

**SKILLS FRAMEWORK FOR SEA TRANSPORT
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Port Equipment					
TSC	Port Equipment Maintenance					
TSC Description	Implementation of the organisation's port equipment maintenance strategy pertaining to reduce downtime and enhance port operations					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	STP-PEQ-1002-1.1	STP-PEQ-2002-1.1	STP-PEQ-3002-1.1	STP-PEQ-4002-1.1	STP-PEQ-5002-1.1	STP-PEQ-6002-1.1
	Perform maintenance and repair of port equipment	Diagnose and service port equipment	Implement port equipment maintenance schedules and provide maintenance-related assistance	Develop the organisation's maintenance plan and ensure adequate resources are available to facilitate maintenance activities	Evaluate the organisation's maintenance strategy and plans to introduce improvements to enhance port equipment performance and port operations	Drive the organisation's port equipment maintenance strategy and inculcate a culture of pro-active maintenance
Knowledge	<ul style="list-style-type: none"> Maintenance schedules and cycles Procedures for procurement of spare parts Components, characteristics and operating principles of port equipment and their components Types and components of crane systems <ul style="list-style-type: none"> Main systems Power systems Brake and anti-collision systems Positioning systems Techniques for fabricating mechanically fitted assemblies: <ul style="list-style-type: none"> Gas cutting Arc welding Lubrication Direct Current (DC) and Alternating Current (AC) circuits, capacitors and electro-mechanical switching 	<ul style="list-style-type: none"> Repair specifications, and defect lists Preventative, breakdown and predictive maintenance Procedures for defect diagnosis and inspection of equipment components Procedures for procurement of spare parts Relevant Quality Assurance and Quality Control (QA/QC) policies and procedures 	<ul style="list-style-type: none"> Components of port equipment maintenance plans Operating principles and procedures for port equipment Manufacturers' recommended inspection, servicing and related schedules for port equipment Purpose and process of data collection in maintenance strategies Types of maintenance data to be collected Methods of recommending improvements Procedures relating to disposal of waste from maintenance activities Types of maintenance documentation Port operation schedules Workplace Safety and Health (WSH) regulations 	<ul style="list-style-type: none"> Components of port equipment maintenance plans Operating principles and procedures for port equipment Manufacturers' recommended inspection, servicing and related schedules for port equipment Procedures for purchasing or obtaining replacement parts, materials and other consumables required for port equipment maintenance Resources required for port equipment maintenance Methods and parameters used to calculate duration of specific port equipment maintenance Organisation's policies and procedures relating to repair or replacement 	<ul style="list-style-type: none"> Components of port equipment maintenance strategies Operating principles and procedures for port equipment Manufacturers' recommended inspection, servicing and related schedules for port equipment Organisation's policies and procedures relating to repair or replacement of equipment or components during maintenance processes Types of maintenance documentation Methods and parameters used to calculate duration of specific port equipment maintenance Organisational procedures relating to the safe disposal of waste of all types of materials 	<ul style="list-style-type: none"> Components of port equipment maintenance strategies Operating principles and procedures for port equipment Manufacturers' recommended inspection, servicing and related schedules for port equipment Methods and parameters used to calculate duration of specific maintenance activities Organisation's policies and procedures relating to repair or replacement of port equipment or components during maintenance processes Organisation's policies and procedures relating to port equipment maintenance documentation Equipment operating and control procedures

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	<ul style="list-style-type: none"> • Characteristics, functions, applications, and limitations of soldering processes and cable terminations • Concepts and characteristics of semi-conductors, diodes and transistors • Programmable Logic Controllers (PLC) • Crane engine construction and operation including: <ul style="list-style-type: none"> ○ Lubrication systems ○ Cooling systems ○ Fuel systems ○ Air intake and exhaust systems ○ Electrical systems • Safety measures in servicing port equipment 			<p>of port equipment or components during maintenance processes</p> <ul style="list-style-type: none"> • Types of maintenance documentation • Procedures relating to the safe disposal of waste from maintenance activities • Methods to analyse port equipment performance before and after maintenance activities • Hazards associated with port equipment maintenance and mitigation strategies • Methods to handle changes to maintenance schedules • Port operation schedules • Workplace Safety and Health (WSH) regulations 	<ul style="list-style-type: none"> • Methods to handle non-compliance to maintenance strategies and plans • Methods to analyse port equipment maintenance data and port operations data • Hazards associated with port equipment maintenance activities and mitigation measures • Method to assess risks • 'Root cause' problem solving analysis • Methods to evaluate improvement ideas • Workplace Safety and Health (WSH) regulations 	<p>to be applied during maintenance activities</p> <ul style="list-style-type: none"> • New technologies, processes and systems and its association with port equipment maintenance strategies • Workplace Safety and Health (WSH) regulations
<p>Abilities</p>	<ul style="list-style-type: none"> • Service crane systems • Maintain and troubleshoot motor control circuits • Maintain analogue and/or digital electronic systems • Service AC machines, transducer circuits and other electric and electronic systems • Test PLC programmes • Service crane engine lubrication systems • Maintain engine oil levels, conditions and filters 	<ul style="list-style-type: none"> • Ascertain source of equipment faults • Advise rectification methods and techniques • Ensure closure of service and repair jobs • Test equipment and system for post-repair performance • Suggest corrective and preventative actions to further enhance equipment functionality and prevent future incidents 	<ul style="list-style-type: none"> • Determine manufacturers' recommended inspection, servicing and related schedules for port equipment • Draft maintenance schedules in consultation with relevant personnel • Ascertain suitable time(s) for port equipment maintenance including optimum timing for shutdown • Recommend improvements to maintenance plans to 	<ul style="list-style-type: none"> • Develop the organisation's port equipment maintenance plans • Review port equipment maintenance plans and schedules to ensure alignment with the organisation's maintenance strategies and manufacturers' recommendations • Manage change requests in maintenance schedules from the maintenance teams or port operations teams 	<ul style="list-style-type: none"> • Evaluate data from port equipment maintenance teams • Evaluate port operations data and port equipment performance data to ascertain the impact of maintenance activities on port efficiency and productivity • Create and maintain visual management records and supporting documentation to support the organisation's port equipment maintenance strategies 	<ul style="list-style-type: none"> • Formulate the organisation's approach to port equipment maintenance • Seek management's endorsement for port equipment maintenance strategies • Evaluate the relevance of new technologies and equipment to enhance port equipment strategies and plans

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	<ul style="list-style-type: none"> • Service crane engine cooling, fuel and/or air and exhaust systems • Adjust crane engine tappet clearances • Service crane electrical components 		<p>improve port equipment performance and reliability</p> <ul style="list-style-type: none"> • Dispose of waste from maintenance activities in accordance with organisational requirements • Oversee the implementation of port equipment maintenance activities • Ensure availability of resources to carry out port equipment maintenance • Manage conflicts in maintenance schedules with port operations staff and maintenance team • Complete maintenance documentation in accordance with organisation policies and procedures 	<ul style="list-style-type: none"> • Procure resources for execution of port equipment maintenance activities • Ensure maintenance schedules are in compliance with port equipment maintenance plans • Assess improvements to maintenance strategies and schedules that may enhance port equipment performance and efficiency • Analyse data on port equipment performance before and after maintenance activities • Seek approval for changes to maintenance schedules • Identify areas of non-compliance to port equipment maintenance plans • Escalate non-compliance issues to Lead Engineers for decision 	<ul style="list-style-type: none"> • Lead improvements to port equipment maintenance strategies and plans to enhance port efficiency and productivity • Review risks associated with port equipment maintenance strategies and plans • Consult and seek endorsement from management on port equipment strategies • Endorse improvements to port equipment maintenance strategies and plans 	
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