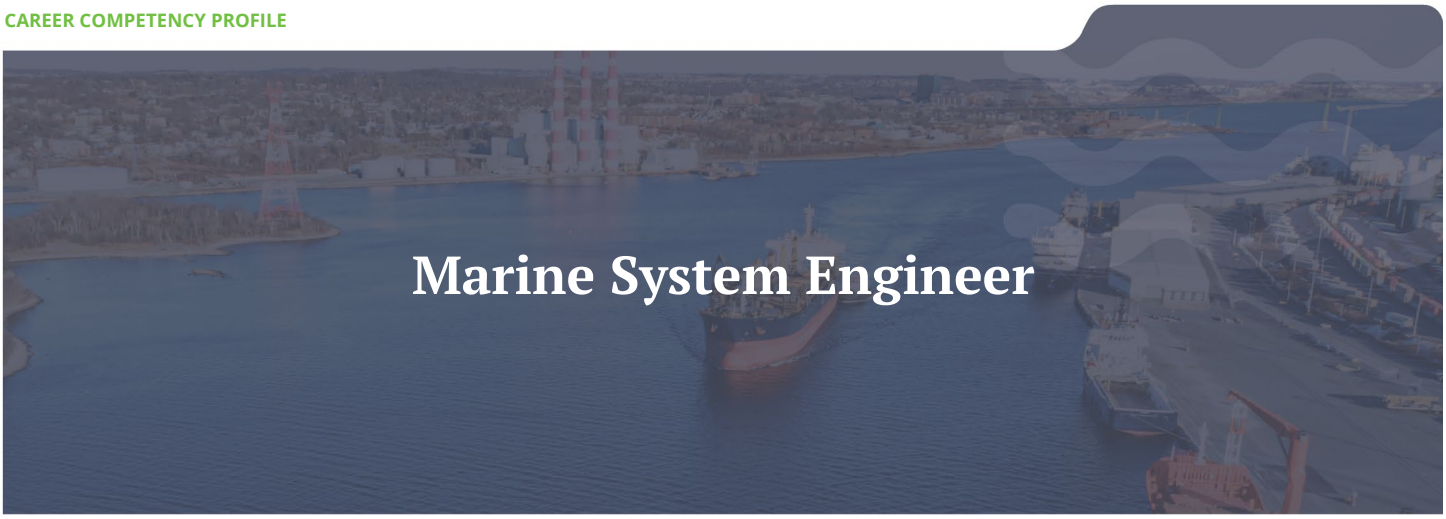

Marine System Engineer

ROLE OVERVIEW

You will be responsible for the preparation, operation, and maintenance of propulsion and ancillary systems, power generation and distribution, auxiliary systems, ship's service systems, ship and machinery control systems, hull structure, ship's stability, damage control, and the integration of these systems.

You will likely work closely with naval architects to design everything from yachts and fishing boats to submarines and aircraft carriers, while supervising technicians, technologists and other engineers. On top of that, there will be the opportunity to oversee construction operations of prototypes and help test and tweak finished vessels. Acute project management skills will also be necessary to ensure projects are carried out in a timely manner. Most shipbuilding operations are intrinsically reliant on communication and collaboration both internally among different teams and with external stakeholders.

Marine system engineers are also responsible for the creation and operation of simulation systems. In this case, you will work to provide the necessary resources for the implementation of mathematical models of marine systems with a focus on control system design. Such models will be used to create state-of-the-art simulation systems for training and vessel development.

Depending on the position and level of seniority, most of the operations are carried out at the office. Nonetheless, openness to work at sea for trials and ship testing is a likely necessity.

STRATA LEVEL: 3B – Technical Specialist

Also Known as:

- Marine Design Engineer
- Marine Consultant
- Marine Engineering Consultant
- Marine Equipment Design Engineer
- Marine Power System Engineer

Education and Experience:

- Bachelor's degree in electrical, mechanical, electronic or computer engineering.
- A marine engineer officer certificate of competency issued by Transport Canada may be necessary. For entry-level jobs, only the first-level certification (out of four) is required.

Associated NOC(s):

- **2274** – Engineer Officers, Water Transport

TECHNICAL

Engineering Design

Responsible for the technical aspects of the planning and design of engineering project[s] to ensure project is constructed in a safe, efficient, and effective manner.

- Defines the engineering-related problem or opportunity and potential risk and benefits of project proposal[s] to senior management and stakeholders so that project proposal can be approved and implemented.
- Proposes technical design or process changes to improve efficiency, quality, or performance of structures, systems, or facilities.
- Prepares complete technical drawings with sufficient details and specifications to ensure the effective and safe construction of structures, systems, and facilities.
- Applies quality control techniques throughout the design and construction to ensure the safe construction of structures, systems, and facilities for the purposes of achieving regulatory compliance.
- Inspects marine equipment and machinery to troubleshoot and schedule maintenance and repairs in an efficient matter.

Mathematics Model Creation and Simulation

Develops, improves, and validates mathematical models embedded in simulation computers to test navigation capabilities of vessels.

- Create mathematical procedures or algorithms that represent the relationships between the various factors involved for a data framework.
- Through the process of “identification” associate numerical constants to the appropriate framework for the specific case under consideration.
- Applies appropriate simulation models to define the depths and contours of the waterway for determining the forces that act on the boat.
- Identify and alter databases specific to the environment to adjust quantities such as wind, current and density to adjust environmental factors to the specific seasons.

Simulation Design

Simulate ships and maritime environments to recreate specific challenges to navigation for training, research, or case-specific purposes.

- Recreate case-specific challenges to navigation to provide basic training and simulator training for maritime professionals.
- Recreate dynamic behaviour of vessels and their systems in a simulated maritime environment to allow the operator to control and interact with the simulated surrounding.
- Simulate full mission bridge to develop a realistic model a vessel's bridge and control consoles to prepare users for any scenarios.

Performance Testing

Use ship performance testing software to analyze and compare design variants and conduct full-scale propulsion simulations.

- Analyze and compare design variants with respect to their calm waterpower demand to reveal the degree of quality compared to other similar vessels in the database.
- Implement standardized performance assessments to offer design improvements for vessels in development.
- Apply standardized performance assessments to provide third-party assessments for efficiency purposes.
- Ensure the electronic equipment on board the ship works properly by checking and testing performance as expected by standardized testing.

Project Team Management

Lead research and delivery of projects to enhance engineering projects to provide support regulatory requirements and improve process deliverables.

- Advises on methods to enhance and improve engineering projects and recommends follow-up actions.
- Develops project management plans and briefings to identify possible policy initiatives and project deliverable options.
- Represents the organization in strategy sessions with industry experts to discuss marine engineering development efforts and contribute to policy recommendations.
- Prepare plans, estimates, design and construction schedules to act as a liaison between ships owners and shore personnel to ensure schedule and budget are followed.
- Ensure that equipment available is appropriately allocated to the right locations to ensure resources are used at full capacity.
- Interface with shipyard production and planning teams to ensure the outfitting design products adequately reflect facility limitations, capabilities, and building methodologies.

Model Integration

Integrate models to simulation systems to assist in the design, testing and manufactory of different vessels to address engineering challenges.

- Implement simulation technology to identify and possibly mitigate the impact of structural fatigue determine the environmental risks associated with seagoing loads and minimize risk.
- Implement simulation technology to identify and mitigate the impact of structural, hydro, dynamic and thermal fatigue to minimize risk.
- Implement simulation technology to identify and mitigate the impact of above surface and underwater weapon threats and other possible dangers to minimize risk.

PERSONAL AND PROFESSIONAL

Communication

Positively directs outcomes by delivering communication that better understands goals and objectives, captures interest, and gains support for immediate action.

- Provides marine systems design and communicate relevant supporting information to development and construction teams working on projects.
- Produces and/or review the quality of technical reports and presentations for both internal and external audiences.
- Conducts effective client and agency presentations to provide information on findings and deliver informed advice.
- Prepares technical reports for use by engineers, managers, or sales personnel to coordinate activities.

Stakeholder Relation Management

Identifies the needs of relevant actors, working in partnerships with all necessary partners, to achieve a well-balanced solution to the desired project, process, or program.

- Maintains an ongoing channel of communication with subcontractors to ensure operations move through production properly timed.
- Follow up with clients to present products and services and ensure customer requirements are being fulfilled.
- Maintains up-to-date knowledge of relevant projects to keep stakeholders informed and communicate any changes for the purpose of transparency.

LEGAL, REGULATORY, AND POLICY

Regulatory Compliance

Offer overwatch and ensure that standards and regulations are followed throughout the whole span of operations.

- Research system layouts, drawings and schematics to review constructability and help resolve technical issues to ensure production complies with national and international standards.
- Records facility operations to ensure compliance with standards and regulations.
- Notifies necessary parties of containment or quality issues to ensure appropriate measures are taken.
- Clearly communicates the regulatory compliance requirements to employees to ensure employees have the requisite information to perform duties safely and effectively.

ENVIRONMENTAL

Environmental Requirements

Uphold requirements to ensure equipment and systems follow regulations, standards, and best practices for environmental purposes.

- Use appropriate simulation technology to assist in the design of vessels in order to improve efficiency and reduce production and lifecycle maintenance costs.
- Assess environmental compliance of systems to ensure designs and their construction follow Construction Specifications Canada.
- Participate in the development and oversight of testing and commissioning of new designs and systems for the reduction of emissions.
- Address risk items for the design and outfitting of hull and other vessel requirements to ensure the structural integrity of ships following environmental standards.
- Propose design and process improvements related to vessel emissions and fuel consumption to reduce the impact on the environment when possible.

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