnect the non-emergency circuits from the emergency switchboard, are to satisfy 4-3-2/5.9.

## 5.11 Ballast Pumps

On column-stabilized units, arrangement of ballast pumps is to satisfy 4-3-2/5.11. It is to be possible to supply each ballast pump required by 4-2-4/13.5.1 from the emergency source of power. The arrangement is to be such that one of the pumps is connected directly to the main switchboard and the other pump is connected directly to the emergency switchboard. For systems utilizing independent pumps in each tank, all pumps are to be capable of being supplied from an emergency source of power. When sizing the emergency source of power in accordance with 4-3-2/5.3, the largest ballast pump capable of being supplied from this source is to be assumed to be operating simultaneously with the loads specified in 4-3-2/5.3, allowing for suitable load and diversity factors.

## 5.13 Starting Arrangements for Emergency Generator Sets

### 5.13.1 Cold Conditions

Emergency generating sets are to be capable of being readily started in their cold condition at a temperature of 0°C (32°F). If this is impracticable or if lower temperatures are likely to be encountered, heating arrangements are to be provided for ready starting of the generating sets.

### 5.13.2 Number of Starts

Each emergency generator that is arranged to be automatically started is to be equipped with approved starting devices with a stored energy capability of at least three consecutive starts. Unless a second independent means of starting is provided, the source of stored energy is to be protected to preclude critical depletion by automatic starting system, i.e., the automatic starting system is only allowable for consumption of the stored energy source to a level that would still provide the capability for starting the emergency generator upon intervention by personnel. In addition, a second source of energy is to be provided for an additional three starts within 30 minutes unless manual starting can be demonstrated to be effective.

### 5.13.3 Charging of Stored Energy

The stored energy is to be maintained at all times, as follows:

- i) Electrical and hydraulic starting systems are to be maintained from the emergency switchboard.
- ii) Compressed air starting systems may be maintained by the main or auxiliary compressed air receivers through a suitable non-return valve or by an emergency air compressor which, if electrically driven, is supplied from the emergency switchboard.
- iii) All of these starting, charging and energy storing devices are to be located in the emergency generator space. These devices are not to be used for any purpose other than the operation of the emergency generating set. This does not preclude the supply to the air receiver of the emergency generating set from the main or auxiliary compressed air system through the non-return valve fitted in the emergency generator space.

#### 5.13.4 Manual Starting

Where automatic starting is not required, manual (hand) starting is permissible, such as manual cranking, inertia starters, manually charged hydraulic accumulators or power charge cartridges, where they can be demonstrated as being effective.

When manual (hand) starting is not practicable, the requirements of 4-3-2/5.15.2 and 4-3-2/5.15.3 are to be complied with, except that starting may be manually initiated.

### 5.15 Alarms and Safeguards for Emergency Diesel Engines

Alarms and safeguards are to be fitted in accordance with 7-1-6/Table 1.

The safety and alarm systems are to be designed to 'fail safe'.

Regardless of the engine output, if shutdowns additional to those specified in 7-1-6/Table 1 are provided, except for the over-speed shutdown, they are to be automatically overridden when the engine is in automatic or remote control mode.

The alarm system is to function in accordance with 4-9-1/9.3 and 4-9-1/9.7 of the *Steel Vessel Rules*, with additional requirements that grouped alarms are to be arranged on the bridge. For drilling units that are not self-propelled, the grouped alarms are to be arranged at an emergency control station.

In addition to the fuel oil control from outside the space, a local means of engine shutdown is to be provided.

Local indications of at least those parameters listed in 7-1-6/Table 1 are to be provided within the same space as the diesel engines and are to remain operational in the event of failure of the alarm and safety systems.

**TABLE 1**  
**Emergency Diesel Engine – Alarms and Shutdowns (2012)**

<i>Systems</i>		<i>Monitored Parameters</i>	<i>Alarm</i>	<i>Auto Shutdown</i>	<i>Notes [X = Required]</i>
Fuel Oil	A1	Leakage from pressure pipes	x	—	-
Lubricating Oil	B1	Temperature – high	x	—	For engines having a power of 220 kW or more.
	B2	Lubricating oil pressure – low	x	—	-
	B3	Oil mist concentration in crankcase – high	x	—	For engines having a power of more than 2250 kW (3000 hp) or having a cylinder bore of more than 300 mm (11.8 in.).
Cooling Medium	C1	Pressure or flow – low	x	—	For engines having a power of 220 kW or more.
	C2	Temperature – high	x	—	-
Engine	D1	Over-speed activated	x	x	For engines having a power of 220 kW or more.

## 7 Distribution System

### 7.1 Main Service Distribution System

Current-carrying parts with potential to earth are to be protected against accidental contact.

For recognized standard distribution systems, see 4-3-1/7. Separate feeders are to be provided for essential and emergency services.

Method of the distribution system is to satisfy 4-3-2/7.1.

### 7.3 Hull Return System

The hull return system is not to be used for power, heating or lighting, except that the following systems may be used:

- i) Impressed Current Cathodic Protective (ICCP) system;
- ii) Limited and locally earthed systems, provided that any possible resulting current does not flow directly through any hazardous areas; or
- iii) Insulation level monitoring devices, provided the circulation current does not exceed 30 mA under all possible conditions.
- iv) Current-carrying parts with potential to earth are to be protected against accidental contact.

Where the hull return system is used, arrangements are to satisfy 4-3-2/7.3.2.

### 7.5 Earthed Distribution Systems

System earthing is to satisfy 4-3-2/7.5.

### 7.7 External or Shore Power Supply Connection

Where arrangements are made for the supply of electricity from a source on shore or other external source, they are to satisfy 4-3-2/7.7.

#### 7.7.1 Information Plate

An information plate is to be provided at or near the connection box giving full information on the system of supply and the nominal voltage (and frequency if AC) of the drilling unit's system and the recommended procedure for carrying out the connection.

#### 7.7.2 Securing of Trailing Cable

Provision is to be made for securing the trailing cable to a framework to absorb stress on the electrical terminals by catenary tension of the cable.

### 7.9 Harmonics

The Total Harmonic Distortion (THD) is to satisfy 4-3-2/7.9.

## 9 Circuit Protection System

Examination and testing of the circuit protection system is to be carried out to confirm compliance with these Rules as referenced below, and prior to the sea trial as referenced in Section 7-1-9 of these Rules.

- i) Generators is to satisfy 4-3-2/9.3
- ii) AC generators is to satisfy 4-3-2/9.5
- iii) DC generators is to satisfy 4-3-2/9.7
- iv) Accumulator batteries is to satisfy 4-3-2/9.9
- v) External or shore power supply is to satisfy 4-3-2/9.11
- vi) Motor branch circuits to satisfy 4-3-2/9.13
- vii) Transformer circuits is to satisfy 4-3-2/9.15
- viii) Meters, pilot lamps and control circuits is to satisfy 4-3-2/9.17

## 11 Systems for Steering Gear Installed in Self-Propelled Units

Examination and testing of the systems for steering gear installed on self-propelled drilling units is to be carried out to confirm compliance with below specific requirements, as applicable, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 11.1 Power Supply Feeder

Arrangement of power supply circuits for the electric or electro-hydraulic steering gear system is to satisfy 4-3-2/11.1.

### 11.3 Protection for Steering Gear Motor Circuit

Short circuit protection and under voltage release arrangements are to satisfy 4-3-2/11.3.

### 11.5 Emergency Power Supply

Emergency power supply is to satisfy 4-3-2/11.5.

### 11.7 Controls, Instrumentation, and Alarms

See 4-3-4/5.7, 4-3-4/13, 4-3-4/15 and 4-3-4/17 of the *Steel Vessel Rules*.

## 13 Lighting and Navigation Light Systems

Examination and testing of the lighting and navigation light systems is to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 13.1 Lighting System

#### 13.1.1 Main Lighting System

A main electric lighting system is to provide adequate illumination throughout those parts of the drilling unit normally accessible to and used by crew. It is to be supplied from the main source of electrical power.

#### 13.1.2 System Arrangement

The arrangement of the main electric lighting system is to be such that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, the main switchboard and the main lighting switchboard will not render the emergency electric lighting system required by 4-3-2/5.3ii) inoperative.

The arrangement of the emergency electric lighting system is to be such that a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, if any, the emergency switchboard and the emergency lighting switchboard will not render the main electric lighting system required by 4-3-2/13.1.1 inoperative.

#### 13.1.3 Lighting Circuits

In machinery and accommodation spaces such as:

- Public spaces
- Category 'A' machinery spaces
- Galleys
- Corridors
- Stairways leading to boat-decks, including stair towers and escape trunks

There is to be more than one final subcircuit for lighting, one of which may be supplied from the emergency switchboard, in such a way that failure of any one circuit does not leave these spaces in darkness.

#### 13.1.4 Protection for Lighting Circuits

Lighting circuits are to be protected against overload and short circuit. For further details, see 4-3-2/13.1.4.

### 13.3 Navigation Light System

Feeders, navigation light indicators, and protection of the lighting circuits are to satisfy 4-3-2/13.3

### 13.5 Obstruction Light System

Feeders, obstruction light indicators, and protection of the lighting circuits are to satisfy 4-3-2/13.

## 15 Interior Communication Systems

Examination and testing of the interior communication system is to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 15.1 Interior Communication Systems for All Units

#### 15.1.1 Public Address (PA) System

For all type of units, self-propelled or not, the public address system is to comply with the following requirements and verified accordingly:

- i) *System Requirements.* The system is to be a loud speaker installation enabling the broadcast of messages which are clearly audible in all parts of the unit. The system is to provide for the broadcast of messages from the navigation bridge, emergency control stations (see 7-1-8/17) and other strategic points with an override function so that all emergency messages may be broadcast if any loudspeaker in the locations concerned has been turned off, its volume has been turned down or the public address system is in use for other purposes.
- ii) *Minimum Sound Levels.* With the drilling unit underway or in normal operating conditions, the minimum sound levels for broadcasting emergency announcements are to be:
  - In interior locations, 75 dB (A) and at least 20 dB (A) above the speech interference level
  - In exterior locations, 80 dB (A) and at least 15 dB (A) above the speech interference level
- iii) *Emergency Source of Power.* The system is to be connected to the emergency source of power.
- iv) *Public Address System Combined with General Alarm System.* Where a single system serves for the public address and general emergency alarm functions, the system is to be arranged so that a single failure is not to cause the loss of both systems and is to minimize the effect of a single failure. The major system components, such as power supply unit, amplifier, alarm tone generator, etc., are to be duplicated. The coverage provided by the arrangement of the system loops and speakers is to be such that after a single failure, the announcements and alarms are still audible in all spaces. Duplication of system loops and speakers in each room or space is not required provided the announcements and alarms are still audible in all spaces.

#### 15.1.2 Voice Communications

Means of voice communication is to be available for transfer of information between all locations where action may be necessary in case of an emergency. Such locations include the emergency control stations required by 7-1-8/17, machinery spaces, SCR rooms and all locations vital to the safety of the unit. Simultaneous talking among these locations is to be possible at all times and the calling to these locations is always to be possible even if the line is busy.

Where an elevator is installed, a telephone is to be permanently installed in all cars and connected to a continuously manned area. The telephone may be sound powered, battery operated or electrically powered from the emergency source of power.

Final sub-circuit for power supply to these voice communication systems is to be independent of other electrical systems and control, monitoring and alarm systems. See 7-1-6/5.3.4 for power supply.

### 15.3 Interior Communication Systems for Self-Propelled Units

For self-propelled units, in addition to the requirements of 7-1-6/15.1, interior communication systems are to comply with the following requirements and verified accordingly:

#### 15.3.1 Navigation Bridge Communication

At least two independent means are to be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the speed and direction of thrust of the propellers are normally controlled. Appropriate means of communication are to be provided to any other positions from which the main propulsion machinery may be controlled. See 4-3-2/5.3.4 for power supply.

One of the communicating means between the navigation bridge and the main propulsion control position is to be an engine room telegraph which provides visual indication of the orders and responses both in the machinery space and on the navigation bridge. Communication network and power supply circuit for this may be combined with the engine order telegraph system specified in 4-3-2/15.3.

#### 15.1.2 Main Propulsion Control Stations

A common talking means of voice communication and calling or engine order telegraph repeater is to be provided between the main propulsion control station and local control positions for main propulsion engines and controllable pitch propellers. Voice communication systems are to provide the capability of carrying on a conversation while the drilling unit is being navigated. Final subcircuit for power supply to these is to be independent of the other electrical system and the control, monitoring and alarm systems. Communication network and power supply circuit for the voice communication system may be combined with the system required in 4-3-2/15.5.

#### 15.1.3 Voice Communications

In addition to 7-1-6/15.1.2, a common talking means of voice communication and calling is to be provided between the navigation bridge, main propulsion control station and the steering gear compartment so that the simultaneous talking among these spaces is possible at all times and the calling to these spaces is always possible even if the line is busy.

#### 15.1.4 Emergency and Interior-communication Switchboard

Emergency and interior-communication switchboards, when fitted, are to comply with the applicable parts of 6-1-7/9 of these Rules, and attention is directed to the requirements of the governmental authority whose flag the drilling unit flies.

## 17 Manually Operated Alarms

Examination and testing of the following manual alarm systems are to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 17.1 General Alarm (GA) System

A general alarm system complying with requirements of 4-3-2/17.1.2 is to be provided to summon crew to muster stations and initiate actions included in the muster list. The system is to be supplemented by instructions over a public address system meeting the requirements of 4-3-2/15.9. Any entertainment sound system is to be automatically turned off when the general emergency alarm is activated.

The general emergency alarm system is to be capable of sounding the general emergency alarm signal, fire alarm signal and abandon unit signal on an electrically operated bell or klaxon or other equivalent warning system, which is to be powered from the drilling unit's main supply and the emergency source of electrical power required by 4-3-2/5. The system is to be capable of operation from the navigation bridge, emergency control stations (see 7-1-8/17) and from other strategic points.

The system is to be clearly audible in all parts of the unit. The alarm is to continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

- i) The minimum sound levels for the emergency alarm tone in interior spaces are to be 80 dB and at least 10 dB (A) above ambient noise levels existing during normal equipment operation in moderate weather. In cabins without a loud speaker installation, an electrical alarm transducer is to be installed.
- ii) The sound levels at the sleeping position in cabins and in cabin bathrooms are to be at least 75 dB (A) and at least 10 dB (A) above ambient noise levels.

*Note:* Refer to the Code on Alarms and Indicators adopted by IMO Resolution A.830(19).

#### 17.1.1 General Alarm (GA) System on Self-Propelled Units

Self-propelled drilling units are to be capable of sounding the general emergency alarm on the drilling unit's whistle, but which need only be capable of operation from the navigation bridge.

### 17.3 Engineers' Alarm for Self-Propelled Units

An engineers' alarm operable from the main propulsion control station or at the maneuvering platform, as appropriate, is to be provided. It is to be audible in each engineer's cabin and its sound pressure level is to comply with 7-1-6/17.1. See 7-1-6/5.3.12(c) for power supply.

### 17.5 Refrigerated Space Alarm

Fan and diffuser rooms serving subfreezing compartments are to be provided with a device capable of activating an audible and visual alarm in a manned control center and operable from within the latter space for the protection of personnel. See 7-1-6/5.3.12(c) for power supply.

### 17.7 Elevator Alarm

A device which will activate an audible and visual alarm in a manned control center is to be provided in all cars. Such alarm system is to be independent of power and control systems of the elevator. See 7-1-6/5.3.12(c) for power supply.

## 19 Fire Protection and Fire Detection Systems

Examination and testing of the following systems are to be carried out to confirm compliance with below specific requirements, prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 19.1 Emergency Stop

#### 19.1.1 Ventilation System

All electrical ventilation systems are to be provided with means for stopping the motors in case of fire or other emergency. These requirements do not apply to closed re-circulating systems within a single space. See also 7-1-8/9.

The main machinery-space ventilation is to be provided with means for stopping the ventilation fans, which is to be located in the passageway leading to, but outside of the space, or in the fire-fighting station, if provided.

A control station for all other ventilation systems is to be located in the fire-control room or navigation bridge, or in an accessible position leading to, but outside of the space ventilated.

#### 19.1.2 Other Auxiliaries

For emergency tripping and emergency stop for other auxiliaries such as forced and induced draft fans, electric motor pressurization fans, oil fuel transfer pumps, fuel oil units, see 4-2-5/1.5 and 7-1-8/17.9.

### 19.3 Fire Detection and Alarm System

See 7-1-8/13.

## 21 Electrical System Testing

All machinery and associated equipment is to be examined and tested prior to the sea trial as referenced in Section 7-1-9 of these Rules.

### 21.1 Auxiliary Systems

All auxiliary apparatus is to be tried under working conditions.

### 21.3 Generators

Each generator is to be run for a time sufficient to show satisfactory operation, and parallel operation with all possible combinations is to be demonstrated.

Generator safety devices and shutdowns are to be confirmed operational.

The emergency generator is to be run for a time sufficient to show satisfactory operation, and its alarms and safeguard devices to be confirmed (see 4-3-2/5).

### 21.5 Auxiliary Motors

Each auxiliary motor necessary to the operation of the drilling unit is to be run for a time sufficient to show satisfactory performance at such load as can readily be obtained.

### 21.7 Main Switches and Breakers

All main switches and circuit breakers are to be operated, but not necessarily at full load.

### 21.9 Lighting System

The operation of the lighting system, heaters, etc., is to be demonstrated satisfactorily (see 7-1-6/13.1).

Satisfactory operation the emergency lights after a black-out condition is to be confirmed. Sufficient lighting in all control stations, egress routes, and embarkation stations are to be verified.

### 21.11 Voltage Drop

The entire installation is to operate and the drop in voltage on any part of the installation is not to exceed 6%. See 7-1-6/7.1.

### 21.13 Public Address (PA) & General Alarm (GA) Systems

The entire installation is to operate satisfactorily. Operation of the system with emergency source of power is to be confirmed. In areas where background noise may be high, installation of additional light probes is to be verified. (see 7-1-6/15.9 and 7-1-6/17.1)

### 21.15 Fire and Gas (F&G) Detection System

The entire installation is to operate satisfactorily. Operation of the system with emergency source of power is to be confirmed. In areas where background noise may be high, proper installation of additional light probes is to be verified. Each fire alarm call point is to be activated and proven operational, and each smoke, heat, infra-red detector is to be tested per manufacturer's test procedure. Ventilation shutdowns and closure of fire dampers are to be verified during this test.

### 21.17 Electrical Equipment in Hazardous Areas

All electrical equipment installed in hazardous areas is to be verified in accordance with ABS approved drawings. Upon satisfactory completion of the survey, a final list of electrical equipment is to be produced by the builder, and the list is to be endorsed by the attending Surveyor. ABS endorsed electrical equipment list and hazardous area drawings are to be placed onboard the drilling unit to be used during Survey After Construction.

Where purge air system is used, the purge air system and satisfactory operation of the equipment with its associated alarm is to be confirmed.

For further details, see Section 7-1-7.

### **21.19 Hazardous Area Doors, Ventilation and Alarms**

All doors, ventilators and alarms associated with hazardous areas are to be examined and tested (see Section 7-1-7).

### **21.21 Mud Pit Level Alarm**

See 7-1-8/13.5.

### **21.23 Shutdown of Ventilation Fans and Openings**

Means provided for stopping ventilating fans serving machinery spaces and for closing all doorways, ventilators, annular spaces around funnels and other openings to such spaces are to be tested. These means are to be capable of being manually operated from outside of such spaces in case of fire.

Remote means provided for stopping machinery driving forced and induced draft fans, electric motor pressurization fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps are to be tested. These means are to be situated outside of such spaces in case of a fire arising in the space in which they are located. See 7-1-6/19.1.2.

In addition to the remote shutdowns required above, a means to shutdown the equipment is to be provided within the space itself and tested.

### **21.25 Emergency Shutdown System**

Selective or simultaneous emergency shutdown of all electrical equipment is to be tested and the shutdown sequence is to be in accordance with recommended sequence provided in the drilling unit's Operating Manual (see 4-3-5/7).

### **21.27 Helicopter Deck Lighting**

Operation of the helicopter deck lighting is to be demonstrated. Satisfactory operation the lighting after a black-out condition is also to be confirmed.

### **21.29 Navigation and Obstruction Lights**

Operation of all navigation and obstruction lights is to be confirmed. See 7-1-6/13.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 7 Surveys at Builder's Yard – Hazardous Areas

#### 1 General

This Section pertains to survey of the following items onboard mobile offshore drilling units built at builder's yard/facility, including required onboard testing and trial. The documentation requirements for design review are given Part 4 of these Rules. Following items are to be surveyed and tested in presence of and to the satisfaction of the attending Surveyor, preferably prior to delivery of the drilling unit.

- i) Arrangement of hazardous areas (zones)
- ii) Openings and penetrations affecting the extent of hazardous areas
- iii) Installation and function of access doors and hatches between hazardous areas and adjoining areas/spaces
- iv) Installation and function of ventilation of hazardous areas and adjoining areas/spaces
- v) Installation of machinery in hazardous areas
- vi) Installation of cables and electrical equipment in hazardous areas
- vii) Installation of cables and electrical equipment in paint stores and battery lockers
- viii) Piping systems serving the hazardous areas

Aforementioned items are further referenced in subsequent Subsections of this Section.

#### 1.1 Definitions

For definition of various terms, see 4-3-1/3 and 4-3-6/1 of these Rules.

#### 3 Openings and Penetrations Affecting the Extent of Hazardous Zones

##### 3.1 Openings

Where there is an opening, not fitted with any gas-tight enclosure device, at boundary decks or bulkheads between an area/space categorized as hazardous and a less hazardous or non-hazardous enclosed area/space, the entire area/space categorized as less hazardous will be considered as the same category of the higher category hazardous Zone.

Mitigation of this situation is possible only if the opening is permanently closed, fitted with a bolted gas-tight closure or provided with doors satisfying the arrangements and provisions required by 7-1-7/3.1 through 7-1-7/3.5, as applicable.

Where there is an opening, not fitted with any gas-tight enclosure device, at boundary decks or bulkheads between an area/space categorized as hazardous and a non-hazardous open space, hazardous Zone will extend into the non-hazardous open space. The extended hazardous areas will be categorized as defined in 4-3-6/3 of these Rules, and any machinery or electrical equipment within the extended hazardous area is to be verified as suitable for safe operation for that hazardous Zone.

### 3.3 Penetrations

Any structural, piping or electrical penetration located on a deck or a bulkhead between an area/space categorized as hazardous and a less hazardous or non-hazardous enclosed area/space, is to maintain the gas-tight integrity of the deck or bulkhead.

#### 3.3.1 Testing of Penetrations

Completed penetrations are to be tested to prove the gas-tightness of the boundary. Testing can be carried out by one of the following method:

- i) Hose test (mostly used for structural or piping penetrations)
- ii) An air-flow pressure test (mostly used for Multi-Cable Transit (MCT) penetrations)
- iii) Surface Nondestructive Testing (NDT), such as a dye-penetrant test, if accepted by the Surveyor

## 5 Access and Ventilation Conditions Affecting the Extent of Hazardous Zones

Where access is provided for operational purposes, any enclosed space not referred to under 4-3-6/3.3 or 4-3-6/3.5 and having a direct access to any Zone 1 location or Zone 2 location becomes the same zone as the location, except that:

### 5.1 Enclosed Zone 1 or Zone 2 Space with Direct Access to any Zone 1 Location (see 7-1-7/Figure 1)

#### 5.1.1 Access between Enclosed Zone 1 to any Zone 1 Location

An enclosed Zone 1 space with direct access to a semi-enclosed Zone 1 location is to be fitted with a door opening into the semi-enclosed Zone 1 space.

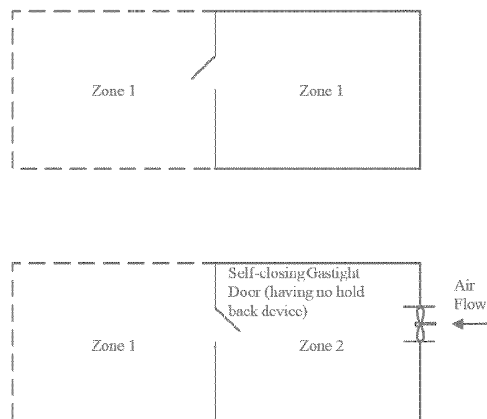
#### 5.1.2 Access between Enclosed Zone 2 to any Zone 1 Location

An enclosed space with direct access to any Zone 1 location is considered as Zone 2, provided all three conditions listed below are met:

- i) The access is fitted with a gas-tight door opening into the zone 2 space; and
- ii) Ventilation is such that the air flow with the door open is from the zone 2 space into the zone 1 location; and
- iii) Loss of positive (+) ventilation in Zone 2 location is alarmed at a normally manned station.

**FIGURE 1**  
**Access to Zone 1 (2012)**

Broken lines represent open, semi-enclosed, or enclosed zone.



Note: Loss of ventilation is to be alarmed at a normally manned station

### 5.3 Enclosed Zone 2 or Non-Hazardous Space with Direct Access to any Zone 2 Location (see 7-1-7/Figure 2)

#### 5.3.1 Access between Enclosed Zone 2 to any Zone 2 Location

An enclosed Zone 2 space with direct access to a semi-enclosed Zone 2 location is to be fitted with a door opening into the semi-enclosed Zone 2 space.

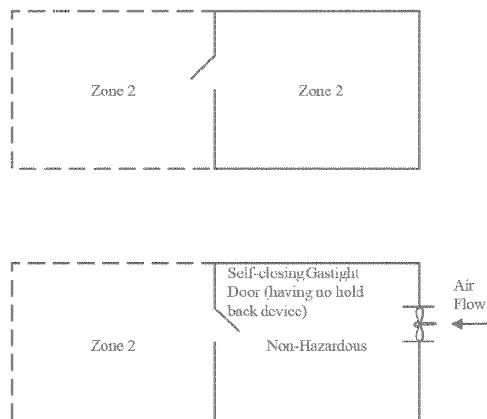
#### 5.3.2 Access between Enclosed Zone 2 to any Non-Hazardous Location

An enclosed space with direct access to any Zone 2 location is considered non-hazardous, provided all three conditions listed below are met:

- i) The access is fitted with self-closing gas-tight door that opens into the non-hazardous space; and
- ii) Ventilation is such that the air flow with the door open is from the non-hazardous space into the Zone 2 locations; and
- iii) Loss of positive (+) ventilation in Non-Hazardous location is alarmed at a normally manned station.

**FIGURE 2**  
**Access to Zone 2 (2012)**

Broken lines represent open, semi-enclosed, or enclosed zone.



Note: Loss of ventilation is to be alarmed at a normally manned station

## 5.5 Enclosed Non-Hazardous Space with Direct Access to any Zone 1 Location (see 7-1-7/Figure 3)

### 5.5.1 Access between Enclosed Zone 1 to any Zone 1 Location

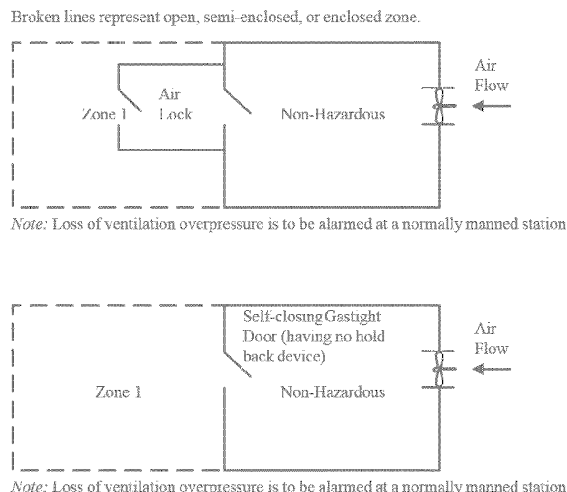
See 7-1-7/5.1.1.

### 5.5.2 Access between Enclosed Non-Hazardous Space to any Zone 1 Location

An enclosed space with access to any Zone 1 location is considered non-hazardous, provided all three conditions listed below are met:

- i) The access is fitted with gas-tight self-closing doors forming an air lock, or a single self-closing gas-tight door which opens toward the non-hazardous space and has no hold-back device; and
- ii) Ventilation is such that the air flow with the door or air lock doors open is from the non-hazardous space into the Zone 1 location (i.e., non-hazardous space has ventilation overpressure in relation to the Zone 1 location); and
- iii) Loss of ventilation overpressure is alarmed at a normally manned station.

**FIGURE 3**  
**Access from Enclosed Non-Hazardous Areas to Zone 1 (2012)**



## 5.7 Doors and Hatches

Any gas-tight door or a hatch on a deck or a bulkhead between an area/space categorized as hazardous and a less hazardous or non-hazardous enclosed area/space, is to maintain the gas-tight integrity of the deck or bulkhead.

Gas-tight doors or hatches are to be tested to prove the gas-tightness of the boundary. Testing can be carried out by one of the following method:

- Hose test (mostly used where there is no machinery or electrical equipment that may be affected by splashing of water)
- An air-flow pressure test (recommended for all gas-tight doors fitted on bulkheads providing direct access mentioned in 7-1-/3.1 through 7-1-7/3.5 of these Rules)

*Note:* Where a gas-tight door is tested per 7-1-7/3.7.3 ii) above, the applied air pressure is to be natural and provided by the ventilation system fitted in each adjoining area/space. During the test, all applicable ventilators are to be fully operational, and the loss of positive (+) and loss of overpressure is to be preferably tested simultaneously with testing of the doors.

Door alarms are to be clearly visible and audible during drilling unit's normal operational noise level.

## 5.9 Ventilation

Ventilation systems for the hazardous and non-hazardous areas are to be in accordance with 4-3-6/7 of these Rules. All ventilation system ducts and associated ventilation alarms are to be examined and tested.

### 5.9.1 Ventilation Ducts

Gas-tight ventilation ducts fabricated to maintain either positive or negative internal pressure, as required, are to be subjected to appropriate testing of the ducts, to verify its tightness, after installation onboard the drilling unit and prior to function testing of the ventilation system and its alarms required by 7-1-7/5.1 through 7-1-7/5.5 of these Rules.

### 5.9.2 Non Sparking Ventilation Fans

Fans used for the ventilation of the hazardous areas are to be of non-sparking construction in accordance with 4-3-3/9.7 and 4-6-3/11.7 of these Rules.

Type tests on non-sparking fans are to be carried out using an acceptable national or international standard. Such type test reports are to be made available when requested by the Surveyor.

#### 5.9.3 Loss of Ventilation/Overpressure Alarms

Where fitted, loss of ventilation and ventilation overpressure alarms are to be clearly visible and audible at local site and at the control stations during drilling unit's normal operational noise level.

## 7 Machinery Installations

Where installed in hazardous areas, machinery installation is to comply with 4-3-6/9 of these Rules.

## 9 Equipment and Installation in Hazardous Area

Where installed in hazardous areas, all electrical cables and equipment are to comply with 4-3-6/9 of these Rules.

All electrical equipment installed as referenced in the drawings required by 4-3-3/1.5 of these Rules and reviewed by ABS are to be verified for its satisfactory installation, and in compliance with these Rules. Upon satisfactory completion of the survey, a final list of electrical equipment is to be produced by the builder, and the list is to be endorsed by the attending Surveyor. ABS endorsed electrical equipment list and hazardous area drawings are to be placed onboard the drilling unit to be used during Survey After Construction.

### 9.1 General

#### 9.1.1 Cables Installation

Installation of electrical cables is to be in compliance with 4-3-3/9.1.4 of these Rules.

#### 9.1.2 Lighting Circuits

Installation of lighting circuits is to be in compliance with 4-3-3/9.1.5 of these Rules. The switches and protective devices for lighting fixtures are to be suitably labeled for identification purposes.

#### 9.1.3 Permanent Warning Plates

Permanent warning plates are to be installed in the vicinity of hazardous areas in which electrical equipment is installed, such as pump room, to advise personnel carrying out maintenance, repair or surveys of availability of the booklet/list of equipment in hazardous areas referenced in 4-3-3/1.5, if required for their use.

### 9.3 Certified-Safe Type and Pressurized Equipment and Systems

Where permitted by the Rules and approved for installation, all electrical equipment of certified-safe type equipment are to be type-tested and certified by a competent independent testing laboratory as suitable for hazardous areas and the product satisfies the design so tested and approved. Certificates are to be readily available to the Surveyor.

#### 9.3.1 Intrinsically-Safe (IS) System

Intrinsically-Safe System is to be in compliance with 4-3-3/9.3.2 of these Rules.

The sub-compartment to separate intrinsically-safe components from non-intrinsically-safe systems, as required by 4-3-3/9.3.2(b), is to have an identifying nameplate indicating that the equipment within is intrinsically safe and that unauthorized modification or repairs are prohibited.

#### 9.3.2 Pressurized Equipment

Pressurized equipment is to be in compliance with 4-3-3/9.3.3 of these Rules.

Where pressurized/purged air system is used, the purge air system and operation of the pressurized/purged equipment with its associated loss of power or the ventilation and alarms provided are to be tested for compliance with 4-3-3/9.3.3 of these Rules.

### 9.5 Electrical Equipment used After Rig Shutdown

As stated in 4-3-5/7.1 of these Rules, all electrical equipment in exterior locations which is capable of operation after the rig shutdown is to be verified suitable for installation in Zone 2 locations.

The equipment installed or used on exterior locations of the rig and required after a rig shutdown includes but not limited to; emergency lighting, general alarm system, blow-out preventer control system, public address system, and distress and safety radio communications.

### 11 Paint Stores and Battery Lockers

Arrangement of access, ventilation and electrical equipment installed in the paint stores and battery lockers are to comply with 4-3-3/9.5 and 4-3-3/3.7 of these Rules respectively.

### 13 Piping and Installation in Hazardous Area

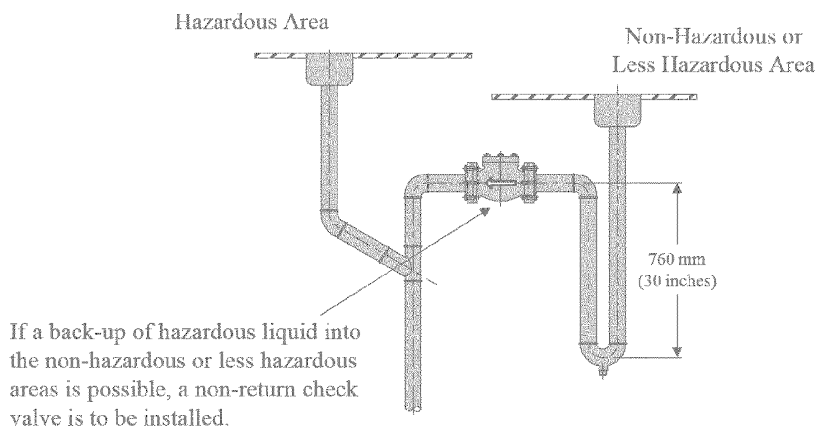
Piping systems carrying non-hazardous fluids are to be segregated from piping systems which may contain hazardous fluids. Cross connection of the piping systems may be made where means for avoiding possible contamination of the non-hazardous fluid system by the hazardous medium are provided.

Piping systems such as drains and scuppers originating in a hazardous area are to be led to hazardous collection facility/tank. Hazardous drains need not be separated from non-hazardous drains, provided the connections do not create an unsafe condition where the back-up of hazardous liquids and gases into non-hazardous areas may be possible.

#### 13.1 Installation of Loop-Seal and Non-Return Check Valve

Where an unsafe condition, due to interconnection of hazardous and non-hazardous piping or less hazardous piping, is possible non-hazardous or less-hazardous drains are to be fitted with a loop-seal to trap hazardous gases. If back-up of hazardous liquid into the non-hazardous or less hazardous areas is possible, a non-return check valve is to be installed. Height of the loop-seal is to be not less than 760 mm (30 inches) and the check valve is to be fitted downstream of the seal (see 7-1-7/Figure 4). Both the seal and the valve are to be accessible for maintenance by crew.

**FIGURE 4**  
**Typical Drain Connection (2012)**



### 13.3 Extent of Hazardous Areas

Piping systems such as sounding pipes and air vents of a non-hazardous space, originating or terminating in hazardous space will cause the safe area to become hazardous and designated as same zone as the hazardous space. Installation of all such piping is to prevent safe areas from becoming hazardous.

### 13.5 Electrically Conductive Plastic Piping in Hazardous Areas

Regardless of the fluid being conveyed, plastic piping passing through a hazardous area is to be electrically conductive. The resistance per unit length of the pipes and fittings is not to exceed  $1 \times 10^5$  ohm/m ( $3 \times 10^4$  ohm/ft). See also 4-2-2/7.7.4.

If the pipes and fittings are not homogeneously conductive, the conductive layers are to be protected against the possibility of spark damage to the pipe wall.

Installation of electrically conductive plastic pipe is to be tested to confirm compliance with the following:

- i) The resistance to earth (ground) from any point in the system is not to exceed 1 megohm. The resistance is to be checked in the presence of and to the satisfaction of the Surveyor.
- ii) Where used, earthing wires or bonding straps are to be accessible for inspection. The Surveyor is to verify that they are in visible locations.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 8 Surveys at Builder's Yard – Fire and Safety

#### 1 General

This Section pertains to surveys and testing to be carried out on fire and safety features during construction, installation and testing of mobile offshore drilling units at builder's yard/facility. The documentation requirements for design review are given Part 5 of these Rules.

ABS Surveyor attendance is required, typically for the following purposes. All surveys and testing is to be carried out in presence of and to the satisfaction of the attending Surveyor, prior to the sea trial.

#### 1.1 Administration Certification

When an Administration or its Agent other than the ABS, issues the IMO Mobile Offshore Drilling Unit Safety Certificate to a drilling unit, such certificate will be accepted as evidence that the unit is in compliance with the requirements of 7-1-8/5. In all other cases, the required information and plans are to be reviewed by ABS, and surveys completed by ABS Surveyors.

#### 3 Surveys of Fire and Safety Features

All fire and safety features required by this Section are to be installed and tested in accordance with the Rules or recognized standards to the satisfaction of the attending Surveyor.

Structural fire protection details, materials and methods of construction are to be in accordance with the *International Code for Application of Fire Test Procedures (Resolution MSC.61(67)) (FTP Code)*, as applicable, and SOLAS Regulations II-2/5.3 and II-2/6, as applied to cargo ships.

ABS reviewed booklet of the standard passive and active fire protection practices and details, including such items as fire insulation installation and supports, bulkhead and deck penetrations of pipes, cables and ventilation trunks, joiner details, fire damper installation, etc., as applicable, is to be available to the attending Surveyor. Where penetration methods for A- or B-class decks or bulkheads are shown, an evidence of approval by an Administration signatory to 1974 SOLAS as amended is also to be available.

The quality control program for the fire and safety features of a drilling unit is to at least include the following items, as appropriate:

- i) Material quality and traceability
- ii) Inspection of passive fire protection system
- iii) Inspection and testing of active fire protection systems
- iv) Inspection and testing of fire-extinguishing systems
- v) Inspection and testing of fire and gas detection systems
- vi) Inspection and testing of ventilation systems
- vii) Inspection and testing of shutdown arrangements

## 5 Passive Fire Protection Systems

All passive fire protection systems are to be in accordance with ABS reviewed plans and in compliance with this Subsection.

All mobile offshore drilling units are to meet the requirements of this Subsection with regard to structural fire protection, protection of accommodation spaces, service spaces and control stations.

### 5.1 Structural Fire Protection

#### 5.1.1 Construction Materials

All steel material used for construction is to be certified in accordance with Section 7-1-2 of these Rules. Material other than steel is to be provided with manufacturer's certification of compliance, and be readily available to the attending Surveyor.

Installation of materials, which contain asbestos is prohibited.

#### 5.1.2 Fire Integrity of Bulkheads and Decks

Bulkheads and decks are to be built and protected in compliance with applicable Paragraphs of 5-1-1/3 of these Rules including associated Tables defining fire integrity of bulkheads and decks, and in accordance with ABS reviewed drawings. These requirements apply to all permanent structures and temporary or portable accommodation (including workspaces).

Fire integrity of bulkheads and decks are to be confirmed only after the bulkheads and decks are satisfactorily examined and tested for structural purposes.

#### 5.1.3 Fire Resistance of Bulkheads and Decks

Fire resistance of bulkheads and decks are to be satisfactorily maintained when;

- i) "A" and "B" class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc.
- ii) "A" class divisions are penetrated for girders, beams or other structural members, or
- iii) "B" class divisions are penetrated for the fitting of ventilation terminals, lighting fixtures and similar devices.

Pipes penetrating "A" or "B" class divisions are to be of materials approved by the Administration, having regard to the temperature that such divisions are required to withstand.

For pipe penetration details on "A" class bulkheads and decks, see 5-1-1/3.21 and Fig.1 of these Rules. For pipe penetration details on "B" class bulkheads and decks, see 5-1-1/3.23 and Fig.2 of these Rules.

All of the above mentioned penetrations are to be examined and tested as deemed necessary by the Surveyor. Pipe penetrations through "A" class divisions may be tested with surface NDT.

#### 5.1.4 Structural Fire Protection Details in way of Intersections, Joints and Penetrations

Whilst examining the fire integrity of bulkheads and decks, special attention is to be paid to the structural fire protection details in way of joints and penetrations. Areas in way of intersection or terminal joints and penetrations of all types are to avoid the risk of heat transmission. Unless specifically indicated otherwise on drawings, where protection against heat transmission is required, an extension of insulation by a minimum 450 mm (18 in.) beyond the intersections or terminal points is to be installed. For further details, see 5-1-1/3.13 of these Rules.

Structural fire protection of joints and penetrations is to be applied, preferably when fire integrity is confirmed by the Surveyor and only after bulkheads and decks are satisfactorily examined and tested for structural purposes.

#### 5.1.5 Windows and Side-scuttles

Windows and side-scuttles are to be examined for compliance with 5-1-1/3.15 of these Rules, and installation in accordance with ABS reviewed drawings.

#### 5.1.6 Fire Doors

Fire doors are to be examined for compliance with 5-1-1/3.17 of these Rules, and installation in accordance with ABS reviewed drawings. For conditions of accepting installation of watertight doors in fire tight boundaries, see 5-1-1/3.17. Record of tests in accordance with Fire Test Procedure Code (Resolution MSC.61(67)) are to be available to the Surveyor.

Where the self-closing fire doors are allowed to be fitted with hold-back hooks that incorporate remote release fittings of the fail-safe type, the remote-release mechanism is to be tested.

### 5.3 Protection of Accommodation Spaces, Service Spaces and Control Stations

Protection of all accommodation spaces, service spaces, and control stations are to be examined and verified for compliance with ABS reviewed drawings. Following items are to be subjected to visual examination and testing as required:

#### 5.3.1 Accommodation Bulkheads

All accommodation bulkheads are to be examined prior to their enclosure behind joiner work. For further details see 5-1-1/5.3 and 5-1-1/5.5 of these Rules.

#### 5.3.2 Stairs and Stairways

All stairs and stairways are to be examined prior to their enclosure behind joiner work. For further details, see 5-1-1/5.7 and 5-1-1/5.9 of these Rules.

All self-closing doors are to be tested for proper closure without any external force.

#### 5.3.3 Draft Stops

All draft stops required by 5-1-1/5.11 of these Rules are to be examined prior to closing behind joiner work. Structure, piping or electric cables penetrations through draft stops are to maintain the integrity of the draft stop. Fire protection drawings reviewed by the ABS is to be used as guidance for installation and penetration details.

#### 5.3.4 Insulation and Framing Materials

All insulation and framing material are to be examined. For further details, see 5-1-1/5.13 and 5-1-1/5.15 of these Rules.

#### 5.3.5 Low Flame-Spread Surfaces

Following surfaces are to have low flame-spread characteristics:

- i) All exposed surfaces in corridors and stairway enclosures
- ii) Surface in concealed or inaccessible spaces
- iii) Exposed surfaces of ceilings

#### 5.3.6 Veneers

Where bulkheads, linings and ceilings are covered with combustible veneers, they are to be in compliance with 5-1-1/5.19 of these Rules. Where veneers are used, appropriate certificates are to be available to the Surveyor.

#### 5.3.7 Primary Deck Coverings

Primary deck coverings, if applied (see 5-1-1/5.21 of these Rules), are to be of approved materials which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures. Where deck covering is used, appropriate certificates are to be available to the Surveyor.

#### 5.3.8 Coating of Exposed Interior Surfaces

Paints, varnishes and other finishes used on exposed interior surfaces are not to be of a nature to offer an undue fire hazard and are not to be capable of producing excessive quantities of smoke or toxic fumes (see 5-1-1/5.23 of these Rules). Where exposed interior surfaces are coated, appropriate certificates are to be available to the Surveyor.

- 5.3.9 Ventilation Ducts  
Ventilation ducts are to be examined and tested for compliance with ABS reviewed drawings, and they are to be in compliance with 5-1-1/5.25 of these Rules.
- 5.3.10 Ventilation Ducts Penetrating "A" Class Divisions  
Ventilation ducts penetrating "A" class divisions are to be verified for compliance with ABS reviewed drawings and 5-1-1/5.27 of these Rules, as applicable. Where provided, all ventilation dampers are to be examined and tested.
- 5.3.11 Ventilation Ducts for Machinery Spaces Cat. 'A', Hazardous Areas, and Galleys  
Construction and arrangement of ventilation ducts serving the machinery spaces of Cat. 'A', hazardous areas, and galleys are to be examined and tested for compliance with ABS reviewed drawings and 5-1-1/5.29 of these Rules.  
Where provided, all ventilation dampers are to be examined and tested.
- 5.3.12 Ventilation Ducts for Accommodation and Service Spaces or Control Stations  
Construction and arrangement of ventilation ducts for accommodation and service spaces or control stations are to be examined and tested for compliance with ABS reviewed drawings and 5-1-1/5.31 of these Rules.  
Where provided, all ventilation dampers are to be examined and tested.
- 5.3.14 Ventilation Ducts Penetrating "B" Class Divisions  
Ventilation ducts penetrating "B" class divisions are to be verified for compliance with ABS reviewed drawings and 5-1-1/5.33 of these Rules.
- 5.3.15 Exhaust Ducts from Galley Ranges and Galleys  
Construction and arrangement of exhaust ducts from galley ranges and the galleys are to be verified for compliance with ABS reviewed drawings, and 5-1-1/5.35 and 5-1-1/5.37 respectively.
- 5.3.16 Closure of Ventilation Systems  
Closure of all main inlets and outlets of the ventilation system are to be verified as being fitted outside the space being ventilated.
- 5.3.17 Stopping of Power Ventilation  
Power ventilation of accommodation spaces, service spaces, control stations, machinery spaces and hazardous areas are to be verified for compliance with 5-1-1/5.41 of these Rules, and their means of stopping ventilation are to be tested.:
- 5.3.18 Windows and Sidescuttles in "A-60" Boundaries  
Where windows and/or sidescuttles are fitted on "A-60" bulkheads which face the drill floor area, they are to be verified for compliance with 5-1-1/5.43 of these Rules.  
Where they are fitted with shutters or water curtain, arrangements are to be function tested.
- 5.3.19 Arrangement of Ventilation for Accommodation Spaces and Control Stations  
The ventilation for accommodation spaces and control stations are to be arranged in such a way as to prevent the ingress of flammable, toxic or noxious gases, or smoke from surrounding areas.
- 5.3.20 Air Balancing Ducts (Jumper Ducts)  
Where air balancing ducts are fitted, compliance with 5-1-1/47 of these Rules is to be verified.

## 7 Active Fire Protection – Fixed Systems

All active fire protection – fixed systems are to be in accordance with ABS reviewed plans and in compliance with this Subsection.

All mobile offshore drilling units are to meet the requirements of this Subsection with regard to fire control plans, fire pumps, fire main, hydrants, fire hoses, nozzles and international shore connections.

### 7.1 Fire Control Plan

Onboard provision of an approved fire control plans in compliance with 5-2-1/3.3 is to be verified. Where last-minute minor changes are necessary and the fire control plan is submitted to ABS engineering for final approval, the Surveyor may verify the submitted plan, endorse it to signify its correctness, and the drilling unit may use this plan until the ABS reviewed copy is received onboard.

*Note:* The use of Surveyor-endorsed fire control plan per the above, is not considered to be an outstanding.

### 7.3 Fire Pumps

There are to be at least two independently-driven fire pumps. Following items affecting suitability and performance of the fire pumps installed onboard and in compliance with 5-2-2/1.1 of these Rules are to be verified:

- i) Examination of all certified fire pumps
- ii) Verification of location and operation of the fire pumps
- iii) Where provided, examination and testing of other type pumps used for active fire protection
- iv) Verification of the output pressure at hydrants
  - Note:* Pressure is to be at least 3.5 bar (3.5 kgf/cm<sup>2</sup>, 50 psi) at the hydrant, and the maximum pressure at any hydrant shall be such that the effective control of a fire hose can be demonstrated.
- v) Testing of the fire pump capacity
  - Note:* Capacity is to be demonstrated and satisfy 5-2-2/1.1.5 of these Rules.
- vi) Where installed, testing of the relief valves (per 5-2-2/1.1.6 of these Rules)
- vii) Where installed, installation and testing of intermediate tank water supply (per 5-2-2/1.1.7 of these Rules)
- viii) Where fire pumps take suction from a pressurized water main system (i.e., a system not utilizing an intermediate tank supply as on self elevating units), arrangement and precautions required by 5-2-2/1.1.8 are to be verified.

### 7.5 Fire Main

The fire main system is to be examined and tested for compliance 5-2-2/1.3 of these Rules and verified in accordance with approved drawings.

### 7.7 Hydrants, Hoses, Nozzles and International Shore Connection

All hydrants, hoses nozzles, and the international shore connections are to be examined and tested as necessary for compliance 5-2-2/1.5 of these Rules and verified in accordance with approved drawings.

#### 7.7.1 Hydrants

The number and position of the hydrants are to be physically verified after completion and installation of structure, machinery and equipment onboard the drilling unit.

*Note:* Confirming that a single length of hose may reach any part of the unit normally accessible to the crew while the drilling unit is being operated, is to be confirmed by actual measurements, to the extent deemed necessary by the Surveyor.

#### 7.7.2 Hoses

All fire hoses are to be in compliance with 5-2-2/1.5.2 of these Rules and provided with couplings and nozzles. Additionally, at least one complete fire hose assembly is to be carried as a spare.

Certification of fire hoses by a competent independent testing laboratory as being constructed of nonperishable material to recognized standard is to be verified.

The hoses are to be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Fire hoses are to have a length of at least 10 m, but not more than:

- i) 15 m in machinery spaces
- ii) 20 m in other spaces and open decks
- iii) 25 m for open decks with a maximum width in excess of 30 m

See "Note" of 7-1-8/7.7.1 for required verification.

All fire hoses may be subjected to leak test as deemed necessary by the Surveyor before they are placed onboard the drilling unit and used as part of the commissioned active fire protection system. In general, this test may be done either before trials per Section 7-1-9 of these Rules or delivery of the drilling unit.

#### 7.7.3 Nozzles

Dual purpose combined jet spray nozzles fitted throughout the unit, and in compliance with 5-2-2/1.5.3 of these Rules, are to be verified.

#### 7.7.4 International Shore Connection

For surface type drilling units, international shore connections fitted and in compliance with 5-2-2/1.5.4 of these Rules, are to be verified.

## 9 Active Fire Protection – Additional Fixed Systems

All additional active fixed fire protection systems fitted in accordance with 5-2-3/1 of these Rules are to be in accordance with ABS reviewed plans and in compliance with this Subsection.

All mobile offshore drilling units are to meet the requirements of this Subsection with regard to the additional fixed fire fighting systems, particularly gas smothering, foam system, water spraying, protection of helicopter decks, and protection of paint and flammable liquid lockers, where fitted.

### 9.1 Gas Smothering System

All additional active fixed fire protection systems fitted in accordance with 5-2-3/1 of these Rules are to be in accordance with ABS reviewed plans.

#### 9.1.1 Storage of Gas Smothering Medium

Storeroom for storage of gas smothering medium is to be located and effectively ventilated in compliance with 5-2-3/3 of these Rules.

#### 9.1.2 Fire-Extinguishing Gas Alarm

Means are to be provided for automatically giving audible warning of the release of fire extinguishing gas into any space to which personnel normally has access. The alarm is to operate for at least a 20-second period before the gas is released. Alarms may be pneumatically (by the extinguishing medium or by air) or electrically operated. Operation of alarms is to be arranged in accordance with 5-2-3/3.1.3 of these Rules and tested.

#### 9.1.3 Controls

Arrangement of independent manual controls is to be verified, and the controls are to be tested.

#### 9.1.4 Carbon Dioxide Systems

In addition to the applicable requirements of the Rules, fixed carbon dioxide fire extinguishing systems are to be in accordance with Chapter II-2, Regulations 10.4.2 and 10.4.3 of the International Convention for the Safety of Life at Sea (SOLAS) 1974 and Amendments in force, and with Chapter 1.4 and Chapter 5 of the International Code for Fire Safety Systems. Fixed low pressure carbon dioxide systems are to be in accordance with 4-7-3/3.5 of the *Steel Vessel Rules*.

Installation of the CO<sub>2</sub> system is to be examined in accordance with reviewed drawings and the system subjected to function testing with a gas safe for human health.

### 9.3 Foam System

Where fitted, installation of the foam system is to be examined in accordance with reviewed drawings and function tested.

#### 9.3.1 Fixed High Expansion Foam Systems

In addition to the applicable requirements of the Rules, fixed high expansion foam systems are to be in accordance with Chapter 6.2.1 and 6.2.2 of the International Code for Fire Safety Systems.

Fixed foam fire-extinguishing systems using inside air are to be designed, constructed and tested in accordance with the requirements identified in MSC.1/Circ. 1271 *Guidelines for the Approval of High-Expansion Foam Systems Using Inside Air for the Protection of Machinery Spaces and Cargo Pump-Rooms*.

Foam concentrates are to be of an approved type.\*

\* *Note:* Reference is made to the International Maritime Organization MSC/Circular 670 "Guidelines for the Performance and Testing Criteria, and Surveys of High-Expansion Foam Concentrates for Fixed Fire-Extinguishing Systems."

#### 9.3.2 Low Expansion Foam System

Low expansion foam systems may be fitted in machinery spaces in addition to the required fixed fire extinguishing system.

In addition to the applicable requirements of the Rules, fixed low expansion foam systems are to be in accordance with Chapter 6.2.1 and 6.2.2 of the International Code for Fire Safety Systems. Foam concentrates are to be of an approved type.\*\*

\*\* *Note:* Reference is made to the International Maritime Organization MSC/Circular 582 "Guidelines for the Performance and Testing Criteria, and Surveys of Low-Expansion Foam Concentrates for Fixed Fire-Extinguishing Systems."

### 9.5 Fixed Pressure Water Spraying Systems

In addition to the applicable requirements of the Rules, fixed water spraying systems are to be in accordance with Chapter 7 of the International Code for Fire Safety Systems.

Installation of the fixed pressure water spraying system is to be examined in accordance with reviewed drawings and the system function tested using fresh water. Where use of water may cause physical damage to surrounding outfit, machinery or equipment, testing with an alternate test medium may be accepted by the Surveyor.

### 9.7 Protection of Helicopter Decks

Where areas of a unit are designated for helicopter operations, details of the facilities are to be in accordance with reviewed drawings and provision of firefighting systems referenced in 5-2-3/9.3 and 5-2-3/9.5 are to be verified as being stored near the access to those areas.

Deckhouse tops directly below helicopter decks are to be verified as to not having any opening that could allow flammable liquid from the helideck to enter the deckhouse. See 4-2-6/17 for helicopter deck drainage.

#### 9.7.1 Helicopter Decks with No Refueling Capability

Provision and arrangement of fire fighting equipment in compliance with 5-2-3/9.3 of these Rules, are to be verified.

#### 9.7.2 Helicopter Decks with Refueling Capability

Provision and arrangement of fire fighting system in compliance with 5-2-3/9.5 of these Rules, are to be verified.

Function of the fixed-foam system is to be demonstrated and the rate of delivery of the foam solution is to be measured.

### 9.9 Paint and Flammable Liquid Lockers

Fire-extinguishing systems for paint and flammable liquid lockers or any similar service spaces used for the storage of flammable liquids (such as solvents, adhesives, lubricants etc.) provided in compliance with 5-2-3/11 of these Rules and installed in accordance with reviewed drawings, are to be examined and tested.

## 11 Active Fire Protection – Portable Fire Fighting Systems

All portable fire fighting equipment fitted in accordance with Section 5-2-4 of these Rules are to be in accordance with ABS reviewed plans and in compliance with this Subsection.

All mobile offshore drilling units are to meet the requirements of this Subsection with regard to portable fire extinguishers and sand, and fireman's outfit.

### 11.1 Portable Fire Extinguishers and Sand

#### 11.1.1 Portable Fire Extinguishers

Installation of all portable and semi-portable extinguishers provided in the quantities and locations indicated in 5-2-4/Table 1 and 5-2-4/Table 2 are to be verified, and confirmed to be visible and readily accessible.

#### 11.1.2 Sand

On self-propelled units fitted with main or auxiliary oil-fired boilers, each boiler space is to be provided with a receptacle containing at least 0.28 m<sup>3</sup> (10 ft<sup>3</sup>) of sand, sawdust impregnated with soda or other dry material suitable for extinguishing oil fires. Alternatively, an approved portable extinguisher may be substituted as indicated in ABS reviewed plans.

### 11.3 Firefighter's Outfit

All firefighter outfits installed as indicated on ABS reviewed plans, are to be verified for compliance with 5-2-4/3 of these Rules. Every firefighter's outfit is to be provided with a breathing apparatus, a lifeline, a safety lamp, an axe, nonconductive boots and gloves, a rigid helmet and protective clothing as required by 5-2-4/3 of these Rules.

If provided, the apparatus for recharging air cylinders is to be confirmed to be in compliance with 5-2-4/3.5 of these Rules, and the recharging capacity is to be tested to confirm that it meets the requirements of SOLAS regulation II-2/10.10.2.6.

## 13 Fire Detection and Alarm Systems

Fire detection and alarm systems installed in accordance with ABS reviewed plans, are to be examined and tested for compliance with 5-2-5/1 of these Rules.

Other alarms systems, such as the general alarm system, ventilation alarms and mud tank/pit level alarms fitted onboard the drilling unit, installed in accordance with ABS reviewed plans, are to be examined and tested for compliance with 5-2-5/1 of these Rules.

### 13.1 Testing of Alarm Systems

Thorough examination and testing of the fire detection and other alarm systems are to be carried out, preferably before the drilling unit commences its trials per Section 7-1-9 of these Rules. This is to at least include testing of all detectors, manual fire alarm actuators, general alarms (including the public address system), fire-detection indicator boards, and ventilation alarms. Remaining alarms may be tested before delivery.

## 15 Flammable Gas Detection and Alarm Systems

Flammable gas detection and alarm systems installed in accordance with ABS reviewed plans, are to be examined and tested for compliance with 5-2-5/3 of these Rules.

Thorough examination and testing of the system and associated alarms are to be carried out, preferably before the drilling unit commences its trials per Section 7-1-9 of these Rules. This is to include testing of all detectors and gas-detection indicator boards.

### 15.1 Hydrogen Sulfide (H<sub>2</sub>S) Detection and Alarm System

Location and alarms of the fixed automatic hydrogen sulfide gas detection and alarm system is to be verified and tested (See 5-2-5/3.1 and 5-3-1/7).

It is to be confirmed that if the alarm at the emergency control station is unanswered within 2 min, the toxic gas (hydrogen sulfide) alarm and the helideck status light are automatically activated.

In addition to the fixed automatic hydrogen sulfide gas detection, minimum of two portable hydrogen sulfide gas monitoring devices are to be provided on the unit.

## 17 Outfitting

Outfitting items fitted onboard the drilling unit, such as the systems covered by this Subsection are to be in accordance with ABS reviewed plans and in compliance with this Subsection.

Thorough examination of the means of escape, means of access and egress, and guards and rails fitted along the routes is to be carried out, before the drilling unit commences its trials per Section 7-1-9 of these Rules.

### 17.1 Means of Escape

Arrangement of escape routes from accommodation spaces, service spaces and control stations, from category 'A' machinery spaces, from other machinery spaces, superstructures or deckhouses, together with stairways or ladders in way of any escape route, and the accessibility and access through the routes, are to be in accordance with 5-3-1/1 of these Rules.

#### 17.1.1 Gratings in way of Escape Routes

If deck gratings are used along designated escape route(s) in manned areas, category 'A' machinery spaces, other machinery spaces, or from the superstructure and deckhouses to the survival craft embarkation areas, material of grating is to be of steel.

Gratings made of material other than steel, such as Fiber Reinforced Plastics (FRP), may be used, provided the grating material meets the design criteria similar to requirements contained in Section 4-2-2 of these Rules.

- i) Fire endurance of non-steel gratings used in way of escape routes of open decks and spaces that may be directly subjected to hydrocarbon fire, is to meet requirements of "Level 1" fire endurance standard (I.1).
- ii) Fire endurance of non-steel gratings used in way of escape routes of open decks and spaces that may not be directly subjected to hydrocarbon fire, is to meet requirements of "Level 2" fire endurance standard (I.2).

Manufacturer's material test reports for any L1 and L2 grating material are to be available to the attending Surveyor.

Gratings made of material other than steel may be used in spaces (e.g. walkways in service spaces, normally unmanned spaces, mud pit rooms, machinery maintenance decks/platforms, etc.) that are not along the designated escape route, provided the grating material meets the design criteria similar to requirements contained in Section 4-2-2 of these Rules and requirements of "Level 3" fire endurance standard (L3).

### 17.3 Means of Access and Egress

The means of access and egress is to be verified for compliance with 5-3-1/3 of these Rules.

### 17.5 Guards and Rails

All guards and rails provided along floor deck areas and openings, and helicopter landing deck is to be verified for compliance with 5-3-1/5 of these Rules.

### 17.7 Emergency Control Stations

Emergency control stations are to be verified for compliance with 5-3-1/7 of these Rules.

Testing of contact makers to activate the General Alarm (GA) system, communication system between the control stations and all locations vital to the safety of the unit, and emergency shut-down facilities (see 7-1-8/19 of these Rules) are to be carried out, before the drilling unit commences its trials per Section 7-1-9 of these Rules.

### 17.9 Arrangements in Machinery Space

Examination and testing, as applicable, for the following arrangements/items are to be carried out, before the drilling unit commences its trials per Section 7-1-9 of these Rules.

- i) Ventilating fans and openings to be examined and tested (see 5-3-1/9.1 of these Rules)
- ii) Other auxiliaries (see 5-3-1/9.3 of these Rules)
- iii) Oil tank suction pipes (see 5-3-1/9.5 of these Rules)
- iv) Oil fuel unit (see 5-3-1/9.7 of these Rules)

### 17.11 Segregation of Fuel Oil Purifiers

Installation of purifiers and fire and safety provisions provided for enclosed spaces containing the purifiers are to be examined for compliance with 5-3-1/11 of these Rules.

The examination and any testing required is to be carried out, before the drilling unit commences its trials per Section 7-1-9 of these Rules.

### 17.13 Fire Precautions for Machinery Spaces

Fire precautions taken in machinery spaces, as required by 5-3-1/15 of these Rules, are to be examined. The examination is to be carried out, before the drilling unit commences its trials per Section 7-1-9 of these Rules.

## 19 Emergency Shutdown Arrangements

### 19.1 Arrangements and Services

Arrangements are to be provided for the disconnection or shutdown, either selectively or simultaneously, of all electrical equipment and devices, including the emergency generator, except for the services listed under 7-1-8/19.1.2 from the emergency control station. Initiating of the above shut-downs may vary according to the nature of the emergency. A recommended sequence of shut-downs is to be provided in the unit's operating manual.

*Note:* In the case of units using Dynamic Positioning System (DPS) as the only means of position keeping, special consideration may be given to the selective disconnection or shutdown of machinery and equipment associated with maintaining the operability of the DPS in order to preserve the integrity of the well.

#### 19.1.1 Operation After Shutdown

The following services are to be operable after an emergency shutdown:

- i) Emergency lighting required by 7-1-6/5.3ii) and 7-1-6/5.3vii) for half an hour
- ii) General Alarm (GA) system
- iii) Blow-Out Preventer (BOP) control system
- iv) Public Address (PA) system
- v) Distress and safety radio communications

All equipment in exterior locations which is capable of operation after shutdown is to be suitable for installation in Zone 2 locations.

## PART

# 7

## CHAPTER 1 Surveys During Construction

### SECTION 9 Surveys at Builder's Yard – Sea Trial

#### 1 General

A sea trial procedure is to be developed by the builder and submitted to the attending Surveyor for review and comments, well in advance, prior to commencement of the trial.

A pre-planning meeting in presence of the attending Surveyor(s) is to be carried out prior to the sea trial to at least confirm the following:

- Sea trial procedure to be followed
- Sea trial schedule and estimated duration of tests to be carried out during the sea trial
- Key personnel from the builder, owner, operator, and any other representative
- Any specific test to be carried out that may be outside the scope of classification

During sea trial of a drilling unit, the operation of machinery, electrical systems and safety features required by these Rules is to be demonstrated to the satisfaction of the attending Surveyor(s). **Complete function tests are to be carried out, including duration runs and tests for operation of all protective devices and stability tests for control**, in presence of and to the satisfaction of the attending Surveyor(s).

If the drilling unit is self-propelled, maneuvering tests which should include a reversal of the drilling unit from full speed ahead to full speed astern, is also to be carried out in presence of and to the satisfaction of the attending Surveyor(s).

#### 3 Stability Test

A stability test is required to be performed on every vessel. The American Society and Materials Standard (ASTM) Guide for conducting stability tests, “*Standard Guide for Conducting a Stability Test (Inclining and Lightweight Survey) to Determine the Light Ship Displacement and Centers of Gravity of a Vessel*” may be used for conducting stability test.

A stability test, in accordance with a procedure accepted by an ABS engineering office, is to be carried out in protected waters, and in presence of and to the satisfaction of the attending Surveyor before commencement of the sea trial. The Surveyor is then to attest to the satisfactory performance of the experiment in a report to the ABS engineering office for evaluation.

For a subsequent drilling unit, in a series built from the same set of drawings of an inclined drilling unit, the requirement for an Inclining Experiment may be waived, provided:

- A “weights and centers” calculation is prepared, indicating the differences between the subsequent and the inclined drilling unit, and
- The calculated light ship properties are subsequently confirmed by a Lightweight Survey witnessed by an ABS Surveyor and found to be within the limits specified in SOLAS Regulation II-1/B-1(5.2), unless indicated otherwise by the Flag Administration. If the limits specified are exceeded, the Flag Administration is to be contacted to determine the acceptability of such a deviation.

## 5 Safety

Sea trial can not be commenced in presence of an ABS Surveyor unless the Surveyor agrees with the builder that suitable safety precautions are taken onboard the drilling unit. This may include but not limited to the verification of following items by the attending Surveyor:

- Operational preparedness of any additional portable fire extinguishing placed onboard
- Posting of temporary fire control and safety plans to be used during the sea trial
- Satisfactory condition and installation of life saving appliances for the sea trial personnel, particularly if the number of personnel exceeds the drilling unit's Persons On Board (POB) capacity
- "Abandon Unit Drill" with entire sea trial personnel
- "Fire Drill" with designated fire fighters

An exemption to any of the above is the responsibility of the Coastal State Authority, and if an exemption is issued, the written exemption is to be made readily available to the attending Surveyor for evaluation.

## 7 Hull Structure Testing

As mentioned in 7-1-2/1, hull structure testing such as hydrostatic testing and hull structural testing of tanks may be carried out during the sea trial. Provided it is to be agreed upon by the attending Surveyor before the commencement of the sea trial, if the tank boundaries were previously subjected to satisfactory air test, complete filling of water ballast tanks during the ballast trial may be accepted as the hull structure test.

## 9 Testing on Self-Elevating Drilling Units

### 9.1 Initial Jacking Test

The test should include a trial jacking of the completed hull up to the limit of designed travel and then down again, to prove alignment of leg racks, pinions and guides, effectiveness of lock or brake arrangements, and proper functioning of jacking system together with electrical safety system monitoring indicators.

After the initial trial jacking test, all legs and leg to spud can or mat connections are to be visually examined and verified free from damage or permanent deformation. Additionally, all leg connections to spud cans or mat are to be nondestructively tested with a suitable surface crack detection method.

### 9.3 Moveable Cantilever and Skid Beam Testing

Prior to placing the drilling unit in service, a function test of the longitudinal skidding arrangements of the moveable cantilever and skid beam as well as any transverse skidding arrangements such as the sub-base (drill floor) is to be carried out by skidding the completed drilling structures with derrick assembly to the maximum limits of travel.

This test is to be carried out after the entire marine and drilling systems have been installed on the drilling unit that affects the function load of the beams. During the testing, the cantilever and rig's skid beams need not be overloaded to loads over and above their maximum allowable design loads.

## 11 Sea Trial

During the sea trial, following tests is to demonstrate that each item of plant and the system as a whole is satisfactory for drilling unit's service after construction:

### 11.1 Operation of Machinery and Piping Systems

Satisfactory operation of all machinery and piping systems required by the Rules are to be confirmed throughout the sea trial period.

If any excessive vibration of piping is noted during the sea trial, it is to be rectified upon completion of the trial.

### 11.3 Ballast System

Ballast system is to operate satisfactorily throughout the sea trial period.

On column stabilized drilling units, ballast system is to be tested to demonstrate that it is capable of raising the drilling unit, starting from a level trim condition at deepest normal operating draft, either a distance of 4.6 m (15 ft) or to the severe storm draft, whichever distance is greater, within three hours. The test is to preferably follow the ballasting procedure that is to be provided to the drilling unit's operating personnel. In addition, all controls and indication systems in the central ballast control station are to operate satisfactorily throughout the sea trial period, particularly during the ballast test.

### 11.5 Bilge System

Bilge system is to operate satisfactorily throughout the sea trial period. Satisfactory operation of bilge alarms and suction from bilge wells is to be verified during the trial by random activation/testing of the system.

On column stabilized drilling units, two independent systems of high bilge water level detection, giving an audible and visual alarm at the central ballast control station is to be demonstrated during the sea trial, preferably when the drilling unit is operating under emergency power. High bilge water level audible and visual alarm at the central ballast control station for propulsion rooms and pump rooms in lower hulls of column-stabilized units are to be demonstrated during the trial.

### 11.7 Electrical Installation for Drilling Unit Main Services

All auxiliary apparatus is to be tried under working conditions. Each generator is to be run for a time sufficient to show satisfactory operation, and parallel operation with all possible combinations is to be demonstrated.

Each auxiliary motor necessary to the operation of the drilling unit is to be run for a time sufficient to show satisfactory performance at such load as can readily be obtained. All main switches and circuit breakers are to be operated, but not necessarily at full load. The operation of the lighting system, heaters, etc., is to be demonstrated satisfactorily. The entire installation is to operate to the satisfaction of the Surveyor and the drop in voltage on any part of the installation is not to exceed 6%. See 4-3-3/5.1.3.

### 11.9 Communication Facilities

Satisfactory operation of the interior communications system required by 4-3-2/15 is to be demonstrated to the Surveyor during sea trials. Particular attention is to be given to demonstrating that the voice communication systems required by 4-3-2/15 provide the capability of carrying on a conversation while the drilling unit is being navigated.

### 11.11 Fire Extinguishing System

Fire main system, main fire pumps, emergency fire pump, and foam pump are to operate satisfactorily throughout the sea trial period.

Satisfactory operation of the fixed fire-water extinguishing system is to be demonstrated during the sea trial with main fire pumps and the emergency fire pump. This includes confirmatory testing of the system output pressure from fire hoses coupled to two separate hydrants located far way from each other as practicable, where one of which is to be at the drill floor. Minimum pressure measured at each fire hose nozzle is to be 3.5 bar (3.5 kgf/cm<sup>2</sup>, 50 psi) and the maximum pressure shall be such that the effective control of a fire hose by crew can be demonstrated.

### 11.13 Main Source of Power

Main source of power is to operate satisfactorily throughout the sea trial period. No specific testing is required.

### 11.15 Emergency Source of Power

Automatic start of the emergency source of power is to be demonstrated during the sea trial. On Self-Propelled drilling units, this test is to be demonstrated preferably whilst the drilling unit is in motion and at least in a "dead-slow" speed.

### 11.17 Distribution System

Main distribution system, hull return system, earthed distribution systems, external or shore power supply connection, and harmonics, are to operate satisfactorily throughout the sea trial period. No specific testing is required.

### 11.19 Circuit Protection System

Protection for generators, accumulator batteries, external or shore power supply, motor branch circuits, transformer circuits, meters, pilot lamps and control circuits, are to operate satisfactorily throughout the sea trial period. No specific testing is required.

### 11.21 Lighting and Navigation Light Systems

General lighting, emergency lighting, obstruction lights, helicopter landing lights and navigation lights are to operate satisfactorily throughout the sea trial period.

The entire installation is to operate to the satisfaction of the Surveyor and the drop in voltage on any part of the installation is not to exceed 6%.

Satisfactory operation the emergency lights after a black-out condition is to be confirmed. Sufficient lighting in all control stations, egress routes, and embarkation stations are to be verified.

### 11.23 Public Address (PA) and General Alarm (GA) Systems

The PA system is to operate satisfactorily throughout the sea trial period. Satisfactory operation is to be verified during the trial by random activation/testing of the system. With the drilling unit underway or in normal operating conditions, the minimum sound levels for broadcasting emergency announcements are to be:

- i) In interior locations, 75 dB (A) and at least 20 dB (A) above the speech interference level
- ii) In exterior locations, 80 dB (A) and at least 15 dB (A) above the speech interference level

Particular attention is to be paid to machinery/working spaces where normal noise level is higher than other areas of the drilling unit.

The GA system is to be clearly audible in all parts of the unit. The alarm is to continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system. The GA system is to operate satisfactorily throughout the sea trial period. Satisfactory operation is to be verified during the trial by random activation/testing of the system. With the drilling unit underway or in normal operating conditions, the minimum sound levels of the alarm is to be:

- i) The minimum sound levels for the emergency alarm tone in interior spaces are to be 80 dB and at least 10 dB (A) above ambient noise levels existing during normal equipment operation in moderate weather. In cabins without a loud speaker installation, an electrical alarm transducer is to be installed.
- ii) The sound levels at the sleeping position in cabins and in cabin bathrooms are to be at least 75 dB (A) and at least 10 dB (A) above ambient noise levels.

### 11.25 Fire Protection and Fire Detection Systems

Emergency stops and emergency shutdown system is to be verified during the trial by random activation/testing.

Fire detection system is to operate satisfactorily throughout the sea trial period. Satisfactory operation of the system and its alarms is to be verified during the trial by random activation/testing of the system. Particular attention is to be paid to machinery/working spaces where normal noise level is higher than other areas of the drilling unit.

### 11.27 Gas Detection System

Gas detection system is to operate satisfactorily throughout the sea trial period. Satisfactory operation of the system and its alarms is to be verified during the trial by random activation/testing of the system. Particular attention is to be paid to machinery/working spaces where normal noise level is higher than other areas of the drilling unit.

## 13 Sea Trial for Self-Propelled Drilling Units

### 13.1 Full Power Trial

A final under-way full-power trial is to be made of all machinery required for propulsion, the steering gear and the anchor windlass.

For surface-type and self-elevating units, the trial is to be conducted at the draft corresponding to the minimum freeboard.

For column-stabilized and self-elevating drilling units, the trial is to be conducted at transit draft or as near transit draft as practicable.

### 13.3 Reduced Power Trial

Column-stabilized units are to conduct final under-way reduced-power trial of all machinery required for propulsion at a design operating draft to the satisfaction of the Surveyor.

### 13.5 Operation of Machinery, Electrical Systems and Safety Features

The operation of other machinery, electrical systems and safety features required by the Rules is to be demonstrated to the satisfaction of the Surveyor.

### 13.7 "Dead-Ship" Start

Restoring the propulsion system from a dead ship condition is to be demonstrated.

The emergency source of electrical power may be used to restore the propulsion, provided its capacity either alone or combined with that of any other available source of electrical power is sufficient to provide at the same time those services required to be supplied by 4-3-2/5.3.1 through 4-3-2/5.3.7.

The emergency source of electrical power and other means needed to restore the propulsion are to have a capacity such that the necessary propulsion starting energy is available within 30 minutes of blackout, as defined in 4-1-1/10.1. Emergency generator stored starting energy is not to be directly used for starting the propulsion plant, the main source of electrical power and/or other essential auxiliaries (emergency generator excluded).

### 13.9 Steering Gear Trial

Power supply feeder, protection for steering gear motor circuit, emergency power supply, controls, instrumentation, and alarms, are to operate satisfactorily throughout the sea trial period. Verification of the emergency power supply, controls, instrumentation, and alarms is to be to the satisfaction of the attending Surveyor.

The steering gear is to be capable of:

- i) Putting the rudder from 35° on one side to 35° on the other side with the vessel running ahead at the maximum continuous rated shaft rpm and at the summer load waterline and, under the same conditions, from 35° on either side to 30° on the other side in not more than 28 seconds; and
- ii) With one of the power units inoperative, putting the rudder from 15° on one side to 15° on the other side in no more than 60 seconds with the vessel running ahead at the summer load waterline at one half of the maximum ahead service speed or 7 knots, whichever is the greater.

The steering gear trial is to be performed with the rudder fully submerged. Where full rudder submergence cannot be obtained in ballast conditions, alternative procedures for trials with less than full rudder submergence are to be submitted for consideration.

#### 13.9.1 Full Speed Trial

Satisfactory performance is to be demonstrated under the following conditions:

- i) Changing the rudder position from 35° on either side to 30° on the other side in not more than 28 seconds with the vessel running ahead at the maximum continuous rated shaft rpm. For controllable pitch propellers, the propeller pitch is to be at the maximum design pitch approved for the above maximum continuous ahead rated rpm.
- ii) Unless 7-1-9/13.9.2iii) is applicable, this test is to be carried out with all power units intended for simultaneous operation for this condition under actual operating conditions.

#### 13.9.2 Half Speed Trial

Satisfactory performance is to be demonstrated under the following conditions.

- i) Changing the rudder position from 15° on either side to 15° on the other side in not more than 60 seconds while running at one-half of the maximum ahead speed or 7 knots whichever is the greater.
- ii) This test is to be conducted with either one of the power units used in 7-1-9/13.9.1ii) in reserve.
- iii) Half Speed Trial may be waived where the steering gear consists of two identical power units with each capable of meeting the requirements in 7-1-9/13.9.1i).

#### 13.9.3 Steering Gears with More than Two Power Units

Where three or more power units are provided, the test procedures are to be specially considered on the basis of the specifically approved operating arrangements of the steering gear system.

#### 13.9.4 Drilling Units Fitted with Propellers

The designed performance of the propeller at rated speed is to be demonstrated during sea trial.

#### 13.9.5 Drilling Units Fitted with Azimuthal Thrusters

Steering systems for azimuthal thrusters are to meet the requirements of Section 4-3-4 of the *Steel Vessel Rules*, as applicable, and the following requirements.

- i) For drilling units that are arranged with only one azimuthal thruster as the only means of propulsion and steering, the thruster is to be provided with steering systems of a redundant design such that a single failure in one system does not affect the other system.
- ii) For drilling units that are arranged with two azimuthal thrusters as the only means of propulsion and steering, each thruster is to be provided with at least one steering system. The steering system for each thruster is to be independent of the steering system for the other thruster.
- iii) Each azimuthal thruster is to be capable of rotating at a speed of not less than 0.4 rpm (from 35 degrees on either side to 30 degrees on the other side in not more than 28 seconds) while steering the vessel with the vessel running ahead at the maximum continuous rated shaft rpm and at the summer load waterline. Where the azimuthal thruster is arranged to rotate for the crash stop or astern maneuver, the azimuthal thruster is to be capable of rotating at the speed of not less than 2.0 rpm (180 degrees in not more than 15 seconds) to account for the crash stop or astern maneuver.

#### 13.9.6 Additional Items

The trial is also to include the operation and verification of the following:

- i) The power units, including transfer between power units
- ii) The emergency power supply, if applicable
- iii) The steering gear controls, including transfer of control and local control
- iv) The means of communication between the navigation bridge, engine room and the steering gear compartment




- v) The alarms and indicators required by 4-3-4/15 of the *Steel Vessel Rules* (test may be done at dockside)
- vi) The storage and recharging system in 4-3-4/9.3 of the *Steel Vessel Rules* (test may be done at dockside)
- vii) The isolation of one power actuating system and time for regaining steering capability (test may be done at dockside)
- viii) Where the steering gear is designed to avoid hydraulic locking (4-3-4/9.1.3 of the *Steel Vessel Rules*), this feature is to be demonstrated.
- ix) Where practicable, simulation of a single failure in the hydraulic system, and demonstration of the means provided to isolate it and the regaining of steering capability, as in 4-3-4/5.5 and 4-3-4/9.1.3 of the *Steel Vessel Rules*.
- x) The stopping of the steering gear before the rudder stop is reached, as in 4-3-4/5.11 of the *Steel Vessel Rules*.

### 13.11 Interior Communication Systems for Self-Propelled Units

Interior communication between the navigation bridge and main control stations is to operate satisfactorily throughout the sea trial period. Satisfactory operation is to be verified during the propulsion trial.

The voice communication system is to be verified to provide the capability of carrying on a conversation while the drilling unit is being navigated.

## 15 Anchoring/Mooring Trial

Where optional ABS symbols , , or  are requested, the drilling unit is to undergo trials to prove its capability as applicable. For further details, see Appendix 7-1-A1 of these Rules.

### 15.1 Anchoring/Mooring System Foundations

Although the mooring system is an optional scope of classification, drilling unit's hull back-up structure/foundations are required to be surveyed in compliance with ABS approved drawings, in presence of and to the satisfaction of the attending Surveyor.

Proper fit-up, alignment and final weldments of hull foundations for mooring winches, fairleads and other mooring system components are to be visually examined. Completed welds are to be subjected to surface NDT (preferably Magnetic Particle Inspection) to the extent deemed necessary by the attending Surveyor, before the drilling unit commences its mooring trial.

### 15.3 Anchor Windlass Trials

Each anchor windlass is to be tested under working conditions after installation onboard to demonstrate satisfactory operation. Each unit is to be independently tested for braking, clutch functioning, lowering and hoisting of chain cable and anchor, proper riding of the chain over the chain lifter, proper transit of the chain through the hawse pipe and the chain pipe, and effecting proper stowage of the chain and the anchor.

It is to be confirmed that anchors properly seat in the stored position and that chain stoppers function as designed if fitted.

The mean hoisting speed, as specified in 4-5-1/5.1.4 of the *Steel Vessel Rules*, is to be measured and verified, with each anchor and at least 82.5 m (45 fathoms) length of chain submerged and hanging free. The braking capacity is to be tested by intermittently paying out and holding the chain cable by means of the application of the brake. Where the available water depth is insufficient, the proposed test method will be specially considered.

## 17 Dynamic Positioning System (DPS)

Dynamic Positioning System is to be subjected to trial in presence of and to the satisfaction of the Surveyor, and the test items mentioned in 7-1-9/17.3 are to demonstrate that each item of plant and the system as a whole is satisfactory for drilling unit's service after construction.

### 17.1 Failure Mode and Effect Analysis (FMEA)

The purpose of an FMEA is to give a description of the difference failure mode of the equipment referred to its function tasks. Drilling units classed with the DPS-2 or DPS-3 notations are required to have their FMEA plans and data reviewed by ABS.

### 17.3 DP Trials

A detailed DP trial program, that includes schedule of tests, is to be submitted for ABS review prior to the proposed date of testing. The DP trial program is to be prepared to demonstrate the level of redundancy established in FMEA, as applicable.

The test environment is to reflect the limiting design operating conditions, as far as practicable. The DP trial is to be a complete performance test of the dynamic positioning system, and to at least include the following testing/verification:

- i) The complete DP system is to be tested in all operation modes, with simulation of different failure conditions to try switching modes, back up system and alarm system such as;
  - Fail each automatic control computer at main station.
  - Verified automatic changover to stand by DP control computer without manual intervention and without any adverse effect on station keeping.
  - Fail two automatic control computers.
  - Verify manual changover from automatic control system to back up automatic control computer at emergency DP control station.
  - Verify manual changover from automatic control system to independent joystick.
  - Computer program verification if single fault including loss of thruster or thruster group (based on FMEA), sufficient thruster remains available in steady state and transient conditions.
- ii) Manual override is to be demonstrated during normal operation and failure conditions.
- iii) Resubmitted results for approval may be necessary if significant differences in expected/actual results are found.
- iv) If transient excursion occurs, submit analysis of worst case not to exceed distance endangering safe operation of vessel (Operation Envelope).

## PART

# 7

## CHAPTER 1 Survey During Construction

## APPENDIX 1 Mooring Equipment and Systems

### 1 General

On self propelled vessels, the symbol  $\textcircled{E}$  is required as a condition of classification and therefore it is a mandatory to comply with the ABS Rules. On vessels that are not self propelled (i.e., without the **AMS** notation), the  $\textcircled{E}$  is an optional symbol that may be requested by the owner.

The symbols  $\textcircled{M}$  and  $\textcircled{P}$  are not required as a condition of classification. These are optional symbols that may be requested by the owner.

All mooring equipment associated with below class symbols are to be fabricated and certified by ABS at manufacturer's facility. Installation of the mooring equipment/system is to be carried out in presence of and to the satisfaction of the attending Surveyor. The mooring system is to be tested, per an agreed test procedure, during sea trial of the unit.

#### 1.1 Anchoring (Temporary Mooring) Equipment

The symbol  $\textcircled{E}$  is placed after the symbols of classification in the *Record*, thus:  $\textcircled{X} \text{A1} \textcircled{E}$ , which will signify that the equipment for anchoring (temporary mooring) of the drilling unit is in compliance with the applicable requirements of Section 3-5-1 of the *Steel Vessel Rules* or of Section 3-3-1 of the *Barge Rules*.

This requirement may be met if position mooring equipment can be released in an emergency while the unit is in the transit mode.

Fabrication tests of the mooring equipment; such as anchors, chains, wires, shackles, etc. are to be in accordance with the *ABS Rules for Materials and Welding (Part 2)* for the respective sizes of equipment. See Section 2-2-1 and Section 2-2-2.

#### 1.3 Position Mooring Equipment

When requested by the owner, the symbol  $\textcircled{M}$  may be placed after the symbols of classification in the *Record*, thus:  $\textcircled{X} \text{A1} \textcircled{M}$ , which will signify that the mooring equipment, anchors, chain or wire rope which have been specified by the owner for position mooring have been tested in accordance with the specifications of the owner and in the presence of a Surveyor.

Fabrication tests of the position mooring equipment; such as anchors, chains, wires, shackles, etc. are to at least satisfy the requirements of the *ABS Rules for Materials and Welding (Part 2)* for the respective sizes of equipment. See Section 2-2-1 and Section 2-2-2. Compliance with *ABS Guide for Certification of Offshore Mooring Chain* and the use of at least ABS "RQ" quality chains is also required.

In addition, it is to be confirmed that the position mooring equipment is in compliance with the owner's specification.

#### 1.5 Position Mooring Systems

When requested by the owner, ABS is prepared to certify the position mooring capability of the unit in accordance with the requirements outlined in Appendix 3-4-A1. A unit so certified for position mooring will be designated in the *Record* by the symbol  $\textcircled{P}$  placed after the symbols of classification in the *Record*, thus:  $\textcircled{X} \text{A1} \textcircled{P}$ .

### 3 Mooring System Foundations

Drilling unit's hull back-up structure/foundations are required to be surveyed in compliance with ABS approved drawings, in presence of and to the satisfaction of the attending Surveyor.

Proper fit-up, alignment and final weldments of hull foundations for mooring winches, fairleads and other mooring system components are to be visually examined. Completed welds are to be subjected to surface NDT (preferably Magnetic Particle Inspection) to the extent deemed necessary by the attending Surveyor, prior to the sea trial.

### 5 Mooring Trial

Mooring trial is to be carried out in accordance with ABS reviewed mooring trial test procedures, in presence of and to the satisfaction of the attending Surveyor.

#### 5.1 Anchoring (Temporary Mooring) Equipment

Each anchor windlass is to be tested under working conditions after installation onboard to demonstrate satisfactory operation. Each unit is to be independently tested for braking, clutch functioning, lowering and hoisting of chain cable and anchor, proper riding of the chain over the chain lifter, proper transit of the chain through the hawse pipe and the chain pipe, and effecting proper stowage of the chain and the anchor. It is to be confirmed that anchors properly seat in the stored position and that chain stoppers function as designed if fitted. The mean hoisting speed, as specified in 4-5-1/5.1.4 of the *Steel Vessel Rules*, is to be measured and verified, with each anchor and at least 82.5 m (45 fathoms) length of chain submerged and hanging free. The braking capacity is to be tested by intermittently paying out and holding the chain cable by means of the application of the brake. Where the available water depth is insufficient, the proposed test method will be specially considered.

#### 5.3 Position Mooring Equipment

The mooring system is to be tested under working conditions after installation onboard to demonstrate satisfactory operation. Each unit is to be independently tested for braking, clutch functioning, lowering and hoisting of chain cable and anchor, proper riding of the chain over the chain lifter, proper transit of the chain through the hawse pipe and the chain pipe, and effecting proper stowage of the chain and the anchor.

#### 5.5 Position Mooring System

The position mooring system is to be tested under working conditions after installation onboard to demonstrate satisfactory operation. It is to be confirmed that the position mooring system is in compliance with Owner's specification and operates within required parameters specified by the Owner.

##### 5.5.1 Control Stations for Position Mooring Systems

Following provisions are to be confirmed during the position mooring system trials:

- i) Suitable equipment to indicate anchor line tensions, wind speed and direction at a manned central control station.
- ii) Reliable means of communication between locations critical to the anchoring operation.
- iii) Controls of each winch or windlass from a position which provides a good view of the operation, and suitable equipment at each winch or windlass control positions to monitor anchor line tension, winch or windlass power load, and to indicate the amount of anchor line paid out.

## PART

# 7

## CHAPTER 1 Surveys During Construction

## APPENDIX 2 Surveys of Computers for Stability Calculations

### 1 General

This Appendix pertains to surveys and testing to be carried out on onboard computers for stability calculations. As mentioned in 7-1-1/23, the use of onboard computers for stability calculations is not a requirement of class, it is optional. However, if software is installed onboard for calculating stability of the unit, it is to be surveyed and tested in presence of and to the satisfaction of the attending Surveyor.

Following subsections describe the requirements for survey of onboard computers. Satisfactory ABS design review of the computer, in accordance with Appendix 3-3-A2 of the *MODU Rules*, is to be completed before surveys are commenced onboard the unit.

### 3 Functional Requirements

#### 3.1 Calculation Program

The calculation program is to present relevant parameters of each operating condition in order to assist the Master in his judgment on whether the drilling unit is loaded within the approval limits. The following parameters are to be presented for a given operating condition:

- Deadweight data
- Lightship data
- Trim
- Draft at the draft marks and perpendiculars
- Summary of operating condition displacement, VCG, LCG and, if applicable, TCG
- Down-flooding angle and corresponding down-flooding opening
- Compliance with stability criteria: Listing of all calculated stability criteria, the limit values, the obtained values and the conclusions (criteria fulfilled or not fulfilled)

If direct damage stability calculations are performed, the relevant damage cases according to the applicable rules are to be pre-defined for automatic check of a given operating condition.

#### 3.3 Computer Data/Indicators

The computer is to satisfy following requirements during operating condition.

##### 3.3.1 Warning

A clear warning is to be given on screen and in hard copy printout if any of the operating limitations are not complied with.

##### 3.3.2 Data Printout

The data are to be presented on screen and in hard copy printout in a clear unambiguous manner.

##### 3.3.3 Date and Time

The date and time of a saved calculation are to be part of the screen display and hard copy printout.

3.3.4 Information of Program

Each hard copy printout is to include identification of the calculation program with version number.

3.3.5 Units

Units of measurement are to be clearly identified and used consistently within a operating calculation.

## 5 Operation Manual

An ABS reviewed operation manual is to be placed onboard the unit and verified by the Surveyor. The operation manual is to contain descriptions and instructions, as appropriate, for at least the following:

- i) Installation
- ii) Function keys
- iii) Menu displays
- iv) Input and output data
- v) Required minimum hardware to operate the software
- vi) Use of the test operating conditions
- vii) Computer-guided dialogue steps
- viii) List of warnings

## 7 Installation Testing

To ensure correct working of the computer after the final or updated software has been installed, it is the responsibility of the drilling unit's master to have test calculations carried out according to the following pattern in the presence of the Surveyor:

- i) From the approved test conditions at least one load case (other than lightship) is to be calculated.  
*Note:* Actual operating condition results are not suitable for checking the correct working of the computer.
- ii) Normally, the test conditions are permanently stored in the computer.

### 7.1 Installation Test Steps to be Performed

Following test steps are to be performed in presence of and to the satisfaction of the attending Surveyor:

- i) Retrieve the test load case and start a calculation run; compare the stability results with those in the documentation.
- ii) Change several items of deadweight sufficiently to change the draft or displacement by at least 10%. The results are to be reviewed to ensure that they differ in a logical way from those of the approved test condition.
- iii) Revise the above modified load condition to restore the initial test condition and compare the results. The relevant input and output data of the approved test condition are to be replicated.
- iv) Alternatively, one or more test conditions shall be selected and the test calculations performed by entering all deadweight data for each selected test condition into the program as if it were a proposed loading. The results shall be verified as identical to the results in the approved copy of the test conditions.

# PART 7

## CHAPTER 2 Surveys After Construction

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## PART

# 7

## CHAPTER 2 Surveys After Construction

### SECTION 1 Conditions for Surveys After Construction

#### 1 Application (2010)

##### 1.1 Chapter 2 Sections 1 through 10 (2012)

The requirements for Surveys After Construction contained in Part 7, Chapter 2, Sections 1 through 10, and Appendices 1 through 3 apply to the:

- *Rules for Building and Classing Mobile Offshore Drilling Units*

And are referenced by the following ABS Rules and Guides:

- *Guide for Building and Classing Mobile Offshore Units*
- *Guide for Building and Classing Floating Production Installations*
- *Guide for Automatic or Remote Control and Monitoring for Machinery and Systems (other than Propulsion) on Offshore Installations*

#### 3 Definitions (2010)

##### 3.1 Ballast Tank

A *Ballast Tank* is a tank which is used primarily for the carriage of salt water ballast.

##### 3.3 Corrosion

*Active Corrosion* means gradual chemical or electrochemical attack on a metal resulting from a reaction with its environment and producing loose scale.

*Allowable Corrosion* or *Wastage Limit* is the acceptable corrosion limit for the MODU's structure in a given area. Also known as *Allowable Limit*.

*Excessive Corrosion* is an extent of corrosion that exceeds the allowable limit.

*Extensive Area of Corrosion* is corrosion of hard and/or loose scale, including pitting, over 70% or more of the plating surface in question, accompanied by evidence of thinning.

*Grooving Corrosion* is a localized, linear corrosion which occurs at structural intersections where water collects or flows. This corrosion is sometimes referred to as "in line pitting attack" and can also occur on vertical members and flush sides of bulkheads in way of flexing.

*Localized Corrosion* is by name local in nature and may be caused by local breakdown in coating from contact damage, insufficient preparation, or at areas of stress concentration.

*Overall Corrosion* appears as a non-protective rust which can uniformly occur on tank internal surfaces that are uncoated, or where coating has totally deteriorated. The rust scale continues to break off, exposing fresh metal to corrosive attack. Thickness cannot be judged visually until excessive loss has occurred.

*Pitting Corrosion* is a localized corrosion of a metal surface that is confined to a small area and takes the form of cavities called pits.

*Substantial Corrosion* is an extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of the allowable corrosion, but within the acceptable limits.

*Weld Metal Corrosion* is defined as preferential corrosion of weld deposit. The most likely reason for this attack is galvanic action with the base metal which may start as pitting and often occurs on hand welds as opposed to machine welds.

### 3.5 Corrosion Control System

*Corrosion Control System* may be achieved by application of hard protective coating (usually epoxy coating or equivalent), soft protective coating, impressed current cathodic protection (ICCP) system, sacrificial anodes, etc., provided that they are applied and maintained in compliance with the manufacturer's specification.

### 3.7 Critical Structural Areas

*Critical Structural Areas* are locations which have been identified from calculation to require monitoring or from the service history of the subject unit or from similar sister units to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the unit.

### 3.9 Girth Belt (Transverse Section)

A *Girth Belt* includes the following;

- *Surface-Type Units:* Deck, bottom, side shell and longitudinal bulkhead plating and internal framing.
- *Column-Stabilized Units:* Column and bracing plating and internals as deemed necessary. Deck sides and bottom of lower hulls between columns, including internal stiffeners as deemed necessary.
- *Self-Elevating Units:* Deck, bottom, side shell, internal framing of preload tanks and leg well structure.

### 3.11 Panel

*Panel* is the area between adjacent main frames from stiffener to stiffener.

### 3.13 Survey (2012)

A *Close-up Survey* is a survey where the details of structural components are within close visual inspection range of the Surveyor, i.e. normally within hand reach. Close-up Survey may be referred by the industry as "Close Visual Inspection (CVI)".

*Overall Survey* is a survey intended to report on the overall condition of the structure and to determine the extent of additional close-up surveys. Overall Survey may be referred by the industry as "General Visual Inspection (GVI)".

### 3.15 Representative Spaces/Tanks

*Representative Spaces/Tanks* are those which are expected to reflect the condition of other spaces of similar type and service and with similar corrosion preventive systems. When selecting representative spaces, account should be taken of the service and repair history onboard and identifiable critical and/or Suspect Areas.

### 3.17 Spaces

*Spaces* are separate compartments including tanks, cofferdams, machinery spaces, voids and other internal spaces.

### 3.19 Suspect Areas

*Suspect Areas* are locations showing substantial and/or are considered by the Surveyor to be prone to rapid wastage.

### 3.21 Wind and Water Strakes

*Wind and Water Strakes* are the two (2) strakes or equivalent area located in the vicinity of the load waterline, operating draft or operating depth of the unit. For Self-elevating Units this is the area of the leg components in the vicinity of the operating water depth. For column stabilized units this will include portions of columns and bracing members in the vicinity of the operating draft of the unit.

### 3.21.1 Splash Zone (for Self-Elevating and Column Stabilized Units) (2012)

*Splash Zone* is the external surfaces of a self-elevating or column-stabilized unit that are periodically in and out of the water when the unit is at its operating depth.

## 5 Notification and Availability for Survey (2012)

The Surveyors are to have access to classed units at all reasonable times. The Owners or their representatives are to notify the Surveyors on occasions when parts of the structure not ordinarily accessible can be examined. The Surveyors are to undertake all surveys on classed units upon request, with adequate notification, of the Owners or their representatives and are to report thereon to ABS. Should the Surveyors find occasion during any survey to recommend repairs or further examination, notification is to be given immediately to the Owners or their representatives in order that appropriate action may be taken. The Surveyors are to avail themselves of every convenient opportunity for carrying out periodical surveys in conjunction with surveys of damages and repairs in order to avoid duplication of work. See also 1-1-8/5 of the *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*.

## 7 Damage, Failure and Repair (1996)

### 7.1 Examination and Repair

Damage, failure, deterioration or repair to hull, legs, columns or other structures, machinery or equipment, which affects or may affect classification, is to be submitted by the Owners or their representatives for examination by a Surveyor at first opportunity. All repairs found necessary by the Surveyor are to be carried out to the Surveyor's satisfaction.

### 7.3 Repairs

Where repairs to hull, legs, columns or other structures, machinery or equipment, which affect or may affect classification, are planned in advance to be carried out, a complete repair procedure, including the extent of proposed repair and the need for Surveyor's attendance, is to be submitted to and agreed upon by ABS reasonably in advance. Failure to notify ABS in advance of the repairs may result in suspension of the unit's classification until such time as the repair is redone or evidence submitted to satisfy the Surveyor that the repair was properly carried out.

*Note:* The above applies also to repairs during voyage or on site.

The above is not intended to include maintenance and overhaul to hull, other structures, machinery and equipment in accordance with the recommended manufacturer's procedures and established marine practice and which does not require ABS approval. However, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the unit's log and submitted to the Surveyor as required by 7-2-1/7.1.

### 7.5 Representation

Nothing contained in this section or in a rule or regulation of any government or other administration, or the issuance of any report or certificate pursuant to this section or such a rule or regulation, is to be deemed to enlarge upon the representations expressed in 1-1-1/1 through 1-1-1/7 of the *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*, and the issuance and use of any such reports or certificates are to be governed in all respects by 1-1-1/1 through 1-1-1/7 of the above-referenced Part 1.

### 7.7 Application of Rules (2012)

As referenced in 1-1-3/1.3 of these Rules, the Rules that is applicable to the unit's classification is to be applied to any repair without changing the original design, carried out on the unit's structure, machinery or equipment, that affects or may affect classification. Application of up-to-date Rules will be specially considered only when so requested by the Owner or required by these Rules.

## 9 Alterations/Modifications (2012)

No alteration or modification which affect or may affect classification or the assignment of load lines are to be made to the hull or machinery of a classed unit unless plans of the proposed alterations are submitted and approved by the ABS Technical Office before the work of alteration or modification is commenced, and such work, when approved, is to be carried out to the satisfaction of the Surveyor. Nothing contained in this Section or in a rule or regulation of any government or other administration or the issuance of any report or certificate pursuant to this section or such a rule or regulation is to be deemed to enlarge upon the representations expressed in subsections 1-1-1/1 through 1-1-1/7 *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)* and the issuance and use of any such reports or certificates are to in all respects be governed by subsections 1-1-1/1 through 1-1-1/7 of the above-referenced Part 1.

### 9.1 Application of Rules

As referenced in 1-1-3/1.3 of these Rules, the Rules that is applicable to the unit's classification is to be applied to minor alteration/modification carried out on the unit, including its structure, machinery or equipment, that affects or may affect classification. Application of up-to-date Rules will be specially considered only when so requested by the Owner or required by these Rules.

The following cases may be considered as a major alteration or modification, and therefore require compliance with up-to-date Rules for the section being altered or modified:

- Changing configuration or material of structure that is defined as "Special Application Structure" or "Primary Application Structure" in accordance with these Rules.

*Note: A cantilever extension is not considered to be a major modification.*

- Changing leg jacking system of self elevating units.
- Changing a marine piping system (such as the ballast systems, bilge system, propulsion system, etc.) with all of its components (piping, valves, pumps, etc.).
- Changing a marine electrical system (such as the main power distribution, emergency power distribution, electrical propulsion system, etc.) with all of its components (cabling, electrical motors/pumps, panels, etc.).
- Changing layout and material used in the passive fire protection system, such as more than 10% of deck area alteration or modification to the footprint of the accommodation deckhouse/superstructure or its material used for fire protection.

*Note: Adding another deck on top of an existing accommodation deckhouse is not considered to be a major modification of the entire deckhouse.*

- Changing an active fire protection system (such as the fixed-fire fighting system, fire and gas detection system, etc.) with all of its components (piping, pumps, hoses, panels, alarms, detectors, etc.).

## 11 Welding and Replacement of Materials

### 11.1 Ordinary and Higher-Strength Structural Steels

Welding or other fabrication performed on the structural steels listed in 2-1-2/Table 5 and 2-1-3/Table 5 is to be in accordance with the requirements in Section 2-4-1 of the *ABS Rules for Materials and Welding (Part 2)*.

### 11.3 Special Materials

Welding or other fabrication performed on other steels of special characteristics or repairs or renewals of such steel or adjacent to such steel is to be accomplished with procedures approved for the special materials involved. The procedures are to be in accordance with the information provided under Section 1-1-6 of the Supplement to the *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)* and Chapter 4 of the *ABS Rules for Materials and Welding (Part 2)*. Substitution of steels differing from those originally installed is not to be made without approval.

### 13 Incomplete Surveys (2012)

When a survey is not completed, the Surveyor is to report immediately upon the work done in order that the Owners and ABS may be advised of the parts still to be surveyed.

### 15 Lay-up and Reactivation (2010)

#### 15.1 Units for Unrestricted Service

ABS is to be notified by the Owner that a vessel has been laid-up. This status will be noted in the *Record*, and surveys falling due during lay-up will then be held in abeyance until the vessel is reactivated. Lay-up procedures and arrangements for maintenance of conditions during lay-up may be submitted to ABS for review and confirmation by survey (See Appendix 7-2-A1 of these Rules).

In the case of units which have been laid-up for an extended period (i.e., six months or more), the requirements for surveys on reactivation are to be specially considered in each case, with due regard being given to the status of surveys at the time of the commencement of the lay-up period, the length of the period and conditions under which the unit had been maintained during that period.

Where the lay-up preparations and procedures have been submitted to ABS for review and confirmed by Annual Lay-up Surveys, consideration may be given to deducting part or all of the time in lay-up from the progression of survey intervals.

For units returning to active service, regardless of whether ABS has been informed previously that the vessel has been in lay-up, a Reactivation Survey is required.

#### 15.3 Units Operating in Fresh Water (2012)

Where the lay-up preparations and procedures have been submitted to ABS for review and verified by Annual Lay-up Surveys, consideration may be given to deducting part or all of the time in lay-up from the progression of survey intervals.

When applying for deductions, Owners are to provide details of out of service intervals since last credited surveys. For drilling units operating in the Great Lakes, this does not include the normal winter lay-up months of January, February, and March.

*Note:* The above requirements apply to drilling units operating in fresh water such as in the Great Lakes, and Lake Maracaibo.

### 17 Onboard Drawings and Manuals (2012)

The following documents are to be available onboard at all times.

*Note:* This is applicable to all drilling units built under a contract, signed between the Builder and the Owner, on or after 1 January 2012.

#### 17.1 ABS Engineering Reviewed and Stamped Documents

As a minimum, the following documents reviewed and stamped by ABS are to be available onboard the drilling unit for Surveyor's verification and reference during survey after construction:


- i) Operating Manual.
- ii) Drawings indicating locations of all "Special", "Primary" and "Secondary" application structures as defined in 3-1-3/5 of these Rules.
- iii) Drawings showing all watertight boundaries and access/closing devices for such boundaries.
- iv) Drawings showing the Fire Protection Systems, clearly indicating all fire rated boundaries and access/closing arrangements for such boundaries, including location of fire dampers for 'A' class divisions.

- v) Drawings showing the Fire Extinguishing Systems, clearly indicating layout of all fixed and portable fire extinguishing systems. Minor changes to these drawings may be accepted and endorsed by the attending Surveyor, however the endorsed copy of the drawings are to be submitted to ABS engineering at earliest opportunity for record purposes.
- vi) Drawings showing layout of all Hazardous Areas, clearly indicating layout of different class hazardous divisions together with access/closing/ventilation arrangements for such division boundaries, the arrangement of ventilation shutdown and alarms (referenced in 7-1-5/21.19 of these Rules), and a listing of Electrical Equipment in Hazardous Areas (referenced in 7-1-5/21.17 of these Rules).
- vii) Drawings showing layout of the Emergency Shutdown Systems (referenced in 7-1-5/21.25 of these Rules).
- viii) Where the drilling unit is classed with a notation affecting its Automation System (such as **ACC** or **ACCU**), Automation System Operating Manual.
- ix) Where the drilling unit is classed with a **DPS** notation, the Dynamic Positioning System (DPS) Manual and the Failure Modes and Effects Analysis (FMEA).
- x) Where the drilling unit is classed with a **CDS** notation, drawings showing layout of the Drilling Systems and associated Equipment, and a listing of all equipment and components of the Certified Drilling Systems.
- xi) Where the drilling unit is classed with optional **HIMP** Notation, the Owner's Hull Inspection and Maintenance Program (HIMP) used for hull inspection and maintenance purposes is to be available onboard the drilling unit.

Minor changes to the drawings regarding fire protection systems, fire extinguishing systems, and listing of electrical equipment in hazardous areas, may be accepted by the attending Surveyor and revised documents endorsed to show Surveyor's verification, however the endorsed copy of the drawings are to be submitted to ABS engineering at earliest opportunity for record purposes.

### 17.3 ABS Surveyor Reviewed and Endorsed Documents

As a minimum, the following documents endorsed by an ABS Surveyor are to be available onboard the drilling unit for Surveyor's verification and reference during any survey after construction:

- i) Construction Booklet.
- ii) ABS Certificates for anchoring gear such as the anchors, chains and/or wires, and associated accessories (such as shackles, links, sockets, etc.) used for self-propelled drilling units or installed on units with the  notation.
- iii) Record of all Nondestructive Testing (NDT) of critical structural areas carried out during each Drydocking Survey (or UWILD) or Special Periodical Survey of the Hull.

## PART

# 7

## CHAPTER 2 Surveys After Construction

### SECTION 2 Survey Intervals (2010)

#### 1 Units – Unrestricted Service

The following requirements are to be followed on units for unrestricted service.

##### 1.1 Annual Surveys

Annual Surveys are to be made within three months before or after of each annual anniversary date of the crediting of the previous Special Survey – Hull, or original construction date. For units on Continuous Survey, all Continuous Survey requirements for those parts (items) due are generally to be completed each year. The Annual Survey will not be credited and the Certificate of Classification will not be endorsed unless Continuous Survey items which are due or overdue at the time of the Annual Survey are either completed or granted an extension.

##### 1.3 Special Periodical Surveys (2012)

A Special Periodical Survey is to be completed within five years after the date of build or after the crediting date of the previous Special Periodical Survey. The interval between Special Periodical Surveys may be reduced by ABS. If a Special Periodical Survey is not completed at one time, it will be credited as of the completion date of the survey, but not later than five years from date of build or from the date recorded for the previous Special Periodical Survey. If the Special Periodical Survey is completed prematurely but within three months prior to the due date, the Special Periodical Survey will be credited to agree with the effective due date.

Special consideration may be given to Special Periodical Survey requirements in the case of mobile offshore drilling units of unusual design, in lay-up or in unusual circumstances. The ABS reserves the right to authorize extensions of Rule-required Special Periodical Surveys under extreme circumstances.

A Special Periodical Survey may be commenced at the fourth Annual Survey and be continued with a view to completion by the due date. In connection with the preparation for the Special Periodical Survey, thickness gaugings, as required for the forthcoming Special Periodical Survey, are to be taken to the extent accessible and practical in connection with the fourth Annual Survey.

Where the Special Periodical Survey is commenced prior to the fourth Annual Survey, the entire survey is normally to be completed within 12 months if such work is to be credited to the Special Periodical Survey.

##### 1.5 Continuous Surveys (2012)

At the request of the Owner, and upon approval of the proposed arrangements, a system of Continuous Survey may be undertaken whereby the Special Periodical Survey requirements are carried out in regular rotation to complete all requirements of the particular Special Periodical Survey within a five-year period. The completion date will be recorded to agree with the original due date of the cycle. If the Continuous Survey is completed prematurely but within three months prior to the due date, the Special Periodical Survey will be credited to agree with the effective due date.

ABS reserves the right to authorize extensions of Rule-required Special Continuous Surveys under extreme circumstances.

Each part (item) surveyed becomes due again for survey approximately five years from the date of the survey. For Continuous Surveys, a suitable notation will be entered in the *Record* and the date of completion of the cycle published. If any defects are found during the survey, they are to be dealt with to the satisfaction of the Surveyor.

At a survey approximately four years after each Continuous Survey of Hull has been credited, all accessible thickness gaugings, as required for the forthcoming Special Periodical Survey, are to be taken.

### 1.7 In-line Surveys (2012)

All items required to undergo Special Periodical Surveys, including but not limited to hull, machinery, and automation, are to be carried out at the same time and interval in order that they are recorded with the same crediting date. In cases where damage has necessitated extensive repairs and examination, the survey thereon may, where approved by ABS, be accepted as equivalent to Special Periodical Survey.

### 1.9 Drydocking Survey or Equivalent

For units operating in salt water, a minimum of two Drydocking Surveys are to be carried out in each five-year Special Survey period. One such examination is to be carried out in conjunction with the Special Survey – Hull. In all cases, the interval between any two Drydocking Surveys is not to exceed 36 months.

For units operating in salt water for less than six months each year, the maximum interval is not to exceed three years. For units operating in fresh water the interval between Drydocking Surveys is not to exceed five years.

Consideration may be given to special circumstances which may justify an extension of the interval. An underwater inspection by a diver may be required for such extensions.

#### 1.9.1 Self-Elevating Drilling Units – Drydocking Survey Interval Exceeding 36 Months (2012)

Where a self-elevating drilling unit operating in salt water is unable to complete its Drydocking Survey within a 36 month period, at Owner's specific request, the Drydocking Survey due date may be extended by ABS, provided the unit is attended for examination as required.

Where a self-elevating drilling unit operating in salt water is unable to complete its Drydocking Survey within a 60 month period and remained operating in the same drilling site without any rig move, the unit will be considered a site-specific self-elevating mobile offshore unit and required to comply with 3/3.7.8 of the ABS Rules for Building and Classing Offshore Installations.

### 1.11 Tail Shaft Surveys

#### 1.11.1 Water-Lubricated Bearings in Fresh Water Exclusively

Survey interval is five (5) years.

#### 1.11.2 Water-Lubricated Bearings in Fresh Water and Sea Water

1.11.2(a) *Single Screw.* Survey interval is three (3) years.

1.11.2(b) *Multiple Screw.* Survey interval is five (5) years.

1.11.2(c) *Continuous Liner or Equivalent.* Survey interval of five (5) years provided:

- i) The tail shaft is protected by a continuous metallic liner, or continuous cladding per 4-3-2/5.17.5 of the *Steel Vessel Rules* or fiberglass reinforced plastic coating between liners installed according to approved procedure per 4-3-2/5.17.4 of the *Steel Vessel Rules* which effectively prevents seawater from contacting the steel shaft, or which have shafts of corrosion-resistant materials.
- ii) In addition to the propeller hub details given in the 4-3-2/Figure 1 of the *Steel Vessel Rules*, the design includes other features that would further reduce stress concentration in the propeller assembly.

#### 1.11.3 Oil-Lubricated Bearings

Survey interval is five (5) years.

#### 1.11.4 Extensions – Water-Lubricated Bearings

*1.11.4(a) Extension up to Three (3) Months.* An extension up to three (3) months may be granted by the Surveyor, when requested by the Owner, provided a survey is carried out in accordance with 7-5-1/5.1.1 of the *ABS Rules for Survey After Construction (Part 7)*.

*1.11.4(b) Extension up to One (1) Year.* An extension up to one (1) year may be granted by the Surveyor, when requested by the Owner, provided a survey is carried out in accordance with 7-5-1/5.1.2 of the *ABS Rules for Survey After Construction (Part 7)*.

#### 1.11.5 Extensions – Oil-Lubricated Bearings

*1.11.5(a) Extension up to Three (3) Months.* An extension up to three (3) months may be granted by the Surveyor, when requested by the Owner, provided a survey is carried out in accordance with 7-5-1/5.3.1 of the *ABS Rules for Survey After Construction (Part 7)*.

*1.11.5(b) Extension up to One (1) Year.* An extension up to one (1) year may be granted by the Surveyor, when requested by the Owner, provided a survey is carried out in accordance with 7-5-1/5.3.2 of the *ABS Rules for Survey After Construction (Part 7)*. An additional extension up to one (1) year may be considered, when requested by the Owner, provided a survey is carried out at the end of the first extension period, in accordance with 7-5-1/5.3.2 of the *ABS Rules for Survey After Construction (Part 7)*. No more than two (2) extensions may be granted.

*1.11.5(c) Extensions not Exceeding Five (5) Years.* In lieu of 6-2-2/1.11.4(b), an extension not exceeding five (5) years may be granted by the Surveyor, when requested by the Owner, provided a survey is carried out at the fifth year, in accordance with 7-5-1/5.3.3 of the *ABS Rules for Survey After Construction (Part 7)*. Consideration may be given to an additional extension not exceeding five (5) years when requested by the Owner, provided a survey is carried out at the fifth year after the first extension, in accordance with 7-5-1/5.3.3 of the *ABS Rules for Survey After Construction (Part 7)*. No more than two (2) extensions may be granted.

### 1.13 Auxiliary Boiler Surveys

Waste-heat or fired auxiliary boilers intended for working pressures above 3.4 bar (3.5 kgf/cm<sup>2</sup>, 50 psi), a minimum of two surveys are to be carried out during each 5-year Special Periodical Survey period. One such survey is to be carried out in conjunction with the Special Periodical Survey. In all cases, the interval between any two such surveys is not to exceed 36 months.

An extension of the survey up to three (3) months may be granted by the Surveyor in exceptional circumstances\*, provided a survey is carried out in accordance with 7-7-1/11 of the *ABS Rules for Survey After Construction (Part 7)*.

In addition, annual examinations are to be carried out in accordance with 7-7-1/13 of the *ABS Rules for Survey After Construction (Part 7)*.

For units on continuous survey of hull, the two surveys are to be carried out during each 5 year cycle and may be aligned with the dry dock survey dates as long as the interval between surveys does not exceed 36 months.

\* *Note:* "Exceptional circumstances" means, e.g., unavailability of repair facilities, unavailability of essential materials, equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.

## 3 Units Operating in Fresh Water (2012)

Applicable requirements of Section 7-2-2 of the *ABS Rules for Survey After Construction (Part 7)* are to be followed on units operating in fresh water such as the Great Lakes, and Lake Maracaibo.

## PART

# 7

## CHAPTER 2 Surveys After Construction

### SECTION 3 Survey Pre-Planning (2012)

#### 1 Drydocking Surveys and Special Surveys

Plans and procedures for Drydocking (or UWILD) and Special Surveys are to be made available onboard for the purpose of carrying out an on-board pre-planning of the survey with the Surveyor.

##### 1.1 Plan for UWILD

Owner's plan for the UWILD is to be reviewed and agreed upon by ABS before the survey commences and same is to be discussed during the pre-planning meeting held onboard.

Owner's request to carry out UWILD after Special Survey No. 4 is to be agreed upon by ABS before the survey commences.

##### 1.3 Plan for Out-of-Water Drydocking and Special Periodical Survey

Owner's plan for the Out-of-Water Drydocking Surveys or Special Periodical Survey is to be reviewed and agreed upon by the attending Surveyor before the survey commences and same is to be discussed during the pre-planning meeting held onboard.

Owner's request to carry out UWILD prior to or at time of Special Survey No. 4 is to be agreed upon by the attending Surveyor before the survey commences.

##### 1.5 Planning Document

The planning document is intended to confirm the records kept to date in accordance with 7-2-5/3.3.3 and to verify that no changes have been made to drilling unit's critical structural areas, and to stipulate the minimum extent, location and means of close visual inspection, extent and type of NDT, and thickness measurements, as required.

The planning document is to be prepared by the Owner and to be made available to the attending Surveyor, for review and agreement, well in advance of the survey. Contents of the planning document may vary depending upon whether a Special Survey or a Drydocking is to be carried out.

The planning document should typically contain following information, as applicable:

- Main particulars
- Plans to include details of major brace and column connections on column-stabilized units and details of leg and leg-to-spudcan connections
- Jackhouse/jackcase-to-deck connections, on self-elevating units
- Detailed information on NDT methods and locations
- List of tanks with information on use, protection and condition of coating
- Corrosion risk of tank and other major structural members
- Design risk nomination of major structure
- Method and extent of cleaning inspection points
- Nomination of areas of structure for thickness measurement
- Nomination of critical structural areas for close-up surveys and NDT.

#### 1.5.1 Critical Structural Areas

The basis for nomination of the critical structural areas is an assessment in consideration of possible deterioration and designated fatigue prone areas where the following elements on a particular unit are taken into account:

- Design feature with relatively low fatigue life
- Former history available at Owner's or ABS offices with respect to corrosion, cracking, buckling, indents and repairs for the particular unit as well as similar units
- Unit's service history since last survey (e.g., area of operation, environmental data, water depth, air gap for SEDU's, length of time at each location etc.)

The degree of criticality should be judged and decided on the basis of recognized principles and practice, and the unit's structural fatigue analyses if deemed necessary. ABS reviewed drawing showing all applicable critical structural areas is to be available onboard, referenced during the pre-planning meeting and used during applicable visual examination and NDT.

# PART 7

## CHAPTER 2 Surveys After Construction

### SECTION 4 Annual Surveys

#### 1 Annual Survey – Hull

##### 1.1 All Types of Mobile Offshore Drilling Units

(2010) At each Annual Survey – Hull, the exposed parts of the hull, the deck, deckhouses, structures attached to the deck, derrick substructure, including supporting structure, accessible internal spaces, and the applicable parts listed in 7-2-4/1.1.1 through 7-2-4/1.1.15 below are to be generally examined and placed in satisfactory condition as found necessary and reported upon.

- 1.1.1 Openings in Freeboard Deck and Enclosed Superstructure Decks  
Hatchways, manholes, and other openings in the freeboard deck (bulkhead deck) and enclosed superstructure decks.  
Machinery casings and covers, companionways, and deckhouses protecting openings in freeboard or enclosed-superstructure decks.
- 1.1.2 Openings below the Freeboard Deck and Enclosed Superstructures  
Portlights together with deadcovers, cargo ports, bow or stern entries, chutes, and similar openings in hull sides or ends, below the freeboard deck or in way of enclosed superstructures.
- 1.1.3 Ventilators, Vent Pipes Overboard Discharges on or below Freeboard Deck  
Ventilators, tank vent pipes together with flame screens, and overboard discharges from enclosed spaces on or below the freeboard deck.
- 1.1.4 Openings below the Freeboard Deck and Enclosed Superstructures  
Watertight bulkheads and end bulkheads of enclosed superstructures.
- 1.1.5 Closing Appliances  
Closing appliances for all of the above, including hatch covers, doors, check valves together with their respective securing devices, dogs, sills, coaming, and supports.
- 1.1.6 Freeing Ports  
Freeing ports together with bars, shutters, and hinges.
- 1.1.7 Protection of Crew, Guard Rails, Lifelines, Gangways, and Deckhouses  
Protection of the crew, guard rails, lifelines, gangways, and deckhouses accommodating crew.
- 1.1.8 Openings below the Freeboard Deck and Enclosed Superstructures  
Suspect Areas of the hull are to be overall examined and gauged as considered necessary.  
  
Suspect areas identified at a previous survey and which are readily accessible are to be subject to overall examination and Close-up Survey. Similarly, any areas of Substantial Corrosion identified at previous surveys and which are readily accessible are to have thickness measurements taken.

#### 1.1.9 Corrosion

Where extensive areas of corrosion are found or when considered necessary by the Surveyor, thickness measurements are to be carried out and renewals and/or repairs made when wastage exceeds allowable margins.

Where Substantial Corrosion is found, additional thickness measurements are to be taken to confirm the extent of substantial corrosion. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

#### 1.1.10 Corrosion Control Systems

At each Annual Survey – Hull, the Surveyors are to be satisfied that the type, location and extent of the corrosion control system as well as its continuous effectiveness is in satisfactory condition. Repairs or renewals should be reported on at each survey. Particular attention is to be given to corrosion control systems in ballast tanks, free-flooding areas and other locations subjected to sea water from both sides.

*1.1.10(a) Performance Standards for Protective Coatings (PSPC) (2012).* For units with optional class notation **CPS**, survey after construction are to comply with Section 6 of the *ABS Guide for the Class Notation Coating Performance Standard (CPS)*. See 7-1-2/13.1.

#### 1.1.11 Alterations and Position of Load Lines

At each Annual Survey – Hull, the Surveyors are to be satisfied that no material alterations have been made to the unit, its structural arrangements, subdivision, superstructure, fittings and closing appliances upon which the load line assignment is based.

#### 1.1.12 Construction Booklet (Construction Portfolio) (2012)

ABS reviewed and stamped Construction Booklet is to be available onboard the drilling unit for Surveyor's verification.

#### 1.1.13 Operating Manual (2012)

ABS reviewed and stamped Operating Manual is to be available onboard the drilling unit for Surveyor's verification.

#### 1.1.14 HIMP Notation (optional) (2012)

Owner's Hull Inspection and Maintenance Program (HIMP) used for hull inspection and maintenance purposes is to be available onboard the drilling unit.

#### 1.1.15 Onboard Computers for Stability Calculations (2012)

If an onboard computer is used for stability calculations, satisfactory operation of the software with the onboard computer(s) for stability calculations is to be verified in presence of the Surveyor.

Satisfactory functional requirements (see 7-1-A2/3) are to be confirmed by the Surveyor.

A copy of the approved test conditions and the operation manual (see 7-1-A2/5) for the computer/software are to be available onboard.

*1.1.5(a) Testing.* It is the responsibility of the drilling unit's master to check the accuracy of the onboard computer for stability calculations at each Annual Survey by applying at least one approved test condition.

The testing is to be carried out to verify initial installation testing conditions.

If the Surveyor is not present for the computer check, a copy of the test condition results obtained by the computer check is to be retained onboard as documentation of satisfactory testing for the Surveyor's verification.

For further details, see Appendix 7-1-A2.

### 1.3 Surface-Type Units (2012)

On Surface-Type Units, in addition to the requirements of 7-2-4/1.1, following areas are to be examined.

- The hull and deck structure around the drilling well (moon pool) and in vicinity of any other structural changes in section, slots, steps or openings in the deck or hull..
- The back-up structure in way of structural members or sponsons connecting to the hull.

### 1.5 Self-Elevating Units (2012)

On Self-Elevating Units, in addition to the requirements of 7-2-4/1.1, following areas are to be examined.

- Jackhouse structures and attachment to upper hull or platform.
- Jacking or other elevating systems and leg guides, externally.
- Legs as accessible above the waterline.
- Plating and supporting structure in way of leg wells.

### 1.7 Column-Stabilized Units (2012)

On Column Stabilized Units, in addition to the requirements of 7-2-4/1.1, following areas are to be examined.

- Columns, diagonals and other parts of the upper columns, diagonals and other parts of the upper hull supporting structure as accessible above the waterline.
- The upper hull structure around the drilling well (moon pool) and in vicinity of any other structural changes-in section, slots, steps or openings in the upper hull structure.

## 3 Annual Survey – Machinery and Electrical Systems (2010)

At each Annual Survey – Machinery and Electrical Systems, the entire installation is to be generally examined so far as can be seen and placed in satisfactory condition. The survey is also to include the following items, as applicable.

### 3.1 Non-Self-Propelled Units (1996)

On non-self-propelled units, a general examination is to be made of items required for classification such as auxiliary machinery, pumps, piping, electrical installations, including those in hazardous areas, and fire-extinguishing apparatus as outlined in Part 5, Chapter 2 of these Rules. Fire mains are to undergo satisfactory pressure testing.

### 3.3 Self-Propelled Units (1996)

On self-propelled units, a general examination in accordance with Section 7-6-2 of the *ABS Rules for Survey After Construction (Part 7)* should be made of engines, boilers, steering machinery, windlass, auxiliary machinery, pumps, piping, electrical installations, including those in hazardous areas, and fire-extinguishing apparatus required for classification as outlined in Part 5, Chapter 2 of these Rules.

### 3.5 Preventative Maintenance Techniques (2010)

Units which have an approved program of Preventative Maintenance will be given special consideration as to the details and intervals for examination of machinery. See Appendix 7-A-14, "Guide for Survey Based on Preventative Maintenance Techniques" of the *ABS Rules for Survey After Construction (Part 7)*.

### 3.7 Examination during Overhaul (2010)

On all occasions of overhaul or adjustment, access is to be provided for the Surveyor to examine the parts opened. In the event of defects being discovered, such other parts as may be considered necessary are to be opened and examined.

### 3.9 Examination at Shorter Intervals (2012)

If it is found desirable, upon examination, that any part of the machinery should be examined at shorter intervals than specified, it will be necessary for Owners to comply with ABS requirements in this respect.

## 5 Thrusters and Dynamic Positioning Systems (2010)

Where the unit maintains the optional **PAS**, **APS** or **DPS** notations, thrusters and dynamic positioning systems are to be surveyed on the basis of "Survey Requirements for Additional Systems and Services" in accordance with the requirements of Section 7-9-6 of the *ABS Rules for Survey After Construction (Part 7)*.

In cases where testing may interfere with operations, verification of all different operational modes may not be practicable. Operational status of the vessel may then be taken into consideration. When any operational mode is not witnessed by the Surveyor, the dynamic positioning records are to be examined. The Surveyor is to review the dynamic positioning records and examine the performance of the systems throughout the period since the last survey and to establish if there has been any abnormal functioning or failures and what corrective measures had been taken to preclude their recurrence.

PART

**7**

CHAPTER **2 Surveys After Construction**

SECTION **5 Special Periodical Surveys**

**1 Special Periodical Survey – Hull No. 1 (1996)**

Special Periodical Survey – Hull No. 1 is to include compliance with the Annual Survey and Drydocking Survey requirements and, in addition, the following requirements as listed below are to be carried out, as applicable, the parts examined, placed in satisfactory condition and reported upon. Nondestructive Testing (NDT) may be required of suspect areas.

**1.1 General – All Types of Mobile Offshore Drilling Units**

**1.1.1 External and Internal Examination**

The hull or platform structure, including tanks, watertight bulkheads and decks, cofferdams, void spaces, sponsons, chain lockers, duck keels, helicopter pad, machinery spaces, peak spaces, steering gear spaces, and all other internal spaces, are to be examined externally and internally for damage, fractures or excessive wastage. Thickness gauging of plating and framing may be required where wastage is evident or suspected.

**1.1.2 Examination for Excessive Wastage or Damage**

All tanks, compartments and free-flooding spaces throughout the drilling unit are to be examined externally and internally for excess wastage or damage. Internal examination of spud cans and mats is to be specially considered.

**1.1.3 Watertight Integrity**

Watertight integrity of tanks, bulkheads, hull, bulkhead deck and other compartments is to be verified by visual inspection. Suspect areas may be required to be tested for tightness, nondestructive tested or thickness gauged. Tanks and other normally-closed compartments are to be ventilated, gas-freed and cleaned as necessary to expose damage and allow for a meaningful examination for excessive wastage.

**1.1.4 Waiving Internal Examination and Testing**

Internal examination and testing of void spaces, compartments filled with foam or corrosion inhibitors, and tanks used only for lube oil, light fuel oil, diesel oil or other noncorrosive products may be waived, provided that upon a general examination, the Surveyor considers their condition to be satisfactory.

**1.1.5 Corrosion Control**

External thickness gauging may be required to confirm corrosion control.

**1.1.6 Hull Attachments for Anchoring and Mooring System (2012)**

Attachments of anchor racks, anchor cable fairleads, and anchor windlasses are to be examined. For drilling units with **E**, **M** or **P** Class Symbols, the anchors, chains, and cables and their respective handling means are to be examined.

1.1.7 Other Hull Attachments (2012)

Structures such as derrick substructure and supporting structure, skid-base structure, jackhouses, pipe racks, deck houses, superstructures, helicopter landing areas, raw water (seawater intake) towers and their respective attachments to the deck or hull.

1.1.8 Hull Attachments for Drilling Apparatus

Foundations and supporting headers, brackets and stiffeners for drilling-related apparatus, where attached to hull, deck, superstructure or deck house.

1.1.9 Examination of Underwater Parts

Survey of parts of the unit which are underwater and inaccessible to the Surveyor may be accepted on the basis of an examination by a qualified diver carried out in the presence of the Surveyor. Video or photo records, nondestructive testing and thickness gauging may be required in addition to the diver's report. Refer to 7-2-6/3 of these Rules.

1.1.10 Gauging

At each Special Periodical Survey, thickness gauging is to be carried out where wastage is evident or suspected. At Special Periodical Survey – Hull No. 2 and subsequent Special Periodical Surveys, representative gauging will be required in accordance with 7-2-5/Table 1, 7-2-5/Table 2 and 7-2-5/Table 3. Special attention should be paid to splash zones on hulls, legs or related structure, and in ballast tanks, pre-load tanks, free-flooded spaces, spud cans and mats. The thickness gauging requirements indicated in the tables may be reduced or increased as deemed appropriate or necessary by the Surveyor in accordance with Notes 2 and 3 of the tables.

1.1.11 Inspection of Underwater Joints

Where inspection of underwater joints is required, sufficient cleaning is to be carried out in way, and water clarity to be adequate, to permit meaningful visual, video, camera or NDT examination, as required. Every effort should be made to avoid cleaning damage to special coatings.

1.1.12 Suspect Areas

Suspect Areas of the hull are to be overall examined and gauged as considered necessary.

Suspect areas identified at a previous survey are to be subject to overall examination and Close-up Survey. Similarly, any areas of Substantial Corrosion identified at previous surveys are to have thickness measurements taken.

1.1.13 Corrosion

Where extensive areas of corrosion are found or when considered necessary by the Surveyor, thickness measurements are to be carried out and renewals and/or repairs made when wastage exceeds allowable margins.

Where Substantial Corrosion is found, additional thickness measurements are to be taken to confirm the extent of substantial corrosion. These extended thickness measurements are to be carried out before the Special Periodical Survey is credited as completed.

**1.3 Surface-Type Units**

Structural appendages and ducts for positioning units are to be examined. Refer also to the latest edition of the *ABS Rules for Survey After Construction* (Part 7), as applicable to vessels constructed in accordance with the Steel Vessel Rules.

**1.5 Self-Elevating Units**

1.5.1 Legs

All legs, including chords, braces, diagonals, gussets, racks, joints, together with leg guides are to be examined. Tubular or similar type legs are to be examined externally and internally, together with internal stiffeners and pinholes, as applicable.

- 1.5.2 Jack-House and Leg Wells  
Structure in, around and under jack-houses and leg wells.
- 1.5.3 Leg Jacking or other Elevating Systems  
Leg jacking or other elevating systems externally.
- 1.5.4 Leg Connections to Mat or Spud Cans  
Leg connections to bottom mats or spud cans, including nondestructive testing of leg connections to mats or spud cans.
- 1.5.5 Jetting Piping System  
Jetting piping systems or other external piping, particularly where penetrating mats or spud cans.
- 1.5.6 Spud Cans or Mats (2010)  
Internal and external examination of spud cans or mat.  
  
Note: Spud cans and other bottom spaces subject to contact with, or accumulation of, bottom soil should be thoroughly ventilated and carefully monitored for pocketing or emission of hazardous gases prior to, and during, internal inspection. Where the spud cans or mat are partly or entirely obscured below the mud line when the Special Periodical Survey is otherwise being completed, consideration will be given to postponement of these examinations until the next rig move.

### 1.7 Column-Stabilized Units (1996)

Connections of columns and diagonals to upper hull or platform and lower hull or pontoons. Joints of supporting structure, including diagonals, braces and horizontals, together with gussets and brackets. Internal continuation or back-up structure for the above.

### 1.9 Onboard Computers for Stability Calculations (2012)

If an onboard computer is used for stability calculations, satisfactory operation of the software with the onboard computer(s) for stability calculations is to be verified in presence of the Surveyor.

Satisfactory functional requirements (see 7-1-A2/3) are to be confirmed by the Surveyor.

A copy of the approved test conditions and the operation manual (see 7-1-A2/5) for the computer/software are to be available onboard.

#### 1.9.1 Testing

Testing is to be carried out in accordance with the requirements stated in 7-2-4/1.13.1. At each Special Periodical Survey computer checking for all approved test operating conditions is to be done in presence of the Surveyor.

## 3 Special Survey No. 2 and Subsequent Special Surveys

### 3.1 General (2010)

These surveys are to be at least as comprehensive as Special Periodical Survey – Hull No. 1, with special attention being given to the condition and thickness of material in high corrosion areas. The subsequent Special Periodical Surveys of ship or barge type units will include the requirements of the latest edition of the *ABS Rules for Survey After Construction (Part 7)*, as applicable to vessels constructed in accordance with the *Steel Vessel Rules*.

### 3.3 Close-Up Survey and Nondestructive Testing on Self-Elevating Units (2012)

All critical structural areas are to be subjected to 100% close-up survey and extensive Nondestructive Testing (NDT) at each UWILD associated with Special Periodical Survey. The number of leg joints and associated structure that is to be subjected to NDT is to be determined by the Owner and ABS with consultation of the records and NDT results of previous surveys. The Surveyor may require fatigue analysis to be reviewed by ABS before crediting the Special Survey.

The following is an outline of some of the areas that will be subjected to close-up survey and extensive NDT:

- i) Leg-to-spudcan connections plus 2 bays (to extent deemed necessary by the Surveyor) of leg above the top of the spudcan
- ii) Jackhouse/jackcase-to-deck connections
- iii) Brace-to-chord connection in areas of leg that have been predominately in way of the upper and lower guides  
*Note:* Areas in way of the upper guides are to be examined and subjected to NDT to identify any damage resultant from towing the drilling unit with its legs elevated. Areas in way of the lower guides are to be examined and subjected to NDT to identify any damage as a consequence of operating in the elevated/drilling mode.
- iv) Leg-to-mat connections  
*Note:* In general, these connections are considered to be "Special Application Structures" and are to be treated accordingly.

#### 3.3.1 Special Survey No. 3 and Subsequent Special Surveys

At the 3<sup>rd</sup> Special Periodical Survey and subsequent Special Surveys, 100% of the critical structural areas of a self-elevating unit are to be subjected to close-up survey and extensive NDT within a 5-year period. All of the leg-to-spudcan connections plus 2 bays of every leg above the top of the spudcan are to be subjected to surface NDT. Amount of total close-up survey and NDT may be divided between two UWILDs carried out during each five year cycle. The number of joints and associated internal continuation and back-up structure, plus any gussets or brackets that are to be subjected to NDT may be determined by the Owner and ABS with consultation of the records and NDT results of previous surveys. The Surveyor may require fatigue analysis to be reviewed by ABS before crediting the Special Survey.

### 3.5 Close-Up Survey and Nondestructive Testing on Column-Stabilized Units (2012)

All critical structural areas are to be subjected to 100% close-up survey and extensive Nondestructive Testing (NDT) at each UWILD associated with Special Periodical Survey.

The following is an outline of some of the areas that will be subjected to close-up survey and NDT:

- i) Horizontal and diagonal bracing to columns and upper hull, together with gussets and brackets
- ii) Horizontal and diagonal bracing to pontoons, upper hull and columns, together with gussets and brackets
- iii) Internal back-up structure for the above
- iv) Brace-to-brace connections, together with gussets and brackets
- v) Column connection to lower and upper hulls
- vi) Fairleader connections to columns
- vii) Highly stressed areas in way of the moon pool

#### 3.5.1 Special Survey No. 3 and Subsequent Special Surveys

At the 3<sup>rd</sup> Special Periodical Survey and subsequent Special Surveys, 100% of the critical structural areas of a column stabilized unit are to be subjected to close-up survey and extensive NDT within a 5-year period. Amount of total close-up survey and NDT may be divided between two UWILDs carried out during each five year cycle. The number of joints and associated internal continuation and back-up structure, plus any gussets or brackets that are to be subjected to NDT may be determined by the Owner and ABS with consultation of the records and NDT results of previous surveys. The Surveyor may require fatigue analysis to be reviewed by ABS before crediting the Special Survey.

### 3.7 Record Keeping

The following is an outline of what is expected as far as documentation of the NDT results for each survey:

- i) Details of the areas surveyed and type of NDT carried out (i.e., sketches showing details of joints plus any internal back-up structure that is considered part of the structural joint).
- ii) The Owner shall keep a detailed record of what has been previously surveyed, the type of survey carried out (Visual, MPI, etc.) (e.g., list area/quadrant of joint surveyed, nature and extent of indication found, and how it was repaired).

*Note:* Although it is not a mandatory requirement for Classification, Owner's Inspection and Maintenance Manual could have information on the type of steel used in the construction, as built welding procedures, sketches of each joint to be surveyed and structural inspection NDT methods to be carried out, and may be used as a document maintained onboard for Record Keeping. If the Owner's Inspection and Maintenance Manual is used for Record Keeping, it is to be reviewed and accepted by the attending Surveyor during survey pre-planning and commencement of respective UWILD.

### 3.9 Thickness Measurement (Gauging) (2012)

Areas to be gauged are given in 7-2-5/Table 1 through 7-2-5/Table 3.

**TABLE 1**  
**Thickness Gauging Requirements for Surface-Type Units (2012)**

<i>Special Periodical Survey Number 1</i>	<i>Special Periodical Survey Number 2</i>	<i>Special Periodical Survey Number 3</i>	<i>Special Periodical Survey Number 4</i>
1) Suspect areas throughout the vessel.	1) Suspect areas throughout the vessel. 2) (2012) One transverse section of deck plating abreast the moon pool opening within the amidships $0.6L$ , together with internals in way as deemed necessary. Where vessel is configured with side ballast tanks, the plating and internals of the tanks are also to be gauged in way of the section chosen. 3) Moon pool boundary bulkhead plating.	1) Suspect areas throughout the vessel. 2) (2012) Two girth belts of deck, bottom and side plating abreast the moon pool and one hatch opening within the amidships $0.6L$ together with internals in way as deemed necessary. Where vessel is configured with side ballast tanks, the plating and internals of the tanks to be gauged in way of the required belts, Remaining internals in ballast tanks to be gauged as deemed necessary. 3) Moon pool boundary bulkhead plating. 4) Internal in forepeak tank as deemed necessary.	1) Suspect areas throughout the vessel. 2) (2012) A minimum of three girth belts of deck, bottom, side, and longitudinal-bulkhead plating in way of the moon pool and other areas within the amidships $0.6L$ , together with internals in way (including in perimeter ballast tanks, where fitted in way of belts). 3) Moon pool boundary bulkhead plating. 4) Internals in forepeak and after peak tanks as deemed necessary. 5) Lowest strake of all transverse bulkheads in hold spaces. Remaining bulkhead plating to be gauged as deemed necessary. 6) All plates in two wind and water strakes, port and starboard, full length. 7) All exposed main deck plating full length and all exposed first-tier super-structure deck plating (poop, bridge and forecastle decks). 8) All keel plates full length plus additional bottom plating as deemed necessary by the Surveyor, particularly in way of cofferdams and machinery spaces. 9) Duct keel or pipe tunnel plating or pipe tunnel plating and internals as deemed necessary.

*Notes:*

- 1 With reference to ballasting history and arrangement and condition of coatings, tanks and specific thickness gauging locations should be selected which will provide the best representative sampling of areas likely to be most exposed to corrosion effect.
- 2 Gauging requirements noted may be modified as deemed necessary or appropriate by the Surveyor if the structure remains effectively protected against corrosion by a permanent type special coating.
- 3 In any case where excessive wastage is evident, additional gaugings may be required.

**TABLE 2**  
**Thickness Gauging Requirements for Self-Elevating Units (2012)**

<i>Special Periodical Survey Number 1</i>	<i>Special Periodical Survey Number 2</i>	<i>Special Periodical Survey Number 3</i>	<i>Special Periodical Survey Number 4</i>
1) Suspect areas throughout the unit (particular attention to be paid to the legs in way of the Splash Zone).	1) Suspect areas throughout the unit. 2) Legs in way of Splash Zone. 3) Primary application structures where wastage is evident. 4) Representative gaugings of upper hull deck and bottom plating and internals of one preload (ballast) tank.	1) Suspect areas throughout the unit. 2) Representative gaugings, throughout, of special and primary application structures. 3) Leg well structure. 4) Representative gaugings of deck, bottom, and side shell plating of hull and mat. 5) Representative gaugings of upper hull deck and bottom plating and internals of at least two preload (ballast) tanks.	1) Suspect areas throughout the unit. 2) Comprehensive gaugings, throughout, of special and primary application structures. 3) Leg well structure. 4) Representative gaugings of deck, bottom, and side shell plating of hull and mat. 5) Substructure of derrick as deemed necessary. 6) Representative gaugings of internals of all preload (ballast) tanks.

*Notes:*

- 1 With reference to the operating history and arrangement and condition of coatings, specific thickness gauging locations should be selected which will provide the best representative sampling of areas likely to be most exposed to corrosion effect.
- 2 Gauging requirements noted may be modified as deemed necessary or appropriate by the Surveyor if the structure remains effectively protected against corrosion by a permanent type special coating.
- 3 In any case where excessive wastage is evident, additional gaugings may be required.
- 4 Structural application designation (special, primary, secondary) are defined in Section 3-1-3.
- 5 (2012) Splash Zone is to be considered as the structural area that has been periodically in and out of the water when the unit was at its operating depth, most of the time during the past five-year period. Based on operational record of the unit, additional zones may also be gauged.

**TABLE 3**  
**Thickness Gauging Requirements for Column-Stabilized Units (2012)**

<i>Special Periodical Survey Number 1</i>	<i>Special Periodical Survey Number 2</i>	<i>Special Periodical Survey Number 3</i>	<i>Subsequent Special Periodical Survey</i>
1) Suspect areas throughout the unit. 2) Columns and bracings where wastage is evident in Splash Zone.	1) Suspect areas throughout the unit. 2) Representative gaugings of columns and bracings in Splash Zone together with internals in way as deemed necessary. 3) Special and primary application structure where wastage is evident.	1) Suspect areas throughout the unit. 2) Representative gaugings, throughout, of special and primary application structures. 3) 1 girth belt of each of 2 columns and 2 bracings in Splash Zone together with internals in way as deemed necessary. 4) Chain locker internals as deemed necessary. 5) Lower hulls in way of mooring lines where wastage is evident. 6) 1 girth belt of each lower hull between one set of columns.	1) Suspect areas throughout the unit. 2) Comprehensive gaugings, throughout, of special and primary application structures. 3) 1 girth belt of each of one-half of the columns and bracings in Splash Zone and internals in way as deemed necessary (i.e., gauge half of the unit's columns and bracings in Splash Zone). 4) Chain locker internals as deemed necessary. 5) Lower hulls in way of mooring lines where wastage is evident. 6) 1 girth belt of each lower hull between one set of columns. 7) Representative gaugings of substructure of drilling derrick.

*Notes:*

- 1 With reference to the ballasting history and arrangement and condition of coatings, tanks and specific thickness gauging locations should be selected which will provide the best representative sampling of areas likely to be most exposed to corrosion effect.
- 2 Gauging requirements noted may be modified as deemed necessary or appropriate by the Surveyor if the structure remains effectively protected against corrosion by a permanent type special coating.
- 3 In any case where excessive wastage is evident, additional gaugings may be required.
- 4 Structure application designations (special, primary, secondary) are defined in Section 3-1-3.
- 5 (2012) Splash Zone is to be considered as the structural area that has been periodically in and out of the water when the unit was at its operating depth, most of the time during the past five-year period. Based on operational record of the unit, additional zones may also be gauged.

## 5 Special Periodical Survey – Machinery (2010)

Special Periodical Survey – Machinery is to include compliance with the Annual Survey requirements and, in addition, the following requirements as listed below are to be carried out, as applicable, the parts examined, placed in satisfactory condition and reported upon.

### 5.1 Correlation with Special Periodical Survey – Hull

Main and auxiliary engines of all types for drilling units are to undergo Special Periodical Survey at intervals similar to those for Special Periodical Survey – Hull in order that both may be recorded at approximately the same time. In cases where damage has involved extensive repairs and examination, the survey thereon may be considered as equivalent to a Special Periodical Survey.

### 5.3 Parts to be Examined – All Types of Mobile Offshore Drilling Units

(2012) In addition to the requirements for Annual Survey, at each Special Periodical Survey, special attention is to be given to the following requirements, as applicable.

#### 5.3.1 Openings to the Sea and Fastenings

All openings to the sea, including sanitary and other overboard discharges together with the cocks and valves connected therewith, are to be examined internally and externally while the drilling unit is in drydock or at the time of underwater examination in lieu of drydocking, and the fastenings to the shell plating are to be renewed when considered necessary by the Surveyor.

#### 5.3.2 Pumps and Pumping Arrangements

Pumps and pumping arrangements, including valves, cocks, pipes, and strainers, are to be examined.

#### 5.3.3 Nonmetallic Expansion Pieces

Nonmetallic flexible expansion pieces in the main salt-water circulating system are to be examined internally and externally.

#### 5.3.4 Bilge and Ballast System, and other Systems

The Surveyor is to be satisfied with the operation of the bilge and ballast systems. Other systems are to be tested as considered necessary.

#### 5.3.5 Machinery Foundations (2012)

The foundations of machinery, particularly those categorized as “Primary Application Structure” are to be examined.

#### 5.3.6 Pressure Vessels

Heat exchangers and other unfired pressure vessels (except those used solely for drilling operations and complying with a recognized standard) with design pressures over 0.7 bar (7 kgf/cm<sup>2</sup>, 100 psi) are to be examined, opened out or thickness gauged and pressure tested as considered necessary, and associated relief valves proven operable. Evaporators that operate with a vacuum on the shell need not be opened, but may be accepted on the basis of satisfactory external examination and operational test or review of operating records

### 5.5 Parts to be Examined – Self-Propelled Mobile Offshore Drilling Units (2012)

On self-propelled units, in addition to the requirements for Annual Survey and the applicable requirements of 7-2-5/5.3, the main and auxiliary machinery, including pressure vessels, should be surveyed in accordance with the requirements of the latest edition of the *ABS Rules for Survey After Construction (Part 7)*, as applicable to self-propelled vessels constructed in accordance with the *Steel Vessel Rules*, and the following, as applicable.

## 7 Special Periodical Survey – Electrical Equipment (2010)

Special Periodical Survey – Electrical Equipment is to include compliance with the Annual Survey requirements and, in addition, the following requirements as listed below are to be carried out, as applicable, the parts examined, placed in satisfactory condition and reported upon.

### 7.1 Correlation with Special Periodical Surveys – Hull

The entire installation, including auxiliary and emergency equipment is to undergo Special Periodical Survey at intervals similar to those for Special Periodical Survey – Hull in order that both may be recorded at approximately the same time. In cases where damage has involved extensive repairs and examination, the survey thereon may be considered as equivalent to a Special Periodical Survey.

### 7.3 Parts to be Examined

#### 7.3.1 Main Switchboards and Distribution Panels

Fittings and connections on main switchboards and distribution panels are to be examined, and care is to be taken to see that no circuits are over fused.

#### 7.3.2 Cables

Cables are to be examined as far as practicable without undue disturbance of fixtures.

#### 7.3.3 Generator Run

All generators are to be run under load, either separately or in parallel; switches and circuit breakers are to be tested.

#### 7.3.4 Equipment and Circuits

All equipment and circuits are to be inspected for possible development of physical changes or deterioration. The insulation resistance of the circuits is to be measured between conductors and between conductors and ground and these values compared with those previously measured. Any large and abrupt decrease in insulation resistance is to be further investigated and either restored to normal or renewed as indicated by the conditions found.

#### 7.3.5 Electrical Auxiliaries, Generators and Motors

The specified electrical auxiliaries for vital purposes, generators and motors are to be examined and their prime movers opened for inspection. The insulation resistance of each generator and motor is to be measured.

#### 7.3.6 Accumulator Batteries (2012)

The accumulator batteries are to be examined, including their maintenance schedule and ABS reviewed procedure of maintenance.

#### 7.3.7 Bilge Alarm (if fitted)

Bilge alarm system, if fitted, is to be tested and proven satisfactory.

### 7.5 Self Propelled Units – Main Propulsion Apparatus

Where the unit maintains the optional **AMS** Notation, the windings of generators and motors are to be thoroughly examined and found or made dry and clean. Particular attention is to be paid to the ends of the windings of stator and rotors. After the winding have been cleaned and found dry, they are to be varnished, if necessary, with a standard insulating varnish applied preferably by spraying.

### 7.7 Major Repairs

On the occasion of major repairs, the coils repaired or renewed are to be subjected to a dielectric strain test, as specified under the applicable parts of Part 4, Chapter 3. In addition, the circuits containing the repairs or renewals and coils which have been disturbed during repairs are to be subjected to dielectric strain tests for one minute by application of a potential of 125% of the maximum operating voltage of the circuits to which it is applied. The direct current fields of generators and motors are to be subjected for one minute to a test potential equal to 50% of the value specified under the applicable parts of Part 4, Chapter 3 and the whole apparatus operated under full-load conditions.

## 9 Special Periodical Survey – Special Features (All Types) (2010)

Special Periodical Survey – Special Features is to include compliance with the Annual Survey requirements and, in addition, the following requirements as listed below are to be carried out, as applicable, placed in satisfactory condition and reported upon.

Mobile offshore drilling units may have many items of machinery and electrical equipment not found on conventional cargo vessels. Certain of these items are required for classification even if the unit is without propulsion machinery. Items to be especially examined and reported upon at all Special Periodical Surveys are listed in 7-2-5/9.3 through 7-2-5/9.13 for all types of Mobile Offshore Drilling Units, and additionally 7-2-5/9.15 for Self Elevating Drilling Units.

### 9.1 Correlation with Special Periodical Surveys – Hull

The entire installation is to undergo Special Periodical Survey at intervals similar to those for Special Periodical Survey – Hull in order that both may be recorded at approximately the same time. In cases where damage has involved extensive repairs and examination, the survey thereon may be considered as equivalent to a Special Periodical Survey.

### 9.3 Hazardous Areas

Hazardous areas, delineated in accordance with the onboard copy of the ABS approved hazardous area plan, are to be examined. The onboard copy of the ABS approved listing of electrical equipment is to be used for survey of hazardous areas. The following items are to be especially examined, tested as necessary, and proven satisfactory:

- Gas-tight doors and closures in boundary bulkheads or decks of hazardous areas, including those fitted in air-lock passages.
- Drains and scuppers from hazardous areas, and associated loop-seal traps where fitted.
- Explosion-proof or intrinsically safe electric lighting, electrical fixtures and instrumentation, in particular any associated sealing arrangements.
- Purged electrical equipment, including visual and audible indication of loss of purge alarms or shutdowns.
- Electric motors, including closed-loop ventilating systems for large motors. Automatic power disconnect to motors in case of loss of ventilating air.
- Ventilating systems, including ductwork, fans, inlets and outlets for enclosed restricted areas.
- Ventilation alarm systems, including pressure differential devices, if fitted.

For Units built prior to 1996 that may not have an onboard copy of the ABS approved listing of electrical equipment in hazardous areas, the equipment in the hazardous areas are to be examined to the satisfaction of the attending Surveyor.

### 9.5 Remote Shutdown Arrangements (1996)

Remote shutdown arrangements for fuel-oil transfer service pumps and ventilating equipment, together with oil tank outlet valves, where capable of being remotely closed, are to be proven satisfactory. Emergency switches, where required by the Rules, for all electrical equipment, including main and emergency generators, except alarm and communication systems and lighting in vital areas such as escape routes and landing platforms, are to be proven satisfactory.

### 9.7 Passive Fire Protection System

A general examination of the passive fire protection system is to be made in order that the Surveyor may be satisfied as to its efficient state. The following items are to be especially examined:

- Structural fire protection system and protection of accommodation spaces, service spaces and control stations. This examination is to verify that fire integrity of bulkheads and decks, all openings and access through enclosed spaces, as well as closing devices, satisfactorily maintain original integrity of these spaces and in accordance with approved design and construction.

### 9.9 Active Fire Protection Systems and Equipment

A general examination of applicable active fire protection system is to be made in order that the Surveyor may be satisfied as to its efficient state. The following items are to be especially proven in compliance with the Rules:

- Fire control plans are permanently exhibited for the guidance of operating personnel, showing clearly for each deck provision, location, controls and particulars, as applicable, of the; fixed fire detection, alarm and extinguishing systems, portable fire-fighting equipment and appliances, controls of fuel-oil pumps and valves, ventilation system shut-downs and closing of openings, and locations and type of fire retarding bulkheads. Where onboard conditions are found to have been modified, exhibited plans are to reflect the onboard conditions, and fire control plans are to be submitted for review.

- Fire main systems are to be examined and tested, as applicable, particularly to verify that; fire pumps, including their relief valves (if fitted), fire main piping together with associated hydrants, hoses and nozzles, and international shore connection remain in satisfactory condition. Pressure and operational tests of the fire main system, as required by the Rules, are to be carried out.
- Additional fixed fire fighting systems, such as those using gas smothering, foam, fixed pressure water spraying, and systems protecting helicopter decks are to be examined and tested, and to be proven satisfactory.
- Portable and semi-portable fire extinguishers and sand (where provided) are to be examined, all portable soda-acid and foam extinguishers are to be serviced, and all dry chemical and CO<sub>2</sub> extinguishers are to be weighed and recharged, as necessary, and proven satisfactory.
- Fireman's outfits, consisting of a breathing apparatus, a lifeline, a safety lamp, an axe, nonconductive boots and gloves, a rigid helmet and protective clothing complying with the requirements of the Rules are to be examined, and verified as to be easily accessible and ready for use, and stored in separate positions so that a fire in one location would not block access to both outfits.
- Fire detection system and its alarms, general alarms system, mud tank level alarms, ventilation system alarms, and gas detection system and its alarms, are to be examined and tested, and proven satisfactory.

### 9.11 Outfitting

A general examination of following outfitting items is to be made in order that the Surveyor may be satisfied as to its efficient state. The following items are to be especially proven in compliance with the Rules:

- Means of escape
- Means of access and egress
- Guards and rails
- Emergency control stations
- Arrangements in machinery spaces
- Segregation of fuel oil purifiers
- Rotary table area
- Fire precautions in machinery spaces

### 9.13 Piping Systems Supporting the Drilling System

Piping systems supporting the drilling system, but outside the scope of Certified Drilling System (optional Classification) equipment and associated components and complying either with these Rules or a recognized standard as required by 4-2-1/1 are to be examined, as far as practical, operationally or hydrostatically tested to working pressure, to the satisfaction of the Surveyor.

### 9.15 Self-Elevating Drilling Units – Leg Jacking Systems (2011)

On self-elevating type drilling units, leg jacking systems are to be examined and reported on. Pinions and gears of the climbing pinion gear train of rack and pinion systems are to be examined as far as practicable, to the Surveyor's satisfaction, by an effective crack detection method.

At Special Periodical Survey No. 2 and subsequent Special Periodical Surveys, the leg jacking system is to be examined in the presence of the Surveyor by the original equipment manufacturer or other third party inspector mutually agreeable to the owner and the Surveyor.

## 11 Thrusters and Dynamic Position Systems (2010)

Where the unit maintains the optional **PAS**, **APS** or **DPS** notations, thrusters and dynamic positioning systems are to be surveyed on the basis of "Survey Requirements for Additional Systems and Services" in accordance with the requirements of Section 7-9-6 of the *ABS Rules for Survey After Construction (Part 7)*.

### **13 Units with Retractable Propulsion Thrusters (2010)**

Where the units are fitted with retractable propulsion thrusters, component parts of oil-lubricated retractable propulsion thrusters are to be opened for examination at least every five years. Internal examination of oil-lubricated retractable propulsion thrusters may be waived only if an approved condition monitoring scheme has been applied and if vibration records and lube-oil analysis have proven satisfactory performance.

## PART

# 7

## CHAPTER 2 Surveys After Construction

### SECTION 6 Drydocking Surveys or Equivalent

#### 1 Parts to be Examined

##### 1.1 Surface-type Units (Ship or Barge Type Units)

External surfaces of the hull, keel stem, stern frame, rudder, nozzles, and sea strainers are to be selectively cleaned and examined together with appendages, the propeller, exposed parts of stern bearing assembly, rudder pintle and gudgeon securing arrangements, sea chests and strainers and their fastenings. Propeller shaft bearing, rudder bearing, and steering nozzle clearances are to be ascertained and reported upon.

##### 1.3 Self-Elevating Units (2012)

External surfaces of the upper hull or platform, spud cans, mat, underwater areas of legs, together with their connections, as applicable, are to be selectively cleaned and examined.

At each Drydocking Survey (or equivalent) after Special Survey No. 2, the satisfactory condition of the internal structure of the mat or spud cans, as accessible, is to be verified.

The following is an outline of some of the areas that will be subjected to close visual and extensive NDT at each UWILD not associated with Special Surveys:

- i) Leg-to-spudcan connections
- ii) Jackhouse/jackcase-to-deck connections
- iii) Brace-to-chord connection in areas of leg that have been predominately in way of the upper and lower guides

*Note:* Areas in way of the upper guides are to be examined and subjected to NDT to identify any damage resultant from towing the drilling unit with its legs elevated. Areas in way of the lower guides are to be examined and subjected to NDT to identify any damage as a consequence of operating in the elevated/drilling mode.

- iv) Leg-to-mat connections

*Note:* In general, these connections are considered to be “Special Application Structures” and are to be treated accordingly.

- v) Suspect areas

*Note:* Spud cans and other bottom spaces subject to contact with, or accumulation of, bottom soil should be thoroughly ventilated and carefully monitored for pocketing or emission of hazardous gases prior to, and during, internal inspection. Where the spud cans or mat are partly or entirely obscured below the mud line when the UWILD is otherwise being completed, consideration will be given to postponement of the underwater examination of the unit until the next rig move.

##### 1.5 Column-Stabilized Units

External surfaces of the upper hull or platform, footings, pontoons or lower hulls, underwater areas of columns, bracing and their connections, as applicable, are to be selectively cleaned and examined.

Nondestructive testing may be required of areas found to be suspect.

Sea chests and strainers are to be cleaned and examined.

### 1.7 Ballast and Preload Spaces – All units

In conjunction with Drydocking Surveys (or equivalent) after Special Survey No. 1 and between subsequent Special Surveys, the following ballast and preload spaces are to be internally examined and the effectiveness of coatings or corrosion control arrangements are to be verified either visually, by indicator strips or by thickness gauging (as considered necessary), placed in satisfactory condition, as found necessary, and reported upon.

#### 1.7.1 Surface-Type Units

One peak tank and at least two other representative ballast tanks between the peak tank bulkheads used primarily for water ballast.

#### 1.7.2 Self-Elevating Units

Representative ballast tanks or free-flooding compartments in mat or spud cans, if accessible, and at least two representative upper hull salt water tanks on mat supported units or two representative preload tanks on independent leg units.

#### 1.7.3 Column-Stabilized Units

Representative ballast tanks in footings, lower hulls or free-flooding compartments as accessible, and at least two ballast tanks in columns or upper hull, if applicable.

### 1.9 All Units

#### 1.9.1 Internal Examinations of Tanks and Voids

All tanks and voids which are to be internally examined are to be thoroughly ventilated and gas-freed prior to being entered and are to be carefully monitored for pocketing or emissions of hazardous gases during examination.

#### 1.9.2 Sea Valves

For Underwater Inspection in Lieu of Drydocking Survey associated with Special Surveys, means are to be provided to permit the opening up of all sea valves for internal examination.

#### 1.9.3 External Portions of Propulsion Units (2010)

External portions of propulsion units are to be examined, where applicable.

## 3 Underwater Inspection in Lieu of Drydocking (UWILD) (2010)

Underwater inspection by diver equivalent to a Drydocking Survey may be carried out at each Drydocking Survey up to and including Special Survey No. 4. The underwater inspection is to be carried out in accordance with this Section.

For each drydocking after Special Survey No. 4, requests to carry out an UWILD in accordance with previously approved plans are to be submitted for consideration well in advance of the proposed survey. Approvals to carry out the UWILD after Special Survey No. 4 are to be made available onboard for the Surveyor's reference.

The following are the procedures and conditions under which a properly conducted UWILD may be credited as a Drydocking Survey.

### 3.1 Conditions

#### 3.1.1 Limitations

UWILD may not be acceptable where there is record of abnormal deterioration or damage to the underwater structure, or where damage affecting the fitness of the unit is found during the course of the survey.

#### 3.1.2 Thickness Gauging and Nondestructive Testing

Underwater or internal thickness gaugings of suspect areas may be required in conjunction with the underwater inspection. Means for underwater nondestructive testing may also be required for fracture detection.

#### 3.1.3 Plans and Data (2012)

Approved plans and procedures for the survey are to be made available onboard for the purpose of carrying out an onboard preplanning of the survey with the Surveyor. These should include nomenclature of underwater parts and drawings or forms for laying out the areas to be surveyed, the extent of hull cleaning, nondestructive testing locations (including NDT methods) and for mapping damage or deterioration found. The examination of items associated with the Special or Continuous Surveys and Tail Shaft Surveys is to be included in the plans.

#### 3.1.4 Underwater Conditions

The areas to be surveyed are to be sufficiently clean and the sea water clear enough to permit meaningful examination and photography (if necessary) by the diver. Overall or spot cleaning may be required by the attending Surveyor.

### 3.3 Physical Features

The following physical features are to be incorporated into the unit's design in order to facilitate the underwater inspection. When verified, they will be noted in the unit's Classification for reference at subsequent surveys.

#### 3.3.1 Stern Bearing

For self-propelled units, means are to be provided for ascertaining that the seal assembly on oil-lubricated bearings is intact and for verifying that the clearance or wear-down of the stern bearing is not excessive. For oil-lubricated bearings, this may only require accurate oil-loss-rate records and a check of the oil for contamination by sea water or white metal. For wood or rubber bearings, an opening in the top of the rope guard and a suitable gauge or wedge would be sufficient for checking the clearance by a diver. For oil-lubricated metal stern bearings, wear-down may be checked by external measurements between an exposed part of the seal unit and the stern tube bossing, or by use of the unit's wear-down gauge, where the gauge wells are located outboard of the seals, or the unit can be tipped. For use of the wear-down gauges, up-to-date records of the base depths are to be maintained onboard. Whenever the stainless steel seal sleeve is renewed or machined, the base readings for the wear-down gauge are to be re-established and noted in the unit's records and in the survey report.

#### 3.3.2 Rudder Bearings

For self-propelled units with rudders, means and access are to be provided for determining the condition and clearance of the rudder bearings, and for verifying that all parts of the pintle and gudgeon assemblies are intact and secure. This may require bolted access plates and a measuring arrangement.

#### 3.3.3 Sea Suctions

Means are to be provided to enable the diver to confirm that the sea suction openings are clear. Hinged sea suction grids would facilitate this operation.

#### 3.3.4 Sea Valves

Means must be provided to examine any sea valve for the UWILD associated with the Special Survey.

### 3.5 Procedures

#### 3.5.1 Exposed Areas

An examination of the outside of the structure above the waterline is to be carried out by the Surveyor. Means and access are to be provided to enable the Surveyor to accomplish visual inspection and nondestructive testing, as necessary.

### 3.5.2 Underwater Areas (2012)

An examination of the entire unit below the waterline is to be carried out by a suitably qualified diver using closed-circuit television with two-way communication capable of being monitored by the Surveyor, as required, or photographic documentation, or both, depending on the age and type of unit. This is to be supplemented by the diver's report, describing and attesting to the conditions found. A copy of this diver's report and pertinent photographs are to be submitted to the attending Surveyor for retention at the local office for five (5) years. Copies are also to be retained onboard, together with any video recording, for reference.

### 3.5.3 Damage Areas

Damage areas are to be photographed. Internal examination, measurements, marking and thickness gauging of such locations may be a necessary adjunct as determined by the attending Surveyor. Means are to be provided for locating, orienting and identifying underwater surfaces in photographs or on video tapes.

## 3.7 Crediting UWILD on a Self-Elevating Drilling Unit without Completing the Examination of Spudcans/Mat (2012)

As mentioned under the 'Note' of 7-2-5/1.5.6 and 7-2-6/1.3, where the spud cans or mat are partly or entirely obscured below the mud line when a Special Periodical Survey or a UWILD is otherwise being completed, consideration will be given to postponement of these examinations until the next rig move.

In such cases, where requested by the Owner, the UWILD may be credited with an outstanding to complete the remaining examination and NDT (as applicable) at the time of next rig move, but not later than next scheduled Drydocking Survey (or UWILD).

## 3.9 Incomplete UWILD over a Five-Year Period – Self-Elevating Drilling Units (2012)

Where a self-elevating drilling unit has been on same location without a move for a five year period, and therefore its two consecutive drydocking surveys could not be completed within that five year cycle, the drilling unit will be considered a site-specific offshore installation and compliance with the *ABS Rules for Building and Classing Offshore Installation (Offshore Installation Rules)* will be required.

Under the above mentioned circumstances, in order to accept the completion of the UWILD and to maintain classification of the unit as a mobile offshore drill unit, compliance with 3/3.7.8 of the *Offshore Installation Rules* will be required and necessary data is to be submitted to ABS for review.

## 3.11 Alternatives

ABS is prepared to consider alternatives to the above guidelines and would be pleased to consult with interested clients concerning means and details for accomplishing results no less effective.

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CHAPTER **2 Surveys After Construction**

SECTION **7 Specific Survey on Self-Elevating Units After Ocean Transit Tow (2012)**

**1 Ocean Transit Wet Tow**

There is no ABS requirement to survey the drilling unit before the tow. A specific survey is to be carried out on self-elevating drilling units after the completion of an ocean transit wet tow.

This survey should be carried out prior to elevating the unit and should include a comprehensive visual examination of the structure, including helicopter support structure, as well as surface Nondestructive Testing (NDT) of critical structural areas.

If the survey is carried out by the Owner and damage is found which affects or may affect classification, ABS is to be notified and arrangements are to be made for survey. If the survey is carried out by the Owner and no damage is found which affect or may affect classification, ABS is to be advised of the details of the tow, and a confirmation survey will be made at the next periodical survey.

**3 Ocean Transit Dry Tow**

There is no ABS requirement to survey the drilling unit before the tow. An overall survey is to be carried out on self-elevating drilling units after the completion of an ocean transit dry tow.

This overall survey should be carried out prior to elevating the unit and should include a visual examination of the structure, including helicopter support structure, as well as surface Nondestructive Testing (NDT) of critical structural areas, as deemed necessary.

If a survey is carried out by the Owner and damage is found which affects or may affect classification, ABS is to be notified and arrangements are to be made for survey equivalent to 7-2-7/1 of these Rules.

If a survey is carried out by the Owner and no damage is found which affect or may affect classification, onboard records are to be available to the Surveyor at next periodical survey.

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CHAPTER **2 Surveys After Construction**

SECTION **8 Tail Shaft Surveys**

Surveys are to be carried out in accordance with applicable paragraphs of the latest edition of the ABS *Rules for Survey After Construction (Part 7)*, as applicable to vessels constructed in accordance with the *Steel Vessel Rules*. However, due to low running hours on tail shafts of drilling units, the interval between tail shaft surveys may be extended based on the following being to the satisfaction of the Surveyor:

- i) Diver's external examination of stern bearing and outboard seal area, including wear-down check as far as is possible.
- ii) Internal examination of the shaft area (inboard seals) in propulsion room(s).
- iii) Confirmation of lubricating oil records (satisfactory oil loss rate, no evidence of unacceptable contamination).
- iv) Shaft seal elements are examined/replaced in accordance with the seal manufacturer's recommendations.

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CHAPTER **2 Surveys After Construction**

SECTION **9 Boiler Surveys**

**1 Parts to be Examined**

**1.1 Internal and External Examination**

At each survey, the boilers, superheaters and economizers are to be examined internally (water-steam side) and externally (fire side).

**1.3 Mountings and Safety Valves**

Boiler mountings and safety valves are to be examined at each survey and opened as considered necessary by the Surveyor.

**1.5 Operation of the Safety Valves**

The proper operation of the safety valves is to be confirmed at each survey.

**1.7 Hydrostatic Pressure Testing**

When considered necessary by the Surveyors, the boilers and superheaters are to be subjected to hydrostatic pressure test.

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CHAPTER **2 Surveys After Construction**

SECTION **10 Automatic and Remote-control Systems**

**1 Annual Survey**

At twelve month intervals from the date of installation, a survey is to be carried out during which a general examination of the automatic and remote-control system is to be made. The examination is to be made with a generator in operation and the control system energized to permit random checking of function indicators, alarms and such control actuators as may be operational. The Surveyor is to examine the machinery records to check the performance of the control system throughout the period since the last survey and to establish if there has been any abnormal functioning or failures and what corrective measures had been taken to preclude their recurrence. The machinery-space fire-detecting and bilge water-level alarms are to be checked for performance.

**3 Special Periodical Surveys**

Special periodical surveys are to be carried out at intervals of five years from the date of installation and are to include compliance with all requirements for Annual Surveys and with those that follow.

**3.1 Control Actuators**

All mechanical, hydraulic, and pneumatic control actuators and their power systems are to be examined and tested as considered necessary.

**3.3 Electrical**

The insulation resistance of the windings of electrical control motors or actuators is to be measured, with all circuits of different voltages above ground being tested separately, and is to be on the order of one-half to one megohm.

**3.5 Unattended Plants**

Control systems for unattended machinery spaces are to be subjected to dock trials at reduced power on the propulsion engine to check the proper performance of all automatic functions, alarms, and safety systems.

**5 Repairs or Alterations**

Major repairs or alterations to the automatic and remote-control systems are to be made, in accordance with approved plans, under the supervision and to the satisfaction of the Surveyor.

## CHAPTER 2 Surveys After Construction

## APPENDIX 1 Guide for Lay-up and Reactivation of Laid-up Mobile Offshore Drilling Units (2008)

## 1 Guide for Lay-up of Mobile Offshore Drilling Units

If requested by the Owner, the American Bureau of Shipping will undertake to review, survey, and confirm by issuance of a factual Lay-up Report, the actions taken to preserve and protect a unit in lay-up. Outlined below are precautions and procedures suggested to accomplish this objective; however, it is recognized that there may be a variety of equally satisfactory approaches to accomplish the same objective.

## 1.1 Lay-up Requirements

- i) When ABS is notified by the owner that a unit has been laid-up, this status will be noted in the unit's survey status and in the *Record*, and surveys falling due during lay-up may be then held in abeyance until the unit reactivates, at which time they are to be brought up to date.
- ii) In the case of units which have been laid up for an extended period (six months or more), the requirements for the Reactivation Survey are to be specially considered in each case, due regard being given to the status of surveys at the time of the commencement of lay-up, the length of the lay-up period and the conditions under which the unit has been maintained during that period.
- iii) Where initial lay-up preparations and procedures have been submitted to ABS for review and survey, and re-verified annually by survey, consideration may be given to deducting part or all of the time in lay-up from the progression of survey intervals, or to modifying the requirements for up-dating surveys at time of reactivation.

## 1.3 Safety and Protection

- i) Sufficient and qualified personnel should be available in order to maintain full-time fire, leakage, moorings and security watch of the unit. In addition, efficient independently-powered fire and bilge flooding alarms with exterior warning lights should be fitted for the machinery spaces, bilges and for other locations as deemed appropriate. The available watchmen should include a barge engineer and other personnel capable of operating the emergency communications equipment and taking emergency action pending arrival of outside assistance for fire extinguishing, leakage pumping, mooring adjustment or release, and general security. This includes the operation of the necessary emergency power sources, pumping units and any active fixed fire control apparatus. Qualified personnel for emergency ballasting in hurricane areas should be considered.
- ii) All the unit's fire safety equipment including emergency fire pump should be proved in good order immediately prior to lay-up and maintained prepared for immediate use thereafter.
- iii) The unit's fire lines should be proven in good condition before draining. Drains should be kept only sufficiently open to allow drainage of condensate. Alternatively, the fire lines may be filled with inhibited fresh water, including anti-freeze if necessary. The International Shore connection should be loosely installed and its location prominently marked. Fire line valve stems should be freed up and lubricated.
- iv) Oxygen breathing apparatus and flotation escape equipment should be provided and maintained immediately available for the watchmen or lay-up crews.

- v) All ventilator and air intake or exhaust openings should be adequately covered. Supply and exhaust openings for necessary emergency diesel generator or fire pump engines should be arranged for immediate or automatic opening. All fire dampers should be freed-up and then secured in closed position. All fire division doors should be closed.
- vi) Effective and reliable means of communication such as an independently-powered radiotelephone should be provided for all-hours contact with firefighting, tug and rescue facilities, or central security base. A secondary communication system should be provided in the event of failure or damage to the primary means.
- vii) A source of power for providing emergency lighting, fire extinguishing water, and bilge pumping throughout the unit should be immediately available.  
  
Where the emergency source of power is a portable diesel generator set mounted on deck, care should be taken to ensure fire safety of the fuel and exhaust systems, fire extinguishing arrangements, weather protection, proper electrical installation, and electrical protective devices for the unit.
- viii) All loose flammable materials such as debris, oily rags, cotton waste, chemicals, additives, corrosives, old pyrotechnics, matches, unsealed painting oils and dregs, garbage, etc. should be removed from the unit. Arrangements should be made for safe containment and frequent removal of garbage produced by watch personnel.
- ix) All mud and cement storage, mixing and holding tanks together with associated piping and shale shaker system should be clean and gas-free.
- x) Machinery space bilges should be pumped dry and cleaned of all debris, oil or other flammable products.
- xi) Fuel and lube oil tanks should be wired or locked closed at the tank valve except where required for the emergency power supply engine.
- xii) All valves to or from the sea on floating units should be wired or locked closed except those actually required for use during lay-up in connection with emergency ballasting, fire extinguishing, pumping out or watch personnel service. In order to prevent excessive fouling and choking, the sea suction openings, except for emergency fire pump, should be covered over externally and/or protected with a slow acting biocide.
- xiii) On floating units, the anchor windlass should be proven to be in good order prior to lay-up, and anchors, chains or mooring cables checked. Where used as part of the lay-up mooring arrangements, the chains or mooring cable should be regularly checked for twists and chafing and shifted or padded as necessary. If not required for the mooring, an anchor should be prepared for emergency release. See also 6-2-A1/1.5.7.
- xiv) Hot work (i.e., welding or burning) should not be permitted during lay-up except under specially supervised safety control. No unshielded or open-flame devices such as portable heaters should be permitted on board. Safe smoking areas, if required, should be clearly marked.
- xv) The unit should be readily accessible and approachable for shore-based or floating firefighting and other emergency equipment at all times and tides.
- xvi) In the event of an emergency tow from lay-up while in deactivated condition, a towing pendant should be available. If the unit is self propelled the propeller shaft(s) should be blocked from turning by some positive means. The turning gear should not be used for this and should only be engaged when in use. Rudders, if fitted, should also be hydraulically locked or otherwise blocked amidships.

## 1.5 Preservation and Maintenance

### 1.5.1 Hull and Deck Equipment

The primary objective of lay-up is to protect the hull and deck equipment against accelerated corrosion, weathering damage and freezing.

*1.5.1(a)* The unit's external coating systems should be in good condition prior to lay-up. Consideration should be given to supplemental sacrificial anodes on submerged areas; e.g., externally along the side shell, on lower hulls or pontoons, columns and bracing members, legs, mats, spud cans, and in ballasted areas.

*1.5.1(b)* Impressed-current cathodic hull protection systems where fitted, should be maintained in operation if a continuous power source is available and readings logged weekly by watch personnel who should be advised of proper procedures in case of abnormal readings. If the unit is moored to another unit or shore power is used, the system may need to be modified or secured due to possible electrolytic interaction. This should be taken up with the system manufacturer.

*1.5.1(c)* Deck machinery should be thoroughly lubricated and operated in all modes before securing. Also refer to “Machinery” or “Electrical Installation”.

*1.5.1(d)* The accommodation spaces, deck, and other hull water, steam and air piping should be drained and/blown clear and dry with air. Alternatively, they may be completely filled with chemically inert anti-freeze liquids compatible with the piping or tubing material. The latter should be carried out under the guidance of a chemical specialist. Salt water lines, including tank washing apparatus, should be flushed out with fresh water, drained and blown dry. (Note that this will require a good supply of fresh water on arrival at the lay-up site.)

*1.5.1(e)* The drill floor, derrick, substructure, topdrive and rotary table should be cleaned of all mud and grease. Drill floor and substructure drain holes and drain wells should be cleared to insure proper draining of rain water.

*1.5.1(f)* Jacking units, skidding apparatus, and raw water tower jacking gear assemblies should be cleaned and unprotected surfaces coated with a protective coating.

*1.5.1(g)* Air vents for water tanks and fuel oil may be left open. Flame arrestor arrangements on fuel tanks and adjacent cofferdams should be in good order.

*1.5.1(h)* Empty tanks should be ventilated as much as possible and condensate regularly removed or inhibited. Supplemental anodes and inhibitors should be considered for ballast tanks containing water.

*1.5.1(i)* All doors and side scuttles should be kept closed and deadcovers in place, except where in regular use by watch personnel. Machinery casing top openings and skylights should be kept closed and weathertight.

*1.5.1(j)* Hull hydraulic systems should be kept completely full of fluid. All hydraulic cylinders and ram assemblies should be actuated periodically to ensure capability for proper operation.

*1.5.1(k)* Wire radio antennae should be lowered and secured except for emergency communications antenna.

*1.5.1(l)* All loose items on deck should be properly secured against movement by wind or other external forces.

*1.5.1(m)* All exposed navigation equipment, drillers’ consoles, derrickman’s console and any other exposed gauge and meter panels should be protected with weathertight covers.

*1.5.1(n)* Galley exhaust grease collection apparatus should be cleaned. If in use by watch personnel, it should be re-cleaned monthly.

*1.5.1(o)* Potable water tanks not in use by watch personnel should be drained and left open for free ventilation. Alternatively, they may be left completely filled if not subject to freezing.

*1.5.1(p)* All deck electrical receptacles should be closed up weathertight. Deck mounted electrical or hydraulic controls should be protected by a weathertight cover.

*1.5.1(q)* Crane booms should be down and secured. Exposed wire rope such as for cranes, derrick falls, riser tensioner wire, lifeboat falls and mooring wires should be slushed with preservative grease, and where possible, removed from the blocks and stowed out of the weather. Fibrous mooring ropes and other cordage not in use should be stowed off the deck and out of the sun and weather.

*1.5.1(r)* Exposed deck fittings liable to corrosion seizing, such as hinges, clips, screw-dogs, roller fairleads, boom fittings and valve stems should be coated or injected with preservative grease.

### 1.5.2 Machinery Spaces, Machinery, and Drilling Equipment

The machinery and related engine room equipment should be protected against accelerated or localized corrosion, seizing and freezing. This normally requires the use of stabilized or preservative lubricants, prevention of acid concentrations, and regularly scheduled rotation or movement of machinery parts to shift contact surfaces. There should be a means or source of power for lighting and for turning over machinery. Continuous heating for the machinery spaces, including steering gear room, to maintain a temperature a few degrees above atmospheric; or alternatively, complete dehumidification at 35% to 45% RH is normally required to prevent sweating or humidity corrosion damage.

*1.5.2(a)* Thrusters and all rotating machinery in the machinery spaces and in the pump rooms should be turned over several revolutions and stopped at a new position at least once a month. Where fitted, pressure lubrication systems should be actuated and cylinder lubricators manually operated prior to turning over the machinery. The steering gear on floating units should be operated and moved full travel at the same intervals. Deck machinery should be turned over at least quarterly.

*1.5.2(b)* Lube oil in engines should be thoroughly separated or dehumidified prior to shutting down, after which the oil should be periodically chemical analyzed to confirm stability and the absence of harmful acidity. Any lube oil reservoir or sump vents to the exposed atmosphere should be closed off and opened only to a dry space. Where tube oil tanks are contiguous with the hull plating, means of coping with accumulation of condensation should be provided for.

*1.5.2(c)* All other machinery should be thoroughly lubricated with a stable grease or oil before securing and at least annually thereafter. For reciprocating machinery this should include also some form of non-contaminating protection in the cylinders. There are various proprietary products available specifically for this purpose.

*1.5.2(d)* The bilges in machinery spaces should be thoroughly cleaned and pumped dry. If the unit has a water-lubricated stern bearing, the stern gland should be tightened up just sufficiently to stop leakage, and warning notice to this effect posted at propulsion control station.

*1.5.2(e)* The sea-water side of heat exchangers should be thoroughly cleaned of all sea growth or other organic products, washed through with fresh water, then drained, dried and closed up, or left open to a dehumidified space. Drains may be left partly open but should be clearly marked to this effect and connecting valves to the sea wired-closed. Alternatively, these heat exchangers may be kept completely filled with chemically inert liquid. This latter approach should be carried out under the guidance of a chemical specialist.

*1.5.2(f)* All water system heat exchangers, reservoirs and piping should be drained and blown dry. Alternatively, these may be protected by filling with a non-contaminating, chemically inert liquid or dry inert gas. This process should be carried out under the guidance of a chemical specialist.

*1.5.2(g)* Air reservoirs should be fully charged, water drained and air outlet valve closed off at the tank. Alternatively, they may be opened, cleaned, dried and left open for free ventilation.

*1.5.2(h)* The unit's air conditioning and refrigeration systems should be pumped down and secured. Inert Gas systems should be completely drained, dried out, and secured with means for air circulation or dehumidification. Acidic areas may required to be neutralized

*1.5.2(i)* Drilling equipment left on the rig such as rotary, Kelly, tongs, wedges, BOP stacks, drill bits, etc. should be cleaned, secured and weather protected where exposed. The derrick hook and block should be secured against movement.

### 1.5.3 Boilers

*1.5.3(a)* The boiler fire-side should be laid-up thoroughly clean in order to minimize external acidic corrosion from the absorption of atmospheric moisture by the products of combustion. Usual soot accumulation areas such as where tubes enter headers or water drum and around floor tubes require special attention. If water washing is resorted to for cleaning, the boiler should then be fired for about 12 hours to dry the residual moisture from the insulation and brickwork. Where feasible, alkaline wash water should be used. Final cleaning by dry method is recommended, after which the furnace openings should be left open for free ventilation.

*1.5.3(b)* The boiler water-steam side may be preserved by a wet method or a dry method. In either case the water-steam side of the entire boiler, including superheater and economizer, should be first washed clean of all residue and existing chemical concentrates.

If the dry method is employed, after thoroughly heat drying, the water-steam side of the boiler should be either charged with trays of desiccant and resealed, or left open top and bottom including a hand hole in each header for free ventilation to a dehumidified space or with a continuous source of heating inside the water drum. If desiccant is used, this should be renewed or re-dried at least monthly or changed on the basis of a moisture indicator. A third alternative is to keep the boiler empty, sealed and slightly pressurized with a dry inert gas.

If the wet system is employed, the entire boiler should be kept full under a slight head with chemically inert distilled water. The initial charging and occasional rechecks should be carried out under the guidance of a chemical specialist. If the wet system is employed, external space heating or dehumidification may be required to control sweating and consequent pitting corrosion under insulation.

#### 1.5.4 Boiler Stack Openings

After securing the boiler and engines, all stack outlets should be provided with weathertight covers. If not in use, the galley stack should also be covered weathertight.

#### 1.5.5 Electrical Installation

The electrical system should be protected against insulation deterioration, primarily from atmospheric moisture absorption or water ingress, and the rotating elements protected against corrosion damage in the bearings.

*1.5.5(a)* Before securing, electrical motors and generators should be thoroughly cleaned of carbon or other hygroscopic foreign matter, heat dried so as to obtain acceptable insulation resistance readings, and the bearings lubricated with a stable grease or oil. Any carbon brushes should be lifted to prevent spot corrosion on the commutator or slip rings. Insulation readings should be taken and recorded at least monthly thereafter and where found abnormal, immediately corrected by heating, drying or cleaning.

*1.5.5(b)* All electrical apparatus should be maintained internally a few degrees above atmospheric by means of built-in heaters, if fitted, or by other means such as a strip heaters or heat lamps. Alternatively, the humidity control may be maintained by opening the unit to the effects of a dehumidifier or by sealing the unit with desiccant inside. This latter approach would require replacement of the desiccant and re-sealing at least monthly or based on a moisture indicator.

*1.5.5(c)* Electrical junction boxes should be covered with either protective coatings or protective tape.

*1.5.5(d)* Switchboards, distribution panels, SCR panels, and explosion-proof motors should be protected against moisture absorption by use of heaters, heat lamps, dehumidifier, or by sealing with desiccant inside.

*1.5.5(e)* Jacking, skidding and deck machinery motor enclosures should be checked for watertightness and suitable driers placed inside or internal heaters provided.

*1.5.5(f)* Crane controls and motors should be provided with heaters or desiccant.

*1.5.5(g)* The gyro compass, radar, loran, radio, and automation electronic apparatus should be maintained heated and/or dehumidified in the same manner as above. The manufacturer should be consulted regarding the maintenance during lay-up of computer systems. Such equipment may be required to be operated periodically.

*1.5.5(h)* All liquid-filled storage batteries should be fully charged and if possible, maintained on trickle charge under weekly inspection.

*1.5.5(i)* All electrical switches for circuits not in regular use should be kept in open or disconnect position.

#### 1.5.6 Tensioning System and Heave Compensators

The tensioner rams and heave compensators should be retracted and secured. All associated equipment should be cleaned, secured and unprotected surfaces coated with proper preservatives. Wire rope should be coated with preservative grease and if possible, removed from the blocks and stowed in a dry space.

#### 1.5.7 Lay-up Site and Mooring Arrangements

The following portions of the lay-up arrangements are normally subject to approval of the local port authorities and the underwriters. However, they may be surveyed and included in the ABS Lay-up report at the option of the unit's Owner.

##### 1.5.7(a) Lay-up Site Considerations

- i) Protection from open seas and surge
- ii) Sufficient year-round water depth
- iii) Good holding ground for anchors, clear of wrecks, cables or other bottom debris
- iv) Clear of known cyclone or typhoon zones and tidal wave lee shore
- v) Clear of open roadstead anchorages or shipping channels
- vi) Clear of high-velocity or turbulent tidal currents
- vii) Clear of significant amounts of moving ice
- viii) Clear of hazardous shore facilities
- ix) Clear of detrimental industrial waste discharges
- x) Freezing or excess humidity
- xi) Suitable soil conditions for self-elevating units and submersible column stabilized units, considering type of support, such as spud cans or mats

##### 1.5.7(b) Mooring Arrangements Considerations

- i) Good holding ground, non-foul bottom, and ample anchor chain scope. "Ample" scope is generally considered to be seven times the depth of the water as a minimum.
- ii) Unless secured to a permanent mooring buoy, elevated or submerged in shallow water, the unit should preferably be moored to prevent rotating with wind or tide changes, stem or head toward the usual most severe of winds or currents. The chains should not be subjected to cross-contact or twisting or the anchors to tripping. For ship-type units, supplemental stern mooring or anchoring arrangements should normally be provided to the ship basic anchoring equipment. Where mooring by a single anchor is necessary, provisions must be made for periodically clearing the chain of twists.
- iii) The chains or mooring wire should be led and protected so as to avoid chafing against the unit. If the unit is subject to wave movement or surge, the chain should be regularly shifted in or out a short distance to move the point of wear. When initially paying out, the locking arrangement of each connecting link on the anchor chains should be verified.
- iv) Where ship or barge type units are moored in groups or as a part of a group, the following additional items should be considered:
  - a) The size and number of units or other vessels (i.e., total windage and current drag areas) of the group and the external forces to be expected should be compatible with the capacity of the mooring arrangements.
  - b) Adjacent units or vessels should be similar in size to avoid differential surging motion, and at similar freeboards to enable direct lead for breast lines.

- c) Ship-type units should be moored in alternate directions bow to stern in even numbers in order to provide equal anchor holding power at both ends of the group and to prevent swinging. The fore-and-aft direction should be parallel to the usual most severe winds.
- d) All unit-to-unit or unit-to-vessel (breast) mooring lines should be material of similar stretch characteristics.
- v) Ample size fenders or camels should be provided alongside at areas of possible or actual contact with other units, vessels, or fixed structures.
- vi) Day and night compass bearings and or line-up markers should be clearly established and regularly checked by the watch personnel for signs of the mooring shifting or anchor dragging.
- vii) Anchor lights, aircraft warning lights and fog signals should be in good order. Supplemental deck lighting should be used if near shipping lanes.
- viii) A tug or supply vessel with pumping-out equipment and firefighting assistance should be available within reasonable distance and time.
- ix) Ship- or barge-type units should be ballasted to reduce windage, rolling and surge, 30% or more of the load line draft is suggested, with due regard for similar freeboards where moored to other units or vessels. Hull stresses and salvage potential should also be established, clearly visible reference marks should be painted at bow and stern just above the waterline as external means of checking for leakage.
- x) Column-stabilized semi-submersible units should be ballasted to a suitable draft, considering the environmental conditions at the lay-up site.
- xi) Jack-up units should be elevated and ballasted for storm conditions.
- xii) Emergency towing pendants should be secured to bitts at bow and stern of each unit and arranged for easy access from a tug.
- xiii) Means should be provided for the watch personnel to release the anchors or moorings if necessary in an emergency. Anchors should be buoyed for locating. If steam-driven, the anchor windlass and any necessary mooring winches should be fitted with emergency air connections. If electric, an emergency source of power should be available for their operation.

### 3 Guide for Reactivation of Laid-up Mobile Offshore Drilling Units

For units returning to service from extended lay-up (six months or more), regardless of whether ABS has been informed that the unit has been in lay-up or lay-up preparations reviewed by ABS, a Reactivation Survey is required. An ABS Office should be contacted for details of the requirements. Outlined below are guidelines on such surveys.

#### 3.1 Reactivation Survey Status

- i) In order to restore a laid-up unit to active Class status, a Reactivation Survey is to be carried out including a corresponding point-by-point coverage of the original lay-up steps. The extent of the Reactivation Survey is generally dependent on the length of time in lay-up, the lay-up procedures followed, and the maintenance conditions during lay-up; however, the equivalent of an Annual Survey for all Class items, up-dating any due surveys, and compliance with any outstanding recommendations are normally required.
- ii) The primary objective of the Reactivation Survey is to ensure that the unit is fit, within the scope of Classification, to transit to the drilling site and resume normal drilling operations. Where lay-up preparations and procedures were submitted to ABS for review and verified by survey at time of lay-up from the progression of survey intervals, or to modifying the requirements for up-dating surveys at time of reactivation.
- iii) Applicable items of the Reactivation Survey may be credited to a forthcoming Special Survey, provided that the entire Special Survey is completed within a period of approximately twelve months, or the Special Survey is on continuous basis.

### 3.3 Hull and Outfit

#### 3.3.1 Drydocking Survey

Underwater Inspection by a diver may be permitted in lieu of Drydocking for reactivation of most units except for floating-type units where lay-up has been unduly extended. Cleaning of the unit's underwater body, including sea suctions, will normally be required to enable meaningful underwater examination. Where it is intended to proceed from the lay-up site to another location for completion of reactivation work, an underwater inspection by diver (for wet tow) will normally be required prior to departing lay-up site.

#### 3.3.2 Witnessing of Functional Testing or Verification of Fitness for Service

Witnessing of functional testing or verification of fitness for service of the following items should be normally included in the reactivation surveys of hull and outfit:

- i) Anchors and chain cables or mooring cable, chain stoppers, and chain locker pumping arrangements
- ii) Anchor windlass, mooring winches, and roller fairleads
- iii) Drill floor and machinery-space drain wells together with bilge pumping arrangements and hull penetrations
- iv) Random ballast or preload tanks, pump rooms, ballast piping, and associated ballast control system and pumping arrangements
- v) (2010) Watertight and weathertight doors, machinery room skylights (where fitted), fire dampers, ventilators, portlights, hatch covers and their respective closing devices
- vi) General examination of the mud and cement storage and mixing tank. Examination and random testing of the associated piping as deemed necessary by the attending Surveyor
- vii) Internal examination of cofferdams and void spaces together with their pumping out arrangements
- viii) Cleaning and flushing of potable water tanks
- ix) General examination and testing of whistle, internal communications systems, engine-order telegraph, steering arrangements and controls (if applicable), alarm systems, rudder angle indicator and navigational or warning lights
- x) (2010) Helideck arrangements
- xi) Fire extinguishing arrangements
- xii) Tank venting arrangements including closing devices, pressure-vacuum relief valves and flame arrestors

### 3.5 Machinery and Drilling Equipment

- i) Stack and ventilation covers to be removed or opened up.
- ii) Boilers, heat exchangers, piping systems and other equipment to be drained and cleaned of preservatives or inhibitors, inspected and closed up in good order and afterwards tested under operating conditions.
- iii) Engine lubricating oil, stern bearing oil, and steering system hydraulic fluids to be analyzed for contamination or chemical degradation and if found unserviceable, the system is to be drained, flushed, sterilized if bacterial deteriorations is present, and refilled with new oil or fluid of the proper grade.
- iv) BOP stack control system, derrick skidding system, braking system, heave compensation and riser tensioning hydraulic fluids should be analyzed for contamination or chemical degradation and if found unserviceable, the system is to be drained, sterilized if bacterial deterioration is present, and refilled with new oil or fluid of the proper grade.

If the system was drained at the time of lay-up, the preservatives should be flushed out and the system refilled with new fluid of the proper specification and air purged as necessary.

- v) Thruster units, reduction and reverse gearing to be examined as accessible via inspection openings including lubrication arrangements. Gear casing and foundations to be examined and reversing and braking arrangements operationally tested as necessary.
- vi) Thrust bearings, lineshaft bearings and their respective lubrication arrangements to be checked.
- vii) Diesel engines and their accessory gear to be selectively opened out and examined for corrosion, excess wear, damage, proper tensioning and torque. Low-speed engine crankshaft deflections (drillships) to be taken and recorded. Protective trips and alarms are to be verified.
- viii) All essential auxiliary machinery and equipment to be operationally tested and protective devices verified.
- ix) All essential piping systems to be examined under pressure, checked for leaks, and over-pressure relieving arrangements verified. All connections to the sea and their respective valves and non-metallic expansion pieces to be examined.
- x) All required fire extinguishing arrangements to be examined, including fire pumps, and operationally tested as necessary.
- xi) The rotary assembly, top drive, leg and raw-water jacking machinery, derrick skidding gear, racks and pinions, should be re-lubricated, operationally tested and safety or protective devices verified.
- xii) The condition of hazardous-areas doors and closures in boundary bulkheads should be checked.
- xiii) The drilling and well-control equipment should be examined prior to re-installation, function tested as considered necessary and verified in proper working condition.

### **3.7 Electrical**

- i) Insulation resistance of all power and lighting circuits together with generators, motors and switchgear, to be tested, results evaluated and low-reading components dealt with as necessary.
- ii) Generators to be tested under operating conditions, and switches, circuit breakers and electrical protective devices verified.
- iii) Electrical lighting, electrical fixtures, and instrumentation in hazardous areas to be verified in satisfactory condition.

### **3.9 Tensioner System and Motion Compensator**

Tensioner system and heave compensators should be examined, trial actuated to full stroke, and re-conditioned as necessary.

### **3.11 Control and Instrumentation**

All essential control systems, monitoring instrumentation, limit alarms and emergency shut-offs to be verified in working order.

### **3.13 Trials**

In addition to the operational tests of individual units of machinery, for self propelled units, a dock trial and subsequent sea trial if deemed necessary or applicable, should be carried out to the satisfaction of the attending Surveyor.

### **3.15 Documentation and Certification**

- i) The validity of the various statutory or operating documents such as the Register of Lifting Appliances, IMO MODU Code, MARPOL, Load Line and any applicable SOLAS Certificates should be checked and up-dated or renewal surveys carried out as necessary.
- ii) Statutory certificates issued by ABS that are still valid at the time of the Reactivation Survey will require at least a general examination of the covered items to confirm continued validity.
- iii) Possible changes or revisions in international convention requirements since the time of lay-up or in the interpretations of same by the registry Administration should be investigated.

## PART

# 7

## CHAPTER 2 Surveys After Construction

### APPENDIX 2 Survey of Temporary Modular Units (2012)

#### 1 General

Where a temporary modular unit is installed onboard a drilling unit, it is to be subjected to survey in presence of and to the satisfaction of the attending Surveyor.

Modular units may be used for various purposes, such as the following:

- Accommodation/Sleeper Cabins (Quarters)
- Instrument Control/MCC/Battery/Switchgear Rooms
- Offices/Laboratories
- Telecoms and Communication Cabins
- R.O.V. Control Room
- Mud Logging Cabins
- Shower and Toilet Facilities; etc.

#### 3 Container Box used as a Modular Unit

Where a container box is considered acceptable as a temporary modular unit in accordance with the applicable Rules for the intended purpose, the container is to be confirmed as being certified to a recognized standard.

A container box is to be properly secured onboard the deck. Means of securing other than welding may be accepted provided efficiency of tie downs are design reviewed by ABS.

#### 3.1 Multiple Container Boxes used as Temporary Modular Units

Use of multiple container boxes as temporary modular units in various layouts (side-by-side, stacked or combination) requires design review by ABS, and to be surveyed accordingly.

#### 5 Survey of Temporary Modular Quarters

Survey of a temporary modular quarter is to be carried to at least verify satisfactory condition of the following conditions:

- i) The modular quarter is free of any physical damage that may affect its strength and effectiveness of its service.
- ii) Material used for flooring, furniture, etc. that is included in the interior of the modular quarter is in compliance with similar standard applied to the main accommodation spaces on the drilling unit.
- iii) The modular quarter is secured onboard the deck by means of welding. Means of securing other than welding may be accepted provided efficiency of tie downs are design reviewed by ABS.
- iv) Boundaries of the modular quarter is constructed (and insulated where necessary) of suitable material to withstand equal level of fire protection in the area where other accommodation structure(s) are installed. See Section 5-1-1 of these Rules.

- v) Access doors to and from the modular quarter are of self-closing type, opening to the outside, unobstructed by any means, without any hold-back device, and rated to withstand equal level of fire protection of the temporary modular quarter.
- vi) The modular quarter is provided with suitable fire and gas detection system. If the external alarms of the fire and gas detection system are audible from inside the quarter during normal operation of the unit, installation of an internal detection system may be waived.
- vii) The modular quarter is provided with suitable number of general alarms bells. If the external alarms of the general alarm and public address system are audible from inside the quarter during normal operation of the unit, installation of an internal system may be waived.
- viii) The modular quarter is provided with satisfactory positive ventilation with inlet(s) and outlet(s) located in non-hazardous areas.
- ix) Piping of modular quarter is connected to the drilling unit's piping system(s), and cross-connections do not affect the safety of the drilling unit. Under no circumstances, are drain pipes of modular quarters are connected to any hazardous drain of the drill unit.
- x) The modular quarter is located to provide easy and protected access to all escape routes that lead to designated embarkation stations. The term "easy and protected" will be interpreted as routes that provide protection from falling objects; heat from well fire; a walk path without any structural, mechanical or electrical obstruction; and efficiently illuminated with main and emergency power system.
- xi) All connections and/or penetrations on the modular unit for rig supplied piping and/or electrical systems maintain the original integrity of the modular unit, and these connections and/or penetrations are in compliance with a recognized standard.
- xii) Where modular quarter is located on open deck of a surface drill ship and may be subjected to wave impact loading, efficiency of the quarter is design reviewed by ABS.
- xiii) Where the drilling unit is certified by ABS and meets ILO Convention standard(s) for crew accommodation, temporary modular quarters are also in compliance with same standard(s).

## 7 Survey of Temporary Modular Units other than Quarters

Survey of a temporary modular unit used for other than quarters, is to be carried out to verify that it complies with 7-2-A2/5i) through xii) of these Rules.

## 9 Certification of Drilling Unit fitted with Temporary Modular Units

Where a temporary modular unit is fitted on a drilling unit and the number of rig personnel is temporarily more than the original POB indicated on the IMO MODU Safety Certificate (or SOLAS Safety Equipment Certificate, if issued), the drilling unit is to be equipped with sufficient life saving appliances, as required by the applicable Code and requirements of the Flag Administration.

The drilling unit's life-saving plan is to be temporarily amended to indicate installation and location of additional temporary modular units. Surveyor is to endorse the onboard life-saving plan to indicate ABS verification.

In addition, onboard drills are to incorporate all personnel, including those who are designated to live/work out of the temporary modular units.

## PART

# 7

## CHAPTER 2 Surveys After Construction

### APPENDIX 3 Modification of a Self-Elevating Drilling Unit to Become Site-Specific Fixed Offshore Installation (2012)

#### 1 General

An existing self-elevating drilling unit (SEDU) may be modified to become a site-specific fixed offshore unit and used for purposes of oil/gas production, storage or both. Depending upon the requested classification, the modified unit may need to comply with one or more of the Rules/Guides listed under 7-2-A2/3.

Before ABS commences any work associated with the modification, the owner is to submit a signed request for class for ABS's review and signing of the service agreement.

#### 3 Application

One or more of the following Rules/Guides may be applicable to the modification:

##### 3.1 Rules for Building and Classing Offshore Installations (Offshore Installation Rules)

This Rule is applied if the unit is modified to become a site-specific fixed offshore unit, without its hull jacking system, marine systems, safety systems and any of the production/process and/or storage system classed by ABS. Only the main hull structure is considered within ABS scope of service.

##### 3.3 Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)

This Rule is applied if the unit is modified to become a site-specific mobile offshore unit, without its marine systems, safety systems and any of the production/process and/or storage system classed by ABS. Only the main hull structure and its jacking system is considered within ABS scope of service.

##### 3.5 Guide for Building and Classing Floating Production Installations (FPI Guide)

This Guide is applied if the unit's topside production/process system is also requested to be classed by ABS. The safety systems, particularly suitability of electrical equipment in hazardous areas, fixed and portable fire extinguishing systems, fire and gas detection systems, and fire protection system is to be in compliance with this Guide.

##### 3.7 Guide for Building and Classing Facilities on Offshore Installations (Facilities Guide)

This Guide is applied if the unit's topside production/process system is also requested to be classed by ABS. The production/process systems are to be in compliance with this Guide.

##### 3.9 Guide for Building and Classing Floating Offshore Liquefied Gas Terminals (FLGT Guide)

This Guide is applied if the unit is modified to become a site-specific offshore LNG terminal.

## 5 Modification Survey

Modification survey is to be carried out as instructed by ABS and in accordance with ABS approved drawings. In general, following applicable surveys are to be completed during the modification:

### 5.1 Hull

The SEDU is to be placed in a dry-dock (UWILD is not allowed) to carry out following hull surveys:

- i) *Annual Survey – Hull.* Annual Survey – Hull is to be carried out in accordance with 7-2-4/1 of these Rules.
- ii) *Drydocking Survey.* Unit's hull is to be subjected to visual examination and NDT, as applicable and in accordance with Section 7-2-6 of these Rules. Non-hull items associated with Annual Hull Survey are not required.
- iii) *Special Periodical Survey – Hull.* Unit's hull is to be subjected to visual examination, close-up survey, extensive NDT, and gauging, as applicable and in accordance with Section 7-2-5 of these Rules. Non-hull items associated with Special Periodical Survey are not required.

### 5.3 Jacking System

Where the unit is modified to become a fixed installation, and if none of its non-structural items are to be classed, and if the jacking system is only to be used once during the initial jacking of the unit on site, jacking system survey may be excluded from ABS's scope of classification work. Condition of the jacking system, its capability of jacking and satisfactory operation will not be the responsibility of ABS.

### 5.5 Marine and Safety Systems

Where the unit is modified to become a fixed installation, and if its marine and safety systems serving the entire installation are requested to be classed by the Owner, ABS's scope of classification work is to include the marine and safety systems and compliance with applicable ABS Rules and/or Guides, as referenced in 7-2-A3/3, is required.

A special note will be entered into ABS Record regarding the extent of services and the required Survey After Construction.

### 5.7 Topside Systems

Where the unit is modified to become a fixed installation, and if its topside systems serving the entire installation are requested to be classed by the Owner, ABS's scope of classification work is to include the requested topside systems and compliance with applicable ABS Rules and/or Guides, as referenced in Subsection 7-2-A3/3, is required.

Where topside systems are classed, compliance with 7-2-A3/5.5 is a prerequisite.

Recommended class designation will be in accordance with either the *ABS Rules for Building and Classing Offshore Installations (Offshore Installation Rules)* or the *ABS Guide for Building and Classing Floating Offshore Liquefied Gas Terminals (FLGT Guide)*, as applicable.

A special note will be entered into ABS Record regarding the extent of services and the required Survey After Construction.