

SUB-COMMITTEE ON STANDARDS OF TRAINING AND WATCHKEEPING 41st session Agenda item 7.3

STW 41/7/17 9 October 2009 Original: ENGLISH

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.

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.



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.

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	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	workshop environment 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,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	
Use hand tools,	Safety requirements for	Assessment of evidence	Implementation of safety
electrical and	working on shipboard	obtained from one or	procedures is satisfactory
electronic	electrical systems	more of the following:	
measuring and			Selection and use of test
test equipment for	Construction and	.1 approved workshop	equipment is appropriate
fault finding,	operational	skills training	and interpretation of
maintenance and	characteristics of		results is accurate
repair operations	shipboard AC and DC	.2 approved practical	
	electrical systems and	experience and tests	Selection of procedures
	equipment		for the conduct of repair
	Construction and		and maintenance is in
	Construction and		accordance with manuals
	operation of electrical test		and good practice
	and measuring equipment		Commissioning and
			commissioning and
			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,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	
Use internal	Operation of all internal	Examination and	Transmission and
communication	communication systems	assessment of evidence	reception of messages are
systems	on board	obtained from one or	consistently successful
		more of the following:	
			Communication records
		.1 approved in-service	are complete, accurate
		experience	and comply with statutory
			requirements
		.2 approved training	
		ship experience	
		.3 approved simulator	
		training, where	
		appropriate	
		.4 approved laboratory	
		equipment training	

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,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	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,	Method for	Criteria for evaluating
_	understanding and	demonstrating	competence
	proficiency	competence	_
Maintain a safe engineering watch (<i>continued</i>)	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 <i>Engine-room Resource</i> <i>Management</i>	Assessment of evidence obtained from one or more of the following:	Resources are allocated and assigned as needed in
	 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 	 approved training ship experience approved in-service experience approved simulator training 	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	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	
Use internal	Operation of all internal	Assessment of evidence	Transmission and
communication	communication systems	obtained from one or	reception of messages are
systems	on board	more of the following:	consistently successful
		.1 approved in-service experience.2 approved training ship experience	Communication records are complete, accurate and comply with statutory requirements
		.3 approved simulator training, where appropriate	
		.4 approved laboratory equipment training	
Operate main and	Basic structure and	Assessment of evidence	Structures and operating
auxiliary	operation principles of	obtained from one or	mechanisms can be
shipboard plant	major machinery systems	more of the following:	understood and explained
machinery and	including:	1 approved in convice	with drawings
systems	.1 marine diesel engine	experience	/instructions
	.2 marine steam turbine	.2 approved training	
	.3 marine gas turbine	ship experience	
	.4 marine boiler	.3 approved laboratory	
	.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		

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
-	understanding and	demonstrating	competence
	proficiency	competence	
Operate main and	Safety and emergency	Examination and	Operation of equipment
auxiliary	procedures for operation	Assessment of evidence	and systems is in
shipboard plant	of propulsion plant	obtained from one or	accordance with operating
machinery and	machinery including	more of the following:	manuals
associated control	control systems		
systems	Operational characteristics	.1 approved in-service	Operations are planned
(continued)	of machinery and control	experience	and carried out in
	systems	2 approved training	accordance with
		.2 approved training	procedures to ensure
	Main and auxiliary	sinp experience	safety of operations and
	machinery:	3 approved simulator	avoid pollution of the
	Droparation operation	training where	marine environment
	fault detection and	appropriate	
	necessary measures to		Deviations from the norm
	prevent damage for the	.4 approved	are promptly identified
	following major	laboratory	1 1 5
	machinery items and	equipment training	The output of plant and
	control systems:		engineering systems
			consistently meets
	.1 preparation of main		requirements, including
	machinery and		bridge orders relating to
	preparation of		changes in speed and
	auxiliary machinery		direction
	tor operation main		
	engine and associated		The causes of machinery
	auxinaries		malfunctions are promptly
	.2 operation of steam		designed to an actions are
	boiler and associated		averall safety of the ship
	auxiliaries, including		and the plant having
	combustion systems		regard to the prevailing
			circumstances and
	-3 methods of checking		conditions
	water level in steam		conditions
	bollers and action		
	hecessary II water		
	iever is adnormal		
	.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		

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

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

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

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	-
Operate	Basic configuration and		
electrical,	operation principles of the		
electronic and	following electrical,		
control systems	electronic and control		
(continued)	equipment:		
	.1 electrical equipment		
	.a power generation		
	b proparing starting		
	.0 preparing, starting,		
	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,	Method for	Criteria for evaluating
-	understanding and	demonstrating	competence
	proficiency	competence	
Operate	.b PID control		
electrical,	characteristics		
electronic and	and associated		
control systems	system devices		
(continued)	for process		
Use hand tools	Safety requirements for	Assassment of avidence	Safaty magguras for
electrical and	working on shipboard	obtained from one or	working are appropriate
electronic	electrical systems	more of the following:	working are appropriate
measuring and	ciccultur systems	more of the following.	Selection and use of hand
test equipment for	Construction and	1 approved workshop	tools, measuring
fault finding.	operational characteristics	skills training	instruments and testing
maintenance and	of shipboard AC and DC		devices are appropriate
repair operations	electrical systems and	.2 approved practical	and interpretation of
	equipment	experience and	results is accurate
Maintenance and		tests	
repair of electric	Maintenance and repair		Dismantling, inspecting,
and electronic	works for electrical	.3 approved in-service	repairing and
equipment	system equipment, main	experience	reassembling equipment
	switchboard, electric		are in accordance with
	motor, generator and DC	.4 approved training	manuals and good
	electrical system and	ship experience	practice
	equipment		N 1 1 1
			Reassembling and
	Detection of electric		performance testing is in
	malfunction, location of		accordance with manuals
	naults and measures to		and good practice
	prevent damage		
	Construction and		
	operation of electrical test		
	and measuring equipment		
	0 1 1		
	Function and performance		
	tests of the following		
	equipment and their		
	configuration:		
	.1 monitoring systems		
	2 automatic control		
	.2 automatic control		
	uevices		
	3 protective devices		
	The interpretation of		
	electrical and simple		
	electronic diagrams		

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

Function: Maintenance and repair at the operational level

emergency/temporary

Safety measures to be taken for using hand tools, machine tools and measuring instruments

repair

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and	Method for demonstrating	Criteria for evaluating competence
	proficiency	competence	-
Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board (<i>continued</i>)	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

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

Function: Marine engineering at the management level

CompetenceKnowledge, understanding and proficiencyMethod for demonstrating competenceCriteria for evaluating competencePlan and schedule operations (continued)Refrigerators and refrigeration cyclecompetenceCriteria for evaluating competencePlan and schedule operations (continued)Refrigerators and refrigeration cyclecompetenceCriteria for evaluating competencePlan and schedule operations (continued)Physical and chemical propulsion of maintename of: 1 marine discole engines 2 marine steamExamination and assessment of evidence obtained from one or more of the following: 1 approved in-service captronance assessment and propulsion plant 3 marine gas turbinesExamination and assessment of appropriateThe methods of preparing the start up and of naking available fuels, lubricants; evolutions during the start up and of making available fuels, lubricants; evolutions during the start up and or making ship experienceThe methods of preparing the start up and of making available fuels, lubricants; evolutions during the start up and ververus up erroinance assessment and propulsion plant ad auxiliary methoding pumping and primity systems; operation, testing and maintenance of cargo- handling equipment and deck-machinery proposed KUP)Operation, and maintenance of cargo- handling equipment and deck-machinery following proposed KUP)Operating limits and efficient operation of propulsion plantA approved laboratory sufficient operation of propulsion plantSurveillance of main gasesment and approved laboratory sufficient operation of propulsion plant <th>Column 1</th> <th>Column 2</th> <th>Column 3</th> <th>Column 4</th>	Column 1	Column 2	Column 3	Column 4
understanding and proficiency competence Plan and schedule operations (continued) Refrigerators and refrigeration cycle competence Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Technology of materials Start up and shut down main mechinery, machinery, assessment of propulsion and auxiliary machinery, assessment and maintenance of: auxiliary machinery, assessment and maintenance of: auxiliary machinery, assessment and maintenance of: auxiliary machinery, assessment and maintenance of: auxiliary machinery, assessment and maintenance of auxiliary machinery, assessment and maintenance of auxiliary machinery, assessment and maintenance of auxiliary machinery, afty of propulsion plant and auxiliary machinery The methods of preparing the start up and of making obtained from one or more of the following: assessment and maintenance of auxiliary machinery, auxiliary machinery, astery of propulsion plant and auxiliary machinery The methods of preparing the start up and ware, the maintenance of auxiliary machinery appropriate The methods of preparing the start up and ware, the work plans Operation, auxiliary machinery, after of maintenance of coargo- handing equipment and deek machinery approved isonator appropriate Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating the load capacity of the engine are the most appropriate Operation to KUP form STW 40, but if is not necessary referring to the following proposed KUP) Operation and ethicient operation of p	Competence	Knowledge,	Method for	Criteria for evaluating
proficiency competence Plan and schedule operations (continued) Refrigerators and refrigerators and properties of fuels and lubricants Refrigerators and refrigeration eveloc Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Start up and shut down-main propulsion and auxiliary Practical knowledge Examination and assessment of evidence obtained from one or more of the following: -1 marine steam The methods of preparing the start up and of making propulsion and auxiliary Operation and maintenance of: -1 marine diesel engines -2 marine gas turbines 1 approved in-service experience The methods of preparing the start up and of making propulsion plant Operation and maintenance of: assessment and propulsion plant and auxiliary systems and turing propulsion plant 1 approved simulator training, where appropriate 1 approved simulator training, where appropriate Operation, toting and maintenance of centrol systems Operation, toting and maintenance of centrol systems 3 approved simulator training, where appropriate Surveillance of main propulsion plant and auxiliary systems is sufficient to maint in safe operating conting the surveils the deal capacity of the engine are the most appropriate Operation, toting and maintenance of centrol devel, machinery proposed KUP) Operation and maintenance of centrol foruantic control for main engine The methods of me	•	understanding and	demonstrating	competence
Plan and schedule operations (continued) Refrigerators and refrigeration cycle Refrigerators and refrigeration cycle Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and ship construction, including damage control Image: Construction, including damage control Start up and shut down main Practical knowledge Examination and assessment of evidence obtained from one or more of the following: -1 marine diesel engines The methods of preparing the start-up and of making available fuels, lubricants, eooling water and air are most appropriate Operation serveillance, performance assessment and maintenance of auxiliary machinery, safety of propulsion plant adaxiliary machinery Operation and maintenance of eontrol systems 1 approved in-service experience Checks of pressures, temperatures and revolutions during the ship experience 0peration, safety of propulsion plant and auxiliary machinery Operation and maintenance of eontrol systems 2 approved training ship experience 3 approved simulator training, where appropriate 4 approved laboratory following proposed KUP Operation and maintenance of ceargo- handling equipment and deck machinery Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating to fold capacity of the engines are the most appropriate 0peration and maintenance of ceargo- handling equipment and deck machinery The methods of magainst bidge orders <th></th> <th>proficiency</th> <th>competence</th> <th>-</th>		proficiency	competence	-
operations (continued) refrigeration cycle Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Start up and shut down main propulsion and auxiliary machinery, including damage control propulsion and auxiliary Technology of materials Start up and shut down main propulsion and auxiliary machinery, including damage control propulsion plant assessment of evidence obtained from one or maintenance of: including pumping and primit systems Examination and assessment of evidence obtained from one or more of the following: including pumping and primit systems, auxiliary assessment and maintenance of auxiliary machinery, including pumping and primit systems I approved in-service cxperience The methods of preparing the start-up and of making assessment of evidence obtained from one or more of the following: including pumping and primit systems, auxiliary addition to KUP from STW 40, but it is not necessary referring to the following propolsion plant 3 approved itaining ship experience Surveillance of main propulsion plant and auxiliary systems Operation net maintenance of control systems 4 approved laboratory equipment training work plans Operation and maintenance of control systems Operation and maintenance of control systems Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions Operating limits and efficient operation of propulsion plant Functions and mechanism Purctions and mechanism Functions and mechanism	Plan and schedule	Refrigerators and		
(continued)Physical and chemical properties of fuels and lubricantsPhysical and chemical properties of fuels and lubricantsStart up and shut down main propulsion and auxiliary machinery, including damage controlExamination and assessment of evidence obtained from one or more of the following: 1 marine desel engines 2 marine steam propulsion plant addition to KUP from STW 40, but it is not naccessary refering to the following propulsion plantExamination and assessment of evidence obtained from one or more of the following: 1 approved in-service experienceThe methods of preparing the start up and of making available fuels, lubricants; ecoling water and air are the most appropriateOperation surveillance, performance reconstruction, including pumping and primig systems, auxiliary machinery2 approved training ship experience appropriateThe methods of preparing the start up and of making available fuels, lubricants; ecoling water and air are the methods and markenance of attrang water and maintenance of auxiliary machinery; including pumping and primig systems; auxiliary period are in accordance work plans1 approved training ship experience appropriateChecks of pressures; temperatures and revolutions during the start up and warm up period are in accordance work plant and steering gear systemsOperation, testing and maintenance of cargo- handing equipment and deek machinery3 approved laboratory equipment and maintenance of cargo- handing equipment and deek machinery3 approved laboratory equipment and auxiliary appropriateOperation in the following proposed KUP	operations	refrigeration cycle		
Physical and chemical properties of fuels and lubricants Physical and chemical properties of fuels and lubricants Technology of materials Start up and shut down main propulsion and auxiliary machinery, including damage control Examination and assessment of evidence obtained from one or more of the following: The methods of preparing the start up and of making assessment of evidence obtained from one or more of the following: Operation and auxiliary machinery, including propulsion plant systems Deration and mainteananee of assessment and mainteananee of auxiliary machinery; including propulsion plant systems I approved in-service experience Checks of pressures; temperatures and revolutions during the shart up and warm up period are in accordance with technical specifications and agreed work plans Operation and auxiliary machinery Operation and mainteananee of enviliary machinery; including pumping and steering gear systems 3 approved simulator training, where appropriate Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions Operation and mainteananee of ceargo- handling equipment and deck machinery A approved laboratory equipment training Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions Operation and mainteananee of ceargo- handling equipment and deck machinery The methods of preparing the shutdown and dof supervising the cooling down of the engine are he shutdown and dof supervising the cooling down of the engine are in an accordance with technical specifications	(continued)			
Properties of Tucls and lubricants Technology of materials Technology of materials Start up and shut dewn main propulsion and auxiliary Naval architecture and ship construction, including damage control Examination and assessment of evidence obtained from one or more of the following: The methods of preparing the start up and of making the start up and of making assessment of evidence obtained from one or more of the following: The methods of preparing the start up and of making the start up and of making assessment of evidence obtained from one or more of the following: Operation surveillance, performance assessment and maintaining ad auxiliary machinery Operation and maintenance of auxiliary machinery; including pumping and piping systems, auxiliary promusion plant and auxiliary machinery 3 approved training ship experience Checks of presures, temperatures and revolutions during the start up and warm up period are in accordance with technical specifications and agreed work plans Operation, safety of propulsion plant and auxiliary machinery Operation, testing and maintenance of cargo- handling equipment and deck machinery A approved laboratory equipment training Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions Operation function propulsion plant Operation and maintenance of cargo- handling equipment and deck machinery The methods of preparing the eshutdown and of supervising the cooling dewn of the engine are the mesaturing the load capacity of the engines are in accordance with technical specifications		Physical and chemical		
International construction, including damage control including damage and directly including damage and directly including damage and piping systems, auxiliary in adauxiliary machinery; and truting systems, auxiliary including purphing and piping systems, auxiliary in adauxiliary machinery in adauxiliary in adauxiliary internation ada maintenance of cargo-handing equipment and deck machinery inclusion plant A approved laboratory is appropriate in adauxiliary is additional damage of a adaption of the engine are in accordance with technical specifications and agreed work plans is additional damage of a adaption of propulsion plant and axiliary is systems is a sufficient operation of propulsion plant and axili		properties of fuels and		
Technology of materialsTechnology of materialsTechnology of materialsNaval architecture and ship construction, including damage controlNaval architecture and ship construction, including damage controlThe methods of preparing the start up and of making available fuels, lubricants, colinant are the mathemare of: amarine steam ystemsThe methods of preparing the start up and of making available fuels, lubricants, colinant are the more of the following: including pumping and propulsion plant and maintenance of control surveilance, performance activity of activity of propulsion plant and auxiliary machinery; machineryCoperation and maintenance of maintenance of control systemsThe methods of preparing the start up and of making activity machinery; including pumping and piping systems, auxiliary machineryTapproved in-service experienceThe methods of preparing the start up and of making appropriateOperation and maintenance of control systemsOperation, testing and maintenance of control systems3 approved simulator training, where appropriateChecks of pressures; temperatures and appropriateOperation, testing and maintenance of control systemsOperation and maintenance of control systems3 approved laboratoryOperation in KUP; Addition to KUP proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryA appropriateA approved laboratoryOperation in this and efficient operation of propulsion plantOperation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing <b< td=""><td></td><td>lubricants</td><td></td><td></td></b<>		lubricants		
Naval architecture and ship construction, including damage controlImage: Construction, including damage controlImage: Construction, including damage controlImage: Construction, including damage controlImage: Construction, assessment of evidence obtained from one or more of the following: Image: Image: Construction, including associatedThe methods of preparing the start-up and of making assessment of evidence obtained from one or more of the following: Image: Image: Image: Construction, surveillance, performance assessment and maintenance of experienceThe methods of preparing the start-up and of making assessment and maintenance of experienceThe methods of preparing the start-up and of making evolutions are and or construction, surveillance, performance assessment and maintenance of ewitiary machinery, including pumping and priming systems, auxiliary including pumping and priming systems, auxiliary including pumping and priming systems, auxiliary including pumping and priming systems, auxiliary operation, testing and maintenance of control systemsAapproved laboratory equipment trainingSurveillance of main propulsion plant auxiliary systems is sufficient operation of propulsion plantOperation and maintenance of control systemsOperation and maintenance of control systems.4approved laboratory equipment trainingSurveillance of main propulsion plantOperation of propulsion plantOperation and maintenance of control systems.4approved laboratory equipment trainingOperation of propulsion plantOperation and maintenance of control systemsThe method		Technology of materials		
ship construction, including damage controlThe methods of preparing the start-up and of making assessment of evidence obtained from one or more of the following:The methods of preparing the start-up and of making available fuels, lubricants, ecoling water and air are the most appropriateOperation, systems-1 marine diesel engines ropulsion plant -2 marine gas turbines1 approved in-service experienceChecks of pressures, teoling water and air are the most appropriateOperation, surveillance, performance adauitary machinery maintenance of auxiliary machinery, including pumping and propulsion plant assessment and maintenance of eauxiliary er main boiler plant and steering gear systems3 approved imulator training, where approved laboratory equipment trainingSurveillance of main propulsion plant adauxiliaryOperation, surveillance, performance adauxiliary machineryOperation, testing and maintenance of control systems.4 approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient o peration of propulsion plantOperating in KUP, Addition to KUP from STW 40, but it is not necessary refering to the following proposed KUPOperating mits and efficient operation of propulsion plant.4 approved laboratory equipment trainingSurveillance of main propulsion plantFunctions and mechanism of automatic control for main engineOperation of propulsion plant.4 approved laboratory equipment and auxiliary systemsSurveillance of main engine are the most appropriateFunctions and mechanism<		Naval architecture and		
Start up and shut down main propulsion and auxiliaryPractical knowledgeExamination and assessment of evidence obtained from one or more of the following:The methods of preparing the start up and of making ovailable fuels, lubricents, eooling water and air are the most appropriateOperation, surveillance, performance anatining safety of propulsion plant and auxiliary maintenance of: auxiliary machinery, including pumping and prime systems.1 approved in-service caperoid in-service auxiliary machinery, including pumping and prime systems, auxiliary or main boiler plant and steering gear systems.1 approved in-service caperoid in-service auxiliary machinery, including pumping and prime systems, auxiliary permain boiler plant and steering gear systems.1 approved in-service caperoid in-service caperoid in-service caperoid reservice auxiliary machinery, including pumping and prime systems, auxiliary machinery.1 approved in-service caperoid in-service caperoid in-service caperoid are in accordance work plansOperation, systems.2 approved training ship experience.3 approved simulator training, where appropriateJor main propulsion plant and auxiliary machinery.3 approved laboratory systems.4 approved laboratory sufficient operation and maintenance of cargo- handling equipment and dek machinery.4 approved laboratory approved laboratorySurveillance of main propulsion plant auxiliary systems is sufficient operation of propulsion plantFunctions and mechanism of automatic control for main engine.4 approved laboratory auxiliary systemsThe methods of preparing 		ship construction,		
Start up and shut down main propulsion and maintenance of: .1 marine diesel engines .2 marine gas turbinesExamination and assessment of evidence obtained from one or more of the following: .1 approved in-service experienceThe methods of preparing the start up and of making available fuels, lubricants, cooling water and air are the most appropriateOperation surveillance, performance adsessment and maintenance of auxiliary machinery.1 approved in-service experienceThe methods of preparing the start up and of making available fuels, lubricants, cooling water and air are the most appropriateOperation surveillance, performance adsatty of propulsion plant and auxiliary machinery.2 approved training ship experienceThe methods of preparing the start up and of making available fuels, lubricants, cooling water and air are the most appropriate(pr main bioler plant and auxiliary machineryOperation and maintenance of control systems.2 approved iraining appropriateSurveillance appropriate(pr main in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)Operating limits and efficient operation of propulsion plant.4 approved laboratory appropriateSurveillance of main propulsion plantOperating limits and efficient operation of propulsion plantOperating limits and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsThe methods of marine gainsFunctions and mechanism of automatic control for 		including damage control		
down main propulsion and auxiliary machinery; including associatedOperation and maintenance of: .1 marine diesel engines .2 marine gas turbinesassessment of evidence obtained from one or more of the following: .1 approved in-service experiencethe start up and of making cooling water and air are the most appropriateOperation, surveillance, performance adauxiliary machinery; safety of propulsion plant and auxiliary machinery;Operation and maintenance of auxiliary machinery; including pumping and piping systems, auxiliary er mainboiler plant and steering gear systems.1 approved in-service experience.2 approved training ship experience.2 approved imulator training, where appropriateCheeks of pressures, temperatures and revolutions during the start up and warm up period are in accordance 	Start up and shut	Practical knowledge	Examination and	The methods of preparing
propulsion and auxiliary machinery, including associated systemsOperation and maintenance of: - marine diesel engines - marine steam propulsion plant -3 marine gas turbinesobtained from one or more of the following: - more of the following: - more of the following: - marine steam propulsion plant -3 marine gas turbinesobtained from one or more of the following: - 1 approved in-service experienceavailable fuels, lubricants, eooling water and air are the most appropriateOperation, surveillance, performance assessment and maintenance of auxiliary machinery, including pumping and propulsion plant and auxiliary machineryOperation, add maintenance of auxiliary machinery, including pumping and propulsion plant at auxiliary or main boiler plant and steering gear systems.1approved simulator training, where appropriateChecks of pressures, temperatures and revolutions during the start up and warm up period are in accordance work plans(Drmain in KUP; Addition to KUPOperation, testing and maintenance of cargo- handing equipment and deek machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant(Drmain in KUP; Addition to KUP)Operation and maintenance of cargo- handing equipment and deek machinery.4approved laboratory equipment training(Drmain in KUP; Addition to KUP)Operating limits and efficient operation of propulsion plant.4approved laboratory equipment training(Drmain in engineOperating limits and efficient operation of propulsion plantThe methods of measuring the load	down main		assessment of evidence	the start-up and of making
auxiliary machinery; including associated systemsmaintenance of: including associated propulsion plant including pumping and ping systems, auxiliary or main boiler plant and steering gear systemsmore of the following: including pumping and ping systems, auxiliary or main boiler plant and steering gear systemsmore of the following: including pumping and ping systems, auxiliary or main boiler plant and steering gear systemsmore of the following: including pumping and ping systems, auxiliary or main boiler plant and steering gear systemsmore of the following: including pumping and ping systemschecks of pressures; temperatures and revolutions during the start up and warm up period are in accordance work plans(or main in KUP: from STW 40, but it is not necessary propussion plantOperation and maintenance of cargo- handling equipment and deck machinery.4approved in-service experienceSurveillance of main specifications and agreed work plans(or main in KUP: from STW 40, but it is not necessary propussion plantOperation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main specificationsOperating the oblig operation of propulsion plantOperation and maintenance of cargo- handling equipment and deck machinery.4approved in-service approved in-serviceOperating limits and efficient operation of propulsion plantOperation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunc	propulsion and	Operation and	obtained from one or	available fuels, lubricants,
machinery, including associated systems1marine diesel engines associated propulsion plant attring surveillance, performance assessment and maintenance of auxiliary machinery, including pumping and piping systems, auxiliary machinery1approved in-service experiencethe most appropriate0Operation and maintenance of auxiliary machinery, including pumping and piping systems, auxiliary machinery.1approved training ship experienceChecks of pressures, temperatures and revolutions during the start up and warm up period are in accordance with technical specifications and agreed work plans0propulsion plant and auxiliary machinery.3approved laboratory equipment trainingSurveillance of main propulsion plant addition to KUP0Operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant0Operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment and deck machinerySurveillance of framing sufficient operation of proposed KUP)0Operating limits and efficient operation of propulsion plant.4approved laboratory equipment and deck machinery0Operating limits and efficient operation of propulsion plant.4approved laboratory equipment and auxiliary systems0Operating limits and efficient operation of propulsion plant.4approved laboratory equipment and auxiliary0 </td <td>auxiliary</td> <td>maintenance of:</td> <td>more of the following:</td> <td>cooling water and air are</td>	auxiliary	maintenance of:	more of the following:	cooling water and air are
Including associated systems2-marine steam propulsion plant 3-marine gas turbines1approved in-service experienceChecks of pressures, temperatures and revolutions during the start up and warm up period are in accordance with technical sperifications and agreed work plansOperation surveillance, performance assessment and maintenance of auxiliary machinery, safety of propulsion plant.1approved in-service experienceChecks of pressures, temperatures and revolutions during the start up and warm up period are in accordance with technical specifications and agreed work plansOperation and auxiliary machineryOperation, testing and maintenance of cargo- handling equipment and deck machinery.3approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systemsOperation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systemsOperation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plantOperation and maintenance of cargo- handling equipment and of automatic control for main engine.4approved laboratory equipment and deck machineryOperation and maintenance of cargo- handling equipment and of automatic control for main engine.4approved laboratory equipment and deck machineryPerformance is checked against bridge ordersPerformance is checked 	machinery,	<u>.1 marine diesel engines</u>		the most appropriate
associated systemspropulsion plant as maintenance of auxiliary machinery; including pumping and propulsion plantc. ExperienceChecks of pressures; temperatures and revolutions during the start up and warm up period are in accordance with technical specifications and agreed work plansOperation, surveillance, performance assessment and maintenance of auxiliary machinery.2approved training ship experience.2approved simulator training, where appropriate.3approved simulator training, where appropriate.3approved simulator training, where appropriate.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems.5Operation, testing and maintenance of coargo- handling equipment and deck machinery.4approved laboratory equipment training.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient operation of propulsion plantSurveillance of main propulsion structure.4approved laboratory equipment and deck machinery.4approved laboratory equipment training.4approved laboratory equipment trainingSurveillance of main propulsion plant.4approved laboratory equipment and deck machinery.5Operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment training.5Operating limits and efficient operation of propulsion plant.6Fu	including	<u>-2 marine steam</u>	.1 approved in-service	
Systemsmatrike gas turbinesOperation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery2approved training ship experiencerevolutions during the start up and warm up period are in accordance with technical specifications and agreed work plans <td< td=""><td>associated</td><td>propulsion plant</td><td>experience</td><td>Checks of pressures,</td></td<>	associated	propulsion plant	experience	Checks of pressures,
Operation, surveillance, performance assessment and maintaining safety of propulsion plantOperation and maintenance of auxiliary machinery; including pumping and piping systems, auxiliary or main boiler plant and steering gear systems.3approved simulator training, where appropriatestart-up and warm-up period are in accordance with technical specifications and agreed work plans.3approved simulator training, where appropriate.3approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation, testing and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient operation of propulsion plant.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient operation of propulsion plant.4approved laboratory equipment training.4approved laboratory equipment and deck machineryOperation and maintenance of cargo- handling equipment and efficient operation of propulsion plant.4approved laboratory equipment and deck machinery.4Depration for maintenance of cargo- handling equipment and efficient operation of propulsion plant.4approved laboratory ema	systems	marine gas turbines	2 approved training	revolutions during the
Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinerySinp Experiod control sinp experiod and piping systems, auxiliary por main boiler plant and steering gear systems.3 approved simulator training, where approved laboratory equipment trainingSurveillance of main specifications and agreed work plans.3approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions(or main form STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machinery.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating limits and efficient operation of propulsion plant.4approved laboratory equipment trainingOperating limits and efficient operation of propulsion plantOperation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	Operation	Operation and	.2 approved training	start up and warm up
 and the line of auxiliary machinery, including pumping and piping systems, auxiliary or main boiler plant and steering gear systems duiting in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP) Operation and maintenance of cargohandling equipment and deficient operation of propulsion plant Operation and maintenance of cargohandling equipment and deficient operation of propulsion plant Proved laboratory equipment training The methods of preparing 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 	surveillance	maintenance of	ship experience	period are in accordance
 assessment and maintaining safety of propulsion plant and auxiliary machinery <i>Operation, testing and maintenance of control</i> systems <i>A</i> approved laboratory equipment training <i>A</i> approved laboratory equipment training <i>Surveillance of main propulsion plant</i> and auxiliary systems is sufficient to maintain safe operating conditions <i>A</i> approved laboratory equipment training <i>Deration, testing and maintenance of control</i> systems <i>A</i> approved laboratory equipment training <i>Deration and maintenance of cargo- handling equipment and deck machinery</i> <i>Operation and maintenance of cargo- handling equipment and deck machinery</i> <i>Operating limits and efficient operation of propulsion plant</i> <i>Derating limits and efficient operation of propulsion plant</i> <i>Derating limits and efficient operation of propulsion plant</i> <i>The methods of measuring the load capacity of the engines are in accordance with technical specifications</i> <i>Performance is checked against bridge orders</i> 	performance	auxiliary machinery	3 approved simulator	with technical
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) Deration and mechanism of automatic control for main engine Hunting, Milet approved laboratory equipment training Ad approved laboratory equipment training Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)	assessment and	including pumping and	training where	specifications and agreed
safety of propulsion plant and auxiliary machinery $\begin{array}{c} \hline or main boiler plant and steering gear systems \\ maintenance of control systems \\ \hline operation, testing and \\ maintenance of control systems \\ \hline operation to KUP \\ from STW 40, \\ but it is not necessary \\ referring to the following \\ proposed KUP \\ \hline operating limits and efficient operation of propulsion plant \\ \hline operation gear bound and \\ maintenance of cargo- \\ handling equipment and \\ deck machinery \\ \hline operating limits and efficient operation of propulsion plant \\ \hline Functions and mechanism \\ \hline Functions and mechanism \\ \hline unctions and mechanism \\ \hline operations \\ \hline o$	maintaining	piping systems, auxiliary	appropriate	work plans
propulsion plant and auxiliary machinerysteering gear systems.4approved laboratory equipment trainingSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation and maintenance of control systemsSurveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions(or main in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateOperating limits and efficient operation of propulsion plantOperating limits and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main engineFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	safety of	or main boiler plant and		r · · ·
and auxiliary machineryOperation, testing and maintenance of control systemsequipment trainingpropulsion plant and auxiliary systems is sufficient to maintain safe operating conditions(or main in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateOperating limits and efficient operation of propulsion plantOperation of supervising the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	propulsion plant	steering-gear systems	.4 approved laboratory	Surveillance of main
machineryOperation, testing and maintenance of control systemsauxiliary systems is sufficient to maintain safe operating conditionsAddition to KUP from STW 40, but it is not necessary referring to the following 	and auxiliary		equipment training	propulsion plant and
maintenance of control systemssufficient to maintain safe operating conditionsAddition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateProposed KUP)Operating limits and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main engineFunctions and mechanismPerformance is checked against bridge orders	machinery	Operation, testing and		auxiliary systems is
(or main in KUP: Addition to KUP from STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateOperating limits and efficient operation of propulsion plantOperating limits and efficient operation of propulsion plantThe methods of supervising the cooling down of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main engineFunctions and mechanism propriatePerformance is checked against bridge orders		maintenance of control		sufficient to maintain safe
Addition to KUP from STW 40, but it is not necessary referring to the followingOperation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateproposed KUP)Operating limits and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	(or main in KUP:	systems		operating conditions
from STW 40, but it is not necessary referring to the following proposed KUP)Operation and maintenance of cargo- handling equipment and deck machineryThe methods of preparing the shutdown and of supervising the cooling down of the engine are the most appropriateOperating limits and efficient operation of propulsion plantThe methods of supervising the cooling down of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	Addition to KUP			The methods of mononing
but It is notinamitemance of cargo- handling equipment and deck machineryinterstateown and of supervising the cooling down of the engine are the most appropriatenecessary referring to the following proposed KUP)Operating limits and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	from STW 40,	Operation and		the shutdown and of
referring to the following proposed KUP) Operating limits and efficient operation of propulsion plant The methods of Functions and mechanism of automatic control for main engine Functions and mechanism	but it is not	handling againment and		supervising the cooling
following proposed KUP) Operating limits and efficient operation of propulsion plant The methods of measuring the load capacity of the engines are in accordance with technical specifications Performance is checked against bridge orders	referring to the	deck machinery		down of the engine are
proposed KUP) Operating limits and efficient operation of propulsion plant The methods of measuring the load capacity of the engines are in accordance with technical specifications Performance is checked against bridge orders	following	deek maenmery		the most appropriate
proposed iter ()operating initio and efficient operation of propulsion plantThe methods of measuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	proposed KUP)	Operating limits and		the most appropriate
propulsion plantmeasuring the load capacity of the engines are in accordance with technical specificationsFunctions and mechanism of automatic control for main enginePerformance is checked against bridge orders	proposed reor)	efficient operation of		The methods of
Functions and mechanism of automatic control for main engine Functions and mechanism Functions and mechanism		propulsion plant		measuring the load
Functions and mechanism of automatic control for main engineare in accordance with technical specificationsFunctions and mechanismPerformance is checked against bridge orders				capacity of the engines
of automatic control for main enginetechnical specificationsFunctions and mechanismPerformance is checked against bridge orders		Functions and mechanism		are in accordance with
main enginePerformance is checkedFunctions and mechanismagainst bridge orders		of automatic control for		technical specifications
Functions and mechanism Performance is checked against bridge orders		main engine		
Functions and mechanism against bridge orders				Performance is checked
		Functions and mechanism		against bridge orders
of automatic control for		of automatic control for		Doufourson on 11 '
auxiliary machinery Performance levels are in		auxiliary machinery		reflormance levels are in
to:		to.		specifications

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

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

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

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

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	
Operate and supervise electrical and electronic control equipment (<i>continued</i>)	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	Operation, testing and maintenance of electrical and electronic control equipment, and safetydevices, including fault diagnosticsTroubleshooting of electric and electronic control equipmentFunction test of electric, electronic control equipment and safetyfunction test of electric, electronic control equipment and safetyTroubleshooting of monitoring systemsSoftware 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	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
	understanding and	demonstrating	competence
	proficiency	competence	
Organize and	Theoretical knowledge	Examination and	Maintenance activities are
supervise safe		assessment of evidence	correctly planned and
maintenance and	Marine engineering	obtained from one or	carried out in accordance
repair procedures	practice	more of the following:	with technical, legislative,
			safety and procedural
		.1 approved in-service	specifications
		experience	

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge,	Method for	Criteria for evaluating
-	understanding and	demonstrating	competence
	proficiency	competence	-
Organize and supervise safe maintenance and repair procedures (<i>continued</i>)	Practical knowledge Organizing and supervising carrying out safe maintenance and repair procedures Planning maintenance including statutory verifications	.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	Planning repair works 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 ocupment 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)

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.

21 Training in workshop skills ashore can be carried out in a training institution or approved workshop.

32 Onboard training should be adequately documented in the training record book by qualified assessors.