

**SKILLS FRAMEWORK FOR MARINE AND OFFSHORE
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Marine Manufacturing					
TSC	Robotics and Automation Application					
TSC Description	Integrate automated technologies and robotic systems in ships, rigs or conversions manufacturing to enhance precision and productivity and reduce reliance on manual tasks					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		MAR-MMF-2009-1.1	MAR-MMF-3009-1.1	MAR-MMF-4009-1.1	MAR-MMF-5009-1.1	MAR-MMF-6009-1.1
		Apply procedural knowledge of robotic systems and automated technologies to execute manufacturing tasks	Oversee the use of robotics and automated technologies in compliance with manufacturers' recommendations and workflow plans	Review performance of automated workflows for process improvements	Formulate new manufacturing workflows to adopt robotics and automated technologies to streamline processes	Explore wider applications of robotic and automation methods of manufacturing in the organisation by using expertise within the field to transform manufacturing workflows
Knowledge		<ul style="list-style-type: none"> Types of robotic systems, automated technologies and process control systems utilised in manufacturing tasks Methods of operating robotic systems for manufacturing tasks Procedures for safe machinery operation Types of sensors and actuators Procedures for installing actuators and sensors 	<ul style="list-style-type: none"> Organisational manufacturing workflows Principles of automated technologies and robotic systems Procedures for setting up and inspecting robotic systems and automated technologies Approaches to oversee manufacturing tasks that use robotic systems and automated technologies Control theory Types and applications of control loop components and controllers 	<ul style="list-style-type: none"> Application range of automated technologies and robotic systems Methods for evaluating resources and skills to carry out manufacturing tasks using automated technologies and robotic systems Principles of electro-pneumatics Types of logic control programmes Concepts pertaining to performance specifications and analysis Best practices in robotics and automation Components of a robot Principles of path and trajectory planning Types of programming skills of a robot 	<ul style="list-style-type: none"> Organisation's products and processes Organisation's quality and workplace safety and health (WSH) guidelines Methods of developing detailed operating procedures for automated technologies and robotic systems Methods to influence adoption of new technologies Impact of robotics and automation on manufacturing operations Principles of change management 	<ul style="list-style-type: none"> Applications of emerging robotics and automation technologies Industry best practices and applications of new technologies in the marine and offshore sector Impact of robotics and automation on manufacturing operations beyond alignment of ships, rigs and/or conversion components Benefits and trade-offs of advanced robotics and automation Principles of change management Methods of conducting research and development in automation and robotics

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<p>Abilities</p>		<ul style="list-style-type: none"> Operate automated technologies and robotic systems by following manufacturer's instructions and operating procedures Follow safety procedures when operating automated technologies and robotic systems Identify and report any issues with the automated technologies and robotic systems Install sensors and actuators for process control in specified locations 	<ul style="list-style-type: none"> Oversee use of automated technologies and robotic systems Diagnose faults in the use of automated technologies and robotic systems for manufacturing processes and suggest solutions Interpret and extract relevant process parameters from given specifications Apply corrective actions for automatic and manual shut-downs during critical and emergency situations Review feedback on operation of automated technologies and robotic systems, and incorporate into updated operating procedures 	<ul style="list-style-type: none"> Evaluate various automated technologies and robotics systems to compare their strengths and limitations Evaluate the feasibility of incorporating automation and robotic systems into manufacturing processes Apply optimisation techniques to improve automated processes' efficiency and product quality Assess improvements on the manufacturing products and processes Evaluate the benefits and trade-offs of implementing advanced optical metrologies to the business 	<ul style="list-style-type: none"> Determine range of applications, resources, skill requirements and production feasibility of automated technologies and robotic systems Develop technical operating procedures for robotics and automation Evaluate the benefits and trade-offs of implementing advanced robotics and automation to the business Formulate processes and procedures for manufacturing components using robotics and automation Ensure procedures and operations are implemented according to plan and WSH requirements Determine post-processing procedures for manufacturing components using robotics and automation 	<ul style="list-style-type: none"> Develop robotics and automation application strategies Refine parameters of robotics and automation processes to improve operational efficiency Analyse alternative approaches to robotics and automation to enhance manufacturing precision and productivity Identify potential opportunities to improve robotics and automation approaches in the organisation Prepare business cases for implementing advanced robotics and automation to satisfy business and legislative requirements
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