

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part D Machinery Installations

Guidance for the Survey and Construction of Steel Ships

Part D

2011 AMENDMENT NO.1

Notice No.41 30th June 2011

Resolved by Technical Committee on 3rd February 2011

ClassNK
NIPPON KAIJI KYOKAI

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:

Part D MACHINERY INSTALLATIONS

Amendment 1-1

D1 GENERAL

D1.1 General

Paragraph D1.1.4 has been amended as follows.

D1.1.4 Modification of Requirements

For those machinery installations specified in **1.1.4, Part D of the Rules** (excluding those specified in other Parts of the Rules), some requirements of **Part D of the Rules** may be modified as follows:

((1) to (6) are omitted)

(7) Piping of Groups I and II, and their respective valves, pipe fittings and valves and pipe fittings which are directly fitted to the shell plating and collision bulkhead:

Materials which comply with any national standards may be accepted for the following (a) to (c), except for those cast iron products for valves, seats and distance pieces mounted on the shell plating (including sea chests).

(a) Pipes with both a design pressure less than 1 *MPa* and a design temperature of 230 °C or less

(b) Valves and pipe fittings used for pipes with a nominal diameter less than 100 *mm*

(c) Valves and pipe fittings with both a design pressure less than 3 *MPa* and a design temperature of 230 °C or less

(d) Pipe flanges

(8) (Omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2011.

D15 STEERING GEARS

D15.3 Controls

Paragraph D15.3.1 has been amended as follows.

D15.3.1 General

1 It may be acceptable that only one set of floating levers or other mechanical follow-up control systems are provided.

~~**2** Control systems specified in the requirements of **15.3.1-1(2), Part D of the Rules** are in principle to be follow-up types.~~

2 The two independent control systems specified in the requirements of **15.3.1-1(2), Part D of the Rules** are to be so arranged that a mechanical or electrical failure in one of them will not render the other one inoperative.

3 The control systems and relevant components specified in the requirements of **15.3.1-1(2), Part D of the Rules** are to comply with following requirements:

(1) Wires, terminals and the components for duplicated control systems installed in units, control boxes, switchboards or bridge consoles are to be separated as far as practicable. In cases where enough separation is not practicable, separation may be achieved by means of a fire retardant plate.

(2) All electric components of the control systems are to be duplicated.

(3) In cases where a joint steering mode selector switch (uniaxial switch) is employed for both control systems, the connections for the circuits of the control systems are to be divided accordingly and separated from each other by an isolating plate or by air gap.

(4) In cases where double follow-up controls are arranged (Refer to **Fig. D15.3.1-2**), the follow-up amplifiers are to be designed and independently supplied so as to be electrically and mechanically separated. In cases where both non-follow-up controls and follow-up controls are arranged, the follow-up amplifiers are to be protected selectively. (Refer to **Fig. D15.3.1-3**)

(5) Control circuits for additional devices, e.g. steering lever or autopilot, are to be arranged for all-pole disconnection. (Refer to **Fig. D15.3.1-1** to **Fig. D15.3.1-3**)

(6) In respect to control systems, in cases where feed-back units and limit switches are arranged, such devices are to be separated electrically and mechanically and connected to the rudder stock or rudder actuator separately.

(7) Hydraulic system components in the power actuating or hydraulic servo systems controlling the power systems of the steering gear (e.g. magnetic valves, etc.) are to be duplicated and arranged separately. In cases where there are two or more separate power units and the piping to each power unit can be isolated, the hydraulic system components in the control systems that are part of a power unit may be regarded as being duplicated and separated.

4 The control systems specified in the requirements of **15.3.1-1(2), Part D of the Rules** are to be provided with the following (1) and (2) failure detection functions:

(1) At least the following failures that may cause reduced or erroneous system performance are to be detected. In such cases, visible and audible alarms are to be given on the navigation bridge in the event of all failures:

(a) Power supply failure

(b) Loop failure in closed loop systems, both command and feedback loops

(c) In cases where programmable electric systems are used:

i) Data communication errors

ii) Computer hardware and software failures

(d) Hydraulic locking considering order given by steering wheel or lever

(2) In cases where, the above (1)(b) and (c) are not able to be detected due to the characteristics of the rudder, the monitoring of the following may be accepted as an alternative measure. In such cases, visible and audible alarms indicating rudder failure are to be given on the navigation bridge when detecting critical deviations between rudder order and response. All electric components of the control systems are to be duplicated.

(a) Actual rudder positions are to follow the set value.

(b) Actual rudder positions are to reach a set position within acceptable time limits.

(c) The end actual position is to corresponded to the set value within the design offset tolerances.

5 Measures which result in the least critical of any new possible conditions by the most probable failures are to be provided for the control systems specified in the requirements of 15.3.1-1(2), Part D of the Rules.

36 Amplifiers, relays, etc., included in control systems may also be used for automatic pilot systems.

47 For electrohydraulic steering gears equipped with power units comprising variable-displacement pumps, two sets each of hydraulic servo cylinders and associated hydraulic systems (including pump driving electric motors and control equipment) or electric servo motors for controlling displacement of pump plungers are to be provided.

58 In general, the following cases are not considered to be one of the cases “where hydraulic locking, caused by a single failure, may lead to loss of steering” that is specified in 15.3.1-4, Part D of the Rules.

(1) Steering systems with performance at least equal to that required for auxiliary steering gear are fitted as stand-by systems and are operable from navigation bridges. In such cases, stand-by systems are to be designed so that they do not run parallel using interlocking devices, etc.

(2) Not less than 3 systems are operated parallel and, in the case of a single failure, steering capability at least equal to that required for auxiliary steering gears is maintained.

(3) Steering gears designed to avoid leading to any loss of steering by automatically by-passing failed systems using duplicated control valve systems. These arrangements are subject to special consideration with respect to any reduced reliability due to increased complexity.

69 Those “audible and visual alarms, which identify failed systems” specified in 15.3.1-4, Part D of the Rules, are, in general, to be activated under the following conditions:

(1) In cases where positions of variable displacement pump control systems do not correctly respond to given commands.

(2) In cases where incorrect positions of 3-way full flow valves or similar constant delivery pump systems are detected.

710 The location of sensors for those alarms specified in the aforementioned 6, are to be as near as possible to actuators. However, in cases where two or more pumps are mechanically interconnected by floating bars or by similar devices, special consideration does not need to be given to their breakage. An example of some acceptable locations of alarm sensors is given in Fig. D15.3.1.

Fig. D15.3.1-1 Example Layout of Control Systems with Double Non Follow-up Control and Autopilot or Other Additional Control

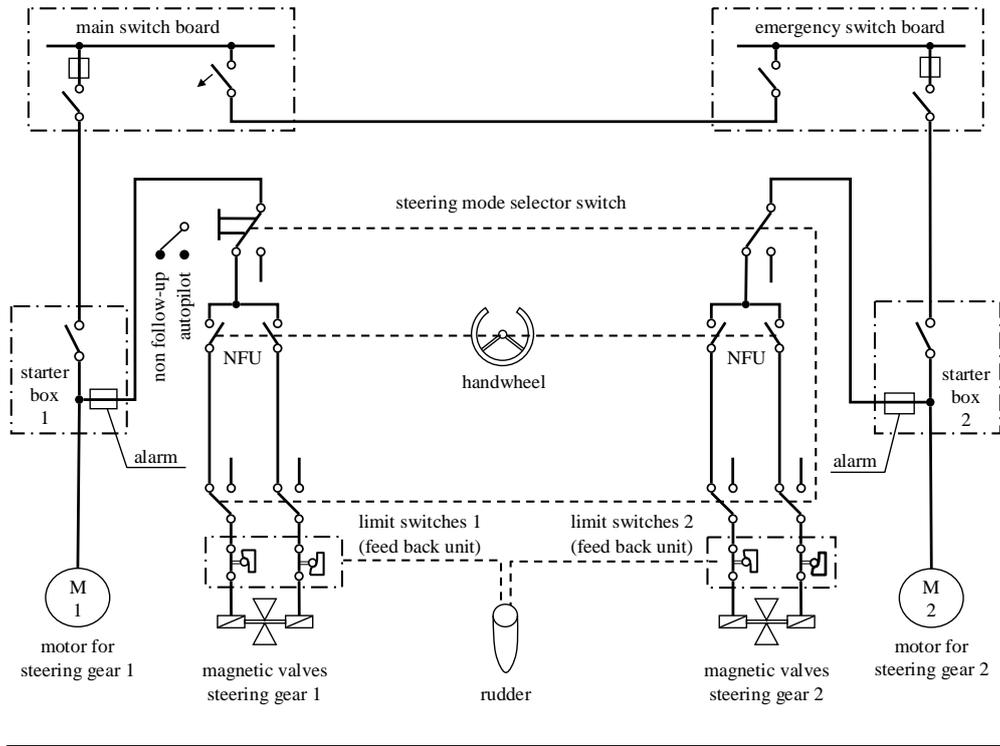


Fig. D15.3.1-2 Example Layout of Control Systems with Double Follow-up Control and Autopilot or Other Additional Control

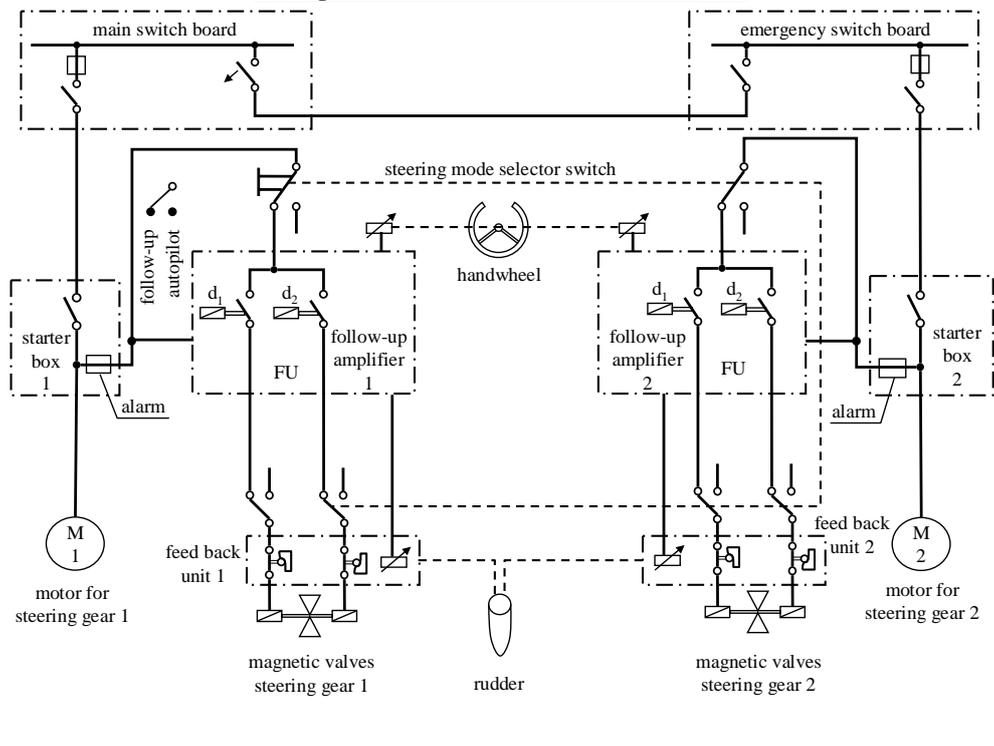


Fig. D15.3.1-3 Example Layout of Control Systems with Double Non Follow-up Control.

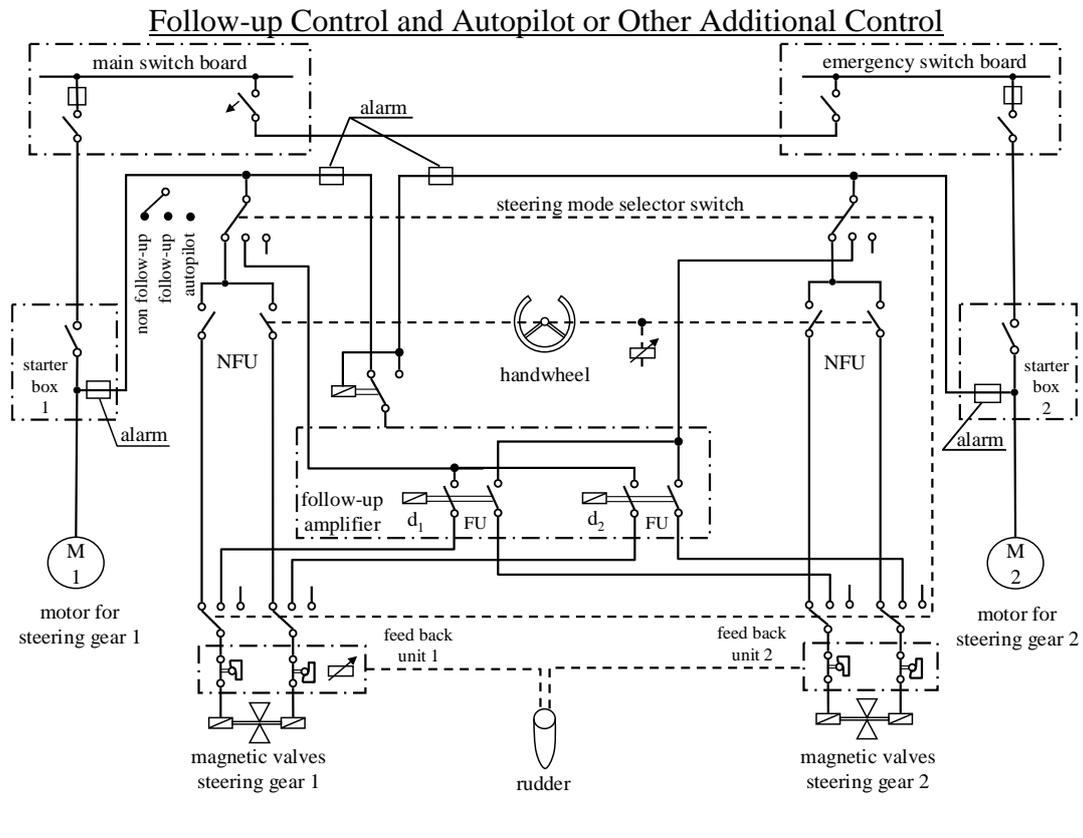


Fig. D15.3.1-4 Example Layout of Hydraulic Locking Alarm Sensors

(Omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2011.
2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships for which the date of contract for construction* is before the effective date.
* “contract for construction” is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of “contract for construction” of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.
2. The date of “contract for construction” of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.
For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a “series of vessels” if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:
 - (1) such alterations do not affect matters related to classification, or
 - (2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.
3. If a contract for construction is later amended to include additional vessels or additional options, the date of “contract for construction” for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a “new contract” to which **1.** and **2.** above apply.
4. If a contract for construction is amended to change the ship type, the date of “contract for construction” of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:

This Procedural Requirement applies from 1 July 2009.

D9 BOILERS, ETC. AND INCINERATORS**D9.2 Materials and Welding**

Paragraph D9.2.4 has been amended as follows.

D9.2.4 Non-destructive Tests for Cast Steels

The criteria for non-destructive tests of cast steels used for boiler drums exposed to internal pressure are to be in accordance with the following: ~~K5.1.10(3)~~

- (1) The testing method of radiographic tests is to be in accordance with JIS G 0581. Any cracks or insufficient fusion are to be judged unacceptable. Gas and blowholes, sand spots, inclusions, and internal shrinkage are judged acceptable in cases where the defects are classified as Grade 1 in accordance with the above standard.
- (2) The testing method of magnetic particle tests is to be in accordance with JIS Z 2320-1 to -3. The result of a magnetic particle test is acceptable, provided the following (a) to (d) are complied with:
 - (a) There are no magnetic particle indications due to surface cracks.
 - (b) The maximum length of linear magnetic particle indications is 4 mm or less.
 - (c) The major axis length of circular magnetic particle indications is 4 mm or less.
 - (d) The point total specified in Table D9.4.2 with respect to the type of magnetic particle indications is 12 or less within an area of 2500 mm² for scattering magnetic particles.
- (3) Defects judged unacceptable by (1) or (2) may be repaired. Welding for such repairs is to be in accordance with the requirements specified in 5.1.11, Part K of the Rules.

Table D9.4.2 Points for Scattering Magnetic Particle Indication

<u>Magnetic particle pattern of defect</u>	<u>Magnetic particle indications of 2 mm or less</u>	<u>Magnetic particle indications of more than 2 mm, 4 mm or less</u>
<u>Linear</u>	<u>3</u>	<u>6</u>
<u>Circular</u>	<u>1</u>	<u>2</u>

D10 PRESSURE VESSELS

D10.2 Materials and Welding

Paragraph D10.2.6 has been amended as follows.

D10.2.6 Non-destructive Testing for Cast Steels and Cast Irons

The criteria for non-destructive testing in cases where cast steels are used for shells of Group I or Group II pressure vessels are to be in accordance with the following: ~~to be as specified in Annex K5.1.10 (3) "GUIDANCE FOR NON-DESTRUCTIVE TEST AND SURFACE INSPECTION OF CAST STEEL FOR BOILERS AND PRESSURE VESSELS" of Part K.~~

- (1) The testing method of radiographic tests is to be in accordance with JIS G 0581. Any cracks or insufficient fusion are to be judged unacceptable. Gas and blowholes, sand spots, inclusions, and internal shrinkage are judged acceptable in cases where the defects are classified as Grade 1 in accordance with the above standard. Gas and blowholes, sand spots, and inclusions of Grade 2 are judged acceptable in cases where the thickness of Group II pressure vessels in defect area is 25 mm or more.
- (2) The testing method and the criteria for acceptable defects detected by magnetic particle tests are to be in accordance with those in D9.2.4(2).
- (3) The testing method of liquid penetrant testing is to be in accordance with JIS Z 2324. The criteria for acceptable defects detected by liquid penetrant testing is to be in accordance with those in D9.2.4(2).
- (4) Defects judged unacceptable by (1), (2), or (3) may be repaired. Welding for such repairs is to be in accordance with the requirements specified in 5.1.11, Part K of the Rules.

D11 WELDING FOR MACHINERY INSTALLATIONS

D11.4 Welding of Boilers

Sub-paragraph -3 has been amended as follows.

D11.4.6 Non-destructive Testing for Other Welds

3 The standards for magnetic particle tests are to be in accordance with the following:

- (1) The testing method is to be in accordance with *JIS Z 2320-1* to ~~-3C-0565~~ or equivalent thereto.
- (2) The result of a magnetic particle test is acceptable, provided the following (a) through (d) are complied with.
 - (a) There are no magnetic particle indications due to surface cracks.
 - (b) The maximum length of linear magnetic particle indications is 2 *mm* or less.
 - (c) The major axis length of circular magnetic particle indications is 2 *mm* or less.
 - (d) The point total specified in **Table D11.4.6-3** with respect to the type of magnetic particle indications is 6 or less within an area of 2500 *mm*² for scattering magnetic particles.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 30 December 2011.
2. Notwithstanding the amendments to the Guidance, the current requirements may apply to machinery installations other than those for which the application for survey is submitted to the Society on or after the effective date.