

ASSESSMENT MAPPING

STCW Table: Title:	Table A – III / 5 Specification of minimum standard of competence for ratings as able seafarer engine in a manned engine-room or designated to perform duties in a periodically unmanned engine-room
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Guidance Notes (Scoring)

Terms	Description
Award	Bonus points, an integer within the range of 0 to 100. The default value is 0.
Penalty	Penalty points, an integer within the range of 0 to 100. The default value is 0.
Single	A rule is triggered in the scenario only once: the first time the conditions occur.
Circular	A rule is triggered every time the conditions occur.
Time	Time dependency ruling
Weight	Multiplier of a trainee's level of competency

Levels of Simulation

Familiarization	Familiar with the equipment, layout procedures, and routine task.
Operational	The task relates to the inputs and outputs and their relationship and has to do with the performance of a function.
Functional	The task relates to the functions or activities performed by the system without reference to which of the elements of the system perform those functions.
Management	Relates to the management of the combination of systems to perform a given job.
Communication	Relates to effective communication between human resources to report, get feedback, or to execute a task.
Emergency	Task performed in circumstances where there is variation or deviation from an expected scenario or situation.
Crisis	Task performed when the emergency has developed into a crisis.



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Function 1: Marine engineering at the support level

C1 Contribute to a safe engineering watch	<ul style="list-style-type: none"> Ability to understand orders and communicate with officer of the watch in matters relevant to watchkeeping duties. Procedures for relief, maintenance and handover of a watch. Information required to maintain a safe watch 	Carry out watchkeeping duties for proper relief, maintenance and handover of the watch and communicate with the duty engineer in accordance with established watchkeeping procedures	Communications are clear and concise in performing the tasks	<ul style="list-style-type: none"> The candidate repeats and follows the order or instructions given by the officer or assessor The candidate uses internal communication system in performing engine-room watch 	Rubrics	Communication	Actual laboratory equipment and/or approved simulator
			Maintenance, handover and relief of the watch is in conformity with acceptable practices and procedures	The candidate shall carry out the following in accordance with shipboard engine room watchkeeping procedure: <ul style="list-style-type: none"> * Condition, important information and operation of main engine, boiler, and auxiliary engines and other critical equipment should be informed * Condition and state of fire extinguishing equipment and 	Rubrics	Communication	



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				<p>systems, in case any specific section or fire alarm has been isolated</p> <p>* Check machinery conditions like pressure, temperature and level of machineries and critical equipment</p>			
<p>C2 Contribute to the monitoring and controlling of an engine-room watch</p>	<ul style="list-style-type: none"> Basic knowledge of the function and operation of main propulsion and auxiliary machinery Basic understanding of main propulsion and auxiliary machinery control pressures, temperatures and levels 	Perform monitoring and controlling of an engine-room watch focusing on the function and operation of main propulsion and auxiliary machinery including control parameters	PPE used is appropriate to the task	<ul style="list-style-type: none"> coverall safety helmet gloves safety glasses safety shoes 	Rubrics	Operational	Actual laboratory equipment and/or approved simulator
			The frequency and extent of monitoring of main propulsion and auxiliary machinery conforms with accepted principles and procedures	The candidate monitors and checks the status and the operation of the following: <ul style="list-style-type: none"> Fuel Oil System including purification, transfer and service systems Main engine general data parameters 	Rubrics	Functional	



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				<ul style="list-style-type: none"> Compressed Air System including starting, working and/or control air systems. Lubrication oil system Sea water and freshwater cooling system <p><i>(additional system/s maybe added)</i></p>			
			deviations from the norm are identified	<ul style="list-style-type: none"> The candidates shall identify the normal range of parameters <i>(values depend on the equipment/ approved simulator)</i>: fuel oil inlet pressure: piston cooling outlet temperature: main engine lube oil inlet pressure: control air pressure: 	Rubrics	Functional	



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				<ul style="list-style-type: none"> exhaust gas temperature before turbocharger: jacket cooling water temperature: starting air pressure: 			
			C2.4 Unsafe conditions or potential hazards are promptly recognized, reported and rectified before the works continues	The candidate shall recognize, report and rectify the deviations from the normal parameters of main and critical equipment.	Rubrics	Emergency	
C3 Contribute to fuelling and oil transfer operation	Knowledge of the function and operation of fuel system and oil transfer operations, including: 1. Preparations for fuelling and transfer operations 2. Procedures for connecting and	Perform bunkering operations including preparations, connecting and disconnecting of hoses, actions to be taken in case of incidents, securing and reporting tank levels in accordance with established bunkering practice and	C3.1 The handling of dangerous and harmful liquids complies with established safety practices by wearing appropriate PPE	1.1 Wear PPE appropriate to the task: <ul style="list-style-type: none"> coverall safety helmet gloves safety glasses safety shoes 	Rubrics	Operational	Actual laboratory equipment and/or approved simulator
			C3.2 Bunkering/ transfer operations are carried out in accordance with established safety practices and equipment operating procedure	2.1 Preparation for bunkering: <ul style="list-style-type: none"> correct tools and fittings are selected for bunkering place the scupper plugs in the drain and check for tightness 	Rubrics	Operational Functional Communication	



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	disconnecting fuelling and transfer hoses 3. Procedures relating to incidents that may arise during fuelling or transferring operation 4. Securing from fuelling and transfer operations 5. Ability to correctly measure and report tank levels			<ul style="list-style-type: none"> place portable foam extinguisher near the manifold prepare Shipboard Oil Pollution Emergency Plan (SOPEP) materials familiarize with appropriate bunkering checklist and risk assessment <p>2.2 Hose Connection:</p> <ul style="list-style-type: none"> connect the hose flange to the manifold using correct tightening method use the hand tools, bolts and nuts and gasket secure the hose to the railings if possible place the sampling valve and container in the sampling point open the sampling valve and the manifold valve start bunkering upon order from the Chief Engineer 			



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				<p>2.3 Monitoring and reporting correct tank levels</p> <ul style="list-style-type: none"> • read the pressure and temperature readings in the gauges (<i>readings depending on the actual equipment value</i>) • measure tank level using deep sounding (innage) method (<i>readings depending on the actual equipment value</i>) • measure tank level using ullage sounding method (<i>readings depending on the actual equipment value</i>) <p>2.4 Hose disconnection and securing:</p> <ul style="list-style-type: none"> • close manifold valve and drain the hose • close sampling valve • disconnect flange hose using correct loosening 			



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				method from manifold flange and other fittings <ul style="list-style-type: none"> blank off bunker manifold flange clean and secure all tools and return to proper places			
			C3.3 Communications within the operator's area of responsibility are consistently successful in dealing with procedures relating to incidents that may arise during bunkering /fuelling operation	3.1 perform the safety procedures and actions needed in case of the following incidents using appropriate communication device: Oil spill by Leakage: <ul style="list-style-type: none"> Immediately stop the bunkering operation using the emergency stop button or inform the officer of the watch through two-way radio or hand signal Apply corrective actions by changing damaged gasket 	Rubrics	Operational Functional Communication Emergency	



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				<p>or check the tightness of the bolts and nuts and tight if loose.</p> <p>Oil spill by Overflow:</p> <ul style="list-style-type: none"> • Immediately stop the bunkering operation using the emergency stop button or inform the officer of the watch through two-way radio or hand signal • Contain the oil using SOPEP materials. 			
C4 Contribute to bilge and ballast operations	Knowledge of the safe function, operation and maintenance of	Contribute in the operations and maintenance of the bilge and ballast system in	C4.1 PPE used is appropriate to the task	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes 	Rubrics	Operational	Actual laboratory equipment <u>and/or</u>



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	the bilge and ballast systems, including: 1. reporting incidents associated with transfer operations 2. ability to correctly measure and report tank levels	accordance with established safety practices and report incidents associated with the transfer operation and take measurement of tank levels	C4.2 Operations and maintenance are carried out in accordance with established safety practices and equipment operating instructions, and pollution of the marine environment is avoided	2. prepare, line up and start transfer bilges: 2.1 sound off and acknowledge the alarm 2.2 open port/starboard bilge well suction valve 2.3 open bilge pump suction and discharge valves 2.4 open filling valve to bilge holding tank 2.5 check suction filter if installed 2.6 start the bilge pump 3. read pressures and measure tank levels during operation 3.1 read the suction and discharge pressures 3.2 check the level of the bilge well/s and bilge holding tank through sight-glass or sounding pipe 3.3 stop the pump though push button as per	Rubrics	Operational Communication	approved simulator



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				instruction of the assessor 4 secure bilge system after the operation 4.1 close suction and discharge valves of bilge wells and bilge systems 4.2 close suction and discharge valves of emergency bilge systems			
			C4.3 Communications within the operator's area of responsibility are consistently successful through reporting and application of emergency procedure in case of emergency	3.1 report the incident to the officer in charge or assessor through two-way radio 3.1 apply the following actions in case of: * broken seal or gasket – replace the broken gasket; or * loose bolts and nuts – tighten bolts and nuts; or * holes or cracks due to wear or corrosion – place an insert to minimize or stop the leak temporarily and	Rubrics	Operational Communication Emergency	



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				report to duty engineer for action. 3.2 If leaks are not controlled, open the EMERGENCY SUCTION VALVE of the emergency bilge pump and start pump as per instruction of the CHIEF ENGINEER 3.3 stop pump and secure as per instruction of the assessor			
C5 Contribute to operation of equipment and machinery	Safe operation of equipment, including: 1. valves and pumps (C5.1)	Identify and operate different types of valves and pumps	C5.1.1 PPE used is appropriate to the task	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes 	Rubrics	Operational Communication	Actual laboratory equipment and/or approved simulator
			C5.1.2 Operations of different valves and pumps are carried out in accordance with established safety practices and equipment operating instructions	2.1 The candidate shall operate the following valves and pumps: <ul style="list-style-type: none"> • ball valve • butterfly valve • globe valve • gate valve • non-return valve or check valve • centrifugal pump • screw pump 	Rubrics	Operational Communication	



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				<ul style="list-style-type: none"> • gear pump • reciprocating pump 			
	Safe operation of equipment, including: 2. Hoists and lifting equipment 3. Hatches, watertight doors, ports and related equipment Ability to use and understand basic crane, winch and hoist signals (C5.2)	Operate the different hoists and lifting equipment, watertight doors and other related equipment including use of hoist signals	<p>C5.2.1 PPE used is appropriate to the task</p> <p>C5.2.2 Operations of hoists and lifting equipment are carried out in accordance with established safety practices and equipment operating instructions</p>	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes <p>2.1 Check for any deformations, deteriorations or damages before using the equipment.</p> <p>2.2 Check and identify the SWL of slings, shackles, chain blocks, crane, crane wires and hook before use: (depends on the actual SWL of the equipment)</p> <ul style="list-style-type: none"> • Slings /wire – • Shackles – • Chain block – • Crane cable – • Crane hook – • Crane - 	Rubrics	Operational	
					Rubrics	Operational	



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			<p>C5.2.3 Communications within the operator's area of responsibility are consistently successful in using basic crane, winch and hoist signal</p>	<p>3.1 The candidate shall use the following hand signals and operate the crane as per instruction of the assessor:</p> <ul style="list-style-type: none"> • lower • hoist • lower boom • raise boom • slowly lower boom • slowly raise boom • stop • Swing boom (left or right) • Emergency stop 	Rubrics	Operational Communication	
			<p>C5.2.4 Operations of hatches, watertight doors, ports or related equipment are carried out in accordance with established safety practices and equipment operating instructions</p>	<p>4.1 inspect the conditions of hinges or rubber quality of the equipment</p> <p>4.2 operate hatches or watertight doors or ports or other related equipment</p> <p>4.3 use grease gun to grease the movable parts if necessary</p>	Rubrics	Operational	



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C6 Safe use of electrical equipment	Safe use and operation of electrical equipment, including: 1. Safety precautions before commencing work or repair 2. Isolation procedures 3. Emergency procedures 4. Different voltages on board Knowledge of the causes of electrical shock and precautions to be observed to prevent shock	Perform lockout/tag-out of electrical equipment using proper electrical tools and instruments and explain emergency procedures in case of electric shock in accordance with established procedures	C6.1 PPE used is appropriate to the task	<ul style="list-style-type: none"> • overall • safety helmet • gloves (for electrical works) • safety glasses • safety shoes 	Rubrics	Operational	Actual laboratory equipment and/or approved simulator
			C6.2 safe working practices are observed and appropriate equipment is used in performing lockout/tag-out and isolation procedures	2.1 lockout/tag-out procedure: <ul style="list-style-type: none"> • request for electrical work permit and risk assessment • inform the immediate officer • shut down or switch off power source • isolate equipment from any source of power and lockout through individual locks • push the start button to make sure certain equipment will not start • tag the equipment using signage such as "DO NOT OPERATE MEN AT WORK" 	Rubrics	Operational Communication	



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				<p>2.2 Action in the event of electrical shock:</p> <ul style="list-style-type: none"> * De-energize the live circuit by switching off the power source * Protect yourself by insulator or insulated materials * Remove the victim from the shock hazard area using non- conductive materials such as safety hook * Apply first aid for electric shock and burn. 			



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C7 Contribute to shipboard maintenance and repair	Ability to use painting, lubrication and cleaning materials and equipment	Contribute to maintenance and repair through surface preparation, cleaning and applying paint to the material using appropriate hand tools and power tools including proper waste disposal in accordance with technical, safety and procedural specifications	C7.1.1 PPE to be used is appropriate to the task	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes • dust mask or respirator mask 	Rubrics	Operational	Actual laboratory equipment <u>and/or</u> approved simulator
	Ability to understand and execute routine maintenance and repair procedures Knowledge of surface preparation techniques Knowledge of safe disposal of waste materials Understanding manufacturer's safety		C7.1.2 handling of dangerous and hazardous materials in accordance with the Material Safety Data Sheet (MSDS) including identification of product hazards	2.2 Identify the hazards of the following products using MSDS: <ul style="list-style-type: none"> • Paint or primer: <ul style="list-style-type: none"> * Flammable liquid and vapor * Causes skin irritation * Harmful to aquatic life with long lasting effect • Thinner: <ul style="list-style-type: none"> * Highly flammable * Causes skin irritation * Can cause genetic defects, cancer and fatal if swallowed 2.3 place the cordon materials and warning signage "WET PAINTS"	Rubrics	Operational Communication	



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	guidelines and shipboard instructions Knowledge of the application, maintenance and use of hand and power tools and measuring instruments and machine tools Knowledge of metalwork			as per instruction from the assessor			
			C7.1.3 selection and use of equipment and tools is appropriate for surface preparations	<ul style="list-style-type: none"> • scrapper • wire brush • hand-held grinder 	Rubrics	Operational	*
			C7.1.4 application of paint is carried out in accordance with safety and maker's specification	4.1 apply metal primer first for metal protection using paint brush or roller 4.2 apply paint for final coating using paint brush or roller	Rubrics	Operational Communication	
			C7.1.5 disposal of waste materials are carried out in accordance with MARPOL or national regulations.	5.1 Dispose the contents and empty containers as per MARPOL Annex V and garbage management plan as per national regulations	Rubrics	Operational Communication	
		Use hand tools, power tools and measuring instrument in making gasket and	C7.2.1 Fabrication of gasket is carried out using appropriate tools	1.1 Use the following hand tools and measuring instrument: <ul style="list-style-type: none"> • Scissors or snips • Dividers • Gasket hole puncher 	Rubrics	Operational Communication	



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		prepare materials to be welded (C7.2)	C7.2.2 Preparation of materials to be welded is carried out using appropriate tools and measuring instrument and in accordance with technical and safety specifications	2.1 clean surfaces and sharp edges of metal using bench grinder 2.2 use file to smooth rough edges 2.3 using Vernier caliper, measure the thickness, length and width of the material Note: <u>(materials length and width depends on the assessment center)</u>	Rubrics	Operational Communication	
		Weld materials using Shielded Metal Arc Welding (SMAW) techniques in accordance with safety and technical specifications (C7.3)	C7.3.1 PPE to be used is appropriate to the task	<ul style="list-style-type: none"> • coverall • welding mask • welding gloves • leather apron • safety shoes 	Rubrics	Operational	
			C7.3.2 shielded metal arc welding is carried out in accordance with technical, safety and procedural specifications	2.1 Apply welding procedures: <ul style="list-style-type: none"> • Select correct welding rod based on the thickness and type of work piece (2.5mm all- purpose welding rod) 	Rubrics	Operational Communication	



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				<ul style="list-style-type: none"> Adjust correct amperage Apply correct welding technique (flat position fillet groove) remove flux by chipping hammer <p>2.2 Handle materials, tools and equipment 2.3 Observe safety practices 2.4 Pass weld visual inspection</p>			
			<p>C7.3.3 Securing of equipment and tools and disposal of waste materials are carried out in accordance with safety procedures and MARPOL or national regulations.</p>	<p>3.1 Switch off welding machine including the breaker 3.2 Secure tools such as chipping hammer, wire brush, etc. to their proper place. 3.3 Dispose the contents and empty containers as per MARPOL Annex V and garbage management plan or national regulations</p>	Rubrics	Operational Communication	*



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C8 Contribute to the handling of stores	Knowledge of procedures for safe handling, stowage and securing of stores	Demonstrate procedures for safe handling, stowage and securing of stores	C8.1 PPE to be used is appropriate to the task	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes 	Rubrics	Operational	Actual laboratory equipment and/or approved simulator
			C8.2 handling of stores are carried out in accordance with established safety practices and equipment operating instructions	2.1 Given the sample stores, keep them according to their compatibility: <ul style="list-style-type: none"> • Bar Soap • Paint • Muriatic acid • Alcohol • Bolts and nuts • Lotions • Food products • Bleach • Kerosene 	Rubrics	Operational	
			C8.3 stowage and securing of heavy equipment is carried out in accordance with safety practices	3.1 secure heavy equipment in place using rope or sling to prevent rolling during bad weather. 3.2 Check the tightness of the rope and stability of the equipment	Rubrics	Operational Communication	



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			C8.4 Demonstrate correct lifting technique and method to prevent back injury in accordance with established safety practices	Correct lifting techniques: <ul style="list-style-type: none"> • Start in a safe position. • Get as close to the object as possible. • Maintain the natural curve in your lower back. • Keep your back straight, push your buttocks out, use your legs and hips to lower yourself down to the object. • Squatting instead of kneeling • Let your legs do the work • Lift slowly. Hold the load close to your body. Avoid twisting 	Rubrics	Operational	
C9 Apply precautions and contribute to the prevention of pollution of the marine environment	Knowledge of the precautions to be taken to prevent pollution of the marine environment Knowledge of the use and operation of	Identify different MARPOL annexes and apply knowledge to be taken to prevent marine pollution and use anti-pollution equipment	C9.1 Procedures designed to safeguard personnel and the ship are observed at all times through knowledge of different Annexes of MARPOL and anti-pollution equipment fitted onboard	The candidate shall enumerate all the Annexes of MARPOL and give brief description: <ul style="list-style-type: none"> • Annex I – Regulation for the prevention of pollution by OIL • Annex II - Regulation for the prevention of pollution 	Rubrics	Operational	Actual laboratory equipment <u>and/or</u> approved simulator



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	anti-pollution equipment Knowledge of approved methods for disposal of marine pollutants			by Noxious Liquid Substances in Bulk <ul style="list-style-type: none"> • Annex III - Regulation for the prevention of pollution by Harmful Substances Carried by Sea in Package Form • Annex IV - Regulation for the prevention of pollution by Sewage from ships • Annex V – Regulation for the prevention of pollution by Garbage from Ships • Annex VI - Regulation for the prevention of Air pollution from ships Enumerate and give a brief description of the different anti-pollution equipment fitted onboard: <ul style="list-style-type: none"> • Oily water separator (OWS) – it is used to separate oil and water mixtures into their separate components with continuous oil monitoring device for 	Rubrics	Operational	



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				maximum 15 ppm content. <ul style="list-style-type: none"> • Sewage treatment plant – it is used to process raw sewage from ships in order to be discharge legally in the sea • Oil Discharge Monitoring Equipment (ODME) – used to prevent the pollution of ocean by oil by measuring oil content in the ballast and slop water. 			
			C9.2 Given the world map, locate and identify the SECA/ECA (Emission Control Area)	<ul style="list-style-type: none"> • Give at least 2 examples of SECA/ECA * Baltic Sea, North Sea, North America including Canada and US Caribbean including Puerto Rico and US Virgin Islands 	Rubrics	Operational Communication	



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C10 Apply occupational health and safety procedures	Working knowledge of safe working practices and personal shipboard safety, including: <ol style="list-style-type: none"> 1. Electrical safety 2. Lockout/ tag-out 3. Mechanical safety 4. Permit to work systems 5. Working aloft 6. Working in enclosed spaces 7. Lifting techniques and methods of preventing back injury 8. Chemical and biohazard safety 	Identify and demonstrate safe working practices and personal shipboard safety in accordance with health and safety precautions	C10.1 PPE to be used is appropriate to the task	<ul style="list-style-type: none"> • coverall • safety helmet • gloves • safety glasses • safety shoes 	Rubrics	Operational	Actual laboratory equipment and/or approved simulator
			C10.2 safe working practices are observed through knowledge of different work permits system used onboard	Identify at least give 5 examples of work permits used onboard from the given set and give brief description or example: <ul style="list-style-type: none"> • Hot work permit – is required for work involving the use of a flame or other sources of ignition. Example: welding, flame cutting or grinding which produces sparks • Electrical work permit – is required for works on electrical systems where there is possibility of contacting energized conductor. Example: working of electric motors, work on instrumentation, instrument panel, reaching into any panels which may have energized 	Rubrics	Operational Communication	



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	9. Personal safety equipment			<ul style="list-style-type: none"> • Working aloft permit – is required when personnel working above 2 meters in height above the deck. Example: working in a mast, lighting fixtures or any work that required safety harness. • Enclosed space entry permit – is required to allow personnel to enter a confined or enclosed space. Example: entry into tanks, void spaces and cofferdams • Working outboard permit – is required to allow personnel to work over the side of the ship. Example: working using bosun’s chair in painting the side of the ship • Small craft alongside permit – is required when operations need to have a small craft alongside the vessel. Example: bunkering using barge or pilot through pilot boat. 			



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				<ul style="list-style-type: none"> • Underwater work permit – is required when working underwater below or side of the keel. Example: inspection of rudder, propeller or fouling of the hull. • Cold work permit – is required for potentially hazardous work not covered by other types of work permits. Example: chemical cleaning, handling of hazardous substance, heavy lifts, erecting or dismantling scaffolds, machinery maintenance 			