

Subject

Amendment to the ClassNK Rules and Guidance related to computer based systems

ClassNK

Technical Information

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To whom it may concern

IACS UR E22(Rev.1) specifies requirements related to composition and function of computer based systems used for machinery systems such as monitoring systems.

These requirements have already been incorporated to Rules and Guidance of NIPPON KAIJI KYOKAI (hereinafter referred as "the Society").

Since the necessity for security measures which reduce risks specific to computer based systems such as computer viruses has been increasing in recent years, IACS discussed way to clarify requirements and adopted UR E22(Rev.2) in June 2016, which specifies responsibilities of stakeholders, security measures for software and hardware and quality management for said systems.

Accordingly, relevant requirements in the Society's Rules and Guidance were amended and what concerned organizations shall address are informed.

1. System Categories

Systems are typically assigned category I, II or III in following Table 2.1 in Annex D18.1.1, Part D of the Guidance for the Survey and Construction for Steel Ships.

Table 2.1 System categories in Annex D18.1.1, Part D of the Guidance for the Survey and Construction for Steel Ships

Category	Effects	Typical system functionality
I	Those systems, failure of which will not lead to dangerous situations for human safety, safety of the vessel and/or threat to the environment.	- Monitoring function for informational or administrative tasks
II	Those systems, failure of which could eventually lead to dangerous situations for human safety, safety of the vessel and/or threat to the environment.	- Alarm and monitoring functions - Control functions which are necessary to maintain the vessel in its normal operational and habitable conditions
III	Those systems, failure of which could immediately lead to dangerous situations for human safety, safety of the vessel and/or threat to the environment.	- Control functions for maintaining the vessel's propulsion and steering - Vessel safety functions

Examples of systems assigned category II or III are also shown in the Notes of the Table.

Further, following machinery, systems, etc. are generally assigned category II or III.

(To be continued)

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Category III

Main propulsion systems : Engine control system, Engine remote control system, Main boiler control system, CPP control system, Electric propulsion control system

Steering system control systems : Steering system (including auto pilot), Azimuth thruster

Electric power systems : Generator engine control system, Electric power converter (for electric propulsion ship, etc.)

Safety systems : Fire detection and fighting system, Flooding detection and fighting system, Internal communication system, System involved in operation of life saving appliances equipment

Other systems : Dynamic positioning system, Drilling system

Category II

Liquid cargo transfer control systems : Cargo control system (e.g. cargo control console, cargo valve remote control system, cargo machinery emergency shut-down system), Reliquefaction system, Inert gas generator (including nitrogen generator), Oil discharge monitoring and control system

Fuel oil treatment systems : Viscosity control system, Fuel oil purifier

Stabilization and ride control systems : Fin stabilizer, Jetfoil

Alarm and monitoring systems for propulsion systems : Engine alarm and monitoring system (including data logger)

Other systems : Ballast transfer valve remote control system, Oily water separator, Oil content meter, Waste oil incinerator, Sewage treatment plant, Aux. boiler control system, Ballast water treatment system, SOx/NOx scrubber, NOx exhaust gas recirculation system

As to the other systems/machinery not listed above, system category is to be confirmed to the Society individually.

2. System Integrator (before delivery)

System integrator (shipyard in general) shall manage suppliers of system/machinery (manufacturer in general) and address followings:

- To confirm if systems/machinery are type-approved*¹ and require suppliers to get type approval and submit necessary documents
- To submit documents and test procedures listed in the attached table
- To carry out on board testing in final integrated environment
- To take over necessary documents, information, etc. to owner and system integrator (after delivery)

3. Supplier

Suppliers of system/machinery assigned category II or III shall address followings:

- To apply for type approval
- To submit documents and test procedures listed in the attached table
- To carry out shop test in the presence of the Surveyor
- To carry out simulation test before final integration on board (in case where it is unable to be carried out during shop test)

(To be continued)

Regardless of "1. System Categories", in case where supplier decides that system/machinery is to be assigned category I, risk assessment report shall be submitted to determine the category, or in case where computer based system is not used in the system/machinery, drawings, etc. shall be submitted to show that no computer based system is used.

4. Owner and System Integrator (after delivery)

Owners and system integrators (after delivery) (ship management company in general) shall address followings:

(Owner)

- To assign system integrator and organization in charge of updating software and report to the Society

(Owner or System Integrator)

- To submit documents related to quality systems

- To take over necessary documents, information, etc. from system integrator (before delivery) and recognize computer based systems used on board including their system categories

- To recognize all of the risk assessment results conducted before delivery and conduct additional risk assessment if necessary

- To make procedure for updating software (including reporting to the Society) and submit it

- To manage history of software update and update software registry

The above report and submission are to be done to ClassNK Machinery Department in principle.

5. Omission of Submission of Documents

In case where a document to be submitted has no revision from that previously submitted at type approval or existing product approval, only application for omission of submission of the document may be acceptable excluding test procedures.

In case where a document has an only minor revision, the application for omission of submission of the document with documents specifying the revised parts may be acceptable.

6. Omission of Performance of Test

As to shop test for computer based system newly required in accordance with the amendments of the Rules and Guidance, omission of its performance may be considered in case where documents showing that used computer based system and connected machinery/equipment are same (manufacturer and model) as those for which shop tests were previously carried out or test results would be unchanged regardless of the connected machinery/equipment are submitted.

(To be continued)

Table. Documents to be submitted

Document	Contents and Notes	Stakeholder in charge
(For approval)		
Quality plan	<p>(a)The quality system is certified as compliant to the recognized standard by an organisation with accreditation under a national accreditation scheme</p> <p>(b)Relevant procedures regarding SW lifecycle and associated HW</p> <ul style="list-style-type: none"> -Responsibilities, system documentation, configuration management and competent staff -The organization set in place for acquisition of related HW/SW from suppliers -The organization set in place for SW code writing and verification -The organization set in place for system validation before integration in the vessel -SW modification and installation on board the vessel (before/after delivery) <p>(c)Documents to be submitted and tests to be witnessed by the Surveyor</p> <p>(d)Reference standard^{*2}</p> <p>(e)Security policy</p>	System integrator and Supplier
Test procedure for functional tests and failure tests at integration test before installation on board	(a)The results of any required failure analysis are to be observed	Supplier
Simulation test procedure for final integration	(a)To be submitted in case where this simulation test is not carried out at functional test and failure test in shop before installation on board	System integrator or Supplier
Test procedure for on board final integration test	(a)To check safe interaction with all computer based systems in its final integrated environment	System integrator
Application and drawings/documents for type approval	<p>(a)In case where type approval is not obtained, application and drawings/document are to be submitted in accordance with 1.2.1, Chapt.1, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use</p> <p>(b)Copy of certificate is to be submitted in case where products have already been type-approved</p>	Supplier

(To be continued)

(For reference)		
Risk assessment report	(a)Figure or table showing system hierarchy and components -List of interface between system and other systems -System category of each system -Type-approved or not (b)Risk assessment for the whole system (c)Risk assessment to determine system category (required to set category other than that mentioned in "1. System Categories" and to be prepared in liaison with supplier)	System integrator
	(a)Risk assessment for individual system (b)FMEA report to support containment of failure test procedure (if requested)	Supplier
SW related document	(a)List and versions of SW installed in system (b)List of standards used for data links (not necessary to specify the standard for each link)	System integrator
	(a)Functional description (b)Code writing and test -Evidence of verification (detection and correction of SW errors) -Evidence of functional tests	Supplier

HW : Hardware, SW : Software

- *1 Type approval is approval in accordance with Chap.1, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use, required only for circuit board, casing, etc. of computer based system (including programmable devices) and not required for sensors remotely provided from the system. However, sensors for which environmental tests are to be carried out in accordance with Table 18.7.1-1, Part D the Guidance for the Survey and Construction of Steel Ships are to be type-approved as previously required. In case where individual approval of each product is obtained, type approval is not required.
- *2 As to reference standard for software development, it is not necessary for system integrator not concerned with the development to specify it while supplier shall specify it and it may not be a public standard such as IEC, etc. but be suppliers' own standards.

For any questions about the above, please contact:

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