PİRİ REİS UNIVERSITY
GUIDE FOR ASSESSMENT PRACTICES ON
ENGINE ROOM SIMULATOR

Commercial vessels are operated for the purpose of making a profit. In the current competitive environment, it is possible to achieve the targeted profit by reaching the targets estimated in the income and expense balance. For this, it is desirable to increase revenues on the one hand and to realize expenses at an acceptable level on the other hand. Personnel and fuel are the two biggest expense items.

The most important thing required by the ship, which operates on water independently off the coast, is energy and its basis is based on hydrocarbon-based fuel, which is the largest of the expense items. For the best consumption of fuel, all systems and machinery of the ship must be managed economically, continuously, efficiently, safely, and environmentally sensitively. The Marine Engineer performs this management by observing, analysing, interpreting, making the right decisions and implementing these decisions as soon as possible, especially during the watch. For this, Marine Machinery Management Engineers should be trained within the framework of the principles contained in the ERS training chain (Table.1).

Table.1 ERS chain of training principles

Platform	Governance	Processes	Need	Profession	Responsible
Ship	Economic Continuous Productive Secure Safe Environmentalist	Observation Analysis Comment Decision making Implementing the decision	Knowledge Experience	Marine Engineer	Engineering Officer of the Watch

Theoretical knowledge is given and measured in accordance with international standards in relevant educational institutions. Experience is partly gained in relevant laboratories, workshops, simulators and practical training at sea. However, these short-term practical trainings are not sufficient in the ship working environment where experience is very important. On the other hand, the automation technology developed with the digital data measurement and processing techniques in electronics has made it necessary to accelerate the skills of the students in managing ship systems and machinery in a quality way. Practical training periods in simulators are needed to increase to assess and evaluate the abilities of the cadets to observe, analyse, comment and to gain the ability to perform all these activities for sound and comprehensive decision making during watch. The standards required to meet such training with the Engine Room Simulator are set out in section A-III/3 of the qualification table of IMO and the 2010-STCW Code.

Table. 2 Effective ERS plant criteria

Platform	Ship type	Systems	Details	Needs chain	Responsible
ERS	General Cargo Tanker LCC Tanker Chemical Container Cruise Tag boat	Electricity Main drive Auxiliary	Subsystems Machines	Training catalogue Automation scope Full ERS menu Training Design principles Strong determination Strong approval	Investor Investment policy Operating budget Senior Chief Engineer Expert designer Expert programmer Expert Web Designer Expert trainer

All parameters of ship systems and machinery in Table 2, issues in the chain of needs and those responsible must meet the criteria set out in IMO and STCW's publications/chapters on ERS.

Although it is at the discretion of the educational institution, the selection of one or several important ship types for ERS training can be considered for the multi-purpose use of ERS. In fact, since all systems and machinery on commercial ships are designed to meet the same need, the selection, preparation, and training of one or two ship types that are most comprehensive is more beneficial to maritime training institutions and students. The aim of the ERS training is to look ahead of the systems and machines operating according to the operating values of the engine systems, to see ahead with the help of command-and-control elements and signals, and to prevent the ship from falling into difficult situations by taking the necessary measures. Therefore, ERS needs to be programmed according to the actual time and the accuracy and precision values of the system/machine manufacturer for reliable assessment and evaluation. The presence of these features in ERS will enable the student to perform tasks based on real, accurate and sensitive data without going to the ship. What is important in ERS education is that the student understands the logic about command-and-control elements, command and control signals, chain events, their relationships very well and gains experience. For this reason, ERS helps the student to gain responsibility without going to the ship and to increase their knowledge and experience (Table.3).

Scientific statistics show that more than 76% of maritime accidents are human caused. In addition to insufficient knowledge and experience, the lack of maintenance of automation systems, the lack of adjustment and calibration, the fact that Marine Engineers are unfamiliar with automation systems, the inadequacies in observation, analysis, the lack of ability to make accurate decisions and to implement them seem to be the biggest factors in the increase in accidents. In this case, in addition to ERS, which is a multi-factor training tool, the need for knowledgeable, experienced and trained instructors in these subjects is another important factor. The dominant characteristics of ERS trainers can be listed as follows.

- Knows the ability and capacity of the ERS to be used,
- Prepares theoretical and practical effective training scenarios,
- Makes effective training programs for the implementation of ERS Scenarios,
- Determines the principles of measurement and evaluation of ERS trainings,

Due to the high importance of operating systems and machines based on superior technical knowledge, experience, national and international standards, theoretical and practical trainings, correct selection of ships and scenarios, effective training plan, program and evaluation must be taken into consideration.

Table. 3 ERS training criteria

Platform	Application	Scenario	Tools	Communication	Responsible
Training Ship	Pier Anchor Manoeuvre Sailing	Preparation Commissioning Commissioning Faulty condition Emergency	Control elements Control elements	Control signals Control signals	System trust Catalogue Forms Educator

One of the most important elements of ERS education is the evaluation of the work done by the student. According to the type of ship and scenario given for this, the working method and practices of the student are **evaluated instantly** and, if possible, examined by mutual interview from printed records. The correct one is taught by discussing with the student on the grounds of wrong practices. At the end of this interview, the work done by the student is evaluated in order to extract the development pattern (Table.4).

Table.4 ERS training evaluation criteria

Platform	Application	Scenario	Operating principles	Application	Responsible	**Assessment**
Training Ship	Pier Anchor Manoeuvre Sailing	Preparation Commissioning Commissioning Faulty condition Emergency	Economic Continuous Productive Secure Safe Environmentalist	Method Logic True Mistakes Shortcomings Schedule	Educator Student	Proper Good Fair Weak Fail

In ERS trainings, scenarios should be prepared by considering the situations in which the student who is in charge of watch is/will be in place. The criteria of Table 1, 2, 3 and 4 are determined for this purpose. Ship types are the most on the agenda. Most of the systems and machines found on these ships are also found in other types of ships as they are standard, although the type and model are different. Automation and operating logic are not different. For this reason, it is appropriate to conduct ERS training, as long as it does not have features, by selecting the most equipped type of ship by using time effectively and using important scenarios in a clear and simple way (Table.5).

Table.5 ERS active training scenario criteria

Type ship	Application	Scenario	Operating principles	Application	Responsible	Assessment
Tanker: A. Crude Oil B. LNG C. Chemical	Pier Anchor Manoeuvre Sailing	Preparation Commissioning Commissioning Faulty condition Emergency	Economic Continuous Productive Secure Safe	Method Logic True Mistake Missing Schedule	Educator Student	Proper Good Fair Weak Fail

			Environmentalist			

Except for special trainings, based on scenarios to be prepared by taking into account the criteria of Table 5 for ship types, ERS training in institutions providing technology training will be useful. The matrix of factors indicated in the table allows the creation of many different multi-purpose scenarios. Examples of seven (7) theoretical (Table.6) and seven (7) practical (Table.7) scenarios prepared on this basis are given below as the basis of "**Guide for Assessment Practices on Engine Room Simulator".**

The aim of the theoretical education is to prepare the student consciously for practical scenarios in line with the principles and discipline of automation, and to understand why he / she performs the sequential operations. The teacher-student interview module of ERS, which allows the student to see all the actions taken by the student, to replay, to examine and correct the errors at the end of the training, helps to strengthen the training, explaining the purpose of the training to be carried out in the selected theory/applied scenario (Table.6)

Table.6 Examples of ERS active theoretical training scenarios

No	Type ship	Situation	Scenario	System	Tools	Application
1	Tanker	Pier	Preparation	Electricity	Generators start panel control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
2	Tanker	Pier	Preparation	Main drive power system	Fuel transfer system actuation panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
3	Tanker	Pier	Preparation	Auxiliary systems and machines	High pressure air compressor actual panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
4	Tanker	Sailing	Commissioning	Electricity	Generator synchronization panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule

5	Tanker	Sailing	Commissioning	Main drive power system	Fuel transfer system actuation panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
6	Tanker	Sailing	Commissioning	Auxiliary machines	Rudder system operating panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
7	Tanker	Sailing	Faulty condition	Electric, Main drive power	Exhaust temperature monitoring panel and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule

ERS-enabled hands-on training scenarios take into account the actual ship, situation, process, system and applications. The aim of the practical training is for the student to learn and apply the systems considered in this scenario and the sequential procedures to be performed correctly and completely. At the end of each scenario training, the training results made by the student are examined and evaluated (Table. 7)

Table. 7 Examples of ERS Enabled Hands-on Training Scenarios

No	Type ship	Situation	Scenario	System	Tools	Application
1	Tanker	Pier	Preparation	Electricity	The process of transferring electricity from the coast to the ship	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
2	Tanker	Pier	Preparation	Main drive power system	1. Lubricating oil 2. Fuel 3. Cooling water 4. Combustion air 5. Exhaust Other Systems	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
3	Tanker	Pier	Preparation	Auxiliary systems and machines	1. Air compressor 2. Fuel and lubricating oil separators 3. Boiler 4. Air conditioning Other systems	1. Method 2. Logic 3. True 4. Mistake 5. Missing

						6. Schedule
4	Tanker	Sailing	Commissioning	Electricity	1. Generator volts, frequency, load settings 2. Generator operating model selection 3. Ship electrical insulation control 4. Shaft generator, 5. Turbogenerator etc. Use of other power generation systems	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
5	Tanker	Sailing	Commissioning	Main drive power system	1. Level, temperature, pressure, viscosity 2. Fuel/air ratio 3. Machine performance 4. Oil vapor, 5. Oil pressure, jacket water temperature and machine speed Other controls	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
6	Tanker	Sailing	Commissioning	Auxiliary systems and machines	1. Rudder hardware 2. Compressed air system 3. Bilge water system 4. Fire system, etc. control of other systems	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule
7	Tanker	Sailing	Faulty condition	Electric, Main drive power	1. Voltage, current, frequency and phase, disturbances 2. Low insulation, leakage, open, short circuit 3. low pressure, high jacket water temperature, overspeed, 4. Oil vapor, etc.other malfunctions. .	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule

In theoretical and practical ERS trainings, in addition to simulator design, hardware and software quality, the importance of the student's technical information infrastructure, instructor, plan, program and training time should be taken into consideration. These points, which are mentioned in the relevant sections of IMO and STCW, are the main guide in international ERS education. ERS trainings gain value by preparing training catalogue forms in accordance with the requirements specified in these regulations at least, and by providing teachers with the necessary national and international trainings (IMO 6.09 and IMO 6.10). Although there is no definite rule, it should be known that the Chief Engineers who have gained sufficient experience in ships are the most suitable teachers for effective ERS training.

There is no limit to theoretical and practical ERS training. A well-designed ERS gives the teacher the opportunity to create and prepare a lot of scripts. This is one of the reasons why experienced

teachers are needed. However, for the preparation and implementation of such scenarios, the uninterrupted duration of ERS training, the error-free operation of the system and the low number of students are also very important factors. For this reason, instead of scenarios to be prepared later, it is extremely important and useful to add very well-prepared scenarios to the software package. Such situations will bring costs. It is useful to discuss these birches, which affect the quality and performance of education, at the ERS design stage.

In ERS training, it should be known that systems and machines work with real values, durations and time. In well-designed ERS education, these aspects have an active role in the success of teachers and students.

ERS training assessment criteria

At the end of ERS education, the assessment and evaluation of the student's success level can be determined by the criteria given below.

1. The subject and scale to be measured in ERS education should be determined openly and transparently and shared with the student.
2. The measurement method to be applied together with the subject to be processed and evaluated in ERS training should be appropriate, realistic, valid and reliable.

Since ERS training includes a wide range of topics, events and possibilities, the training evaluation to be made with the scenarios to be prepared is also multifaceted. However, according to the student's situations in the scenario:

1. Method
2. Logic
3. True
4. Mistake
5. Missing
6. Schedule

Applications have made for:

1. Observe
2. Analyse
3. Exposition
4. Decision making
5. Implement the decision.

Its behaviour in operations can be considered as important criteria in the measurement and evaluation of ERS training. Evaluation criteria and methods, which are simple, clear and short, prevent departing from the essence of education. An example of this is given below (Table.8). However, according to different scenarios, different measurement and evaluation criteria and methods can be used in ERS trainings.
Since ERS trainings, except for special ones, are limited in terms and duration, most of the time is spent on the student's comprehension of the automation menu of the ship he / she trains, the command and control elements and their signals, the sequential events between integrated systems and machines, automation logic and the relationship between software and hardware. When these issues are comprehended, the student becomes easier and quicker to understand, analyse and interpret the situations in the scenarios, the decisions made are correct and accelerated, and therefore corrective actions are made more quickly and accurately. For this reason, the main thing in ERS trainings is that the

above-mentioned issues are learned very well by the student. Although the teaching method of the educator is different here, this fact plays an important role in the education of the student with ERS.

Table.8 ERS effective theoretical training development/evaluation

No	Type ship	Situation	Scenario	System	Tools	Application criterion		Processing criteria	Ölç.
1	Tanker	Pier	Preparation	Electricity	Generator start panel control and control elements and signals	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		Observation Analysis Comment Decision making Implement the decision	
Assessment/Evaluation: 5. Very good, 4. Good, 3. Medium, 2. Bad, 1. Negative, 0. Re do									

Simulator Evaluation Criteria

- Introduction to the configuration and basic functions of the simulator. Each separate system should have the capacity to stand-alone for segregated studies.
- Setup procedure under normal and abnormal conditions, align, start and run all auxiliary and ancillary systems, start and run the main engine.
- Prepare, start and run the main propulsion unit and associated systems.
- Set the main propulsion unit controls to maximum full ahead sea power as directed from bridge control, or
- Apply manoeuvring procedures and use the controls to obtain required power outputs.
- The student shall analyse symptoms and diagnose malfunctions, which could lead to major breakdown and damage to vessel's machinery.
- Power plant and resources management practices
- Each candidate must prepare a written report in which he/she will outline a problem or a situation that a plant manager might have to deal with under normal circumstances.
- This report helps the assessor to evaluate the candidate's management skills and ability to manage and organize any technical situations.
- The report should include appropriate recommendations and solutions to the vessel's owners or other authorities.
- This report must be submitted to the assessor prior the completion of the training.
- This report account for 50% of the final mark and is to be combined with the assessment resulted from the developed scenarios.
- It should be understood that a failure in any of these 2 assessments criteria will result in a course's failure.

THEORETICAL SCENARIOS FOR ASSESSMENT

ERS effective theoretical training scenario -1

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Theoretical training of the engineer in charge of the shift on the command-and-control elements on the ERS generator operating panel and their signals.				
Purpose: The importance and job description of the control and control elements on the ERS generator operating panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Panel definition, task, reality and place in the automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements in the generator panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and function of the control elements in the generator panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, importance and function of the control signals in the generator panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Definition, importance and function of control signals in the generator cabinet	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -2

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Theoretical training of the engineer in charge of the watch ERS flow transfer system actuation panel control and control elements and signals.				
Purpose: Importance and job description of the control and control elements on the ERS flow transfer system operating panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Fuel transfer board water description, task, actual and location in the ERS automation menu	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and task of the control elements in the ERS flow transfer system operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and task of the control elements in the ERS flow transfer system operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, importance and function of the control signals in the operating pan of the ERS flow transfer system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Definition, importance and function of control signals in the operating pan of the ERS flow transfer system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -3

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Theoretical training of the engineer in charge of the shift on the control and control elements and their signals on the operating panel of the ERS compressed air compressor.				
Purpose: Importance and job description of the command and control elements on the ERS High Pressure Air Compressor operating panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	High pressure air compressor operation panel description, task, actual and location in automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements in the ERS high compressed air compressor operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and function of the control elements in the ERS high compressed air compressor operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, type and function of the control signals in the ERS high compressed air compressor operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Description, type and function of the control signals in the ERS high compressed air compressor operating pan	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -4

Type of vessel: Tanker				
Status: Cruising				
Scenario: Theoretical training of the engineer in charge of the shift on the command-and-control elements on the ERS generator synchronization panel and their signals.				
Purpose: The importance and job description of the control and control elements on the ERS generator synchronization panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom I				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Generator synchronization dashboard definition, task, actual and location in automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements in the generator synchronization board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and function of the control elements in the generator synchronization board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, importance and function of the control signals on the generator synchronization board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Definition, importance and function of control signals on the generator synchronization board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -5

Type of vessel: Tanker				
Status: Cruising				
Scenario: Theoretical training of the engineer in charge of the shift on the command-and-control elements on the operating panel of the ERS fuel transfer system and their signals.				
Purpose: Importance and job description of the control and control elements on the ERS fuel transfer system operating panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Fuel transfer system start panel definition, task, actual and location in the automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements on the ERS fuel transfer system operating panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and function of the control elements on the ERS fuel transfer system actuator board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, type and function of the control signals on the ERS fuel transfer system starting panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Description, type and function of the control signals on the ERS fuel transfer system starting board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -6

Type of vessel: Tanker				
Status: Cruising				
Scenario: Theoretical training of the engineer in charge of the shift on the command-and-control elements on the ERS steering system operating panel and their signals.				
Purpose: The importance and job description of the control and control elements on the ERS steering system operating panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Steering system operation dashboard definition, task, actual and place in the automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements on the ERS steering system operating panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and task of the control elements in the ERS steering system operating board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, importance and function of the control signals on the ERS steering system operating panel	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Description, importance and function of control signals in the ERS steering system cabinet	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical training scenario -7

Type of vessel: Tanker				
Status: Cruising				
Scenario: Theoretical training of the engineer in charge of the shift on the control and control elements on the ERS exhaust temperature panel and their signals.				
Purpose: The importance and job description of the control and control elements on the ERS exhaust temperature panel in the automation system,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Exhaust temperature panel description, task, actual and location in the automation menu in the automation system	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Description, type and function of the control elements in the ERS exhaust temperature cabinet	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Description, type and function of the control elements in the ERS exhaust temperature board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Description, importance and function of the control signals in the ERS exhaust temperature board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Description, importance and function of the control signals in the ERS exhaust temperature board	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

PRACTICAL SCENARIOS FOR ASSESSMENT

ERS effective hands-on training scenario -1

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Practical training of the electronic-dependent-power from coast to ship transfer with ERS.				
Objective: Practical training of the engineer in charge of the watch with ERS in preparation of the automation electricity supply system for transfer and navigation from coast to ship.				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Practical training with ERS for the safe transfer of electrical electricity connected to automation from coast to ship.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Practical training with ERS on the preparation of the emergency diesel-generator for navigation due to automation	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Practical training with ERS on the preparation of automated and a diesel-generators for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Practical training with ERS on the preparation of the automation lens electrical distribution system for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Connection to the automation, the transfer from the main generator and the practical training with ERS on the navigational preparation of the ship electrical system.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective hands-on training scenario -2

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Preparing the automated main diesel power system for navigation with ERS				
Purpose: The engineer in charge of the watch has the main drive power system connected to automation lubricating oil, fuel, coolant, combustion air, exhaust ... practical training of the preparation of other systems with ERS.				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 240 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Practical training with ERS of the navigational commemoration of the main power diesel machine connected to automation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Practical training with ERS of the preparation of the lube oil system connected to automation for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Practical training with ERS on the preparation of the automation or scarce system for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Practical training with ERS of the preparation of the cooling water system connected to automation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Practical training with ERS on the preparation of the air and exhaust systems connected to automation for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective hands-on training scenario -3

Type of vessel: Tanker				
Condition: Attached at the pier				
Scenario: Preparing auxiliary machines connected to automation for navigation with ERS.				
Objective: Practical training of the engineer in charge of the watch with ERS in the preparation of compressed air compressor, fuel and lubricating oil separators, boiler, air conditioning and other auxiliary systems connected to automation,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Practical training of the preparation of auxiliary machines connected to automation with ERS.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Practical training with ERS of the navigational preparation of the compressed air system connected to automation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Practical training with ERS on the preparation of the automation and lubricating oil separator system for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Practical training with ERS on the preparation of the hot water/steam system connected to automation for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Practical training with ERS on the preparation of the air and exhaust systems connected to automation for navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective hands-on training scenario -4

Type of vessel: Tanker				
Status: Cruising				
Scenario: Training of the operation and control of automated electricity generation and ship insulation systems with ERS.				
Objective: Practical training of the engineer in charge of watch in the operation and control of automated electricity generation and ship electrical insulation systems with ERS,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Practical training of the operation and control of the electrical system connected to automation on the fly with ERS	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Practical training with ERS on the cruise of electrical insulation control of ships connected to automation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Practical training of the operation, volt, current, frequency and phase control of diesel-generators connected to automation with ERS in navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Practical training of the operation, volt, current, frequency and phase control of the shaft generator connected to automation with ERS in navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Practical training of the operation, volt, current, frequency and phase control of the turbogenerator connected to automation with ERS in navigation.	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective theoretical applied scenario -5

Type of vessel: Tanker				
Status: Cruising				
Scenario: Training of the operation and control of the main drive power system connected to automation on the run with ERS.				
Objective: Practical training of the engineer in charge of the watch in the operation and control of the main power system connected to automation with ERS,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Training of level, temperature, pressure, viscosity adjustment and control of the main power system connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Training of the adjustment and control of the air, fuel ratio (AFR) of the main power system connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Training of the performance control and adjustment of the main power system connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Training of the main power system oil mist control and adjustment connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Training of the main power system connected to automation lubricating oil pressure, jacket water temperature and machine speed with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective hands-on training scenario -6

Type of vessel: Tanker				
Status: Cruising				
Scenario: Training of the operation and control of automated auxiliary systems and machines on the fly with ERS.				
Objective: Practical training of the engineer in charge of the watch in the operation and control of the auxiliary systems and machines connected to automation with ERS,				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Training of the operation and control of auxiliary systems and machines connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Training of the control of the steering system connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Training in the operation and control of an automated compressed air system with ERS	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Training of the operation and control of the water system connected to automation with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Training of the automated fire warning, warning and fighting system with ERS on the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		

ERS effective hands-on training scenario -7

Type of vessel: Tanker				
Condition: Malfunction				
Scenario: Training of automation related electrical and main drive power fault notification, analysis, interpretations, decisions to be made and measures to be taken with ERS				
Objective: Training of the engineer in charge of the watch with ERS on the training, of the electrical and main drive power fault notification, analysis, comments, decisions to be made and measures to be taken				
Student: At the personal station, at the same time, multiple,				
Training location: ERS multi-course training classroom				
Duration: 120 minutes				
Preliminary meeting: Informing the student about the subject, purpose, duration and evaluation method of the training				
Sequence No	Subject of training	Assessment and Evaluation Criteria	Measurement	Investigation
1	Automation related electrical and main drive power system failure notification, analysis and interpretations, decisions to be made and measures to be taken in the course of training with ERS	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
2	Notification, analysis and interpretation of volt, current, frequency and phase disturbances in the electrical system connected to automation, training of the decisions to be made and the measures to be taken with ERS in the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
3	Low insulation, leakage, open, short circuit notification, analysis and interpretation in the electrical system connected to automation, training of the decisions to be made and the measures to be taken with ERS in the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
4	Low or high jacket water temperature, overspeed notification, analysis and interpretation of the main drive power system connected to automation, training of the decisions to be made and the measures to be taken with ERS in the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		
5	Notification, analysis and interpretation of excessive oil mist in the main drive power system connected to automation, training of the decisions to be made and the measures to be taken with ERS in the course	1. Method 2. Logic 3. True 4. Mistake 5. Missing 6. Schedule		