

MEGURI 2040

Safety Assessment Seminar

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Presentation 5:

Study on Competency Requirements for Remote Operators of MASS

5.4 Proposed Competency Requirements and Training Curriculum for RO

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Competency requirements for RO (Level 1)

Ground Staff Level	Competencies Required for RO (Differences from Seafarer Competencies)		
	Perception	Decision making	Action
Common	To perceive, decision-make and act appropriately, taking into account delays within acceptable safety limits		
Level 1 (Monitoring and Navigation Assistance)	[Single-vessel monitoring] ① To interpret meteorological and oceanographic information displayed on land and mentally visualise the effects of wind, currents, waves, etc., on the vessel ② To interpret the two-dimensional plots displayed on the shore-based display, and to mentally visualise a three-dimensional view from the vessel's bridge ③ To interpret the speed of other vessels displayed on the shore-based display and recognise the approach or crossing of other vessels ④ To recognise anomalies in the information displayed on the shore-based display regarding ① to ③, compared with normal display conditions	① To identify anomalies such as display failures or freezes caused by communication system issues specific to remote environments ② To assess the risk of collision or grounding	① To communicate with the crew of the vessel to verify the authenticity of received data ② To steer the vessel in accordance with instructions received in an emergency
	[Multi-vessel monitoring] ⑤ To properly understand the situation of multiple vessels	③ To prioritize	③ To hand over responsibility to another shore-based officer appropriately when a number of vessels exceed ODD
Curriculum	• Training in the vessel's ANS • Study of remote monitoring equipment and communications, and exercises on the ROC simulator • Exercises on the ROC simulator to develop cognitive and decision-making abilities		

Competency requirements for RO (Level 2)

Ground Staff Level	Competencies Required for RO (Differences from Seafarer Competencies)		
	Perception	Decision making	Action
Common	To perceive, decision-make and act appropriately, taking into account delays within acceptable safety limits		
Level 2 (From the onset of a status decline until the bridge is manned by two crew members)	[Single-vessel monitoring] ① To recognise the situation of the vessel and its surroundings by integrating specific reports from crew members and Level 1, in addition to information obtained independently	① To assess the risk of collision or grounding at an early stage when performing evasive manoeuvres, taking into account the difficulties of situational awareness in remote environments	① To execute evasive manoeuvres early and appropriately, taking into account the difficulties of situational awareness in remote environments
Navigational decision-making and evasive manoeuvres	[Multi-vessel monitoring] ② To correctly understand the situation involving multiple vessels		
Curriculum	- Not merely an extension of Level 1 operational skills training, but a discussion-based course aimed at those with seagoing experience equivalent to a position of responsibility on board, focusing on the specific characteristics of remote decision-making—such as the quality and timing of decisions—which differ from those on board - Exercises on the ROC simulator combining the mastery of remote evasive manoeuvres with discussion-based training		

Proposed Requirements for RO Skills and Training (Level 1)

Remote Operator Competency Requirements (Draft)

* Prerequisites: A person who holds a certificate for Radar Observer Training, Radar and Automatic Collision Prevention System Simulator Training, and Electronic Chart Display and Information System (ECDIS) Training, and who holds a marine engineer's certificate enabling them to serve as a watchkeeping officer on the autonomous vessel being monitored, in accordance with the vessel's navigation area and tonnage, or a person who has experience serving on watch on a vessel within the navigation area and of the tonnage of the vessel being monitored, and who has been certified as a deck watch officer

Function: Minimum requirements for Level 1 certification

Column 1	Column 2	Column 3
Competence	KUP (Knowledge, Understanding and Practical Skills)	Methods of demonstrating competence
Ability to plan, navigate and determine the position of the vessel under control and surveillance	Planning, conducting and determining the position of the vessel Possession of the 'ability to plan, conduct and determine the position of the vessel under control and supervision (STCW Table A-II/1)' Voyage planning for the vessel under control and supervision Ability to understand the voyage plan of the vessel under control and supervision Specifications and navigational information of the vessel under control and supervision Be able to ascertain the following particulars and navigational information .1 Specifications such as the ship's name, overall length, breadth and draught .2 Navigation information such as position, course, speed and rate of turn Meteorological and oceanographic information for the vessel under control and surveillance Can verify meteorological and oceanographic information for vessels under control and surveillance	Assessment based on evidence obtained from examinations and approved simulator training
Patrol surveillance [Judgement on evasive manoeuvres]	Ability to make decisions regarding evasive manoeuvres • Can make judgements and take action regarding manoeuvres to avoid collisions, groundings, etc. • Understands the three maritime traffic laws. • Can verify the effectiveness of evasive manoeuvres.	Examination and assessment via approved simulator training
Spatial awareness through the integration of navigational information	• Can fuse data from navigation instruments with different delay times • Can understand the real-world environment based on digital information. • Understanding the distinction between medium-term and short-term planning • Ability to distinguish and understand spatial and situational contexts Ability to distinguish and understand spatial and situational contexts	Approved simulator training or practical examination and assessment
Teamwork	• Understands and can use standard terminology. • Can perform teamwork appropriately within the land-based remote station. • Can understand the intent of actions. • Can communicate their intentions.	Examination and assessment via approved simulator training or practical exercises

***Excerpt from a total of 19 items**

Proposed Requirements for RO Skills and Training (Level 2)

Remote Operator Competency Requirements (Draft)

* Prerequisites: Holders of qualifications in Radar Observer Training, Radar and Automatic Collision Prevention System Simulator Training, and Electronic Chart Display and Information System (ECDIS) Training, who hold a marine engineer's certificate enabling them to serve as a watchkeeping officer on the autonomous vessel being controlled/monitored, in accordance with the navigation area and tonnage, or a Level 1 holder recognised as having equivalent competence

Functions: Minimum requirements for Level 2 certification

Column 1 Competence	Column 2 KUP (Knowledge, Understanding and Practical Skills)	Column 3 Methods of demonstrating competence
Manoeuvring performance of the vessel under control and surveillance	Handling of the vessel under control and surveillance Taking into account the manoeuvring characteristics of the vessel under control and supervision, the ability to change course, maintain course, and accelerate or decelerate from the ROC	Assessment based on evidence obtained from examinations and approved simulator training, and assessment based on evidence obtained from one or more of the following .1 Approved seagoing history .2 Approved remote operator history
Ability to maintain a safe navigational watch on the vessel under control and monitoring	Steering of the vessel under control and monitoring The ability to manoeuvre the vessel under control and supervision when it is under the control of an automatic navigation system and it is recognised that a safe navigational watch is not being maintained	assessment based on evidence derived from examinations and approved simulator training, and assessment based on evidence derived from one or more of the following .1 Approved seagoing history .2 Approved remote operator history
Competence in the use of radar and ARPA information to maintain safe navigation	Radar and ARPA information for the vessel under control and monitoring This may relate to the radar and ARPA information of the vessel under control and surveillance .1 Understanding of information regarding objects in the vicinity of the vessel under control and surveillance	Assessment based on evidence obtained from examinations and approved simulator training, and assessment based on evidence obtained from one or more of the following .1 Approved seagoing history .2 Approved remote operator history
Competence in the use of ECDIS to ensure safe navigation	ECDIS information for vessels under control and monitoring This relates to the following ECDIS information for vessels under control and monitoring .1 Understanding of chart information for the waters in the vicinity of the vessel under control and monitoring	Assessment based on evidence obtained from examinations and approved simulator training, and assessment based on evidence obtained from one or more of the following .1 Approved seagoing experience .2 Approved remote operator history
Competence in the use of Alert Management System (AMS) information (including BNWAS) for maintaining safe navigation	AMS on the vessel under control and monitoring Ability to operate, at the ROC, equipment displaying information equivalent to that of the AMS on board the vessel under control and monitoring Alerts on the vessel under control and monitoring Able to view alerts (Alert/Warning/Caution) on the vessel under control and monitoring via that device	Assessment based on evidence obtained from examinations and approved simulator training, and assessment based on evidence obtained from one or more of the following .1 Approved seagoing history .2 Approved remote operator history
Patrol monitoring [Execution of evasive manoeuvres]	Capable of executing evasive manoeuvres •Can make judgements and execute manoeuvres to avoid collisions, groundings, etc. •Understands the three maritime traffic laws. •Can verify the effectiveness of evasive manoeuvres.	Examination and assessment via approved simulator training * All 6 items

Drafting of Safety Guidelines for Remote Operation Skills for MASS

ANNEX

Draft Guidelines on the competences for remote operators of MASS (Competences on collision avoidance manoeuvre only)

1 INTRODUCTION

1.1 The purpose of these Guidelines on the competences for remote operators of MASS (Competences on collision avoidance manoeuvre only) is to provide a reference for the development and approval of training of remote operators for MASS.

Application

1.2 Unless expressly provided otherwise, these Guidelines apply to remote operators of MASS which is manned and is executing the unmanned bridge operation within the designated OE (Operational Envelope) and ODD (Operational Design Domain). In order to operate MASS safely while under way from the remote operation centre until the onboard crew is present on the bridge.

Definition

1.3 Level 1 remote operator means an operator who is responsible for monitoring the status of the MASS(s) and supporting the autonomous watchkeeping of the MASS(s) from remote operation centre(s).

1.4 Level 2 remote operator means an operator who is responsible for manoeuvring and collision avoidance through MASS direct remote control from the remote operation centre(s) until the onboard crew is present on the bridge.

2 STANDARDS OF COMPETENCE FOR LEVEL 1 REMOTE OPERATORS

Entry requirements

2.1 To demonstrate the proper collision avoidance skills, every candidate for Level 1 remote operators is recommended to hold the certificate of competence in accordance with the STCW regulation II/1.

Standards of competence for remote operators (Collision avoidance competence only)

2.2 Level 1 remote operators of MASS should have the following competences:

.1 Maneuvrability of the MASS being controlled and monitored

Ship manoeuvring and handling

Knowledge regarding ship manoeuvring as follows:

- .1 the effects of ladder and propeller
- .2 stopping distances
- .3 turning circles
- .4 squat effect

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- .5 the effects of UKC reduction due to ship's rolling and pitching
- .6 the effects of shallow water, wind, wave and current on ship handling
- .7 the effects of the interaction between passing ships and sidewall effects
- .8 slow speed operation to avoid damage
- .9 the characteristics of the propulsion system on the ship

.2 Voyage Planning, Navigation, and Position Fixing of the MASS

- .1 Competence described in STCW Table A-II/1: "Plan and conduct a passage and determine position"

Monitored Vessel's Voyage Plan

- .2 Understanding of the voyage plan of the monitored vessel

Vessel Particulars and Navigational Information

- .3 Able to identify the following:

- .1 Vessel particulars such as name, length overall, breadth, draft
- .2 Navigational information such as position, course, speed, rate of turn

Meteorological and Oceanographic Information

- .4 Able to confirm meteorological and oceanographic information relevant to the monitored vessel

.3 Status of Control Authority

Control Authority of Steering and Propulsion

- .1 Able to confirm the location of control authority for steering and propulsion (whether on the monitored vessel or at the Remote Operation Center (ROC))

Automation Level of the Autonomous Navigation System

- .2 Able to confirm the automation level of the autonomous navigation system

.4 Maintaining a Safe Navigational Watch

- .1 Competence described in STCW Table A-II/1: "Maintain a safe navigational watch"

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***Excerpt from a total of 9 pages**