RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part P Mobile Offshore Drilling Units and Special Purpose Barges

2021 AMENDMENT NO.1

Rule No.29 30 June 2021

Resolved by Technical Committee on 27 January 2021

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Rule No.29 30 June 2021
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

“Rules for the survey and construction of steel ships” has been partly amended as follows:

Amendment 1-1

Part P MOBILE OFFSHORE DRILLING UNITS AND SPECIAL PURPOSE BARGES

Chapter 1 GENERAL

1.2 Definitions

Paragraph 1.2.37 has been added as follows.

1.2.37 SPS Code

“*SPS Code*” is the “*Code of Safety for Special Purpose Ships*”.

Chapter 3 DESIGN LOADS

3.1 General

3.1.1 General*

Sub-paragraph -1 has been amended as follows.

1 In regard to loads in determining scantlings of structural members and in calculating mooring forces for the units fixed on the seabed or positioned for long periods of time, unless otherwise specified elsewhere, the following **(1)** to **(16~~8~~)** are to be taken into account, where applicable:

(1) Wind loads;
(2) Wave loads;
(3) Deck loads;
(4) Loads due to helicopter;
(5) Static loads such as water pressure in still water, buoyancy, dead load, etc.;
(6) Loads caused by tide and current;
(7) Loads caused by floating ice;
(8) Loads caused by snow and icing;
(9) Loads caused by earthquake in the case of bottoming-type units;
(10) Impact loads caused by touching seabed;
(11) Loads caused by mooring;
(12) Loads caused by mooring of tenders;
(13) Loads caused by towing;
(14) Loads caused by operation;
(15) Loads due to increase of resistance by marine growth;
(16) Secondary loads due to large deformation of legs for self-elevating units;
(17) Inertial loads due to dynamic response (e.g. DAF: Dynamic Amplification Factor);
(16~~8~~) Other loads considered necessary.

(-2 to -4 are omitted.)

Chapter 5 WATERTIGHT BULKHEADS

5.2 Closing Appliances

5.2.1 General

Sub-paragraphs -3 and -4 have been renumbered to Sub-paragraphs -4 and -5, and Sub-paragraph -3 has been added as follows.

1 The construction and closing appliances of openings through which the sea water is likely to flow in are to be in accordance with the requirements in this **Section**, in addition to the requirements given in **Part C** or **Part CS**.

2 Notwithstanding the requirements given in **-1** above, the construction and closing appliances of the openings through of units, except for units fixed on the seabed or positioned for long periods of time, need not apply the requirements given in **5.2.2** to **5.2.4**.

3 With respect to the provisions of **-1** above, **20.2.13, 20.6.8, Part C** and **21.6.8, Part CS** need not be applied to non self-propelled self-elevating units.

~~**3**~~**4** (Omitted)

~~**4**~~**5** (Omitted)

Chapter 12 ELECTRICAL INSTALLATIONS

12.1 General

12.1.3 Tests*

Sub-paragraphs -1 and -3 have been amended as follows.

1 Electrical installations used for the systems or the equipment essential for the safety of the unit or for the propulsion of the unit (only applicable to the unit which has the main propulsion machinery) and listed in the following **(1)** to **(~~6~~5)** are to be tested in accordance with the respective requirements in **Part H** at the manufacturer's works or at other works which provide with the adequate apparatus for testing and inspections. However, tests for any equipment with small capacities as specified in **(2)** and **(3)** are to be conducted as deemed appropriate by the Society.

(1) Generators
(2) Motors
(3) Control gears for motors
(4) Main and emergency switchboards
(5) Transformers for power and lighting of single phase 1*kVA* or more and three phase 5*kVA* or more
~~(6) Power semiconductor converters not less than 5*kW* and their accessories used for supplying power to electrical equipment~~

2 (Omitted)

3 Electrical installations used for the systems or the equipment essential for the safety of the unit or for the propulsion of the unit (only applicable to the unit which has the main propulsion machinery) and listed in the following **(4)** to **(~~5~~6)** are to be subjected to type tests for each of products.

(1) Fuses
(2) Circuit breakers
(3) Electromagnetic contactors
(4) Explosion-protected electrical equipment
(5) Cables for power, lighting and internal communications
(6) Semiconductor converters for power of not less than 5 *kW* that are used for supplying power to the electrical equipment specified in **-1(1)** to **(5)** above

(-4 to -10 are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 1 July 2021.
2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.
3. Notwithstanding the provision of preceding **2.**, the amendments to the Rules may apply to ships for which the date of contract for construction is before the effective date upon request of the owner.

Amendment 1-2

Chapter 10 POSITIONING SYSTEMS

10.1 General

10.1.2 General*

Sub-paragraph -4 has been added as follows.

4 The surveys to be carried out and the plans and documents to be submitted, etc. for dynamic positioning systems are to be in accordance with relevant requirements specified in **Part B.**

10.2 Classification of Positioning Systems

Paragraph 10.2.3 has been amended as follows.

10.2.3 Dynamic Positioning Systems*

1 Dynamic positioning systems (hereinafter referred to as "DPS") are to be classified into the following three categories specified in **(1)** to **(3)**.

(1) Class ~~A~~1 DPS

(2) Class ~~B~~2 DPS

(3) Class ~~C~~3 DPS

2 Categories of the DPS is defined in the following assumptions specified in **(1)** to **(3)** of the worst failure conditions of ~~each component consisting of~~the DPS. Where the worst failure condition ~~of each component~~ includes a miss-operation (i.e. a single inadvertent act if such an act is reasonably probable) or a malfunction of ~~this~~the components or systems comprising the DPS. Where "failure" means an occurrence in a component or system that causes loss of component or system function or deterioration of functional capability to such an extent that the safety of the vessel or personnel, or of environment protection is significantly reduced.

(1) Class ~~A~~1 DPS means a DPS ~~that~~for which a loss of position keeping capability (i.e. maintaining a desired position or heading) may occur in the event of a single failure ~~in a single component specified in **10.2.1(2)(a) to (c)** is failed~~.

(2) Class ~~B~~2 DPS means a DPS ~~that~~for which a loss of position keeping capability is not to occur in the event of a single failure in any active component or system ~~such as generators, thrusters, remote-controlled valves, switchboards, etc. specified in **10.2.1(2)(a) to (c)**~~. Normally, common static components ~~such as cables, pipes, manual valves, etc.~~(e.g. ventilation and seawater systems not directly cooling running machinery), however, will not be considered to fail where adequate protection from damage is demonstrated~~, and reliability is~~ to ~~be~~ the satisfaction of the Society. This failure includes the following **(a)** and **(b)**.

   (a) Any active component or system (generators, thrusters, switchboards, communication networks, remote-controlled valves, etc.).

   (b) Any normally static component (cables, pipes, manual valves, etc.) that may immediately affect position keeping capabilities upon failure or is not properly documented with respect to protection.

(3) Class ~~C~~3 DPS means a DPS ~~that~~for which a loss of position keeping capability is not to occur in the event of a single failure in all components or systems ~~specified in **10.2.1(2)(a) to (c)**~~. This failure ~~is to~~ includes the following ~~conditions specified in~~ **(a)** ~~and~~to **(~~b~~c)**.

   (a) The components and systems specified in **(2)** above as well as any normally static

component assumed to fail.

(~~a~~b) ~~Where the component consisting of the system is in any one watertight compartment, a~~All components in ~~this~~ any one watertight compartment are to be assumed to ~~be~~ fail~~ure~~ due to fire or flooding.

(~~b~~c) ~~Where the component consisting of the system is in any one fire sub-division divided by "A-60" class, a~~All components in ~~this~~any one fire sub-division are to be assumed to ~~be~~ fail~~ure~~ due to fire or flooding (Cables are to comply with **10.7.9-2**).

3 Considering the requirements in -**2(2)** and **(3)** above, failure mode and effects analysis ~~or fault tree analysis~~ (*FMEA*) deemed appropriately by the Society is to be carried out in order to demonstrate not to los~~s~~e a position keeping capability in the assumed worst failure conditions of each component and is to be updated where considered necessary.

Section 10.7 has been amended as follows.

10.7 Dynamic Positioning System**s**

10.7.1 General*

1 The requirements in **10.7** apply to the units which are provided with the DPS as a solely positioning system.

2 The DPS consists of the following system**s** specified in **(1)** to **(3)**.

(1) Power ~~s~~Systems

"Power system" means all components and systems necessary to supply the DPS with power. The power system includes the following~~s~~ **(a)** to **(~~d~~f)**.

(a) Prime movers with necessary auxiliary systems including piping, fuel, cooling, pre-lubrication and lubrication, hydraulic, pre-heating, and pneumatic systems.

(b) Generators

(c) Switchboards

(d) Distributing system (cabling and cable routing)~~.~~

(e) Power supplies, including uninterruptible power supplies (UPS)

(f) Power management systems (as appropriate)

(2) Thruster Systems

"Thruster system" means all components and systems necessary to supply the DPS with thrust force and direction. The thruster system includes the following~~s~~ **(a)** to **(e)**.

(a) Thrusters with drive units and necessary auxiliary systems including piping, cooling, hydraulic, and lubrication systems, etc.

(b) Main propellers and rudders if these are under the control of the DPS~~,~~

(c) Thruster control electronics~~,~~

(d) Manual thruster controls~~, and~~

(e) Associated cabling specified in **(a)** to **(d)** above and ~~distributing system (cabling and~~ cable routing~~)~~

(3) Dynamic Positioning Control Systems

"Dynamic positioning control system" (hereinafter referred to as "DP-control system") means all control components and systems, hardware and software necessary to dynamically position the vessel. The DP-control system consists of the following~~s~~ **(a)** to **(~~e~~f)**.

(a) Operating systems such as computer system~~/~~s and joystick systems. In this context, "computer system" means a system consisting of one or more computers and associated hardware, software and their interfaces, and "joystick system" means a system with centralized manual position control and manual or automatic heading control.

(b) ~~Sensor system including p~~Position reference system ~~and display systems which indicate the position and operating mode including operator panels~~

(c) Sensor systems

(d) Display systems (including operator panels) which indicate position and operating mode

(~~e~~e) The associated cabling ~~specified in~~ and cable routing for **(a)** ~~and~~to **(~~b~~d)** above ~~anddistributing system (cabling and cable routing)~~

(f) Networks

~~Where computer system means a system consisting of one or several computers including software, their interfaces and display system.~~

3 Redundancy of components or systems required in **10.7** means ability of a component or system to maintain or restore its function, when a single failure has occurred. Redundancy can be achieved, in general, by installation of multiple components, systems or alternative means of performing a function in a timely manner.

4 Installations comprising dynamic positioning system are to be designed, manufactured, and tested in accordance with the standard deemed appropriate by the Society.

10.7.2 Installations Comprising the DPS

1 ~~Each installation~~Redundant components and systems comprising the DPS ~~specified in **10.7.1-2, is**~~are to be immediately available without needing manual intervention from operators and with such capacity that the dynamic positioning operation (hereinafter referred to as "DP-operation".) can be continued for such a period that the work in progress can be terminated safely. The transfer of control is to be smooth and within acceptable limitations of the DP-operation for which the vessel is designed. For Class 2 DPS, the transfer from one component or system to another is to be smooth and within acceptable limitations of the operation and to be capable automatically as far as possible or operator intervention is to be kept to a minimum.

2 If external forces from mission-related systems (cable laying, pipe laying, mooring, etc.) have a direct impact on DP performance, the influence of such systems is to be considered and factored into DP system design. Where data for such influences are available from the DP system or equipment manufacturer, such data inputs are to be provided automatically to the DP-control system. Additionally, provisions are to be made to provide such data inputs into the DP-control system manually.

~~2~~3 For Class ~~A~~1 DPS, each ~~installation~~component need not be ~~of~~ redundan~~cy system~~t according to **10.2.3-2(1)**.

~~3~~4 For Class ~~B~~2 DPS, ~~generators, thrusters, switchboards, remote controlled valves, etc.,~~all active components are to be ~~of~~ redundan~~cy system~~t according to **10.2.3-2(2)**.

~~**4** For Class B DPS, the transfer to the others from one component or system is to be smooth and within acceptable limitations of the operation and to be capable automatically as far as possible or operator intervention is to be kept to a minimum.~~

5 For Class ~~B~~2 DPS, when a component or system not related to the DPS and which will cause a failure of the DPS due to failure of this component or system is provided, the component or system is to comply with the relevant requirements in **10.7**.

6 For Class ~~C~~3 DPS, all components are to be redundant according to **10.2.3-2(3)**, and each component ~~comprising the DPS~~ is to be arranged in the compartment physically separately by watertight and "*A-60*" class division~~, and cabling and piping system related to each component are to be of redundant system, in addition to comply with the requirements in -3 to -5 above. Where each component complies with the following requirements in (1) to (3), however, each component need not be of redundant system.~~ In cases where full redundancy of the control systems may not be possible (i.e. there may be a need for a single changeover system from the main computer system to the backup computer system), such connections between otherwise redundant and separated systems may be accepted when these are operated so that they do not represent a possible failure

propagation path during DP-operations.

~~(1) For connectors between one system and separated system such as a change over system from the main computer system to the back-up computer systems, where the system is clearly safety advantages to satisfaction of the Society, if the function of this connector is lost.~~

~~(2) Non-redundant system is to be kept to absolute minimum and made to fail to the safest condition, when a failure in this system is occur.~~

~~(3) Failure in one system is to in no case be transferred to the other redundant systems.~~

7 For Class 2 DPS and Class 3 DPS, connections between otherwise redundant and separated systems are to be kept to a minimum and made to fail to the safest condition. Failure in one system is to in no case be transferred to the other redundant system.

8 For Class 2 DPS and Class 3 DPS, hidden failure monitoring is to be provided on all devices where the FMEA shows that a hidden failure will result in a loss of redundancy. In this context, "hidden failure" means a failure that is not immediately evident to operations or maintenance personnel and has the potential for failure of equipment to perform an on-demand function, such as protective functions in power plants and switchboards, standby equipment, backup power supplies or lack of capacity or performance.

10.7.3 Power Systems

1 The power system for the DPS is to comply with the requirements of **Chapter 12** and is to have an adequate response time to power demand ~~changes in the worst failure condition specified in **10.2.3**~~. Additionally, sudden load changes resulting from single faults or equipment failures are not to cause blackouts.

2 For Class ~~A~~1 DPS, the power system need not be redundant.

3 For Class ~~B~~2 DPS, the power system is to be divisible into two or more systems such that in the event of failure of one system at least one other system will remain in operation and provide sufficient power for position keeping. The power system may be run as one system during DP-operation, but ~~should~~ is to be arranged by bus-tie breakers to separate automatically upon failures which could be transferred from one system to another, including overloading and short-circuits.

4 For Class ~~C~~3 DPS, the power system and arrangements of this system are to comply with the following~~s~~.

(1) Each power system is to comply with **10.7.3-3.**

(~~1~~3) Each power system is to be located in different spaces separated by an "*A-60*" class division.

(~~2~~4) Where the power systems are located below the load waterline as required by **Chapter 8**, each power system is to be located in different spaces separated by an watertight compartment.

(~~3~~2) Bus-tie breakers are to be open during Class ~~C~~3 DPS operations unless equivalent integrity of power operation can be accepted according to **10.7.~~3~~2-~~3~~7**.

5 For Class 2 DPS and Class 3 DPS, the power available for position keeping is to be sufficient to maintain the vessel in position after the worst failure according to **10.2.3.**

6 For Class 2 DPS and Class 3 DPS, at least one automatic power management system is to be provided and is to have redundancy according to the DPS class and a blackout prevention function.

7 Alternative energy storage (e.g. batteries and fly-wheels) may be used as sources of power to thrusters as long as all relevant redundancy, independency and separation requirements for the relevant notation are complied with. For Class 2 DPS and Class 3 DPS, the available energy from such sources may be included in the consequence analysis function required in **10.7.6** when reliable energy measurements can be provided for the calculations.

10.7.4 Thruster Systems

1 Each thruster on a DP system is to be capable of being remote-controlled individually and

independently of the DP-control system.

~~1~~**2** The thruster system is to provide thrust in longitudinal and lateral directions, and provide yawing moment for heading control. ~~The values of thruster force used are to be corrected for interference between thrusters and other effects which may reduce the effective force.~~

~~2~~**3** Failure of a thruster system including pitch, azimuth or speed control, is not to ~~make the thruster rotate or go to uncontrolled full pitch and speed~~cause an increase in thrust magnitude or change in thrust direction.

4 The values of thruster force used in the consequence analysis specified in **10.7.6** are to be corrected for interference between thrusters and other effects which would reduce the effective force.

5 Individual thruster emergency stop systems are to be arranged in the DP-control station. For Class 2 DPS and Class 3 DPS, the thruster emergency stop system is to have loop monitoring (i.e. functions to monitor disconnections and short-circuits). For Class 3 DPS, the effects of fire and flooding are to be considered.

~~3~~**6** The thruster system for Class ~~A~~1 DPS need not comply with the requirements specified in ~~1~~**2** after failure of one of the constituent power systems ~~is occurred~~ or the thrusters connected to that system.

~~4~~**7** The thruster system for Class ~~B~~2 DPS and Class ~~C~~3 DPS is to be connected to the power system in such a way that the requirements in ~~1~~**2** can be complied with even after failure of one of the constituent power systems and the thrusters connected to that system.

10.7.5 DP-control Systems

1 The design and arrangement of the DP-control system is to comply with the following requirements specified in **(1)** to **(~~4~~10)**.

(1) The DP-control system is to be arranged in a DP-control station ~~is to be located in the space~~ where the operator has a good view of the vessel's exterior limits and the surrounding area. Equipment that is to be located in the DP-control station includes, but is not limited to, the following:
   (a) DP-control and independent joystick control operator stations
   (b) Manual thruster levers
   (c) Mode change systems
   (d) Thruster emergency stop systems
   (e) Internal communication systems
   (f) Position reference system HMIs (Human Machine Interface), when considered necessary

(2) The DP-control station is to display information from the power systems, thruster systems, and DP-control systems to ensure that these systems are functioning correctly. Information necessary to operate the DPS safely is to be visible at all times. Other information is to be available upon operator request.

(3) Display systems and the DP-control station in particular, are to be based on sound ergonometric principles which promote proper operation of the system. The DP-control system is to provide for easy ~~selection~~accessibility of control mode~~,~~ (i.e. manual, joystick, or ~~computer~~automatic DP control of thrusters, propellers, and rudders, if part of the thruster system) and the active mode is to be clearly displayed.

(4) Alarms and warnings for failures in all systems interfaced to or controlled by the DP-control system are to be audible and visual. A ~~permanent~~ record of their occurrence and of status changes is to be provided together with any necessary explanations.

(5) The DP-control system is to prevent failures being transferred from one system to another. The redundant components are to be so arranged that any failed component may be easily isolated so that the other components can take over smoothly with no loss of position or heading.

(6) It is to be possible to control the thrusters manually, by individual levers and by independent joysticks, in the event of the failure of the DP-control system. If an independent joystick is provided with sensor inputs, failure of the main DP-control system is to not affect the integrity of the inputs to the independent joystick.

(7) A dedicated UPS is to be provided for each DP-control system (i.e. minimum one UPS for Class 1 DPS, two UPSs for Class 2 DPS and three UPSs for Class 3 UPS) to ensure that any power failure will not affect more than one computer system and its associated components.

(8) The reference systems and sensors are to be distributed on the UPSs in the same manner as the control systems they serve so that any power failure will not cause loss of position keeping ability.

(9) An alarm is to be initiated in case of loss of charge power. UPS battery capacity is to provide a minimum of 30 *minutes* operation following a main supply failure. For Class 2 DPS and Class 3 DPS, the charge power for the UPSs supplying the main control system is originate from different power systems.

(10) The software is to be produced in accordance with an appropriate international quality standard recognized by the Society.

2 For ~~T~~the DP-control systems for Class ~~B~~2 DPS ~~is to comply with the followings~~ and Class 3 DPS, operator controls are to be so designed that no single inadvertent act on the operator panel can lead to a loss of position or heading in addition to complying with the requirements in **-1**.

~~(1) Operator controls are to be so designed that no single inadvertent act on the operators panel can lead to a critical condition.~~

~~(2) The DP-control system is to prevent failures being transferred from one system to another.~~

~~(3) The redundant components are to be so arranged that a failure of one component should be isolated, and the other component activated.~~

~~(4) It is to be possible to control the thrusters manually, by individual joysticks and by a common joystick, in the event of failure of the DP-control system.~~

~~**3** The DP-control system for Class C DPS is to comply with the requirements in **-1** and **-2**, in addition, the DP-control system is to be located in different spaces separated by "*A-60*" class division.~~

10.7.6 Computer Systems*

1 Computer systems ~~whose systems are of one system provided with~~used as the DP-control systems for Class ~~A~~1 DPS need not be redundant.

2 Computer systems ~~whose systems are of one system provided with~~used as the DP-control systems for Class ~~B~~2 DPS are to comply with the following ~~requirements specified in~~ **(1)** to **(5)**.

(1) The ~~DPS~~DP-control system is to consist of at least two ~~independent~~ computer systems so that automatic position keeping ability is ensured in case of any single failure. ~~One computer system which is being used during the DP-operation is the main computer system and the other systems which are not being used during the DP-operation is the back-up computers.~~

(2) ~~The back-up~~Redundant computer systems are to be arranged with automatic transfer of control after a detected failure in one of the ~~main~~ computer systems. The automatic transfer of control from ~~the main~~one computer system to ~~the back-up computer systems~~another is to be smooth~~, and within the acceptable limitations of the DP-operation~~with no loss of position or heading.

~~(3) An uninterruptible power supply (UPS) is to be provided for each computer system to ensure that any power failure will not affect more than one computer. An UPS battery capacity is to provide a minimum of 30 *minutes* operation after the main supply system is failure.~~

(~~4~~3) ~~Computer systems are to include an appropriate~~Software is to be provided with a "consequence analysis" type of functionality ~~approved by the Society to be able to~~, for continuously verifying that ~~capability of positioning the unit remains after the worst failure~~

~~condition is occur~~ the vessel remains in position even if the worst failure occurs is to be provided. The analysis is to verify that the thrusters, propellers and rudders (if included under DP-control) remaining in operation after the worst failure (as specified in **10.2.3-2**) can generate the same resultant thruster force and moment as required before the failure. The analysis is to provide an alarm if the occurrence of a worst failure were to lead to a loss of position or heading due to insufficient thrust for the prevailing environmental conditions (e.g. wind, waves, current). For operations which will take a long time to safely terminate, the analysis is to include a function which simulates the remaining thrust and power after the worst failure based on the input of environmental conditions.

(~~5~~4) Common facilities such as self-checking routines, alignment facilities, data transfer arrangements, and plant interfaces which are provided with the computer system, are not to be capable of causing the failure of ~~both/all~~more than one computer system~~s~~.

(5) An alarm is to be initiated if any computer fails or is not ready to take control.

3 Computer systems ~~whose systems are of one system provided with~~used as the DP-control system~~s~~ for Class ~~C~~3 DPS are to comply with the following ~~requirements specified in~~ **(1)** to **(~~4~~5)**, in addition that they are to comply with the requirements in **-2**.

(1) ~~The computer systems are to consist of the facilities of self-checking and alignment function.~~A back-up computer system is to be provided in addition to the computer systems specified in **-2**.

(2) ~~An alarm is to be initiated if any computer system fails or is not ready to take control.~~ The back-up computer system is to be in a room separated by an "*A-60*" class division from the main DP-control station where the main computer system is installed.

(3) During the DP-operation, ~~this~~the back-up computer system~~s~~ ~~are~~is to be continuously updated by input from ~~the~~at least one of the required sets of sensors, position reference system, thruster feedback, etc., and be ready to take over control.

(4) The switch-over of control to the back-up computer system~~s~~ from the main computer system is to be manual, situated on the back-up computer system~~s~~, and is not to be affected by failure of the main computer system.

(5) Main and back-up computer systems are to be so arranged to ensure that at least one system will be able to perform automatic position keeping after any single failure.

4 Each computer system is to be isolated from other on-board computer systems and communications systems to ensure the integrity of the DP system and command interfaces. This isolation may be effected via hardware or software systems as well as the physical separation of cabling and communication lines. Robustness of the isolation is to be verified by analysis and testing. Specific safeguards are to be implemented to ensure the integrity of the computer systems and prevent the connection of unauthorized or unapproved devices or systems.

10.7.7 Position Reference Systems

1 For all classes of the DPS, position reference systems which are selected with due consideration to operati~~onal~~ing requirements, both with regard to restrictions caused by the manner of deployment and expected performance in working situation are to be provided with.

2 Two or more position reference systems required to be installed. Such systems are not to all be of the same type but based on different principles and suitable for the operating conditions.

~~2~~6 ~~Position reference systems whose systems are of one system provided with as the DP-control system for Class B DPS are to comply with the following requirements specified in (1) to (3).~~

~~(1)~~ For Class 2 DPS, ~~A~~at least three independent position reference systems are to be installed and simultaneously available to the DP-control system during operation. ~~And they are not to be all be of the same type, but based on different principles and suitable for the DP-operating conditions.~~

~~(2)~~**3** The position reference systems are to produce data with adequate accuracy and repeatability

for the intended DP-operation.

~~(3)~~**4** The performance of position reference systems is to be monitored and warnings are to be provided when the signals from the position reference systems are either incorrect or substantially degraded.

5 For Class 1 DPS, at least two independent position reference systems are to be installed and simultaneously available to the DP-control system during operation.

~~**3**~~**7** ~~Position reference systems whose systems are of one system provided with as the DP-control system f~~For Class ~~C~~3 DPS, the position reference systems required by **-6** above are to be installed and at least one are to be connected directly to the back-up computer systems and separated by an "*A-60*" class division from the other position reference systems~~, in addition that they are to comply with the requirements in -2~~. However, position reference systems, antennas, cables, etc. installed in exposed areas may be separated by physical distance as well as by some other practical method of separation instead of an "*A-60*" class division.

10.7.8 Vessel Sensors

1 Vessel~~s~~ sensors ~~which are to at least~~that measure at least vessel heading, vessel motions, and wind speed and direction are to be installed to all classes of DPS.

~~**2**~~**3** ~~Vessels sensors whose systems are of one system provided with as the DP-control system for Class B DPS are to comply with the following requirements specified in (1) and (2).~~

~~(1)~~ ~~When the DP-control system is fully dependent on correct~~ For Class 2 DPS, signals from vessel sensors~~, these signals~~ are to be based ~~of~~on three systems serving the same purpose when the DP-control system is fully dependent upon the correctness of such signals. This will result in at least three ~~gyro compasses~~ heading reference sensors being installed ~~where the direction of the unit is measured by the gyro compass~~.

~~(2)~~**2** Sensors for the same purpose, connected to redundant systems are to be arranged independently so that failure of one will not affect the others.

~~**3**~~**4** ~~Vessels sensors whose systems are of one system provided with as the DP-control system for Class C DPS are to comply with the requirements in -2, in addition,~~ For Class 3 DPS, vessel sensors which comply with the requirements in **-3** are to be installed. ~~o~~One of each type of sensors is to be connected directly to the back-up computer system and is to be separated by an "*A-60*" class division from the other sensors. However, vessel sensors, antennas, cables, etc. installed in exposed areas may be separated by physical distance as well as by some other practical method of separation instead of an "*A-60*" class division. If the data from these sensors is passed to the main computer system for use, this system is to be arranged so that a failure in the main computer system cannot affect the integrity of the signals to the back-up computer system.

10.7.9 Cables and Piping Systems

1 Cables and piping systems such as fuel oil pipes, lubricating oil pipes, hydraulic oil pipes, cooling water pipes, etc., for Class ~~B~~2 DPS, are to be located with due regard to fire hazards and mechanical damage.

2 Cables and piping systems such as fuel oil pipes, lubricating oil pipes, hydraulic oil pipes, cooling water pipes, etc., for Class ~~C~~3 DPS are to comply with the following requirements specified in **(1)** and **(2)**.

(1) Cables and piping systems for redundant equipment or systems are not to be routed together through the same compartments.

(2) Where the requirement in **(1)** is not complied with or is unavoidable, such cables are to run together in cable ducts of "*A-60*" class division, the termination of the ducts included, which are effectively protected from all fire hazards, except that represented by the cables and piping systems themselves. Cable connection boxes are not allowed in such ducts.

10.7.10 Systems other than DPS

For Class 2 DPS and Class 3 DPS, systems not directly part of the DP system, but which in the event of failure could cause failure of the DP system (e.g. common fire suppression systems, engine ventilation, heating, ventilation and air conditioning (HVAC) systems, shutdown systems) are to also comply with relevant requirements systems specified in this **10.7**.

10.7.11 Independent Joystick Systems

1 A joystick system independent of the automatic DP-control system is to be arranged. The power supply for the independent joystick system is to be independent of the UPS for the DP-control system. An alarm should be initiated upon failure of the independent joystick system.

2 The independent joystick system is to have automatic heading control.

Chapter 18 OPERATING REQUIREMENT

18.2 Operating Requirements

18.2.16 Onboard Training and Instructions*

Sub-paragraph -3 has been added as follows.

1 All persons are to be provided with familiarization training in accordance with the recommendations of the *IMO*.

2 All persons are to be provided with training in personal safety and emergency response commensurate with their assigned duties in accordance with the recommendations of the *IMO*.

3 Personnel engaged in operating a DPS are to have received relevant training and practical experience in accordance with provisions deemed appropriate by the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2021.
2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part P Mobile Offshore Drilling Units and Special Purpose Barges

2021 AMENDMENT NO.1

Notice No.28 30 June 2021

Resolved by Technical Committee on 27 January 2021

Notice No.28 30 June 2021
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

Amendment 1-1

Part P MOBILE OFFSHORE DRILLING UNITS AND SPECIAL PURPOSE BARGES

P1 GENERAL

P1.1 General

P1.1.6 Class Notations

2 The notations specified in **1.1.1-2, Part P of the Rules** are as follows:

Sub-paragraphs (6) to (8) have been amended as follows.

((1) to (5) are omitted.)
(6) Class ~~A~~1 DPS defined in **10.2.3-1(1), Part P of the Rules**: *DPS ~~A~~1*
(7) Class ~~B~~2 DPS defined in **10.2.3-1(2), Part P of the Rules**: *DPS ~~B~~2*
(8) Class ~~C~~3 DPS defined in **10.2.3-1(3), Part P of the Rules**: *DPS ~~C~~3*

P10 POSITIONING SYSTEMS

P10.1 General

Paragraph P10.1.2 has been amended as follows.

P10.1.2 General

1 For mobile offshore drilling units which are installed the dynamic positioning systems as solely positioning systems, the dynamic positioning system is to be of the Class ~~B~~2 DPS or Class ~~C~~3 DPS specified in **10.2.3, Part P of the Rules**.

2 For units which are positioned by other ships' power in the service area, are operating in transferring within limiting areas at a specific route, or are operating safely without positioning, positioning systems need not to be installed.

3 DPS installed on mobile offshore drilling units and special purpose barges, etc. are to comply with the requirements of **Chapter 12, Part B of the Rules**. DPS installed on work-ships are to comply with the requirements of **Chapter 15, Part B of the Rules**.

P10.2 Classification of Positioning Systems

Paragraph P10.2.3 has been amended as follows.

P10.2.3 Dynamic Positioning Systems

~~**1**~~ Failure mode effective analysis (FMEA) means the analysis method to investigate that where failures of one of all installations and systems consisting on the DPS are assumed, effectiveness of the assumed failures is assessed against the safety of units and its environment, and normally considering the relationship of probability of failure occurrence and its effectiveness. Where probability of failure occurrence is based on either the operating duration of systems or frequency of environmental forces acting on the systems corresponding to the systems to be considered.

~~**2** Fault tree analysis is analytical method to investigate that effectiveness of the assumed failures which include more than one system or human factors such as miss operation, etc., is assessed against the safety of units and its environment, in addition to the FMEA specified in -1, and description of the quantity of safety is conducted.~~

P10.3 Anchor Mooring Systems

Paragraph P10.3.1 has been amended as follows.

P10.3.1 General

Anchor mooring systems specified in **10.3.1-12, Part P of the Rules** may be so designed that thruster force capacity in accordance with the following is included.

(1) Where thruster systems are come under the Class ~~B~~2 DPS, 100 % of thruster force capacity when one thruster is considered to fail in operating condition or severe storm condition and 100 % of all thruster capacity when one mooring line is considered to be broken

(2) Where thruster systems are come under the Class ~~A~~1 DPS, 70 % of thruster force capacity when one thruster is considered to fail in operating condition and severe storm condition in case where this DPS is always operated and redundant system is secured by manually and 70 % of all thruster capacity when one mooring line is considered to be broken.

P10.7 Dynamic Positioning Systems

Paragraph P10.7.1 has been amended as follows.

P10.7.1 General

1 The ~~dynamic positioning~~DP-control systems and computer systems used for the Class ~~B~~2 DPS and Class ~~C~~3 DPS are to be approved by the Society in accordance with the requirements of **Chapters~~ 1 and 2 of~~, Part 7 of the ~~"~~Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use~~"~~**.

2 The ~~dynamic positioning~~DP-control systems and computer systems used for the Class ~~A~~1 DPS, as a rule, are to be approved by the Society in accordance with the requirements of **Chapters~~ 1 and 2 of~~, Part 7 of the ~~"~~Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use~~"~~** as far as practicable.

Paragraph P10.7.5 has been added as follows.

P10.7.5 DP-control Systems

The wording "an appropriate international quality standard recognized by the Society" specified in **10.7.5-1(10), Part P of the Rules** means ISO 90003.

Paragraph P10.7.6 has been amended as follows.

P10.7.6 Computer Systems

~~**1** Software developed to operate the dynamic positioning is to be of ISO 9000-3.~~Computer systems installed on Class 2 DPS and Class 3 DPS are to comply with **Annex D18.1.1, Part D of the Guidance "COMPUTER BASED SYSTEMS"**.

~~**2** An appropriate function approved by the Society specified in **10.7.6-2(4), Part P of the Rules** means that software is capable of simulating the failure mode effective analysis or fault tree analysis specified in **P10.2.3** and complies with the following requirements.~~

~~(1) Operating thrusters after the worst failure occurred are to be ensured to generate the same force of thruster force and moment required before thrusters are failed.~~

~~(2) Warning alarm is to be generated where capability of positioning due to inadequate thruster forces is lost against the environmental condition when the worst failure occurred.~~

~~(3) Where the dynamic positioning operation is continued for a long period, thruster forces and power supply and environmental conditions, etc., after the worst failure occurred, is to be simulated by manually input them.~~

P18 OPERATING REQUIREMENT

P18.2 Operating Requirement

P18.2.2 Information for Normal Operations

Sub-paragraph -2 has been amended as follows.

1 Where a computer for stability calculation is on board the units as a supplement to the stability information specified in **18.2.2-1(10), Part P of the Rules**, this computer is to comply with **Annex U1.2.2 "GUIDANCE FOR STABILITY COMPUTER", Part U of the Guidance**.

2 Operating manual for the dynamic positioning system specified in **18.2.2-2(13), Part P of the Rules** is to include the following **(1)** to **(~~4~~11)** items. ~~In addition, check lists for items (1) to (3); the inspection items, inspection procedures and testing measures for Periodical Survey; and examples of failure and means of repair for the failed systems are to be included.~~

(1) ~~Preparation for operating the dynamic positioning system~~Location checklist (refer to paragraph 4.1 of *IMO MSC.*1/*Circ.*1580)

(2) ~~Monitoring the conditions of each installation and system during the dynamic positioning operation~~Watchkeeping checklist (refer to paragraph 4.2 of *IMO MSC.*1/*Circ.*1580)

(3) ~~Operation for emergency condition~~DP operating instructions (refer to paragraph 4.4 of *IMO MSC.*1/*Circ.*1580)

(4) ~~Explanation for failure mode effective analysis or fault tree analysis of the dynamic positioning systems~~Annual tests and procedures (testing procedures for dynamic positioning systems are acceptable.) (refer to paragraph 5.1.1.3 of *IMO MSC.*1/*Circ.*1580)

(5) Classification and periodical (5-year) surveys and procedures (testing procedures for dynamic positioning systems are acceptable.) (refer to paragraphs 5.1.1.1 and 5.1.1.2 of *IMO MSC.*1/*Circ.*1580)

(6) Examples of tests and procedures after modifications and non-conformities (refer to paragraphs 5.1.1.4 of *IMO MSC.*1/*Circ.*1580)

(7) Blackout recovery procedure

(8) List of critical components

(9) Examples of operating modes

(10) Decision support tools such as ASOG

(11) Capacity plots (refer to paragraph 4.5 of *IMO MSC.*1/*Circ.*1580)

Paragraph P18.2.16 has been amended as follows.

P18.2.16 Onboard Training and Instructions

1 In applying **18.2.16, Part P of the Rules**, reference is to be made to "*Recommendations for the Training and Certification of Personnel on Mobile Offshore Units (MOUs)*" (*IMO* Resolution *A*.1079(28)).

2 The wording "provisions deemed appropriate by the Society" specified in **18.2.16-3, Part P of the Rules** means the *STCW* Convention, the *STCW* Code and the *Guidelines for Dynamic Positioning System (DP) Operator Training* (*IMO MSC*/*Circ.*738).

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 1 July 2021.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction is before the effective date.

Amendment 1-2

P5 has been added as follows.

P5 WATERTIGHT BULKHEADS

P5.2 Closing Appliances

P5.2.3 External Openings

With respect to the provisions of **5.2.3, Part P of the Rules**, the number of air pipes and sounding pipes for the watertight compartments of self-elevating unit leg bottoms may be reduced subject to the following conditions:

(1) Stability requirements are satisfied even under flooded conditions.

(2) Safe passage is possible to allow for the confirmation of the inside of the compartment. In such cases, the confirmation procedure is to be described in the operation manual.

P11 MACHINERY INSTALLATIONS

P11.1 General

P11.1.4 General Requirements for Machinery Installations

Sub-paragraph -4 has been amended as follows.

4 "Special consideration" specified in **11.1.4-5, Part P of the Rules** means that measures deemed appropriately by the Administration (for example, risk assessments and treatments for the ship which has a large embarking capacity, or application of the *SPS Code*) are to be taken.

P11.1.6 Bilge Pipings

Sub-paragraph -4 has been added as follows.

4 Omission of bilge piping

Bilge piping for the watertight compartments of self-elevating unit leg bottoms may be reduced subject to the following conditions:

(1) Stability requirements are satisfied even under flooded conditions.

(2) Safe passage is possible to allow the confirmation of the inside of the compartment. In such cases, the confirmation procedure is to be described in the operation manual.

P12 ELECTRICAL INSTALLATIONS

P12.1 General

P12.1.5 Main Source of Electrical Power and Lighting Systems

Sub-paragraph -6 has been amended as follows.

6 "Special consideration" specified in **12.1.5-4, Part P of the Rules** means that measures deemed appropriate by the Administration (for example, risk assessments and treatments for the ship which has a large embarking capacity, or application of the *SPS Code*) are to be taken.

P12.1.6 Emergency Source of Electrical Power

Sub-paragraph -2 has been amended as follows.

2 "Special consideration" specified in **12.1.6-15, Part P of the Rules** means that measures deemed appropriate by the Administration (for example, risk assessments and treatments for the ship which has a large embarking capacity, or application of the *SPS Code*) are to be taken.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2021.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction is before the effective date.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance may apply to ships for which the date of contract for construction is before the effective date upon request of the owner.