TSC Category	Marine Calculations					
TSC	Marine Engineering Calculations					
TSC Description	Apply mathematical formulae and principles of numerical analysis to marine engineering applications					
TSC Proficiency Description	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
		MAR-MCA-2001-1.1	**MAR-MCA-3001-1.1**			
		Collate relevant data and execute marine engineering calculations in procurements, designs and manufacturing of equipment and systems for ships, rigs and/or conversions	Verify marine engineering calculations to infer design and manufacturing implications and facilitate designing of process workflows as well as solve marine engineering problems			
Knowledge		• Basic work functions and process workflows across departments • Types of data collection tools • Methods of organising and cleansing data • Mathematical concepts of linear algebra, differential equations, differentiation and integration, complex numbers and other basic concepts of mathematics • Types of numerical analysis software for computer-aided calculations • Applications of mathematical concepts to design and manufacturing applications • Concepts of wind loadings and wave loadings, resistance and propulsion	• Mathematical concepts relating to areas of work • Applications of marine engineering calculations in pump and piping, ballast, steam and other ship systems designs and evaluations • Applications of marine engineering calculations in propulsion, power and other equipment designs and evaluations • Applications of marine engineering calculations for electrical and electronics systems • Calculations of wind loadings, wave loadings, fluid dynamics, propulsion, manoeuvrability and power • Methods of data analysis • Applications of numerical analysis results			

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		• Units of measurement for different component, machinery and marine equipment parameters • Principles of data interpretation • Formats, terminologies and nomenclatures for technical writing of engineering documents	• Implications of inaccurate data analysis • Procedures for operating Computer-aided Engineering (CAE) software			
Abilities		• Identify and organise relevant data • Segregate noise data from the database • Troubleshoot basic data anomalies • Select relevant data from available datasets • Execute basic marine engineering calculations to obtain design and/or manufacturing specific data • Apply appropriate data analysis tools to obtain results for basic calculations under guidance • Produce technical reports	• Analyse complex data sets in order to answer a specific set of questions • Apply marine engineering calculations to department-specific data to rectify complex engineering faults • Provide production and design departments with actionable information based on calculations • Operate advanced analysis software • Draft technical papers to explain results of numerical analysis • Propose actions required based on analysis results • Decipher and troubleshoot errors in analysis			