

Skills Framework for Marine and Offshore

Technical Skills & Competencies (TSC)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Business Development	Business Negotiation	Engage stakeholders in accordance to established protocols to achieve business goals						
	Business Presentation Delivery	Perform required tasks to prepare and present information in various business settings involving preparation, understanding of audience, delivery and tailoring of messages to be conveyed						
	Business Proposal Writing	Prepare business proposals to respond to business opportunities						
	Market Research	Conduct research on industry, customer and competitor trends to shape the organisation's business development strategies						
	Opportunity Development	Monitor business environments to assess external opportunities that may impact strategic planning and contribute to business growth						
Business Finance	Financial Budgeting	Prepare organisational budgets to support short- and long-term business plans through forecasting, allocation and financial policy settings						
	Financial Planning	Facilitate strategic decision-making on the organisation's business finances by collating, verifying and analysing financial data in reports						
General Management	Change Management	Manage organisational change management systems to drive organisational success and outcomes by preparing, equipping and supporting adoption of change						
	Conflict Resolution	Adopt organisation's conflict mediation guidelines to find peaceful solutions to disagreements by evaluating and implementing resolution approaches and analysing mediation outcomes						
	Corporate Governance	Establish organisational frameworks to ensure stakeholder interests are balanced and aligned with regulatory frameworks and organisational objectives						
	Crisis Management	Apply strategies designed to enable an organisation to deal with disruptive events by planning for responses to potential crises, establishing monitoring systems and training systems, communicating both internally and externally, and leading recovery processes						
	Innovation Management	Manage organisation's ability to respond to internal and external opportunities by using creativity to introduce new ideas, processes and products						
	Intellectual Property Management	Formulate intellectual property management strategies and procedures to protect the organisation's intellectual property assets						
	Operational Risk Management	Manage failed procedures, system failures, policy errors and other business disruption events by assessing risks and implementing risk controls						
	Organisational Performance Management	Implement organisational performance systems to meet business plans and objectives by establishing performance indicators, tracking progress and addressing gaps						
	Programme Management	Manage multiple projects within the organisation to identify efficiencies of common policies, procedures and practices						
	Service Excellence	Create strategies to foster positive customer experience and deliver service excellence throughout the engagement lifecycle						
	Staff Performance Management	Maximise employee performance to meet business goals by aligning organisational objectives with internal processes, creating learning and development for staff and providing systems of feedback and support						
	Stakeholder Management	Manage organisation's key stakeholders, strategic partners and investors to maintain high levels of engagement by identifying needs, setting service standards and resolving issues in accordance with organisational procedures						
	Strategy Development	Develop organisational strategies and policies by analysing the impact of internal and external influencing factors and seeking consultation with relevant stakeholders						
Marine and Offshore System Design	Ballast System Design	Design ballast systems for ships, rigs and/or conversions by interpreting trim and stability tables and applying principles of fluid dynamics, pumping and piping systems, in compliance with regulations						
	Cargo System Design	Design cargo handling systems for ships and/or conversions to ensure efficient and controlled loading, discharging and treatment of specific cargoes						
	Communication and Navigation System Design	Design navigation and communication systems in compliance with international regulations						
	Control System Programming	Develop capabilities in areas of communications and remote operations by programming logic circuits and erasable programmable read-only memory for ships, rigs and/or conversions						
	Cooling System Design	Design cooling systems for ships, rigs and/or conversions to ensure sufficient cooling for engines, auxiliary equipment and fluids by evaluating individual and composite systems cooling requirements, cooling medium capacities, pump and piping system specifications and types of cooling media required						
	Fuel and Lubrication System Design	Design fuel and lube systems for propulsion, power generation and lubrication of machineries installed on ships, rigs and/or conversions including pump and piping components, storage tank designs, heat exchangers and safeties through detailed understanding of fuel and lube properties						
	Heat Transfer System Design	Design heating, ventilation and air conditioning systems to maintain a specific air quality in the accommodation spaces of ships, rigs and/or conversions as well as in the refrigerated compartments for perishables in alignment with regulations						
	Heating, Ventilation and Air Conditioning System Design	Design heat transfer systems by applying concepts of thermodynamics in marine engineering to provide for the heating requirements of ships, rigs and/or conversions						
	Instrumentation and Control System Design	Design instrumentation and control systems to measure and control the process variables of operating equipment and systems by interpreting equipment and system parameters						

	Marine Design Customisation	Customise engineering solutions to meet exceptional customers' requirements beyond typical scoping of existing product portfolios and/or capabilities				
	Marine Equipment Material Selection	Select appropriate materials to be used for marine equipment and components based on material property applications and industry requirements				
	Power Generation System Design	Design power plans for all equipment and systems on-board ships, rigs and/or conversions and integrated power generation systems and auxiliaries to cater to power requirements				
	Propulsion System Design	Design propulsion systems and auxiliaries based on size, cargo carrying capacity and type of ship				
	Pump and Piping Design	Apply hydraulic and fluid dynamics principles to design efficient pump and piping systems for liquids and gases by understanding principles of fluid flow, interaction between fluid layers and pipe materials, and losses in transmission				
	Safety System Design	Design of safety systems for ships, rigs and/or conversions to ensure readiness against emergency incidents on board				
Marine Calculations	Marine Engineering Calculations	Apply mathematical formulae and principles of numerical analysis to marine engineering applications				
	Naval Architecture Calculations	Apply mathematical and physics calculations to specify capacity, trim and stability details, and ensure seaworthiness of ships, rigs and/or conversions				
Marine Manufacturing	Additive Manufacturing	Design and apply additive manufacturing workflows to create three-dimensional objects				
	Computer Numeric Control Operations	Programme and configure computer numerical control machines and equipment to manufacture marine equipment and ship, rig and/or conversion components				
	Forming	Fabricate components through processes using suitable compression, tension, shear, combined and/or other types of stresses to cause material deformation				
	Joining and Welding	Fabricate components through the application of heat, pressure and/or friction to join structures together				
	Laser and Optics Application	Use of laser and optics to automate manufacturing processes by introducing amplified electromagnetism and optical technologies for steelwork and alignment processes				
	Lift Planning and Management	Implement rigging procedures to ensure safe operation of lifting gears by employing prescribed slinging techniques depending upon load and external conditions				
	Machining	Fabricate components through controlled removal of materials from given blocks or pieces				
	Non-destructive Testing	Execute non-destructive tests to ensure structural integrity, insulation resistance, continuity and satisfactory performance of electrical equipment and installations against organisational and regulatory standards and requirements				
	Robotics and Automation Application	Integrate automated technologies and robotic systems in ships, rigs or conversions manufacturing to enhance precision and productivity and reduce reliance on manual tasks				
	Scaffolding	Build work platforms using pre-fitted frames and staging materials to facilitate activities that require working aloft				
	Surface Preparation and Protection	Apply appropriate surface preparation and protection techniques, based on surface material, operating conditions, and maintenance requirements, against exposure to marine environments				
Product Finalisation	Component Assembly	Produce structures from smaller components by interpreting hull structure drawings, mechanical equipment drawings, electrical drawings and other technical drawings applicable to marine equipment, ships, rigs and conversions				
	Installation Planning and Execution	Create suitable foundations and connections among dependent machineries on board ships, rigs and/or conversions according to product specifications and manufacturers' recommendations in alignment with technical drawings				
	Launch Planning and Management	Execute launching procedures for ships, rigs and/or conversions by employing gravitational, mechanical, floating, airbag and other launching techniques				
Production Management	Manufacturing Workflow Management	Manage manufacturing operations to ensure timely and quality delivery of production outcomes				
	Value Engineering	Apply value principles to increase productivity and efficiency in production lines by reducing operational costs and waste				
Project Management	Manpower Forecasting	Estimate and fulfil manpower requirements to achieve business goals and targets				
	Project Coordination	Coordinate project activities and workflows in collaboration with project teams and relevant stakeholders, as determined by project plans, to fulfil expected project outcomes and objectives				
	Project Feasibility Assessment	Evaluate project scopes to ensure commercial, legal, technical, and operational feasibility				
	Project Quality Management	Manage project processes and deliverables, according to stakeholder requirements and objectives, to improve customer satisfaction levels				
	Project Risk Management	Manage risks relating to specific projects as precaution against internal and external vulnerabilities				

Quality Management	Commissioning Coordination	Conduct product performance examinations to conclude manufacturing and transit ships and rigs into operational modes						
	Continuous Quality Improvement	Implement on-going efforts to improve products, services, and/or processes through leveraging on opportunities to streamline work, increase quality and reduce waste						
	Electrical Testing	Execute non-destructive electrical tests to ensure insulation-resistance, continuity, and satisfactory performance of electrical equipment and installations against organisational and regulatory standards and requirements						
	Quality Engineering Integration	Incorporate quality principles and methodologies into engineering processes, products, and services from conception to disposal						
	Quality System Management	Establish quality assurance policies and management systems for products and services to ensure compliance with internal quality requirements, client expectations, international quality standards and/or regulations						
	Structural Testing	Execute non-destructive structural tests to ensure integrity and reliability of structural components against standards and product specifications based on determined test methods, criteria, equipment, and timeframes						
	Technical Inspection	Execute formal inspection exercises to ensure quality, safety, and reliability, adhering with technical specifications and compliance requirements						
	Technical Writing	Apply technical writing approaches to communicate complex information and enable actions in pursuit of defined project goals						
Repair and Maintenance	Marine Auxiliary System Maintenance	Diagnose and rectify systems and machinery components on board ships and rigs						
	Marine Equipment and System Maintenance	Formulate and execute corrective and/or preventative maintenance activities for marine equipment and systems used on ships and rigs						
Research and Development	Big Data Analytics	Analyse and validate significant volumes of data to discover and quantify patterns and trends to improve ship, rig, conversion and/or marine equipment design and refine condition-based maintenance schedules						
	Green Ship Design	Formulate quantitative environmental models, product designs and waste reduction plans in order to drive clean energy and/or green shipping initiatives						
Supply Chain Management	Contract Development and Management	Maximise the organisation's operational and financial performance by drafting contracts, negotiating contract terms and conditions, ensuring compliance with contract terms and conditions, and effecting amendments						
	Materials Inspection	Verify correctness and usability of vendor products and services through specification-matching and quality checks						
	Procurement Coordination and Policy Development	Design and implementation of procurement strategies and workflows to govern activities relating to sourcing and purchasing of materials as required to deliver on project expectations						
	Procurement Performance Monitoring	Monitor procurement performance to cut costs, alleviate risks, and drive continuous process improvement by measuring and analysing vendor and process efficiency						
	Vendor Management	Manage vendor relationships by ensuring contract terms are being met, providing innovation in services, operating within standards established by the organisation, and adhering to all security, compliance, business continuity and best practices						
Systems Engineering	Interface Management	Perform interface management activities to integrate systems on ships, rigs and/or conversions						
	System Architecture Design	Synthesise system architecture baselines for ships, rigs, conversions and/or automated production lines to satisfy stakeholder requirements						
	System Configuration Management	Establish consistency in performance, functional, and physical attributes throughout system lifecycles						
	Systems Integration	Realise the system-of-interest by progressively combining system elements in accordance with architectural design requirements and integration strategies						
Technical Drawing	Electrical Drawing	Create and interpret electrical drawings based on design specifications to guide power planning and installation of electrical systems for ships, rigs and/or conversions						
	Equipment Drawing	Create equipment drawings based on design specifications representing working pieces of machinery for ships, rigs, conversions and/or equipment sub-components						
	Pipeline Drawing	Create pipeline drawings to assist in production and maintenance activities, based on structural and arrangement drawings, equipment lists and consideration of fluids to be carried and pressure to be handled						
	Structural and Arrangement Drawing	Create structural and arrangement drawings to guide production and manufacturing processes						
Workplace Safety and Health	Emergency Response Management	Manage emergency response plans for the range of contingencies affecting the marine and offshore industry						
	Incident and Accident Investigation	Investigate workplace safety and health incidents and accidents based on root cause analysis and identification of corrective actions to prevent recurrences						
	Workplace Safety and Health for Dockside Tower Crane Operations	Carry out dockside tower crane operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements						
	Workplace Safety and Health for Forklift Operations	Carry out forklift operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements						

	Workplace Safety and Health for Marine Electrical Installation	Carry out electrical operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Marine Mechanical Installation	Carry out mechanical installation operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Painting and Blasting	Carry out steel fitting operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Pipe Fitting	Carry out steel fitting operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Self-Propelled Platform Operations	Carry out steel fitting operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Steel Fitting	Carry out steel fitting operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Tank Cleaning	Carry out tank cleaning on ships according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health for Welding	Carry out welding operations on ships, rigs and conversions according to workplace safety and health (WSH) legislative requirements					
	Workplace Safety and Health Culture Development	Create and maintain a workplace safety and health (WSH) culture based on a common set of attitudes, behaviours, and competencies					
	Workplace Safety and Health Performance Management	Establish and monitor indicators measuring effectiveness of workplace safety and health policies and work procedures in preventing incidents and safeguarding employees in marine industry operations					
	Workplace Safety and Health Policy Development	Develop organisational workplace safety and health policies to ensure compliance with national regulations pertaining to the marine and offshore sector by applying knowledge of regulations and staying abreast of regulatory changes and practices					
	Workplace Safety and Health System Management	Implement day-to-day workplace safety and health procedures by following set policies to schedule inspections, internal and external audits, establish emergency response procedures including roles and responsibilities of all staff and departments in emergencies					

General Descriptors for TSC – For Reference Purposes

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Responsibility (Degree of supervision and accountability)					
Work under direct supervision Accountable for tasks assigned	Work with some supervision Accountable for a broader set of tasks assigned	Work under broad direction May hold some accountability for performance of others, in addition to self	Work under broad direction Hold accountability for performance of self and others	Accountable for achieving assigned objectives, decisions made by self and others	Accountable for significant area of work, strategy or overall direction
Autonomy (Degree of decision-making)					
Minimal discretion required. Expected to seek guidance	Use limited discretion in resolving issues or enquiries. Work without frequently looking to others for guidance	Use discretion in identifying and responding to issues, work with others and contribute to work performance	Exercise judgment; Adapt and influence to achieve work performance	Provide leadership to achieve desired work results; Manage resources, set milestones and drive work	Empower to chart direction and practices within and outside of work (including professional field/ community), to achieve/ exceed work results
Complexity (Degree of difficulty of situations and tasks)					
Routine	Routine	Less routine	Less routine	Complex	Complex
Knowledge and Abilities (Required to support work as described under Responsibility, Autonomy and Complexity)					
<ul style="list-style-type: none"> • Recall factual and procedural knowledge • Apply basic skills to carry out defined tasks • Identify opportunities for minor adjustments to work tasks 	<ul style="list-style-type: none"> • Understand and apply factual and procedural knowledge in a field of work • Apply basic cognitive and technical skills to carry out defined tasks and to solve routine problems using simple procedures and tools • Present ideas and improve work 	<ul style="list-style-type: none"> • Apply relevant procedural and conceptual knowledge, and skills to perform differentiated work activities and manage changes • Able to collaborate with others to identify value-adding opportunities 	<ul style="list-style-type: none"> • Evaluate and develop factual and conceptual knowledge within a field of work • Select and apply a range of cognitive and technical skills to solve non-routine/abstract problems • Manage work activities which may be unpredictable • Facilitate the implementation of innovation 	<ul style="list-style-type: none"> • Evaluate factual and advanced conceptual knowledge within a field of work, involving critical understanding of theories and principles • Select and apply an advanced range of cognitive and technical skills, demonstrating mastery and innovation, to devise solutions to solve complex and unpredictable problems in a specialised field of work • Manage and drive complex work activities 	<ul style="list-style-type: none"> • Synthesise knowledge issues in a field of work and the interface between different fields, and create new forms of knowledge • Employ advanced skills, to solve critical problems and formulate new structures, and/or to redefine existing knowledge or professional practice • Demonstrate exemplary ability to innovate, and formulate ideas and structures