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REVIEW OF CHAPTER III OF THE STCW CONVENTION AND CODE

Review of tables A-III/1 and A-III/2 of the STCW Code

Columns 1, 2, 3 and 4

Submitted by Japan, Turkey and IMarEST

SUMMARY

Executive summary:	This document contains a proposal to amend tables A-III/1 and A-III/2 of the STCW Code in order to meet contemporary technologies and improve the texts of the tables
Strategic direction:	5
High-level action:	5.2
Planned output:	5.2.2.1
Action to be taken:	Paragraph 10
Related documents:	STW 38/17; STW 40/7/18, STW 40/7/37, STW 40/14/Add.1 and STW/ISWG 2/4/1

Background

1 The comprehensive review of the STCW Convention and Code is in progress and the principles of the review are to meet the operational requirements of contemporary and future maritime technologies as well as not to scale down existing standards (STW 38/17, paragraph 12.29).

2 With regard to the existing tables A-III/1 and A-III/2 developed at the 1995 amendment to the STCW Convention and Code, no substantial amendment has been made since the Convention was adopted in 1978. The tangible evidence is that the terms “alternator” and “generator” have existed even though no-one has had DC generators on board ships since the 1980s and competence of using tools has been placed at the top of table A-III/1. In other words, it has been noted that technological advancements in propulsion machinery and changes were not reflected in the tables and the existing descriptions in the tables are too general to clarify what should be learned by personnel to be a marine engineer. Therefore, the existing tables require amendment based on the principles of the comprehensive review of the STCW Convention and Code.

3 At STW 40, Japan submitted a proposal to amend tables A-III/1 and A-III/2, aiming at reformatting the functions by providing more specific descriptions and addressing contemporary technologies (STW 40/7/18). After discussion, the Sub-Committee agreed to amend the tables under the existing functions and Japan agreed to re-submit a revised proposal on this issue to the next session.

4 At the second *ad hoc* intersessional meeting of the STW Working Group (7 to 11 September 2009), Japan, Turkey and IMarEST submitted the revised proposal (STW/ISWG 2/4/1). After a brief discussion, the group agreed to amend tables A-III/1, A-III/2 and section B-III/1 of the STCW Code (STW/ISWG 2/WP.1, paragraph 4.7). However, there was no progress of discussion due to a time constraint and difficulty in clarifying how the amendment was to be made. It was concluded that the amendments to the tables did not make sense unless they were shown in two groups, one of which should show only the moves of competencies and the proposed amendment to the competencies in their new locations. Accordingly, Japan was invited to consider the comments made at STW/ISWG 2 and re-submit the proposal to STW 41.

Proposals

5 This document refers to replace the tables in document STW/ISWG 2/4/1 submitted by Japan, *et al*., regarding amendments to tables A-III/1 and A-III/2. The proponents of this document revised document STW/ISWG 2/4/1, specifically tables A-III/1 and A-III/2, to address concerns raised by Governments and other organizations during the working group deliberations.

6 Careful consideration was given to the comments made at STW/ISWG 2 that only additional items, added to the existing table, should be submitted. However, on careful consideration, it was concluded that the amendments to the tables did not make sense unless they were shown in the context of the reorganized competencies.

7 In an attempt to clarify the proposal two tables have been produced; the base document being the text of the tables as shown in document STW 40/14/Add.1. The first table, as set out in annex 1, shows the relocation of the competencies without any amendment to the text. The second table, as set out in annex 2, shows the amendments, having accepted the relocation, made to the relocated competencies.

8 Accordingly, the co-sponsors hereby present new tables to replace the tables presented in annexes 1 and 2 of document STW/ISWG 2/4/1.

9 Bearing in mind the proposed amendment to tables A-III/1 and A-III/2 of the STCW Code, paragraph 1 in section B-III/1 of chapter III should consequently be deleted and paragraphs 2 and 3 should be renumbered as set out in annex 3.

Action requested of the Sub-Committee

10 The Sub-Committee is invited to take the proposal contained in the attached annexes into consideration and decide as appropriate.

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ANNEX 1

PROPOSED RELOCATION OF COMPETENCE IN TABLES A-III/1 AND A-III/2 OF THE STCW CODE

Table A-III/1

Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room

Function: Marine engineering at the operational level

The following text shall be transferred into the function of "**Maintenance and repair at the operational level**":

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Use appropriate tools for fabrication and repair operations typically performed on ships	Characteristics and limitations of materials used in construction and repair of ships and equipment Characteristics and limitations of processes used for fabrication and repair Properties and parameters considered in the fabrication and repair of systems and components Application of safe working practices in the workshop environment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Identification of important parameters for fabrication of typical ship-related components is appropriate Selection of material is appropriate Fabrication is to designated tolerances Use of equipment and machine tools is appropriate and safe
Use hand tools and measuring equipment for dismantling, maintenance, repair and reassembly of shipboard plant and equipment	Design characteristics and selection of materials in construction of equipment Interpretation of machinery drawings and handbooks Operational characteristics of equipment and systems	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Safety procedures followed are appropriate Selection of tools and spare gear is appropriate Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice Recommissioning and performance testing is in accordance with manuals and good practice

The following text shall be transferred into the function of "**Electrical, electronic and control engineering at the operational level**":

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	Safety requirements for working on shipboard electrical systems Construction and operational characteristics of shipboard AC and DC electrical systems and equipment Construction and operation of electrical test and measuring equipment	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory Selection and use of test equipment is appropriate and interpretation of results is accurate Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice Commissioning and performance testing of equipment and systems brought back into service after repair in accordance with manuals and good practice

Table A-III/2

Specification of minimum standard of competence for chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more

Function: Marine engineering at the management level

The following text shall be transferred into the function "**Marine engineering at the operational level**" with introduction of ERM that has been agreed:

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Use internal communication systems	Operation of all internal communication systems on board	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Transmission and reception of messages are consistently successful Communication records are complete, accurate and comply with statutory requirements

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ANNEX 2

PROPOSED AMENDMENTS TO TABLES A-III/1 AND A-III/2 OF THE STCW CODE INDICATING THE RELOCATION OF COMPETENCES SHOWN IN ANNEX 1

Note: Deleted text is shown as strikethrough and new text is shown shaded.

Shifted text is shown shaded in the whole column.

Agreed STW 40 amendments are not marked.

Table A-III/1

Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room

Function: Marine engineering at the operational level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Maintain a safe engineering watch	Thorough knowledge of basic principles to be observed in keeping an engineering watch including: .1 duties associated with taking over and accepting a watch .2 routine duties undertaken during a watch .3 maintenance of the machinery space log-book and the significance of the readings taken .4 duties associated with handing over a watch Safety and emergency procedures; change-over of remote/automatic to local control of all systems	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The conduct, handover and relief of the watch conforms with accepted principles and procedures The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures including basic principles to be observed in keeping an engineering watch A proper record is maintained of the movements and activities relating to the ship's engineering systems

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Maintain a safe engineering watch (*continued*)	Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems *Engine-room Resource Management* Knowledge of Engine-room resource management principles including: .1 allocation, assignment and principles of resources .2 effective communication .3 assertiveness and leadership .4 obtaining and maintaining situational awareness	Assessment of evidence obtained from one or more of the following: .1 approved training ship experience .2 approved in-service experience .3 approved simulator training	Resources are allocated and assigned as needed in correct priority to perform necessary tasks Communication is clearly and unambiguously given and received Questionable decisions and/or actions result in appropriate challenge and response Effective leadership behaviours are identified Team member(s) share accurate understanding of current and predicted engine-room and associated systems state, and external environment
Use English in written and oral form	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties	Examination and assessment of evidence obtained from practical instruction	English language publications relevant to engineering duties are correctly interpreted Communications are clear and understood

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Use internal communication systems	Operation of all internal communication systems on board	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Transmission and reception of messages are consistently successful Communication records are complete, accurate and comply with statutory requirements
Operate ~~main and auxiliary~~ shipboard plant machinery and associated control systems	Basic structure and operation principles of major machinery systems including: .1 marine diesel engine .2 marine steam turbine .3 marine gas turbine .4 marine boiler .5 shafting installations including propeller .6 other auxiliaries including various pumps, air compressor, purifier, fresh water generator and heat exchanger .7 steering gear .8 automatic control systems Fluid flow and characteristics of major piping systems Basic structure and operation principles of refrigerator, ventilation systems and deck machinery	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved laboratory equipment training	Structures and operating mechanisms can be understood and explained with drawings /instructions

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Operate ~~main and auxiliary~~ shipboard plant machinery and associated control systems (*continued*)	Safety and emergency procedures for operation of propulsion plant machinery including control systems Operational characteristics of machinery and control systems ~~Main and auxiliary machinery:~~ Preparation, operation, fault detection and necessary measures to prevent damage for the following major machinery items and control systems: .1 ~~preparation of main machinery and preparation of auxiliary machinery for operation~~ main engine and associated auxiliaries .2 ~~operation of~~ steam boiler and associated auxiliaries, ~~including combustion systems~~ ~~.3 methods of checking water level in steam boilers and action necessary if water level is abnormal~~ ~~.4 location of common faults in machinery and plant in engine and boiler rooms and action necessary to prevent damage~~ .3 generator and associated systems .4 other auxiliaries including refrigerator and ventilation systems	~~Examination and~~ Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Operation of equipment and systems is in accordance with operating manuals Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment Deviations from the norm are promptly identified The output of plant and engineering systems consistently meets requirements, including bridge orders relating to changes in speed and direction The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the ship and the plant, having regard to the prevailing circumstances and conditions

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Method for demonstrating competence	Column 4 Criteria for evaluating competence
Operate fuel, lubrication, ballast and other pumping systems and associated control systems	Operational characteristics of machinery and control systems Operation of pumping systems: .1 routine pumping operations .2 operation of bilge, ballast and cargo pumping systems Oily water separators (or similar equipment) requirements and operation	~~Examination and~~ Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Operation of machinery and systems is in accordance with operating manuals Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment Deviations from the norm are promptly identified and appropriate action taken

Function: Electrical, electronic and control engineering at the operational level

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Method for demonstrating competence	Column 4 Criteria for evaluating competence
~~Operate alternators, generators and control systems~~ Operate electrical, electronic and control systems	~~*Generating plant*~~ ~~Appropriate basic electrical knowledge and skills~~ ~~Preparing, starting, coupling and changing over alternators or generators~~(moved below ".1.b" in more appropriate manner) ~~Location of common faults and action to prevent damage~~ ~~*Control systems*~~ ~~Location of common faults and action to prevent damage~~	~~Examination and~~ Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	~~Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations~~ Structures and operating mechanisms can be understood and explained with drawings /instructions

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Operate electrical, electronic and control systems (*continued*)	Basic configuration and operation principles of the following electrical, electronic and control equipment: .1 electrical equipment .a power generation systems .b preparing, starting, paralleling and changing over generators .c induction motors including starting methodologies .d high-voltage installations .e sequential control circuits and associated system devices .2 electronic equipment .a functions, characteristics and features of control systems for major machinery items including main propulsion plant operation control and steam boiler automatic combustion control .b flowchart for automatic and control systems .c characteristics of basic electronic circuit elements .3 control systems .a various automatic control methodologies and characteristics		

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Operate electrical, electronic and control systems (*continued*)	.b PID control characteristics and associated system devices for process control		
~~Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations~~ Maintenance and repair of electric and electronic equipment	Safety requirements for working on shipboard electrical systems ~~Construction and operational characteristics of shipboard AC and DC electrical systems and equipment~~ Maintenance and repair works for electrical system equipment, main switchboard, electric motor, generator and DC electrical system and equipment Detection of electric malfunction, location of faults and measures to prevent damage Construction and operation of electrical test and measuring equipment Function and performance tests of the following equipment and their configuration: .1 monitoring systems .2 automatic control devices .3 protective devices The interpretation of electrical and simple electronic diagrams	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests .3 approved in-service experience .4 approved training ship experience	Safety measures for working are appropriate Selection and use of hand tools, measuring instruments and testing devices are appropriate and interpretation of results is accurate Dismantling, inspecting, repairing and reassembling equipment are in accordance with manuals and good practice Reassembling and performance testing is in accordance with manuals and good practice

Function: Maintenance and repair at the operational level

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Method for demonstrating competence	Column 4 Criteria for evaluating competence
~~Maintain marine engineering systems, including control systems~~ (Competency deleted, KUP, reworded, divided between Electrical function and "Maintenance and repair of shipboard plant machinery" below)	~~*Marine systems*~~ ~~Appropriate basic mechanical knowledge and skills~~ ~~*Safety and emergency procedures*~~ ~~Safe isolation of electrical and other types of plant and equipment required before personnel are permitted to work on such plant or equipment~~ ~~Undertake maintenance and repair to plant and equipment~~	~~Examination and assessment of evidence obtained from one or more of the following:~~ ~~.1 approved in-service experience~~ .2 ~~approved training ship experience~~ ~~.3 approved simulator training, where appropriate~~ ~~.4 approved laboratory equipment training~~	~~Isolation, dismantling and reassembly of plant and equipment is in accordance with accepted practices and procedures~~ ~~Action taken leads to the restoration of plant by the method most suitable and appropriate to the prevailing circumstances and conditions~~
~~Use appropriate tools for fabrication and repair operations typically performed on ships~~ Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board	Characteristics and limitations of materials used in construction and repair of ships and equipment Characteristics and limitations of processes used for fabrication and repair Properties and parameters considered in the fabrication and repair of systems and components ~~Application of safe working practices in the workshop environment~~ Method of emergency/temporary repair Safety measures to be taken for using hand tools, machine tools and measuring instruments	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests .3 approved in-service experience .4 approved training ship experience	Identification of important parameters for fabrication of typical ship-related components is appropriate Selection of material is appropriate Fabrication is to designated tolerances Use of ~~equipment and~~ hand tools, machine tools and measuring instruments is appropriate and safe

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board (*continued*)	Use of hand tools, machine tools and measuring instruments Use of various types of sealants and packings		
~~Use hand tools and measuring equipment for dismantling, maintenance repair and re-assembly of shipboard plant and equipment~~ Maintenance and repair of shipboard plant machinery	Safety measures to be taken for repair and maintenance works Maintenance and repair works such as dismantling, adjustment and reassembling of plant machinery including propeller The use of specialized tools and measuring instruments Design characteristics and selection of materials in construction of equipment Interpretation of machinery drawings and handbooks ~~Operational characteristics of equipment and systems~~ The interpretation of piping, hydraulic and pneumatic diagrams	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests .3 approved in-service experience .4 approved training ship experience	Safety procedures followed are appropriate Selection of tools and spare gear is appropriate Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice Re-commissioning and performance testing is in accordance with manuals and good practice Selection of materials is appropriate

Function: Controlling the operation of the ship and care for persons on board at the operational level (No proposal)

Table A-III/2

Specification of minimum standard of competence for chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more

Function: Marine engineering at the management level

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Manage the operation of propulsion plant machinery (New description of competence)	Structural features and operative mechanism of the following major machineries and associated auxiliaries .1 marine diesel engine .2 marine steam turbine .3 marine gas turbine .4 marine steam boiler	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved laboratory equipment training	Explanation and understanding of structures and operating mechanisms are appropriate
Plan and schedule operations	*Theoretical knowledge* Thermodynamics and heat transmission Mechanics and hydromechanics ~~Operating principles of ship power installations (diesel, steam and gas turbine) and refrigeration~~ Propulsive characteristics of diesel engines, steam and gas turbines including speed, output and fuel consumption Heat cycle, thermal efficiency and heat balance of the following engines .1 marine diesel engine .2 marine steam turbine .3 marine gas turbine	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The planning and preparation of operations is suited to the design parameters of the power installation and to the requirements of the voyage

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Plan and schedule operations (*continued*)	Refrigerators and refrigeration cycle Physical and chemical properties of fuels and lubricants Technology of materials Naval architecture and ship construction, including damage control		
~~Start-up and shut down main propulsion and auxiliary machinery, including associated systems~~ Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery (or main in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)	*Practical knowledge* ~~Operation and maintenance of:~~ ~~.1 marine diesel engines~~ ~~.2 marine steam propulsion plant~~ ~~.3 marine gas turbines~~ ~~Operation and maintenance of auxiliary machinery, including pumping and piping systems, auxiliary or main boiler plant and steering gear systems~~ ~~Operation, testing and maintenance of control systems~~ ~~Operation and maintenance of cargo-handling equipment and deck machinery~~ Operating limits and efficient operation of propulsion plant Functions and mechanism of automatic control for main engine Functions and mechanism of automatic control for auxiliary machinery including but not limited to:	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	~~The methods of preparing the start-up and of making available fuels, lubricants, cooling water and air are the most appropriate~~ ~~Checks of pressures, temperatures and revolutions during the start-up and warm-up period are in accordance with technical specifications and agreed work plans~~ Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions ~~The methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriate~~ The methods of measuring the load capacity of the engines are in accordance with technical specifications Performance is checked against bridge orders Performance levels are in accordance with technical specifications

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Method for demonstrating competence	Column 4 Criteria for evaluating competence
Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery (*continued*)	.1 power generation systems .2 steam boilers .3 oil purifier .4 refrigeration system .5 pumping and piping systems .6 steering gear system .7 cargo handling equipment and deck machinery		~~(above three criteria moved from deleted competence below)~~
~~Operate, monitor and evaluate engine performance and capacity~~ (Competence merged with "Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery" above)		~~Examination and assessment of evidence obtained from one or more of the following:~~ ~~.1 approved in service experience~~ ~~.2 approved training ship experience~~ ~~.3 approved simulator training, where appropriate~~	~~The methods of measuring the load capacity of the engines are in accordance with technical specifications~~ ~~Performance is checked against bridge orders~~ ~~Performance levels are in accordance with technical specifications~~
~~Maintain safety of engine equipment, systems and services~~ (Competence merged with "Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery" above)		~~Examination and assessment of evidence obtained from one or more of the following:~~ ~~.1 approved in service experience~~ ~~.2 approved training ship experience~~	~~Arrangements for ensuring the safe and efficient operation and condition of the machinery installation are suitable for all modes of operation~~

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Manage fuel, lubrication and ballast operation	Operation and maintenance of machinery, including pumps and piping systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment

Function: Electrical, electronic and control engineering at the management level

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Operate and supervise electrical and electronic control equipment	*Theoretical knowledge* Marine electrotechnology, Electronics, Power electronics Automatic control engineering ~~electronics and electrical equipment~~ ~~Fundamentals of automation, instrumentation, control systems and safety devices~~ Characteristic features and system configurations of automatic control equipment and safety devices for the followings: .1 main engine .2 generator .3 steam boiler	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Operation of equipment and system is in accordance with operating manuals Performance levels are in accordance with technical specifications

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Operate and supervise electrical and electronic control equipment (*continued*)	Characteristic features and system configurations of operation control equipment for induction motor Characteristic features of high voltage installations Features of hydraulic and pneumatic control equipment		
Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	*Practical knowledge* ~~Operation, testing and maintenance of electrical and electronic control equipment, and safety devices, including fault diagnostics~~ Troubleshooting of electric and electronic control equipment Function test of electric, electronic control equipment and safety devices Troubleshooting of monitoring systems Software version control	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience ~~.3 approved simulator training, where appropriate~~ .3 approved laboratory equipment training	Maintenance activities are correctly planned in accordance with technical, legislative, safety and procedural specifications ~~The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified~~ Inspection, testing and troubleshooting of equipment are appropriate

Function: Maintenance and repair at the management level

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Method for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Organize and supervise safe maintenance and repair procedures	*Theoretical knowledge* Marine engineering practice	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience	Maintenance activities are correctly planned and carried out in accordance with technical, legislative, safety and procedural specifications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Method for demonstrating competence**	**Criteria for evaluating competence**
Organize and supervise safe maintenance and repair procedures (*continued*)	*Practical knowledge* Organizing and supervising ~~carrying out~~ safe maintenance and repair procedures Planning maintenance including statutory verifications Planning repair works	.2 approved training ship experience .3 approved workshop training	Appropriate plans, specifications, materials and equipment are available for maintenance and repair Action taken leads to the restoration of plant by the most suitable method
Detect and identify the cause of machinery malfunctions and correct faults	*Practical knowledge* Detection of machinery malfunction, location of faults and action to prevent damage Inspection and adjustment of equipment Non-destructive examination	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The methods of comparing actual operating conditions are in accordance with recommended practices and procedures Actions and decisions are in accordance with recommended operating specifications and limitations
Ensure safe working practices	*Practical knowledge* Safe working practices	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved laboratory equipment training	Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns

Function: Controlling the operation of the ship and care for persons on board at the management level (No proposal)

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ANNEX 3

PROPOSED AMENDMENTS TO SECTION B-III/1 OF CHAPTER III OF THE STCW CODE

CHAPTER III

GUIDANCE REGARDING THE ENGINE DEPARTMENT

Section B-III/1

Guidance regarding the certification of officers in charge of an engineering watch in a manned engine-room or as designated duty engineers in a periodically unmanned engine-room

~~1 In table A-III/1, column 1, top block, the tools referred to should include hand tools, common measuring equipment, centres lathes, drilling machines, welding equipment and milling machines as appropriate.~~

~~2~~ 1 Training in workshop skills ashore can be carried out in a training institution or approved workshop.

~~3~~ 2 Onboard training should be adequately documented in the training record book by qualified assessors.

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