

Roles and Tasks - LIKELIHOOD OF HUMAN RELIANCE PRESENT DAY TO 2040

	NATIONAL AND INTERNATIONAL FRAMEWORK	CAPABILITY REQUIREMENT	PERSONNEL QUALIFICATIONS	CARGO HANDLING	OCCUPATIONAL RESPONSIBILITIES DEFINED BY THE COMPANY - PERSONNEL SAFETY / CULTURE / ETHICS / CODE OF CONDUCT	STANDARD OPERATION	EMERGENCY RESPONSE	PASSAGE PLANNING - APEN	BERTHING	ANCHORING	COLLISION AVOIDANCE	COLD SHIP TO PORT STANDBY	MANOEUVERING to COMMENCEMENT OF PASSAGE AT SEA	COMMENCEMENT OF PASSAGE AT SEA (FULL-AWAY)	COMMENCEMENT OF PASSAGE AT SEA (FULL-AWAY)	SAFE EVACUATION OF PERSONNEL	FAILURE DIAGNOSIS	PREDICTIVE BASED MAINTENANCE	
PRESENT DAY UNTIL 2020	PORT APPROACHES SHIP CONTROL / MANAGEMENT	SKILLS REQUIRED FROM PRESENT DAY FORCE	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
YEAR 2020 - 2025	PORT APPROACHES SHIP CONTROL / MANAGEMENT	SKILLS REQUIRED FROM PRESENT DAY FORCE	H	A	H	M/A	M/A/AI	H	M-A	M-A	M-A	M-AI	H	M	M	M	H	H	H
YEAR 2025 - 2030	INTERNATIONAL / COUNTRY BY COUNTRY SHIP CONTROL MANAGEMENT	SKILLS REQUIRED OF FUTURE WORK FORCE	H	A	H	A	H	M/L	A	AI	L/AI	L	L	L	L	A	H	M/L/A	
YEAR 2030 - 2040	INTERNATIONAL / COUNTRY BY COUNTRY SHIP CONTROL MANAGEMENT	SKILLS REQUIRED OF FUTURE WORK FORCE	H	A	H	A	AI	AI	A	AI	AI	A	A	A	A	A	H/A/AI	L/A/AI	
YEAR 2020 - 2025	RESOURCES	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	PORT EXPERT ASSISTANCE	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	AB/BOSUN	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR	AI ARTIFICIAL INTELLIGENCE NAVIGATOR, CO-NAVIGATOR	MARINE ENGINEER/SYSTEMS ENGINEER	MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	REOL	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, MARINE ENGINEER, ENGINEER SPECIALIST, SYSTEMS ENGINEER	MASTER AND MARINE ENGINEER/SYSTEMS ENGINEER	
YEAR 2025 - 2030		OPERATIONS MANAGER, DP MANAGER, NAVIGATION MANAGER, PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, PROPULSION ENGINEER, SYSTEMS ENGINEER	PORT EXPERT ASSISTANCE	OPERATIONS MANAGER, DP MANAGER, NAVIGATION MANAGER, PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, PROPULSION ENGINEER, SYSTEMS ENGINEER	REOL	OPERATIONS MANAGER, DP MANAGER, NAVIGATION MANAGER, PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, PROPULSION ENGINEER, SYSTEMS ENGINEER	OPERATIONS MANAGER, DP MANAGER, NAVIGATION MANAGER, PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, PROPULSION ENGINEER, SYSTEMS ENGINEER	OPERATIONS MANAGER, DP MANAGER, NAVIGATION MANAGER, PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR, PROPULSION ENGINEER, SYSTEMS ENGINEER	PILOT DP OFFICER, NAVIGATOR, CO-NAVIGATOR	REOL	REOL	REOL	MARINE ENGINEER/SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	REOL	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER
YEAR 2030 - 2040		OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	REOL	OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	REOL	OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	AI ARTIFICIAL INTELLIGENCE OPERATIONS MANAGER DP MANAGER, NAVIGATION MANAGER	REOL	REOL	REOL	REOL	REOL	REOL	REOL	REOL	PROPULSION ENGINEER/ SYSTEMS ENGINEER	PROPULSION ENGINEER /SYSTEMS ENGINEER

EXISTING RESOURCES	OIL	SUPERINTENDENT	CHIEF ENGINEER	CHIEF ENGINEER - SPECIALIST	2nd ENGINEER	2nd ENGINEER- SPECIALIST	ELECTRO TECHNICAL OFFICER	3rd ENGINEER	4th ENGINEER	MOTORMAN	EXPERT ASSISTANCE	SURVEY	DRY DOCK
	WATER	SUPERINTENDENT	MASTER	MASTER SPECIALIST INDUSTRY	MARINE PILOT	CHIEF OFFICER	DP OFFICER	2nd MATE	3rd MATE	4th MATE/CADET	AB/BOSUN		

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FUTURE RESOURCES	HUMAN ROLES	OPERATIONS MANAGER	DP MANAGER	NAVIGATION MANAGER	PILOT DP OFFICER	NAVIGATOR	CO-NAVIGATOR	SYSTEMS ENGINEER	PROPULSION ENGINEER	SYSTEMS AND PROPULSION ENGINEER
	DIGITAL ROLES	AI ARTIFICIAL INTELLIGENCE	A AUTONOMOUS	REOL REACHING/REACHED END OF LIFE	DIGITAL ASSISTANT					

REPAIR PLANNING	PROJECT MANAGEMENT	COLLABORATIVE DISCUSSION	SURVEY REQUIREMENTS	PERFORMANCE AND EFFICIENCY MONITORING	DRY DOCK	EXPERT ASSISTANCE
H	H	H	H	H	H	H
H	H	H	M/L	H	H	H
M/L	H	H	L/A	M/L	M/L	H
L/A	H	H	L/A	L/A	L/A	H
MARINE ENGINEER/SYSTEMS ENGINEER	MARINE ENGINEER/SYSTEMS ENGINEER	MASTER AND MARINE ENGINEER/SYSTEMS ENGINEER	MASTER AND MARINE ENGINEER/SYSTEMS ENGINEER	MASTER AND MARINE ENGINEER/SYSTEMS ENGINEER	MARINE ENGINEER/SYSTEMS ENGINEER	SHOREBASED
PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	PROPULSION ENGINEER, SYSTEMS ENGINEER	SHOREBASED
PROPULSION ENGINEER/SYSTEMS ENGINEER	OPERATIONS MANAGER/DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	OPERATIONS MANAGER/DP MANAGER, NAVIGATION MANAGER, PROPULSION ENGINEER /SYSTEMS ENGINEER	PROPULSION ENGINEER /SYSTEMS ENGINEER	PROPULSION ENGINEER /SYSTEMS ENGINEER	SHOREBASED	SHOREBASED

ADVANCE

HIGH RELIANCE ON HUMAN SKILLS
MEDIUM RELIANCE ON HUMAN SKILLS
LOW RELIANCE ON HUMAN SKILLS
AUTOMATED
ARTIFICIAL INTELLIGENCE