

TRAINING REGULATIONS



MARINE ELECTRICITY NC II

MARITIME SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Superhighway, Taguig City, Metro Manila

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MARITIME SECTOR

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TRAINING REGULATIONS FOR MARINE ELECTRICITY NC II

SECTION1 MARINE ELECTRICITY NC II QUALIFICATION

The MARINE ELECTRICITY NC II Qualification consists of competencies that a person must achieve to enable him to service and maintain electric generators, electric motors, lighting system, batteries, motor controls and other basic control systems, electrical appliances and basic alarm systems.

This Qualification is packaged from the competency map of the Maritime Sector as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

Code No.	BASIC COMPETENCIES
500311105	Participate in Workplace Communication
500311106	Work in a Team Environment
500311107	Practice career professionalism
500311108	Practice occupational health and safety procedures
Code No.	COMMON COMPETENCIES
MTM834201	Launch survival craft and rescue boats / lifeboats
MTM834202	Prevent and fight fire
MTM834203	Perform survival techniques during ship abandonment
MTM834204	Perform first aid treatment on board
MTM834205	Protect marine environment
MTM834206	Comply with emergency procedures
MTM834207	Conduct shipboard security checks

Code No.	CORE COMPETENCIES
MTM311301	Service marine electric generators
MTM311302	Service marine electric motors
MTM311303	Service marine lighting system
MTM311304	Service and maintain marine batteries
MTM311305	Maintain marine motor controls and other basic electronic control systems
MTM311306	Service marine electrical appliances
MTM311307	Maintain basic alarm systems on board ship

A person who has achieved this Qualification is competent to be:

- Cadet Marine Electrician

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in MARINE ELECTRICITY NC II.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Bold and Italicized</i> terms are elaborated in the Range of Variables
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from appropriate sources 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information 1.3 Appropriate medium is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and storage of information are used 1.7 Personal interaction is carried out clearly and concisely
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established protocols 2.4 Workplace interactions are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working

	<p>conditions of employment are asked and responded to</p> <p>2.6 Meetings outcomes are interpreted and implemented</p>
<p>3. Complete relevant work related documents</p>	<p>3.1 Range of forms relating to conditions of employment are completed accurately and legibly</p> <p>3.2 Workplace data is recorded on standard workplace forms and documents</p> <p>3.3 Basic mathematical processes are used for routine calculations</p> <p>3.4 Errors in recording information on forms/ documents are identified and properly acted upon</p> <p>3.5 Reporting requirements to supervisor are completed according to organizational guidelines</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <p>1.1. Prepared written communication following standard format of the organization</p> <p>1.2. Accessed information using communication equipment</p> <p>1.3. Made use of relevant terms as an aid to transfer information effectively</p> <p>1.4. Conveyed information effectively adopting the formal or informal communication</p>
<p>2. Underpinning Knowledge and Attitudes</p>	<p>2.1. Effective communication</p> <p>2.2. Different modes of communication</p> <p>2.3. Written communication</p> <p>2.4. Organizational policies</p> <p>2.5. Communication procedures and systems</p> <p>2.6. Technology relevant to the enterprise and the individual's work responsibilities</p>
<p>3. Underpinning Skills</p>	<p>3.1. Follow simple spoken language</p> <p>3.2. Perform routine workplace duties following simple written notices</p> <p>3.3. Participate in workplace meetings and discussions</p> <p>3.4. Complete work related documents</p> <p>3.5. Estimate, calculate and record routine workplace measures</p> <p>3.6. Basic mathematical processes of addition, subtraction, division and multiplication</p> <p>3.7. Ability to relate to people of social range in the workplace</p> <p>3.8. Gather and provide information in response to workplace Requirements</p>
<p>4. Resource Implications</p>	<p>4.1. Fax machine</p> <p>4.2. Telephone</p> <p>4.3. Writing materials</p> <p>4.4. Internet</p>
<p>5. Methods of Assessment</p>	<p>5.1. Direct Observation</p> <p>5.2. Oral interview and written test</p>
<p>6. Context for Assessment</p>	<p>6.1. Competency may be assessed individually in the actual workplace or through accredited institution</p>

UNIT OF COMPETENCY : WORK IN TEAM ENVIRONMENT

UNIT CODE : 500311106

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA <i>Bold and Italicized</i> terms are elaborated in the Range of Variables
1. Describe team role and scope	1.1. The role and objective of the team is identified from available sources of information 1.2. Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources
2. Identify own role and responsibility within team	2.1. Individual role and responsibilities within the team environment are identified 2.2. Roles and responsibility of other team members are identified and recognized 2.3. Reporting relationships within team and external to team are identified
3. Work as a team member	3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and workplace context 3.3. Observed protocols in reporting using standard operating procedures 3.4. Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OHS and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
<p>2. Underpinning Knowledge and Attitude</p>	<ul style="list-style-type: none"> 2.1. Communication process 2.2. Team structure 2.3. Team roles 2.4. Group planning and decision making
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1. Communicate appropriately, consistent with the culture of the workplace
<p>4. Resource Implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place Materials relevant to the proposed activity or tasks
<p>5. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1. Observation of the individual member in relation to the work activities of the group 5.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
<p>6. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY: PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA <i>Bold and Italicized</i> terms are elaborated in the Range of Variables
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships is are maintained in the course of managing oneself based on performance evaluation 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties
2. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 Resources are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures
3. Maintain professional growth and development	3.1 Trainings and career opportunities are identified and availed of based on job requirements 3.2 Recognitions are -sought/received and demonstrated as proof of career advancement 3.3 Licenses and/or certifications relevant to job and career are obtained and renewed

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
<p>2. Underpinning Knowledge</p>	<ul style="list-style-type: none"> 2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2 Company policies 2.3 Company-operations, procedures and standards 2.4 Fundamental rights at work including gender sensitivity 2.5 Personal hygiene practices
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Appropriate practice of personal hygiene 3.2 Intra and Interpersonal skills 3.3 Communication skills
<p>4. Resource Implications</p>	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 Case studies/scenarios
<p>5. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Simulation/Role-plays 5.4 Observation 5.5 Third Party Reports 5.6 Exams and Tests
<p>6. Context for Assessment</p>	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE : 500311108

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA <i>Bold and Italicized</i> terms are elaborated in the Range of Variables
1. Identify hazards and risks	1.1. Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2. Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3. Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures
2. Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation
3. Control hazards and risks	3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in

	<p>accordance with organization OHS policies</p> <p>3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices</p> <p>3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol\</p>
4. Maintain OHS awareness	<p>4.1 Emergency-related drills and trainings are participated in as per established organization guidelines and procedures</p> <p>4.2 OHS personal records are completed and updated in accordance with workplace requirements</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics <ul style="list-style-type: none"> • Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • Physiological factors – monotony, personal relationship, work out cycle
3. Contingency measures	May include but are not limited to: 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel

VARIABLE	RANGE
4. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
6. OHS personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed

EVIDENCE GUIDE

1. Critical Aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements
2. Underpinning Knowledge and Attitude	<ul style="list-style-type: none"> 2.1 OHS procedures and practices and regulations 2.2 PPE types and uses 2.3 Personal hygiene practices 2.4 Hazards/risks identification and control 2.5 Threshold Limit Value -TLV 2.6 OHS indicators 2.7 Organization safety and health protocol 2.8 Safety consciousness 2.9 Health consciousness
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 Practice of personal hygiene 3.1. Hazards/risks identification and control skills 3.2. Interpersonal skills 3.4 Communication skills
4. Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 4.1 Workplace or assessment location 4.2 OHS personal records 4.3 PPE 4.4 Health records
5. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Portfolio Assessment 5.2 Interview 5.3 Case Study/Situation
6. Context for Assessment	<ul style="list-style-type: none"> 6.1 Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES

UNIT OF COMPETENCY : **Launch survival craft and life boats**

UNIT CODE : **MTM834201**

UNIT DESCRIPTOR : This unit identifies the competence required to launch and operate survival craft and life boats on a vessel under the direction of Officer of the Watch in compliance with the Philippines and International regulations and guidelines

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms are elaborated in the Range of Variables</i>
1. Launch and operate survival craft and life boats	1.1 Preparation for the launch of lifeboat or survival craft are made in accordance with vessel's procedures and manufacturer's direction 1.2 An appropriate launch strategy is adopted following an assessment of weather and sea conditions and the nature of the emergency situation 1.3 Launching equipment is operated in accordance with vessel's instructions and accepted nautical practice 1.4 The survival craft engine is started using the sequence of actions provided in the manufacturer's instruction 1.5 Appropriate handling strategies are applied to maneuver the survival craft in rough weather and sea conditions 1.6 Exposure cover is deployed on an open lifeboat in accordance with accepted survival practice and manufacturer's specification 1.7 Strategies are adopted and implemented to counter threats to survival following the abandonment of a vessel in accordance with accepted survival practice. 1.8 Food and water is rationed to survivors in accordance with accepted survival practice
2. Operate life saving and survival equipment	2.1 Location and accessibility of all life-saving and survival equipment is established 2.2 Survival equipment is checked and operated in accordance with manufacturer's instructions and regulatory protocols

	<p>2.3 Immersion suit, various thermal protective aids, life jacket and other life-saving clothing are correctly donned and used in accordance with instructions</p> <p>2.4 Faulty life saving equipment is identified and reported to enable prompt repair and / or replacement</p>
3. Remove survival craft	<p>3.1 Persons are disembarked from the survival craft in accordance with vessel's procedures</p> <p>3.2 The survival craft is recovered using the sequence of actions provided in vessel's procedures and manufacturer's instruction</p> <p>3.3 Survival craft is checked for signs and damage</p> <p>3.4 Identified damage or faulty equipment on the survival craft is reported in accordance with vessel's procedures</p>
4. Participate in abandon vessel drills	<p>4.1 Participation in organization and conduct of abandon vessel musters and drills in consistent with regulatory requirements and company procedures</p> <p>4.2 Instructions is provided to others, when required, on the correct use of life saving equipment and procedures to be followed in the event of the order to abandon vessel</p> <p>4.3 Documentation on the checking and replenishment of consumable materials used in life saving, fire detection, fire fighting and other safety system is completed in accordance with company procedures and regulatory requirements</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Survival Craft	1.1 Free fall life boats 1.2 Devit launched life boats 1.3 Life rafts
2. Threats to survival after abandoning vessel may include	2.1 Cold water shock 2.2 Hypothermia 2.3 Psychological response to disaster 2.4 Loss of will to live 2.5 Sea sickness 2.6 Dehydration 2.7 Injuries 2.8 Starvation
3. Life saving and survival equipment	3.1 Life jackets 3.2 Life buoys 3.3 Hard hats 3.4 Immersion suits and other thermal protective aid 3.5 Rocket line throwing appliances 3.6 Pyrotechnic distress signals 3.7 GMDSS survival craft VHF radios 3.8 Satellite emergency position indicating radio beacons 3.9 EPIRBs 3.10 SARTs 3.11 Whistles

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ul style="list-style-type: none"> 1.1 Launched and operated the various types of life raft and lifeboat in suitably simulated situation 1.2 Operated and used the various type of survival equipment in suitably simulated situation 1.3 Participated in abandon vessel musters and drills 1.4 Communicated effectively with others as required when operating survival craft and ancillary survival equipment
<p>2. Underpinning knowledge and attitude</p>	<ul style="list-style-type: none"> 2.1 Construction, outfit and particular characteristics of various types of life boats, life rafts and rescue boats 2.2 Donning a life jacket and using a life jacket light and whistle 2.3 Use of hand-held pyrotechnics 2.4 Deployment of a mob combination light and smoke float
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Procedures for correctly operating and using lifesaving appliances and safety equipment on board vessels and survival craft 3.2 Procedures for emergency response on board vessels including abandoning of vessel 3.3 Procedures for the rationing of food and water in survival craft
<p>4. Resource implications</p>	<p><i>The following resources must be provided:</i></p> <ul style="list-style-type: none"> 4.1 Work place location 4.2 Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition 4.3 Material relevant to the proposed activity and tasks
<p>5. Method of assessment</p>	<p><i>Competency must be assessed through:</i></p> <ul style="list-style-type: none"> 5.1 Demonstration and questioning of related underpinning knowledge 5.2 Written Examination 5.3 Portfolio
<p>6. Context for assessment</p>	<ul style="list-style-type: none"> 6.1 Competency may be assessed in workplace or in a simulated workplace setting 6.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY: **Prevent and fight fire**

UNIT CODE : **MTM834202**

UNIT DESCRIPTOR : This unit identifies the competence required to prevent and fight fires on board a vessel, including management of fire prevention measures, initiation and management of evacuation, emergency shutdown and isolation procedures and the execution and coordination of fire-fighting operations

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Manage fire prevention procedures	1.1. Fire hazards on board a vessel are identified and action is taken to eliminate or minimize them 1.2. Fire detection and fire fighting equipment and systems are regularly checked and appropriate action is taken to ensure that they are operational 1.3. Appropriate educational activities are organized to ensure on-board personnel are aware of the dangers of fire, how to prevent it and what to do if a fire is detected 1.4. Personnel on board a vessel are made aware of emergency procedures to be followed in the event of fire
2. Operate portable fire-fighting equipment	2.1. Classes of fires are correctly identified in accordance with accepted fire-fighting practice 2.2. Correct portable fire-fighting equipment is selected and used to fight specific classes of fires 2.3. Class F fires are correctly extinguished with a fire blanket in accordance with accepted fire-fighting practice 2.4. Methods of extinguishing fire on board a vessel are correctly applied 2.5. Correct techniques are applied for the setting up of foam making equipment to extinguish B Class fires on board vessel 2.6. Where applicable, correct techniques are used to recharge the various types of portable fire extinguisher

	2.7. Where applicable, portable fire-fighting equipment is confirmed as operational following recharging
3. Conduct interior search and rescue and fire-fighting operations (where applicable)	<p>3.1. Procedures for donning and starting up SCBA / CABA are correctly applied</p> <p>3.2. Procedures for the logging of SCBA / CABA operations on a BA Control Board is correctly followed in accordance with vessel's procedures and accepted fire-fighting practice</p> <p>3.3. Search and rescue operations in a smoke filled environment are correctly conducted as a member of a fire-fighting team in accordance with accepted fire-fighting practice</p> <p>3.4. Interior fires are extinguished using appropriate fire fighting equipment and procedures as a member of a fire fighting team in accordance with accepted fire-fighting practice</p> <p>3.5. Lifeline signals are correctly used during interior fire fighting operations</p> <p>3.6. A compartment filled with high expansion foam is correctly entered as per accepted fire-fighting practice</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Classes of Fire	<p>Class A</p> <p>1.1. All solid materials, usually organic origin in nature (contains compounds of carbon) and generally produce glowing embers – i.e., wood, textiles, curtains, furniture and plastics.</p> <p>Class B</p> <p>1.2. All flammable liquids and solids, which can also be sub-divided into :</p> <p>1.3. Miscible with water (i.e., petrol, oils, lubricants, paints and waxes)</p> <p>1.4. Non-miscible with water (e.g., alcohol)</p> <p>Class C</p> <p>1.5. Fires involving domestic main gas, cylinder gases (e.g., Acetylene) or Liquid Petroleum Gases (LPG) such as Butane or Propane)</p> <p>Class D</p> <p>1.6. Fires involving metals (where water is generally ineffective and dangerous) i.e., metal powders such as magnesium, titanium, and alloys, etc.</p> <p>Class F</p> <p>1.7. New class specifically dealing with high temperature</p> <p>1.8. (360 degrees centigrade) cooking oils in large industrial catering kitchens, restaurants and take away establishments, etc.</p> <p>1.9. Electrical</p> <p>1.10. Electrical fires are not considered to constitute a fire class on their own, as electricity is a source of ignition that will feed the fire until removed. When the electrical supply has been isolated. The fire can be treated (generally) as Class A for extinguishing purposes. However, you should use a non-conducting agent on all possible occasions.</p>
2. Fire detection and fire fighting equipment and system	<p>2.1. Portable fire extinguisher including foam, water, CO₂, dry chemical and wet foam</p> <p>2.2. Fire blankets</p>

	<p>2.3. CO2 fixed system</p> <p>2.4. Foam installation including semi-portable and fixed system</p> <p>2.5. Sprinkler system</p> <p>2.6. Fire pumps (main and emergency fire pump)</p> <p>2.7. Fire hoses, hydrants, branches and international shore connection</p>
<p>3. Methods of Extinguishing fire</p>	<p>3.1. Cooling</p> <p>3.2. Reducing the ignition temperature by taking the heat out of the fire – using water (limiting the temperature)</p> <p>3.3. Smothering</p> <p>3.4. Limiting the oxygen available by smothering and preventing the mixture of oxygen and flammable vapour – by use of foam or a fire blanket</p> <p>3.5. Starving</p> <p>3.6. Limiting the fuel supply – by removing the source of fuel ; by switching off electrical power, isolating the flow of flammable liquids or pulling away burning wood or straw, etc.</p> <p>3.7. Chemical Reaction</p> <p>3.8. By interrupting the chain of combustion and combining the hydrogen atoms with chlorine atoms in the hydrocarbon chain, e.g. Halons extinguisher (NB: Halons have now generally been withdrawn under the Montreal Protocol of 1990, as ozone depleting agents)</p>

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ul style="list-style-type: none"> 1.1. Managed and implemented fire prevention measures and procedures on board a vessel 1.2. Assessed the operational capability of fire detection and fire fighting equipment and systems and initiate any required maintenance or replenishment action 1.3. Participated in simulated on board fire fighting activities 1.4. Participated in search and rescue and fire fighting teams 1.5. Implemented OHS principles and policies when carrying out fire fighting duties 1.6. Communicated effectively with others as required during fire emergencies
<p>2. Underpinning knowledge and attitude</p>	<ul style="list-style-type: none"> 2.1. Chemistry of fire and its relationship to materials typically carried on vessels 2.2. Types of fire detection, fire fighting, life saving and safety equipment and systems used on board vessels and the procedures for their use 2.3. Relevant regulations, code of practice, policies and procedures related to the maintenance of fire detection, fire fighting, life saving and safety equipment and system 2.4. Faults that can occur with shipboard fire detection, fire fighting, life saving and safety equipment and appropriate remedial action and solutions 2.5. Statutory and typical company requirements for the documentation of maintenance procedures and outcomes for fire detection, fire fighting, life saving and safety equipment and systems used on board vessels.
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Procedures in checking and replacing consumable materials in typical ship board fire detection, fire-fighting and safety equipment and system 3.2. Procedures in identifying and evaluating operational and maintenance problems with fire-detection, fire fighting, life saving and

	<p>safety equipment and systems and determining appropriate courses of action</p> <p>3.3. Procedures in identifying and implementing improvements to maintenance for fire-detection and fire-fighting.</p> <p>3.4. Procedures on onboard housekeeping processes.</p>
4. Resource implications	<p><i>The following resources must be provided:</i></p> <p>4.1 Work place location</p> <p>4.2. Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition</p> <p>4.3. Material relevant to the proposed activity and tasks</p>
5. Method of assessment	<p><i>Competency must be assessed through :</i></p> <p>5.1. Demonstration and questioning of related underpinning knowledge</p> <p>5.2. Written Examination</p> <p>5.3. Portfolio</p>
6. Context for assessment	<p>6.1. Competency may be assessed in workplace or in a simulated workplace setting</p> <p>6.2. Assessment shall be observed while task are being undertaken whether individually or in-group</p>

UNIT OF COMPETENCY: **Perform survival techniques during ship abandonment**

UNIT CODE : **MTM834203**

UNIT DESCRIPTOR : This unit identifies the competence required to perform survival techniques during ship abandonment either individually or in a team environment with some accountability for the safety of self and other. This includes response to abandon vessel in both simulated and real emergency circumstances

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Practice survival techniques	1.1. The timing and sequence of individual survival actions are appropriate to the prevailing circumstances and conditions of emergency and minimize potential dangers and threats to other survivors 1.2. Initial actions when boarding survival craft enhance chance of survival 1.3. Jumps safely from a height into the water in accordance with established survival practice 1.4. Swims while wearing life jacket and floats without a life jacket in accordance with established survival practice 1.5. Inverted life raft is righted while wearing a life jacket in accordance with established survival practice 1.6. Appropriate handling strategies are applied to maneuver survival craft in rough weather and sea conditions 1.7. Signs of hypothermia or other distress are identified and treated in accordance with accepted survival medical practice 1.8. Exposure cover is deployed on an open life boat in accordance with accepted survival practice and manufacturer's instructions
2. Operate life saving and survival equipment	2.1. Location and accessibility of life saving and survival equipment is established 2.2. Method of boarding survival craft is appropriate and avoids dangers to other survivors

	<p>2.3. Survival equipment is operated in accordance with instructions and accepted survival practice</p> <p>2.4. Survival radio equipment is operated in accordance with manufacturer's instructions and regulatory protocols</p> <p>2.5. Immersion suit, various thermal protective aids, life-jacket and other life saving clothing are correctly donned and used in accordance with instructions</p>
<p>3. Participate in abandon vessel drills</p>	<p>3.1. Abandon vessel musters and drills are attended in accordance with regulatory requirements and company procedures</p> <p>3.2. Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures</p> <p>3.3. Information is obtained and correctly interpreted on the use of life-saving equipment and procedures to be followed in the event of the order to abandon vessel</p>

RANGE OF VARIABLES

VARIABLE	SCOPE
1 Emergencies that may lead to abandonment of vessel include	1.1. Collision resulting in damage to the integrity of the vessel's hull 1.2. Fire 1.3. Foundering 1.4. Flooding of vessel's compartment
2 Survival craft may include	2.1. Free-fall life boats 2.2. Davit-launched life boats 2.3. Life rafts
3 Life saving and survival equipment:	3.1. Life jackets 3.2. Life buoys 3.3. Hard hats 3.4. Immersion suits and other thermal protective aids 3.5. Rocket line throwing appliances 3.6. Pyrotechnic distress signal 3.7. GMDSS survival craft VHF radios 3.8. Satellite emergency position indicating radio beacons (EPIRBs) 3.9. Search and Rescue transponders (SARTs) 3.10. Whistles

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ol style="list-style-type: none"> 1.1. Practiced survival techniques in suitably simulated situations 1.2. Operated and used the various types of survival equipment typically found on a vessel in suitably simulated situations 1.3. Participated in abandon vessels musters and drills 1.4. Communicated effectively with others as required when operating survival craft and ancillary survival equipment
<p>2. Underpinning knowledge and attitude</p>	<ol style="list-style-type: none"> 2.1. Knowledge of relevant maritime regulations dealing with survival at sea following abandonment of vessel 2.2. Incidents that may result in an emergency on board vessel and the appropriate response in each case 2.3. Value of training and emergency drills for enhancing chances of survival at sea 2.4. Location of personal lifesaving appliances on a vessel 2.5. Construction, outfit and particular characteristics of various types of life boats, life rafts and rescue boats
<p>3. Underpinning skills</p>	<ol style="list-style-type: none"> 3.1. Procedures for emergency response on board vessels including abandoning vessel 3.2. Procedures for correctly operating and using lifesaving appliances and personal safety equipment on board vessels and survival craft and specifically : 3.3. Donning a life jacket using a life jacket light and whistle 3.4. Donning an immersion suit 3.5. Deployment of a mob combination light and smoke float 3.6. Use of hand-held pyrotechnics 3.7. Threats to survival on abandonment of a vessel and appropriate strategies for countering these threats 3.8. Ways of maximizing detectability and location of survival craft using pyrotechnic distress signals, portable VHF radios, satellite EPIRBs and SARTs

4. Resource implications	<p><i>The following resources must be provided:</i></p> <p>4.1. Work place location</p> <p>4.2. Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition</p> <p>4.3. Material relevant to the proposed activity and tasks</p>
5. Method of assessment	<p><i>Competency must be assessed through :</i></p> <p>5.1. Demonstration and questioning of related underpinning knowledge</p> <p>5.2. Written Examination</p> <p>5.3. Portfolio</p>
6. Context for assessment	<p>6.1. Competency may be assessed in workplace or in a simulated workplace setting</p> <p>6.2. Assessment shall be observed while task are being undertaken whether individually or in-group</p>

UNIT OF COMPETENCY: **Perform first aid treatment on board**

UNIT CODE : **MTM834204**

UNIT DESCRIPTOR : This unit identifies the competence required to perform first aid treatment to crew and / or passengers during a medical emergency on board a vessel, including the performance of immediate life saving first aid until qualified medical assistance is available, the recognition of symptoms and signs of acute illness and or injury and the taking of appropriate action.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Perform immediate life saving first aid pending the arrival of medical assistance	1.1. The priorities of <i>First Aid Care</i> are correctly applied in real or simulated first aid situation 1.2. The DRABC Action plan is correctly used to identify and control danger, loss of consciousness, loss of airway, breathing and circulation 1.3. An unconscious casualty is correctly placed in stable side position and the steps in clearing the airways to promote breathing in accordance with established first aid procedures 1.4. The correct method of Expired Air Resuscitation (EAR), External Cardiac Compression (ECC) and Cardio Pulmonary Resuscitation (CPR) is applied in real life resuscitation situation or in a simulated exercise using a mannequin
2. Recognize the symptoms and acute illness and or injury and take appropriate action	2.1. The <i>conditions requiring special first aid procedures</i> are correctly identified 2.2. A real or simulated unconscious casualty is cared for in accordance with established first aid procedures 2.3. Causes of respiratory failure and breathing difficulty are correctly identified and appropriate care is provided for a real or simulated casualty with obstructed breathing 2.4. The symptoms and signs of casualty with

	<p>angina pain, heart attack and heart failure are correctly identified</p> <p>2.5. The symptoms and signs of poisoning, bites and stings are correctly identified and appropriate immediate management of the conditions is provided in real or simulated situation</p> <p>2.6. A real or simulated conscious casualty with an acute illness and or injury is cared for in accordance with established first aid procedures</p>
3. Manage wounds and bleeding	<p>3.1. Severe external bleeding is correctly controlled in a real or simulated situation</p> <p>3.2. The symptoms and signs of severe internal bleeding are correctly identified and appropriate immediate management of these conditions is provided in a real or simulated situation</p> <p>3.3. A real or simulated laceration, abrasion and a deep puncture wound is correctly managed in accordance with established first aid procedures</p> <p>3.4. The signs of wound infections are correctly identified and a real or simulated wound infection is correctly managed in accordance with established procedures</p>
4. Manage burns	<p>4.1. Immediate rescue procedures are correctly used in real or simulated first aid situations involving a burned casualty</p> <p>4.2. The severity of burn is correctly assessed in terms of depth, position and size in accordance with established procedures</p> <p>4.3. The correct method of treatment for burns and associated shock is correctly applied in real or simulated first aid situations involving a burned casualty</p>
5. Manage bone, joint and muscle injuries	<p>5.1. Symptoms and signs of fractures (simple and complicated) are correctly recognized in accordance with established first aid procedures</p> <p>5.2. Problems and treatment associated with dislocated joints are correctly managed in accordance with established procedures</p>

	<p>5.3. First aid treatment of pelvic and chest injuries and fractures of limbs, including immobilization techniques is correctly performed in accordance with established procedures</p> <p>5.4. The symptoms and signs of sprains and strains are correctly identified in accordance with established procedure</p>
<p>6. Adapt first aid procedures for remote situations</p>	<p>6.1. Safety precautions needed to prevent accidents, illness and injuries and infection in remote areas situations are correctly applied in real or simulated situations</p> <p>6.2. Identify and discuss the factors involved in the prevention of heat and cold exposure</p> <p>6.3. The symptoms and signs of real or simulated casualty exposed to heat or cold are correctly identified including hyperthermia and hypothermia and appropriate management of the casualty carried out in accordance with established procedures</p> <p>6.4. A real or simulated ill or injured person in remote conditions is correctly, cared for until help arrives, including the monitoring of airway, breathing and heart beat, the control of pain, hydration and maintenance of body temperature</p> <p>6.5. A real or simulated casualty with severe injuries in a remote situation is correctly cared for, including the preparation for transport</p> <p>6.6. First aid resources and emergency equipment required for remote area situations is correctly identified and used in real or simulated situations in accordance with established first aid procedures</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. First aid Care on board a vessel may need to be provided in situation involving :	1.1. Acute illness or injury 1.2. Laceration, abrasion and a deep puncture wounds 1.3. Respiratory failure and breathing difficulty 1.4. Shock as a result of severe injury 1.5. Abdominal, pelvic and chest injuries 1.6. Fractures of limbs 1.7. Poisoning, bites and stings 1.8. Sprains, strains and dislocations 1.9. Facial, ear and eye injuries 1.10. Suspected head, neck and back injuries
2. Conditions requiring special first aid procedures include	2.1. Explosion injuries 2.2. Burns 2.3. Poisons and envenomation 2.4. Hypothermia and hyperthermia
3. First aid resources and equipment include	3.1. Vessels/ medicine cabinet 3.2. First aid boxes 3.3. Emergency first aid carry bags 3.4. Specific first aid resources 3.5. Roller bandages 3.6. Triangular bandages 3.7. Face masks 3.8. Cleaning swabs 3.9. Cleaning brush 3.10. Cleaning materials 3.11. Medicines 3.12. Vessel's Medicine Cabinet 3.13. First Aid Boxes 3.14. Emergency first aid carry bags

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ul style="list-style-type: none"> 1.1. Performed immediate life saving first aid 1.2. Recognized the symptoms and signs of acute illness and or injury and take appropriate action 1.3. Managed wounds and bleeding 1.4. Managed burns 1.5. Managed bone, joints and muscle injuries 1.6. Adapted first aid procedures for remote situation 1.7. Communicated effectively with others during provision of first aid. 1.8. Prepared report on first aid situations and activities in accordance with company and regulatory requirements
<p>2. Underpinning knowledge and attitude</p>	<ul style="list-style-type: none"> 2.1. Duties and responsibilities of the designated first aid officer on board a vessel 2.2. Knowledge on ways in which disease can spread on board a vessel and ways of preventing the spread 2.3. Legal issues related to administration of drugs and medicines on board a vessel 2.4. Knowledge of body structures and functions relevant to possible injury, illnesses and disease that may be encountered on board a vessel 2.5. Maritime communication techniques related to health care and receiving radio medical advice from shore based advisers 2.6. Marine publications containing information on first aid and medical treatment on board a vessel
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1. Medical first aid procedures 3.2. Procedures for conducting an initial patient first aid treatment 3.3. Managing injuries and medical emergencies 3.4. Managing medicine resources 3.5. Techniques for care of wounds 3.6. Correct methods of Expired Air

	Resuscitation (EAR), External Cardiac Compression (ECC) and Cardio Pulmonary Resuscitation (CPR)
4. Resource implications	<p><i>The following resources must be provided:</i></p> <p>4.1. Work place location</p> <p>4.2. Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition</p> <p>4.3. Material relevant to the proposed activity and tasks</p>
5. Method of assessment	<p><i>Competency must be assessed through :</i></p> <p>5.1. Demonstration and questioning of related underpinning knowledge</p> <p>5.2. Written Examination</p> <p>5.3. Portfolio</p>
6. Context for assessment	<p>6.1. Competency may be assessed in workplace or in a simulated workplace setting</p> <p>6.2. Assessment shall be observed while task are being undertaken whether individually or in-group</p>

UNIT OF COMPETENCY: **Protect marine environment**

UNIT CODE : **MTM834205**

UNIT DESCRIPTOR : This unit identifies the competence required to protect marine environment. It involves the development of awareness to preserve and protect marine environment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Identify garbage disposal procedures	1.1. Relevant guidelines for the implementation of garbage disposal onboard are identified and applied to ensure protection of marine environment 1.2. Relevant company requirements on marine environmental protection is followed as per established practice 1.3. Appropriate measures to prevent operational pollution are observed and applied to prevent pollution of the marine environment in accordance with regulations and procedures 1.4. Compliance on state / territory garbage disposal procedures for the protection of the marine environment is monitored and required action is taken where incidences of non-compliance are identified
2. Perform garbage segregation	2.1. MARPOL Regulations and procedures concerning protection of marine environment are adequately followed regarding segregation of garbage 2.2. Marine environment protection programs on board are applied as per established practice 2.3. Any breach of regulations and procedures concerning protection of the marine environment are identified and associated actions are taken in accordance with regulatory requirement and procedures 2.4. Deck rating are provided with necessary information and training to ensure compliance with regulations and procedures for the protection of marine

	environment
3. Record garbage segregation	<p>3.1. Others are assisted and encouraged to observe the garbage segregation policies</p> <p>3.2. Social responsibilities in garbage disposal are observed and performed to ensure protection of marine environment</p> <p>3.3. Contents of report on garbage segregation and disposal are adequately filled-up as per established procedures</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Guidelines for the implementation of garbage disposal onboard	1.1. Incineration option for shipboard generated garbage 1.2. All kinds of victual, domestic and operational waste excluding fresh fish and parts thereof 1.3. Garbage for which there is a total prohibition on discharge into the sea
2. Measures to prevent operational pollution by garbage	2.1. All plastic including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags 2.2. Disposal of any materials regulated by Annex V (Garbage) 2.3. Fixed floating flat form engaged in exploration and associated offshore processing of seabed mineral resources 2.4. Disposal into the sea of food wastes may be permitted when they have been passed through comminuter or grinder for such fixed or floating plat forms
3. Contents of the report on garbage segregation and disposal include	3.1. Report must be sent to the nearest coastal state 3.2. Contents of report must include <ul style="list-style-type: none"> 3.2.1. Name of Ship, call sign and flag 3.2.2. Type of Ship and Tonnage 3.2.3. Cargo carried 3.2.4. Date in Time 3.2.5. Position, Course, Speed at time of incident 3.2.6. Radio Channel Guarded

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ol style="list-style-type: none"> 1.1. Exhibited all required safety environmental and garbage control procedures 1.2. Performed garbage segregation and proper disposal 1.3. Complied with existing company regulations and relevant MARPOL regulation 1.4. Assisted in incineration procedures 1.5. Communicated effectively with other concerning measures to protect the marine environment
<p>2. Underpinning knowledge and attitude</p>	<ol style="list-style-type: none"> 2.1. Knowledge of sections of relevant regulation on garbage segregation and disposal 2.2. Safety, environmental and hazard control precautions and procedures relevant to MARPOL regulations 2.3. Storage of non-bio-degradable materials onboard 2.4. Relevant ISM regulations
<p>3. Underpinning skills</p>	<ol style="list-style-type: none"> 3.1. Procedures for checking garbage coding on garbage segregation 3.2. Procedures for the disposal of food waste based on relevant MARPOL regulation 3.3. Procedures on ship-generated waste on non bio-degradable materials
<p>4. Resource implications</p>	<p><i>The following resources must be provided:</i></p> <ol style="list-style-type: none"> 4.1. Work place location 4.2. Tools and equipment appropriate in protecting marine environment 4.3. Material relevant to the proposed activity and tasks
<p>5. Method of assessment</p>	<p><i>Competency must be assessed through :</i></p> <ol style="list-style-type: none"> 5.1. Demonstration and questioning of related underpinning knowledge 5.2. Written Examination 5.3. Portfolio
<p>6. Context for assessment</p>	<ol style="list-style-type: none"> 6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY: **Comply with emergency procedures**

UNIT CODE : **MTM834206**

UNIT DESCRIPTOR : This unit involves the knowledge, skills and attitude to take appropriate initial action on becoming aware of an emergency on board a vessel and to follow established emergency response procedures.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Take action on becoming aware of an emergency	1.1. Emergencies are correctly recognized and identified 1.2. Response to an emergency situation follows established vessel's emergency response procedures 1.3. Correct action is taken on discovery of an actual or potential emergency in accordance with established vessel procedures 1.4. Information given on raising alarm is prompt, accurate, complete and clear
2. Follow established emergency procedures	2.1. Vessel's contingency plans for emergency response are known and are implemented in real and simulated emergency situations 2.2. Escape routes and internal and external communications and alarm systems are correctly used in real and simulated emergency situations in accordance with regulatory requirements and established procedures 2.3. Emergency communications and alarm signals and systems are understood and required action implemented in accordance with emergency procedures and regulatory requirements 2.4. Planned damage controls procedures for dealing with damage to the vessel and its hull are implemented in accordance with company procedures and regulatory requirements

<p>3. Follow procedures for the use of various life saving appliances</p>	<p>3.1. Participation in life saving drills confirms readiness to correctly carry out life saving procedures and use life saving appliances</p> <p>3.2. Survival equipment are correctly used in the event of emergencies</p> <p>3.3. Procedures for the use of various shipboard life saving appliances are followed in accordance with regulatory requirements, manufacturers instruction and company procedures</p>
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RANGE OF VARIABLES

VARIABLE	RANGE
1. Emergencies	1.1. Collision with another vessel 1.2. Explosion on board vessel 1.3. Impairment of integrity of hull and ingress of water 1.4. Loss of steering control 1.5. Loss of motive power 1.6. Foundering 1.7. Grounding 1.8. Beaching a vessel 1.9. Person overboard 1.10. Rescue and evacuation of injured personnel
2. Survival equipment	2.1. Life jackets 2.2. Exposure and immersion suits 2.3. Survival crafts
3. Contingency Plans	3.1. Contingency Plan in controlling fire or explosion emergency 3.2. Use of appropriate fire fighting equipment and techniques such as various types of fire extinguishers, fire blankets, fire hoses and nozzles and foam applicators 3.3. Activation of fixed fire fighting sprinklers and systems 3.4. Removal of fuel or heat source 3.5. Boundary cooling techniques 3.6. <i>Contingency Plan in controlling flooding emergency</i> 3.7. Use of softwood wedges and plugs to reduce water ingress 3.8. Erection and application of vertical shoring 3.9. Construction and fitting of a leak-stopping mat 3.10. Temporary repair of a ruptured pressurized pipe 3.11. Operation of a portable salvage pump

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ol style="list-style-type: none"> 1.1. Took appropriate action in the event of discovering a shipboard emergency 1.2. Followed vessel's contingency plans for emergency response 1.3. Followed procedures for the use of various life-saving appliances 1.4. Implemented damage control following a shipboard emergency in accordance with instructions 1.5. Identified typical problems that may occur during a shipboard emergency and take appropriate action 1.6. Communicated effectively with others during shipboard emergencies 1.7. Participated in drills to prepare shipboard personnel to implement emergency response
<p>2. Underpinning knowledge and attitude</p>	<ol style="list-style-type: none"> 2.1. Knowledge of relevant maritime regulations 2.2. Navigational emergencies for vessels and appropriate action and solutions 2.3. Indications of various types of emergency situations and the action to be followed when various types of actual or potential emergency situations are identified 2.4. Emergency alarm signals and systems in use on vessels and procedures to be followed when an emergency alarm is raised 2.5. Escape routes and internal and external communications systems and alarms on board a vessel 2.6. General principles of damage and control and the manner in which watertight integrity of hull is maintained on a vessel, including the importance of preparation, control and repair 2.7. Ways of controlling damage during a flooding emergency, including the use of various shipboard items that can be used for damage control purposes such as mattresses, canvas and clothing

	2.8. Maritime communication techniques used during navigational emergencies
3. Underpinning skills	<p>3.1. Taking initial action during real and simulated emergency situation</p> <p>3.2. Implementing emergency during a real and simulated emergency situations</p> <p>3.3. Identifying and evaluating problems that may occur during a shipboard emergency and determining appropriate courses of action</p> <p>3.4. Applying safety and life saving precautions and procedures during emergency situations on board vessel</p> <p>3.5. Participating in drills aimed at preparing shipboard personnel to implement emergency response plans</p>
4. Resource implications	<p><i>The following resources must be provided:</i></p> <p>4.1. Work place location</p> <p>4.2. Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition</p> <p>4.3. Material relevant to the proposed activity and tasks</p>
5. Method of assessment	<p><i>Competency must be assessed through :</i></p> <p>5.1. Demonstration and questioning of related underpinning knowledge</p> <p>5.2. Written Examination</p> <p>5.3. Portfolio</p>
6. Context for assessment	<p>6.1. Competency may be assessed in workplace or in a simulated workplace setting</p> <p>6.2. Assessment shall be observed while task are being undertaken whether individually or in-group</p>

UNIT OF COMPETENCY: **Conduct shipboard security check**

UNIT CODE : **MTM834207**

UNIT DESCRIPTOR : This unit involves the knowledge, skills and attitude in checking visitors and all the personnel coming aboard a ship. It includes checking of packages/ baggage being brought aboard and securing and preventing unauthorized access to ship compartments including cargo spaces

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Regulate access and identification system for visitors and clients	1.1. Bonafide persons entering premises or restricted areas verified by checking relevant details on identification documents 1.2. Issues and return of entry passes controlled according to assignment instructions 1.3. Persons attempting to gain entry without authorization reported and recorded as appropriate 1.4. Incidents which infringe employment / client instruction reported and recorded 1.5. SOPs in checking entry of incoming / outgoing visitors and clients implemented in accordance to company policies and regulations 1.6. SOPs of disgruntled visitors and clients implemented 1.7. Visitors received in a courteous manner, authorized person/s notified and escorted if necessary according to assignment instruction
2. Regulate access and identification system for deliveries, bodily search, luggage, baggage, bags and parcels	2.1. Search carried out according to assignment instructions 2.2. Justification for search of person's property clearly established having regard to the company policy 2.3. SOPs in checking entry of incoming / outgoing deliveries, bodily search, luggage, baggage, bags and parcels implemented in accordance to company

	<p>policies and regulations</p> <p>2.4. Questionable items found during search are dealt with according to company policies</p> <p>2.5. Request to search person's property made according to assignment instructions and having regard to legal requirements</p>
3. Regulate access and identification system for any company properties	<p>3.1. Controlled physical barriers operated according to assignment instructions</p> <p>3.2. Keys and key cards controlled, recorded and monitored according to assignment instructions</p> <p>3.3. SOPs in checking incoming / outgoing company properties implemented in accordance to company policies and regulations</p> <p>3.4. Keys , keypads, key cards and alarm panels to secure premises used according to manufacturers' specifications</p> <p>3.5. Keypad and alarm entry systems activated and deactivated according to prescribed procedures and clients instructions</p>
4. Prepare initial report	<p>4.1. Reports are prepared as prescribed by 5Ws and 1H in the cardinal rule in accordance with investigative procedures</p> <p>4.2. Communication flow should be observed at all times</p>
5. Maintain security logbook	<p>5.1. Accurate and detailed report of facts and events in the guard post is properly signed by the guard on duty</p> <p>5.2. Events and facts are recorded in chronological order</p> <p>5.3. Security logbook is properly signed by both guards during the turn-over</p> <p>5.4. Confidentiality of information contained in security logbook maintained</p> <p>5.5. Proper safekeeping of logbook maintained</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Identification documents	1.1. I.D. Cards 1.2. Passes 1.3. Badges 1.4. Gate Pass 1.6. Material Pass 1.7. Work Permits 1.8. Receipts
2. Persons	2.1. Visitors 2.2. Representatives / agents 2.3. Contractors 2.4. All other persons with valid reasons for boarding vessel
3. Incidents	3.1. Refusal to show pass 3.2. Loss Pass 3.3. Using a pass belonging to another party 3.4. Accidents resulting in injury 3.5. Forced entry of persons 3.6. Unauthorized items found during inspection
4. Physical Barriers	4.1. Working system 4.2. Electronic Access Doors 4.3. Shutters and Gates

EVIDENCE GUIDE

<p>1. Critical aspects of Competency</p>	<p>Assessment requires evidence that the candidate :</p> <ol style="list-style-type: none"> 1.1. Regulate of access and identification system for visitors 1.2. Demonstrated capacity to correctly secure premises and systems according to assignment instructions 1.3. Demonstrated capacity to identify items and goods which may contain explosive materials or key ingredients in making explosive 1.4. Properly maintained logbooks, visitor's log book, incident reports and all keys and locks are accounted for
<p>2. Underpinning knowledge and attitude</p>	<ol style="list-style-type: none"> 2.1. ISPS Code 2.2. Bomb Awareness 2.3. Alarm systems and locations 2.4. Dangerous goods (items and materials) 2.5. Confiscation Procedures 2.6. Gender Awareness and Development
<p>3. Underpinning skills</p>	<ol style="list-style-type: none"> 3.1. Ability to monitor activities within area of assignment 3.2. Ability to secure entries to crew and cargo spaces 3.3. Ability to implement emergency procedures 3.4. Conduct search (person, luggage, baggage, bags and parcels)
<p>4. Resource implications</p>	<p><i>The following resources must be provided:</i></p> <ol style="list-style-type: none"> 4.1. Work place location 4.2. Tools and equipment appropriate to schedule housekeeping activities and to monitor and maintain working condition 4.3. Material relevant to the proposed activity and tasks
<p>5. Method of assessment</p>	<p><i>Competency must be assessed through:</i></p> <ol style="list-style-type: none"> 5.1. Demonstration and questioning of related underpinning knowledge 5.2. Written Examination 5.3. Portfolio
<p>6. Context for assessment</p>	<ol style="list-style-type: none"> 6.1. Competency may be assessed in workplace or in a simulated workplace setting 6.2. Assessment shall be observed while task are being undertaken whether individually or in-group

CORE COMPETENCIES

UNIT OF COMPETENCY: **SERVICE MARINE ELECTRIC GENERATORS**

UNIT CODE: **MTM311301**

UNIT DESCRIPTOR: This unit encapsulates skills, know-how and work quality required in performing preventive and corrective maintenance servicing to electric generator.

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1	Work instruction is secured from immediate superior following company standard operating procedures (SOP)
		1.2	<i>Occupational safety and health standards</i> are identified in line with job requirements
		1.3	<i>Personal protective equipment</i> (PPE) is identified and selected in line with job requirements
		1.4	<i>Hand and special tools and test instruments</i> are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1	Work instruction is interpreted in line with job specifications
		2.2	Occupational safety and health standards are complied with.
		2.3	PPE is used in line with job requirements
		2.4	Hand and special tools and test instruments are prepared in line with job requirements

3.	Perform preventive and corrective maintenance servicing for electric generator components	3.1 3.2 3.3 3.4	<p>Checking procedure for generator is performed in line with job requirements</p> <p>Refilling procedure for bearing lubricant is performed in line with job requirements</p> <p>Preventive and corrective maintenance servicing procedure is performed in line with job requirements</p> <p>Insulation resistance measurement procedure is performed in line with job requirements</p>
4.	Perform good housekeeping	4.1 4.2 4.3	<p>Work area is cleaned following company SOP</p> <p>Hand tools and test instruments are cleaned and stored following company SOP</p> <p>Work completion report is prepared and submitted to immediate supervisor following company SOP.</p>

RANGE OF VARIABLES

1.	Occupational safety and health standards	1.1 1.2 1.3	May include but not limited to: Safety checklist accomplishment Availability of PPE Flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5 2.6 2.7	May include but not limited to: Safety helmet Steel toe safety shoes Eye goggles Gloves Face mask Ear muff Coverall
3.	Hand tools and test instruments	3.1 3.2 3.3 3.4	May include but not limited to: Standard electrical hand tools Multi tester Megger tester Clamp-on ammeter
4.	Checking procedures	4.1 4.2	Visual Physical
5.	Generator	5.1 5.2 5.3 5.4	Shaft generator Main/auxiliary generator 600 Volts and below Emergency generator
6.	Lubricant	6.1 6.2	Grease Oil
7.	Preventive and corrective maintenance servicing procedure	7.1 7.2 7.3	May include but not limited to: Ventilation filters Damaged space heater Damaged circuit board

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>1.1 1.2 1.3 1.4</p>	<p>Competency requires evidence that the candidate:</p> <p>Demonstrates ability to plan and prepare for work</p> <p>Demonstrates ability to prepare hand tools and test instruments</p> <p>Demonstrates ability to perform minor maintenance servicing for electric generator components</p> <p>Demonstrates ability to perform good housekeeping</p>
<p>2. Underpinning knowledge</p>	<p>2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9</p>	<p>Occupational safety and health standards</p> <p>Types and uses of hand tools and test instruments</p> <p>Manufacturer's instructions manual</p> <p>Procedure for performing minor maintenance servicing for electric generators</p> <p>Company standard operating procedure</p> <p>Schematic diagram</p> <p>Parts and functions of generators</p> <p>Basic troubleshooting procedure for space heater</p> <p>Basic electrical calculations</p>
<p>3. Underpinning Skills</p>	<p>3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9</p>	<p>Complying occupational health and safety standards</p> <p>Following manufacturer's instruction manual</p> <p>Using hand tools and test instruments</p> <p>Performing procedure for minor maintenance servicing for electric generators</p> <p>Following company standard operating procedure</p> <p>Interpreting schematic diagram</p> <p>Understanding parts and functions of generators</p> <p>Following basic troubleshooting procedure for space heater</p> <p>Applying basic electrical calculations</p>

4. Resource implication	4.1 4.2	The following resources must be provided: Hand tools and test instruments Access to vessel with electrical system
5. Method of assessment	5.1 5.2 5.3 5.4	Competency may be assessed through: Demonstration with oral questioning Third party report Written test Portfolio
6. Context of assessment	6.1	Competency may be assessed in the workplace or in a simulated work environment

UNIT OF COMPETENCY: **SERVICE MARINE ELECTRIC MOTORS**

UNIT CODE: **MTM311302**

UNIT DESCRIPTOR: This section covers the knowledge, skills and attitude in performing preventive and corrective maintenance servicing for electric motors on board ship.

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1 1.2 1.3 1.4	Work instruction is secured from immediate superior following company standard operating procedures (SOP) Occupational safety and health standards are identified in line with job requirements Personal protective equipment (PPE) is identified and selected in line with job requirements Hand and special tools and test instruments are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1 2.2 2.3 2.4	Work instruction is interpreted in line with job specifications Occupational safety and health standards are complied with. PPE is used in line with job requirements Hand and special tools and test instruments are prepared in line with job requirements
3.	Perform preventive and corrective maintenance servicing for electric motors	3.1 3.2 3.3	Checking procedure for electric motor is performed in line with job requirements Preventive maintenance servicing procedure is performed in line with job requirements and as per PMS schedule Corrective maintenance servicing procedure is performed in line with electric motor fault .

4.	Perform good housekeeping	4.1 4.2 4.3	Work area is cleaned following company SOP Hand and special tools and test instruments are cleaned and stored following company SOP Work completion report is prepared and submitted to immediate supervisor following company SOP.
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RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2 1.3	May include but not limited to: Safety checklist accomplishment Availability of PPE Availability and functionality of fire extinguisher and flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5 2.6 2.7	May include but not limited to: Safety helmet Steel toe safety shoes Eye goggles Gloves Face mask Ear muff Coverall
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4 3.5 3.6	May include but not limited to: Standard electrical hand tools Pullers Chain block Multi tester Megger tester Clamp-on ammeter
4.	Checking procedure	4.1 4.2	Visual Physical
5.	Electric Motors	5.1 5.2 5.3 5.4 5.5 5.6 5.7	600 Volts and below 3 phase and single phase motors Squirrel cage and wound rotor induction motor AC and DC motors Synchro motor Stepper motors Universal motor
6..	Preventive maintenance servicing procedure	6.1 6.2 6.3 6.4 6.5 6.6 6.7	May include but not limited to: Clean motor body Clean ventilation impeller Check motor cable gland Check for loose connections and contacts Check for motor alignment/vibrations Measure insulation resistance Grease / lubricate ball bearings

7.	PMS schedules	7.1 7.2 7.3 7.4	Monthly Quarterly Semi-annually Annually
8.	Electric motor fault	8.1 8.2 8.3	May include but not limited to: Abnormal current and voltage Abnormal temperature Unusual noise

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Competency requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Demonstrates ability to plan and prepare for work 1.2 Demonstrates ability to prepare hand and special tools and test instrument 1.3 Demonstrates ability to perform preventive and corrective maintenance servicing procedure for electric motors 1.4 Demonstrates ability to perform good housekeeping
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1 Occupational safety and health standards 2.2 Types and uses of hand and special tools and test instruments 2.3 Manufacturer's instructions manual 2.4 Procedure for performing preventive and corrective servicing for electric motors 2.5 Company standard operating procedure 2.6 Schematic diagram 2.7 Parts and functions of electric motors 2.8 Basic trouble shooting procedure for electric motor 2.9 Basic electrical calculations
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Complying occupational safety and health standards 3.2 Using hand tools and test instruments 3.3 Following manufacturer's instructions manual 3.4 Performing preventive and corrective servicing procedure for electric motors 3.5 Following company operating procedure 3.6 Interpreting schematic diagram 3.7 Understanding parts and functions of electric motors 3.8 Following basic trouble shooting procedure for electric motor 3.9 Applying basic electrical calculations

4. Resource implication	<p>The following resources MUST be provided:</p> <ul style="list-style-type: none"> 4.1 Basic electrical testing instruments 4.2 Spare parts 4.3 Planned Maintenance schedule 4.4 Schematic diagrams and manuals 4.5 Electrical & Mechanical Tools 4.6 Electric motor
5. Method of assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Demonstration with questioning 5.2 Portfolio 5.3 Third party report 5.4 Written test
6. Context of assessment	<p>6.1 Competency may be assessed at work in the workplace or in a simulated work environment</p>

UNIT OF COMPETENCY: **SERVICE MARINE LIGHTING SYSTEM**

UNIT CODE: **MTM311303**

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes in performing preventive and corrective maintenance on lighting system.

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1 1.2 1.3 1.4	Work instruction is secured from immediate superior following company standard operating procedures (SOP) Occupational safety and health standards are identified in line with job requirements Personal protective equipment (PPE) is identified and selected in line with job requirements Hand and special tools and test instruments and materials are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1 2.2 2.3 2.4 2.5	Work instruction is interpreted in line with job specifications Occupational safety and health standards are complied with. PPE is used in line with job requirements Hand and special tools and test instruments are prepared in line with job requirements Electrical materials are prepared in line with job requirements
3.	Perform preventive and corrective maintenance servicing for lighting system	3.1 3.2 3.3	Checking procedure for lighting system is performed in line with job requirements Preventive maintenance servicing procedure is performed in line with job requirements and as per PMS schedule Corrective maintenance servicing procedure is performed in line with lighting system fault .

4.	Perform good housekeeping	4.1	Work area is cleaned following company SOP
		4.2	Hand and special tools and test instruments are cleaned and stored following company SOP
		4.3	Work completion report is prepared and submitted to immediate supervisor following company SOP.
		4.4	Perform inventory report following company SOP

RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2 1.3	May include but not limited to- Safety checklist accomplishment Availability of PPE Availability and functionality of fire extinguisher and flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5 2.6 2.7	May include but not limited to: Safety helmet Steel toe safety shoes Eye goggles Gloves Ear muff Safety belt Coverall
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4	Multi tester Megger tester Basic electrical hand tools Spanners
4.	Materials	4.1 4.2 4.3 4.4 4.5	May include but not limited to: Lamp Lamp holder Ballast Starter Switches
5.	Checking procedure	5.1 5.2	Visual Physical
6.	Preventive maintenance servicing procedure	6.1 6.2 6.3 6.4	May include but not limited to: Cleaning of fixture cover Tightening of connections and cable glands Replacement of deteriorated lighting component Restoration of water tightness for deck lightings
7.	PMS Schedule	7.1 7.2 7.3 7.4	Monthly Quarterly Semi-annually Annually

8.	Corrective maintenance servicing procedure	8.1 8.2 8.3	Relamping and replacement of defective lighting fixture components in hazardous areas (e.g. battery room, paint room, chemical storage room, pump room, etc.) Relamping and replacement of defective lighting fixture components in non-hazardous areas Insulation resistance testing of electric cables
9.	Lighting system fault	9.1 9.2 9.3 9.4	May include but not limited to: Illumination failure Loose connection Deteriorated lamp holder Defective ballast and other components

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>Competency requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Demonstrates ability to plan and prepare for work 1.2 Demonstrates ability to prepare hand and special tools and test instrument and electrical materials 1.3 Demonstrates ability to perform preventive and corrective maintenance servicing procedure for lighting system 1.4 Demonstrates ability to perform good housekeeping
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1 Occupational safety and health standards 2.2 Types and uses of hand and special tools and test instruments and electrical materials 2.3 Manufacturer's instructions manual 2.4 Procedure for performing preventive and corrective servicing for lighting system in hazardous and non-hazardous areas 2.5 Company standard operating procedure 2.6 Circuit diagram of various lighting connections. 2.7 Parts and functions of hazardous and non-hazardous lighting fixtures
<p>3. Underpinning Skills</p>	<ul style="list-style-type: none"> 3.1 Complying occupational safety and health standards 3.2 Using hand and special tools and test instruments and electrical materials 3.3 Following manufacturer's instructions manual 3.4 Performing preventive and corrective servicing procedure for lighting system in hazardous and non-hazardous areas 3.5 Following standard operating procedure 3.6 Connecting various lighting circuits 3.7 Understanding parts and functions of hazardous and non-hazardous lighting fixtures

4. Resource implication	The following resources MUST be provided: 4.1 Basic electrical testing instruments and hand tools 4.2 Electrical materials 4.3 Planned Maintenance schedule 4.4 Schematic diagrams and manuals
5. Method of assessment	Competency may be assessed through: 5.1 Demonstration with questioning 5.2 Portfolio 5.3 Third party report 5.4 Written test
6. Context of assessment	6.1 Competency may be assessed at work in the workplace or in a simulated work environment

UNIT OF COMPETENCY: **SERVICE AND MAINTAIN MARINE BATTERIES**

UNIT CODE: **MTM311304**

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes in performing routine checking, testing and maintaining of batteries on board ship.

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1 1.2 1.3	Occupational safety and health standards are identified in line with job requirements Personal protective equipment (PPE) is identified and selected in line with job requirements Hand and special tools and test instruments and materials are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1 2.2 2.3	Occupational safety and health standards are complied with. PPE is used in line with job requirements Hand and special tools and test instruments are prepared in line with job requirements
3.	Service and maintain marine batteries	3.1 3.2	Routine checking and testing procedure for batteries is performed in line with regulatory requirements Preventive maintenance servicing procedure for battery is performed in line with regulatory requirements and as per battery PMS schedule
4.	Perform good housekeeping	4.1 4.2 4.3 4.4	Work area is cleaned following company SOP Hand and special tools and test instruments are cleaned and stored following company SOP Work completion report is prepared and submitted to immediate supervisor following company SOP. Perform inventory report following company SOP

RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2	May include but not limited to- Safety checklist accomplishment Availability of PPE
2.	PPE	2.1 2.2 2.3 2.4 2.5 2.6 2.7	May include but not limited to: Safety helmet Steel toe safety shoes Eye goggles Rubber gloves Apron Eye wash Mask
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4	May include but not limited to: Hydrometer Volt meter or multi tester Spanner Funnel
4.	Materials	4.1 4.2 4.3	May include but not limited to: Distilled water Silicon grease Rugs
5.	Routine checking and testing procedure	5.1 5.2	May include but not limited to: Visual Physical 5.2.1 Use of hydrometer 5.2.2 Use of multi tester
6.	Batteries	6.1 6.2 6.3 6.4	May include but not limited to: General purpose Radio Emergency generator Life boat
7.	Preventive maintenance procedure	7.1 7.2 7.3	Top up or replenish distilled water Tighten and apply silicon grease on terminal connection Battery boost charging whenever required

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>1.1 1.2 1.3 1.4</p>	<p>Competency requires evidence that the candidate:</p> <p>Demonstrates ability to plan and prepare for work</p> <p>Demonstrates ability to prepare hand and special tools and test instrument</p> <p>Demonstrates ability to service and maintain batteries</p> <p>Demonstrates ability to perform good housekeeping</p>
<p>2. Underpinning knowledge</p>	<p>2.1 2.2 2.3 2.4 2.5 2.6</p>	<p>Occupational safety and health standards</p> <p>Types and uses of hand and special tools and test instruments</p> <p>Battery manufacturer's instructions manual</p> <p>Procedure for servicing and maintaining batteries</p> <p>Company standard operating procedure</p> <p>Types and characteristics of storage batteries</p>
<p>3. Underpinning Skills</p>	<p>3.1 3.2 3.3 3.4 3.5 3.6</p>	<p>Complying safety and health standards</p> <p>Using hand and special tools and test instruments</p> <p>Following manufacturer's instructions manual</p> <p>Following procedure for servicing and maintaining batteries</p> <p>Performing good housekeeping</p> <p>Understanding types and characteristics of storage batteries</p>
<p>4. Resource implication</p>	<p>4.1 4.2 4.3</p>	<p>The following resources must be provided:</p> <p>Batteries</p> <p>Basic and special hand tools and test instruments</p> <p>Battery service manual</p>

5. Method of assessment	5.1 5.2 5.3 5.4	Competency may be assessed through: Demonstration and oral questioning Third party report Written test Portfolio
6. Context of assessment	6.1	Competency may be assessed at work in the workplace or in a simulated work environment

UNIT OF COMPETENCY: **MAINTAIN MARINE MOTOR CONTROLS AND OTHER BASIC ELECTRONIC CONTROL SYSTEMS**

UNIT CODE: **MTM311305**

UNIT DESCRIPTOR: This unit of competency covers the knowledge, skills and attitudes in performing basic maintenance procedures for motor controls and other electronic control systems

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1 1.2 1.3 1.4	Work instruction is secured from immediate superior following company standard operating procedures (SOP) Occupational safety and health standards are identified in line with job requirements Personal protective equipment (PPE) is identified and selected in line with job requirements Hand and special tools and test instruments and materials are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1 2.2 2.3 2.4	Work instruction is interpreted in line with job specifications Occupational safety and health standards are complied with. PPE is used in line with job requirements Hand tools and test instruments are prepared in line with job requirements

3.	Perform basic maintenance	3.1 3.2 3.3	<p>Checking procedure for electric motor control and other basic electronic control systems is performed in line with job requirements</p> <p>Preventive maintenance servicing procedure for electric motor control and other electronic control systems is performed in line with job requirements and as per PMS schedule</p> <p>Corrective maintenance servicing procedure is performed in line with electric motor control and other electronic control systems fault.</p>
4.	Perform good housekeeping	4.1 4.2 4.3 4.4	<p>Work area is cleaned following company SOP</p> <p>Hand and special tools and test instruments are cleaned and stored following company SOP</p> <p>Work completion report is prepared and submitted to immediate supervisor following company SOP.</p> <p>Perform inventory report following company SOP</p>

RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2 1.3	May include but not limited to- Safety checklist accomplishment Availability of PPE Availability and functionality of fire extinguisher and flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5	May include but not limited to: Safety helmet Steel toe safety shoes Gloves Ear muff Coverall
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4 3.5	May include but not limited to: Standard electrical hand tools Multi tester Clamp meter Megger Calibrating instruments for sensors
4.	Supplies and materials	4.1 4.2 4.3 4.4	May include but not limited to: Indicator lamps Bolts Terminal connectors Switches
5.	Checking procedure	4.1 4.2 4.2.1 4.2.2 4.2.3	Visual Physical 4.2.1 Use of multi tester 4.2.2 Use of clamp meter 4.2.3 Use of megger
5.	Electric motor controls	5.1 5.2 5.3 5.4 5.5	May include but not limited to: Pumps Refrigeration and air-conditioning equipment Cranes Electrical appliances Ventilation fans and blowers

6.	Basic electronic control systems	6.1 6.2 6.3 6.4 6.5	May include but not limited to: Level control system/bilges alarm Battery chargers Fire alarm Navigation lights panel Engine room alarm
7	Preventive maintenance servicing procedure	7.1 7.2 7.3 7.4	May include but not limited to: Tightening of terminal connections Tightening of cable glands and cable entries Cleaning of control panels Relamping indicator lamps
8	PMS Schedule	8.1 8.2 8.3 8.4	Monthly Quarterly Semi-annually Annually
9.	Fault	9.1 9.2	Loose connections Defective control components: 9.2.1 Push buttons and selector switches 9.2.2 Limit switches 9.2.3 Proximity switches 9.2.4 Pressure switches 9.2.5 Temperature switches 9.2.6 Relays and contactors

EVIDENCE GUIDE

<p>1. Critical aspects of competency</p>	<p>1.1 1.2 1.3 1.4</p>	<p>Competency requires evidence that the candidate:</p> <p>Demonstrates ability to plan and prepare for work</p> <p>Demonstrates ability to prepare hand and special tools and test instruments and supplies and materials</p> <p>Demonstrates ability to perform basic maintenance for electric motor control and other basic electronic control systems</p> <p>Demonstrates ability to perform good housekeeping</p>
<p>2. Underpinning knowledge</p>	<p>2.1 2.2 2.3 2.4 2.5</p>	<p>Occupational safety and health standards</p> <p>Types and uses of hand and special tools and test instruments</p> <p>Procedure for performing basic maintenance for electric motor controls and other basic electronic controls systems</p> <p>Types and functions of motor control systems</p> <p>Basic calculations</p>
<p>3. Underpinning Skills</p>	<p>3.1 3.2 3.3 3.4 3.5</p>	<p>Complying occupational safety and health standards</p> <p>Using hand and special tools and test instruments</p> <p>Performing basic maintenance procedure for electric motor controls and other basic electronic controls systems</p> <p>Understanding types and functions of motor controls systems</p> <p>Performing basic calculations</p>
<p>4. Resource implication</p>	<p>4.1 4.2 4.3</p>	<p>The following resources must be provided:</p> <p>Hand and special tools and test instrument</p> <p>Access to motor controls and other basic electronic controls system</p> <p>Relevant supplies and materials</p>

5. Method of assessment	5.1 5.2 5.3 5.4	Competency may be assessed through: Demonstration with oral questioning Third party report Written test Portfolio
6. Context of assessment	6.1	Competency may be assessed at work in the workplace or in a simulated work environment

UNIT OF COMPETENCY : **SERVICE MARINE ELECTRICAL APPLIANCES**

UNIT CODE: **MTM311306**

UNIT DESCRIPTOR: This unit of competency covers the knowledge, skills and attitudes in maintaining and repairing electrical appliances

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1 1.2 1.3 1.4	Work instruction is secured from immediate superior following company standard operating procedures (SOP) Occupational safety and health standards are identified in line with job requirements Personal protective equipment (PPE) is identified and selected in line with job requirements Hand and special tools and test instruments and materials are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1 2.2 2.3 2.4	Work instruction is interpreted in line with job specifications Occupational safety and health standards are complied with. PPE is used in line with job requirements Hand and special tools and test instruments and materials are prepared in line with job requirements
3.	Perform preventive and corrective servicing for electrical appliances	3.1 3.2 3.3	Checking procedure for electrical appliances is performed in line with job requirements Preventive maintenance servicing procedure is performed in line with job requirements and as per PMS schedule Corrective maintenance servicing procedure is performed in line with electrical appliances trouble.

4.	Perform good housekeeping	4.1	Work area is cleaned following company SOP
		4.2	Hand and special tools and test instruments are cleaned and stored following company SOP
		4.3	Work completion report is prepared and submitted to immediate supervisor following company SOP.
		4.4	Perform inventory report following company SOP

RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2 1.3	May include but not limited to: Safety checklist accomplishment Availability of PPE Availability and functionality of fire extinguisher and flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5 2.6	May include but not limited to: Safety helmet Steel toe safety shoes Eye goggles Gloves Face mask Coverall
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4 3.5 3.6	May include but not limited to: Standard electrical hand tools Multi tester Megger Clamp meter Spanner Brush
4.	Materials	4.1 4.2 4.3 4.4	May include but not limited to: Electrical cleaning solvent Insulating materials Electrical tapes Penetrating oil
5.	Checking procedure	5.1 5.2	Visual Physical: 5.2.1 Use of multi tester 5.2.1 Use of megger 5.3.3 Use of clamp meter
6.	Electrical Appliances	6.1 6.2 6.3	Laundry appliances Galley appliances Cabin appliances
7.	Preventive maintenance servicing procedure	7.1 7.2 7.3 7.4	Tightening of terminal connections Tightening of cable glands and cable entries Cleaning of control panels Relamping indicator lamps

8.	PMS Schedule	8.1 8.2 8.3 8.4	Monthly Quarterly Semi-annually Annually
9.	Corrective maintenance servicing procedure	9.1 9.2 9.3 9.4	May include but not limited to: Tightening of terminal connections Re-insulating conductors and other wiring connections Drying moisturized or wet wiring connections and other components Replacing defective parts of electrical appliances
10.	Electrical appliances trouble	10.1 10.2 10.3 10.4	Loose connections Earth faults or grounded Short circuit faults Open circuit faults

EVIDENCE GUIDE

<p>1. Critical aspect of competency</p>	<p>Competency requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Demonstrates ability to plan and prepare for work 1.2 Demonstrates ability to prepare hand and special tools and test instrument 1.3 Demonstrates ability to maintain and repair electrical appliances 1.4 Demonstrates ability to perform good housekeeping
<p>2. Underpinning Knowledge</p>	<ul style="list-style-type: none"> 2.1 Occupational safety and health standards 2.2 Types and uses of hand and special tools and test instruments 2.3 Manufacturer's instructions and service manuals 2.4 Procedure for maintaining and repairing electrical appliances 2.5 Company standard operating procedure 2.6 Basic motors and electric heater circuitries 2.7 Basic calculations
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Complying occupational safety and health standards 3.2 Using of hand and special tools and test instruments 3.3 Following manufacturer's instructions and service manuals 3.4 Performing procedures for maintaining and repairing electrical appliances 3.5 Following company standard operating procedure 3.6 Analyzing circuit faults 3.7 Applying basic calculations
<p>4. Resource implications</p>	<p>The following resource must be provided:</p> <ul style="list-style-type: none"> 4.1 Basic and special hand tools and test instruments 4.2 Access to electrical appliances 4.3 Relevant materials
<p>5. Methods of assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 5.1 Demonstration with oral questioning 5.2 Third party report 5.3 Written test 5.4 Portfolio
<p>6. Context for assessment</p>	<ul style="list-style-type: none"> 6.1 At work in the workplace or in a simulated work environment

UNIT OF COMPETENCY: **MAINTAIN BASIC ALARM SYSTEMS ON BOARD SHIP**

UNIT CODE: **MTM311307**

UNIT DESCRIPTOR: This unit covers the knowledge, skills and attitudes in testing, calibrating and repairing alarms system on board ship as required by Classification Society for Engine Room UMS Certificate (Unmanned Machinery Space Certificate)

ELEMENT		PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	
1.	Plan and prepare for work	1.1	Work instruction is secured from immediate superior following company standard operating procedures (SOP)
		1.2	Occupational safety and health standards are identified in line with job requirements
		1.3	Personal protective equipment (PPE) is identified and selected in line with job requirements
		1.4	Hand and special tools and test instruments are identified and selected in line with job requirements
2.	Prepare hand and special tools and test instruments	2.1	Work instruction is interpreted in line with job specifications
		2.2	Occupational safety and health standards are complied with.
		2.3	PPE is used in line with job requirements
		2.4	Hand and special tools and test instruments are prepared in line with job requirements
3.	Perform testing and repair of alarm system	3.1	Testing procedure for alarms system is performed in line with job requirements and/or as per PMS schedule
		3.2	Calibration procedure is performed in accordance with required standard set point
		3.3	Corrective maintenance servicing procedure is performed in line with alarms system failure.

4.	Perform good housekeeping	4.1	Work area is cleaned following company SOP
		4.2	Hand and special tools and test instruments are cleaned and stored following company SOP
		4.3	Work completion report is prepared and submitted to immediate supervisor following company SOP.

RANGE OF VARIABLES

1.	Occupational health and safety standards	1.1 1.2 1.3	May include but not limited to- Safety checklist accomplishment Availability of PPE Availability and functionality of fire extinguisher and flashlight
2.	PPE	2.1 2.2 2.3 2.4 2.5	May include but not limited to: Safety helmet Steel toe safety shoes Gloves Ear muff Coverall
3.	Hand and special tools and test instruments	3.1 3.2 3.3 3.4	May include but not limited to: Standard electrical hand tools Set of spanners Pressure calibrator Temperature calibrator
4.	Testing procedure	4.1 4.2 4.3 4.4	May include but not limited to: Pressure Temperature Level Fire alarm
5.	PMS Schedule	5.1 5.2 5.3 5.4	Monthly Quarterly Semi-annually Annually
6.	Corrective maintenance servicing procedure	6.1 6.2	Tightening Replacement
7.	Alarm system failure	7.1 7.2 7.3	Possible causes: Loose connections Faulty sensor Pressure monitoring failure

EVIDENCE GUIDE

1. Critical aspects of competency	<ul style="list-style-type: none"> 1.1 1.2 1.3 1.4 	<p>Competency requires evidence that the candidate:</p> <ul style="list-style-type: none"> Demonstrates ability to plan and prepare for work Demonstrates ability to prepare hand and special tools and test instrument Demonstrates ability to test and repair basic alarm system Demonstrates ability to perform good housekeeping
2. Underpinning knowledge	<ul style="list-style-type: none"> 2.1 2.2 2.3 2.4 2.5 	<ul style="list-style-type: none"> Occupational safety and health standards Types and uses of hand and special tools and test instruments Manufacturer's manuals Procedure for testing and repairing basic alarm system Company standard operating procedure
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 3.2 3.3 3.4 3.5 	<ul style="list-style-type: none"> Complying occupational safety and health standards Using hand and special tools and test instruments Following manufacturer's manuals Performing procedure for testing and repairing basic alarm system Following company standard operating procedure
4. Resource implication	<ul style="list-style-type: none"> 4.1 4.2 	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> Basic and special hand tools and test instruments Access to various engine room alarm system
5. Method of assessment	<ul style="list-style-type: none"> 5.1 5.2 5.3 5.4 	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> Demonstration with oral questioning Third party report Written test Portfolio
6. Context of assessment	<ul style="list-style-type: none"> 6.1 	<p>Competency may be assessed at work in the workplace or in a simulated work environment</p>

SECTION 3 TRAINING STANDARDS

These guidelines are set to provide the Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for MARINE ELECTRICITY NC II.

3.1 CURRICULUM DESIGN

Course Title: **MARINE ELECTRICITY**

NC Level: **NC II**

Suggested Nominal Training Duration:

18 Hours (Basic Competencies)
24 Hours (Common Competencies)
300 Hours (Core Competencies)
342 Hours –Total*

Course Description:

This course is designed to equip individual with operational skills, knowledge and attitudes in performing electrical work on board in accordance with industry standards. It covers the basic, common and core competencies required of assistant marine electrician or cadet electrician to acquire.

To obtain this, all units prescribed for this qualification must be achieved.

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Participate in workplace communication	1.1 Obtain and convey workplace information 1.2 Complete relevant work related documents 1.3 Participate in workplace meeting and discussion	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews / questioning

* This is the minimum training duration applicable to trainees with equivalent of one year training/experience in industrial electricity (this would include graduates of electrical or electronics engineering and licensed master electricians with experience). This may be increased for programs intended for trainees with minimal or no training and experience in industrial electricity.

2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team 2.2 Describe work as a team member	<ul style="list-style-type: none"> • Discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews / questioning
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals. 3.2 Set and meet work priorities 3.3 Maintain professional growth and development.	<ul style="list-style-type: none"> • Discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews/ questioning
4. Practice occupational health and safety	4.1 Evaluate hazard and risks 4.2 Control hazards and risks 4.3 Maintain occupational health and safety awareness	<ul style="list-style-type: none"> • Discussion • Plant tour • Symposium 	<ul style="list-style-type: none"> • Observation • Interview

COMMON COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Launch survival craft and rescue boats / life boats	1.1 Identify the various types of survival craft, rescue boats / life boats 1.2 Operate the various types of life saving and survival equipment 1.3 Participate in abandon vessel musters and drills 1.4 Communicate effectively with others during survival operation	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration 	<ul style="list-style-type: none"> • Written • Questioning • Observation • Practical performance

<p>2. Prevent and fight fire</p>	<p>2.1 Implement fire prevention measures and procedures on board a vessel.</p> <p>2.2 Check the capability of fire detection and fire fighting equipment and system. Initiate any required maintenance</p> <p>2.3 Simulate on board fire fighting and search and rescue activities</p> <p>2.4 Implement OHS principles and policies when carrying out fire fighting duties</p> <p>2.5 Communicate effectively with others during fire emergencies</p>	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance
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<p>3. Perform survival techniques during ship abandonment</p>	<p>3.1 Identify the different emergency conditions to minimize potential dangers / threats to others</p> <p>3.2 Identify the different types and methods of boarding survival craft and ancillary survival equipment</p> <p>3.3 Operate various types of survival equipment in accordance with instructions</p> <p>3.4 Simulate in abandon vessels musters and drills</p> <p>3.5 Communicate effectively with others in operating survival craft and ancillary survival equipment</p>	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance
<p>4. Perform first aid treatment on board</p>	<p>4.1 Simulate immediate life-saving first aid</p> <p>4.2 Simulate action on recognized symptoms and acute illness / injury</p> <p>4.3 Simulate action on wounds, bleeding, burns, bone, joint and muscle injuries</p>	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance

5. Protect marine environment	5.1 Simulate garbage disposal Procedures 5.2 Simulate garbage segregation 5.3 Record garbage segregation and disposal	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance
6. Comply with emergency procedures	6.1 Simulate correct action on becoming aware of an emergency in accordance with vessel procedures 6.2 Simulate emergency procedures and contingency plans 6.3 Simulate procedures for the use of various survival equipment	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance
7. Conduct shipboard security check	7.1 Simulate access and identification system for visitors and clients 7.2 Simulate SOPs in checking entry of incoming / outgoing deliveries and company properties, bodily search, luggage / baggage, bags and parcels 7.3 Maintain visitor's logbook, incident report and all keys and locks are accounted for	<ul style="list-style-type: none"> • Discussion • Lecture • Demonstration • Simulation 	<ul style="list-style-type: none"> • Observation • Demonstration • Practical performance

CORE COMPETENCIES

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Service marine electric generators	1.1 Plan and prepare for work 1.2 Prepare hand tools and test instruments 1.3 Perform preventive and corrective maintenance servicing for electric generator components 1.4 Perform good housekeeping	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test
2. Service marine electric motors	2.1 Plan and prepare for work 2.2 Prepare hand tools and special and test instruments 2.3 Perform preventive and corrective maintenance servicing for electric motors 2.4 Perform good housekeeping	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test
3. Service marine lighting system	3.1 Plan and prepare for work 3.2 Prepare hand tools and special and test instruments 3.3 Perform preventive and corrective maintenance servicing for lighting system 3.4 Perform good housekeeping	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test

<p>4. Service and maintain marine batteries</p>	<p>4.1 Plan and prepare for work 4.2 Prepare hand and special tools and test instruments 4.3 Service and maintain batteries 4.4 Perform good housekeeping</p>	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test
<p>5. Maintain marine motor controls and other basic electronic control system</p>	<p>5.1 Plan and prepare for work 5.2 Prepare hand and special tools and test instruments 5.3 Perform basic maintenance 5.4 Perform good housekeeping</p>	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test
<p>6. Service marine electrical appliances</p>	<p>6.1 Plan and prepare for work 6.2 Prepare hand tools and special and test instruments 6.3 Perform preventive and corrective servicing for electrical appliances 6.4 Perform good housekeeping</p>	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test
<p>7. Maintain basic alarms systems on board ship</p>	<p>7.1 Plan and prepare for work 7.2 Prepare hand and special tools and test instruments 7.3 Perform testing and repair of alarm system 7.4 Perform good housekeeping</p>	<ul style="list-style-type: none"> • Demonstration • Discussion • Shipboard visitation (educational tours) 	<ul style="list-style-type: none"> • Observation • Practical demonstration and oral examination • Written test

3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery should be guided by the 10 basic principles of competency-based TVET.

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off the job components
- Allows for recognition of prior learning (RPL) or current competencies
- Training allows for multiple entry and exit; and
- Approved training programs are Nationally Accredited

The competency-based TVET system recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.
- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer facilitates the training delivery
- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-job training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace

to acquire specific competencies prescribed in the training regulations.

- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, or audio, video or computer technologies.
- Project-Based Instruction is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

3.3 TRAINEE ENTRY REQUIREMENTS

This section specifies the qualifications of trainees and educational experience. Other requirements like relevant training/experience and health and physical requirements may also be required by the training provider. Passing entry written examinations may also be indicated if necessary.

- Can communicate in oral or written
- Must have good moral character
- Must be physically and mentally fit as per STCW '95

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS FOR MARINE ELECTRICITY NC II

Based on a class size of 12 trainees, the recommended list of tools, equipment and materials is as follows for **MARINE ELECTRICITY NC II**

TOOLS AND INSTRUMENTS		EQUIPMENT		MATERIALS	
QTY		QTY		QTY	
12 pcs	• Electrician pliers	6 pcs	• Hot air blower		• Magnetic contactors
12 pcs	• Long nose pliers	6 pcs	• Portable electric drill		• Thermal overload relay
12 pcs	• Diagonal	6 units	• Temperature		• Start push button

	cutting plier		calibrator		
12 pcs	• Water pump plier	6 units	• Pressure calibrator		• Stop push button
12 sets	• Flat screw driver	6 units	• Capacitor start motor (220 V 60 HZ, ½ HP)		• Reversible push button (2 CKT)
12 pcs	• Wire splicer	6 units	• Capacitor run motor (220 V 60 HZ, ½ HP)		• Pilot lamp
12 sets	• Philips screw driver	6 units	• Capacitor start and run motor (220 V 60 HZ, ½ HP)		• Auxiliary relay
12 sets	• Stubby screw driver (flat and Philips)	6 units	• Universal motor (220 V 60 HZ, ½ HP)		• On-delay timer
12 sets	• Offset screw driver	6 units	• Shaded pole motor (1/8 HP)		• Off-delay timer
12 sets	• Spanners	6 units	• Series DC motor (120 V)		• Latching relay
12 sets	• Allen wrench	6 units	• Shunt DC motor (1/2 HP)		• Miniature circuit breaker
12 pcs	• Adjustable wrench	6 units	• Compound DC motor (1/2 HP)		• Stranded wires (nos.14, 16)
12 pcs	• Pipe wrench	6 units	• Single voltage squirrel cage induction motor (220 V 60 HZ, 1 HP)		• Terminal lugs
12 pcs	• Pipe cutter	6 units	• Dual voltage six leads squirrel cage induction motor (220 V 60 HZ, 1 HP)		• Connecting leads
12 sets	• Tube bender	6 units	• Dual voltage 9 leads wye-squirrel cage induction motor (220 V 60 HZ, 1 HP)		• Pressure switch
2 sets	• Knock out punch	6 units	• Dual voltage 9 leads delta squirrel cage induction motor (220 V 60 HZ, 1 HP)		• Limit switches

12 sets	• Star screw driver	6 units	• 3 phase slip ring motor (220 V 60 HZ, 1 HP)		• Float switch
12 pcs	• Electrician knife	6 units	• 2-speed separate winding 3-phase motor (220 V 60 HZ, 1 HP)		• Selector switch
3 pcs	• Pipe reamer	2 units	• DOL starter (1 HP, 220 V)		• Reed switch
12 pcs	• Hacksaw frame	2 units	• Reversible starter(1 HP, 220 V)		• Fluorescent lamp fixtures
2 sets	• Files	2 units	• Wye delta starter (220 V)		• Tungsten halogen lamp fixtures
12 pcs	• Ballpeen hammer	2 units	• Reduced voltage auto transformer starter (220 V)		• High pressure sodium lamp fixtures
2 sets	• Drill set	2 units	• 2-speed separate winding starter (220 V 60 HZ)		
6 sets	• Bearing puller	1 set	• 3 phase AC generator set (10 KVA, 220 V 60 HZ)		• Mercury vapor lamp fixtures
6 pcs	• Center puncher		• Transformer (dual voltage induction type)		• Explosion proof lamp fixtures
6 sets	• Pin puncher		PNEUMATICS		
6 sets	• Scriber	50 pcs.	• Quick push pull connector		
6 sets	• Crimping tool	10 pcs.	• 10 m plastic tubing		
12 units	• Multi-tester	10 pcs.	• 3/2-way normally closed push button valve		
12 units	• Clamp meter	5 pcs.	• 3/2-way normally detented push button, spring reset		
12 units	• Megger	5 pcs.	• 5/2-way detented pushbutton, spring reset		
6 units	• Hand tachometer	10 pcs.	• Pressure gauge		

6 pcs.	• Thermometer	10 pcs.	• 3/2-way roller lever valve		
2 units	• Portable face sequence tester	5 pcs.	• 5/2-way air actuated valve		
		15 pcs.	• 5/2-way double air actuated valve		
		5 pcs.	• Shuttle valve (OR)		
		10 pcs.	• Two pressure valve		
		5 pcs.	• Time delay valve		
		5 pcs.	• Quick exhaust valve		
		10 pcs.	• One way flow control valve		
		5 pcs.	• Pressure sequence valve		
		5 pcs.	• Single acting cylinder		
		5 pcs.	• Double acting cylinder		
		5 pcs.	• On/off valve with filter regulator		
		5 pcs.	• Pressure regulating valve		
		5 pcs.	• Manifold		
		5 pcs.	• 3/2 way pneumatic actuated, one side		
		5 pcs.	• 3/2 way valve with selector switch, NC		
		10 pcs.	• Proximity switch cyl. attachment		

NOTE: *Implementation of the training program can be made possible through a MOA between the training school and industry. It is so because of the high cost of equipment that the school cannot afford to acquire.*

3.5 TRAINING FACILITIES FOR MARINE ELECTRICITY NC II

Based on a class size of 12 students / trainees, the required size of training facility is indicated below.

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
Lecture Room (Job/ Site/ School)	7.00 x 6.00	42.00	42.00
Trainee Working Space	2.50 x 2.00 / trainee	5.00 per trainee	60.00
Lecture Resource Center	4.00 x 5.00	20.00	20.00
• Administration / Faculty			30.00
Total Workshop Area			152.00

3.6 TRAINER'S QUALIFICATIONS FOR MARITIME SECTOR MARINE ELECTRICITY NC II

TRAINER QUALIFICATION (TQ II)

Must be at least a graduate of BSEE/BSECE

Must be a licensed Electrical Engineer or Registered Electronics and Communications Engineer

Must have at least a total of 2 years as electrical officer on board

Must be physically and mentally fit

Must have a good moral character

Must be good in communicating in English

Must have undergone Trainor's Training /Trainor's Methodology Course

Reference: TESDA Board Resolution No. 2004 03

3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1. To attain the National Qualification of Marine Electricity NC II, the candidate must demonstrate competence through project-type assessment covering all the units listed in Section 1. Successful candidates shall be awarded a National Certificate signed by the TESDA Director General.
- 4.2. The qualification of Marine Electricity NC II can be attained through demonstration of competence in a project-type assessment covering the following core units:
 - 4.2.1 Service marine electric generators
 - 4.2.2 Service marine electric motors
 - 4.2.3 Service marine lighting system
 - 4.2.4 Service and maintain marine batteries
 - 4.2.5 Maintain marine motor controls and other basic electronic control systems
 - 4.2.6 Service marine electric appliances
 - 4.2.7 Maintain basic alarm systems on board ship
- 4.3 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.
- 4.4. The following are qualified to apply for assessment and certification:
 - 4.4.1 Graduates of formal, non-formal and informal including enterprise-based training programs
 - 4.4.2 Experienced Workers (wage employed or self-employed)
- 4.5. The guidelines on assessment and certification are discussed in detail in the Procedures Manual on Assessment and Certification and guidelines on the Implementation of the Philippine TVET Qualification and Certification System ((PTQCS).

COMPETENCY MAP for Maritime Sector

CORE COMPETENCIES	Assist in performing deck maintenance	Perform supervisory functions	Perform engine room housekeeping	Conduct of inventory of tools, equipment and facilities	Perform housekeeping service	Perform victualing service	
	Assist in performing navigational watchkeeping duties	Perform mooring/unmooring operations	Provide assistance in bunkering operations	Install / reinstall/ replace piping system	Perform laundry service	Maintain galley equipment and utensils	
	Assist in performing simple splicing and canvas work	Perform marlinespike and canvas work	Use and care for hand and power tools	Fabricate shipboard components	Perform beverage service	Prepare cold meals	
	Perform housekeeping duties	Provide support in cargo operations	Perform engine watchkeeping duties	Assist in Engineer in the maintenance of main engine....	Prepare mis en place in the galley	Prepare hot meals	
	Perform Navigational Watchkeeping duties	Perform deck maintenance	Maintain / clean engine room, machinery and spaces	Perform messhall service	Assist in maintaining galley equipment and facility	Assist in storing provision	
COMMON COMPETENCIES	Service marine electric generators	Service marine electric motors	Service marine lighting system	Service & maintain marine batteries	Service marine motor controls & other basic electronic	Service marine electrical appliances	Maintain basic alarm systems on board ship
	Launch survival craft and rescue boats	Prevent and fight fire	Perform survival techniques during ship abandonment	Perform first aid treatment on board	Protect marine environment	Comply with emergency procedures	Conduct shipboard security check
	BASIC COMPETENCIES	Receive and Respond to workplace communication	Participate in communication workplace	Practice occupational health & safety procedures	Solve problems related to work activities	Utilize specialist communication skills	Apply problem solving technique in the workplace
		Work with others	Work in team environment	Practice career professionalism	Plan and organize work	Develop team and individual	Plan and organize work

DEFINITION OF TERMS

1. Battery
Two or more connected cells that produce a direct current by converting chemical energy to electrical energy.
2. Calibration
Calibration is the comparing of a measurement device (an unknown) against an equal or better standard. A standard in a measurement is considered the reference; it is the one in the comparison taken to be the more correct of the two. One calibrates to find out how far the unknown is from the standard.
3. Certification
Refers to the process of giving recognition to the attainment of knowledge, skills and attitudes
4. Clamp-on ammeter
Is a type of ammeter which measures electrical current without the need to disconnect the wiring through which the current is flowing.
5. Competency
Is the specification of knowledge, skills and attitudes required to perform work activity in a range of context or environment
6. Electrical Switch
A device for opening and closing electrical circuits under normal load conditions, usually operated manually.
7. Element
Refers to the building blocks of a unit of competency. It describes in outcome terms the functions that a person who works in particular area of work is able to perform
8. Evidence Guide
It is a guide for assessment that provides information on critical aspects of competency, underpinning knowledge, underpinning skills, resource implications, context of assessment and assessment method.
9. Generator
One that generates, especially a machine that converts mechanical energy into electrical energy.
10. Hydrometer
An instrument used to determine specific gravity, especially a sealed, graduated tube, weighted at one end, that sinks in a fluid to a depth used as a measure of the fluid's specific gravity.

11. Lighting Ballast In a fluorescent lighting system, the ballast regulates the current to the lamps and provides sufficient voltage to start the lamps.
12. Lubricant A substance, such as grease or oil, that reduces friction when applied as a surface coating to moving parts.
13. Megger A **megger** (or sometimes **meggarr**) is often used as an alternate term for an insulation tester - a circuit tester which puts a very high voltage at a very low current across two conductors to make sure that they are properly insulated. The word is short for megohm-meter.
14. Ohms An ohm is the electrical resistance offered by a current-carrying element that produces a voltage drop of one volt when a current of one ampere is flowing through it.
15. Open Circuit The difference of electrical potential between two terminals of a device when there is no external load connected.
16. Philippine TVET Qualification Framework Refers to a comprehensive, nationally consistent framework for qualifications in the TVET sector. It also provides the parameter for the integration of learning and assessment in the middle skills development.
17. Pneumatic Referring to the use of air box signal information and control process.
18. Preventive and corrective maintenance servicing for electric generator These are the two main types of maintenance work performed by marine electricians. Preventive maintenance in the context refers to maintenance performed regularly intended to prevent problems in machinery and systems and normally consisting of cleaning, oiling, minor adjustments and occasional replacements. Corrective maintenance refers to work performed when equipment/system malfunctions or troubles occur and involves major and/or minor adjustments, repairs and replacements.
19. Qualification Refers to the national certificate issued by the TESDA or its accredited industry organizations in recognition that a person has achieved competencies relevant to a trade or industry.

20. Range of Variable It describes the circumstances or context in which the work is to be performed.
21. Short Circuit A low-resistance connection established by accident or intention between two points in an electric circuit. The current tends to flow through the area of low resistance, bypassing the rest of the circuit.
22. Spanner A wrench having a hook, hole, or pin at the end for meshing with a related device on another object.
23. Starter A device within a fluorescent lamp or other discharge lamp, for initiating high voltage across the electrodes.
24. Terminal Connector A conductive device for joining electrical circuits together. The connection may be temporary, as for portable equipment, or may require a tool for assembly and removal, or may be a permanent electrical joint between two wires or devices.
25. Unit of Competency Refers to a discrete aspect of work, which would normally be performed by only one person.
26. Voltmeter An instrument for measuring potential differences in volts.

ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) wishes to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who donated their time and expertise to the development and validation of this Training Regulation.

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