Fisheries and Oceans Canada | Pêches et Océans Canada

Canadian Coast Guard | Garde côtière canadienne

Safety First, Service Always

Marine Technology Education and Training Needs – CCG's Perspective

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Canada

Purpose and Content

Purpose - Communicate the needs and challenges on marine education and training to support the CCG mandate

Content

- Overview of Canadian Coast Guard (CCG)
- CCG Programs and Services
- Recruitments Needs and Challenges
- Career Development and Retention Initiatives
- The Canadian Coast Guard College
- Needs and Challenges on:
  - Ship Design and Maintenance
  - Electronics & Informatics
  - Maritime & Civil Infrastructure and Environmental Response

Overview - Mandate

The Canadian Coast Guard (CCG) is rooted in the nation's culture and consciousness as the leading organization tasked with ensuring the safety of our waterways and the people who travel on them

It has a mandate to:

Protect individuals navigating on Canadian waters

Protect the environment from marine spills

Support economic growth by being Canada's on-water economic enabler

Contribute to Canadian sovereignty and security via a strong federal presence on the water

Overview: from Coast to Coast to Coast

We cover more coastline than any other CG in any other country

The Canadian Coast Guard's responsibility extends to Canada's 202,080-kilometre long coastline - the longest of any nation in the world. Its vessels and aircraft operate over an area of ocean and inland waters covering approximately 2.3 million square nautical miles.

The Canadian Coast Guard is a Special Operating Agency of the Department of Fisheries and Oceans.

The Canadian Coast Guard mandate and services fall under the *Oceans Act* and the *Canada Shipping Act*.

On an average day the CCG

Saves 15 lives

Assists 52 people in Search and Rescue

Manages 1,233 vessel Movements

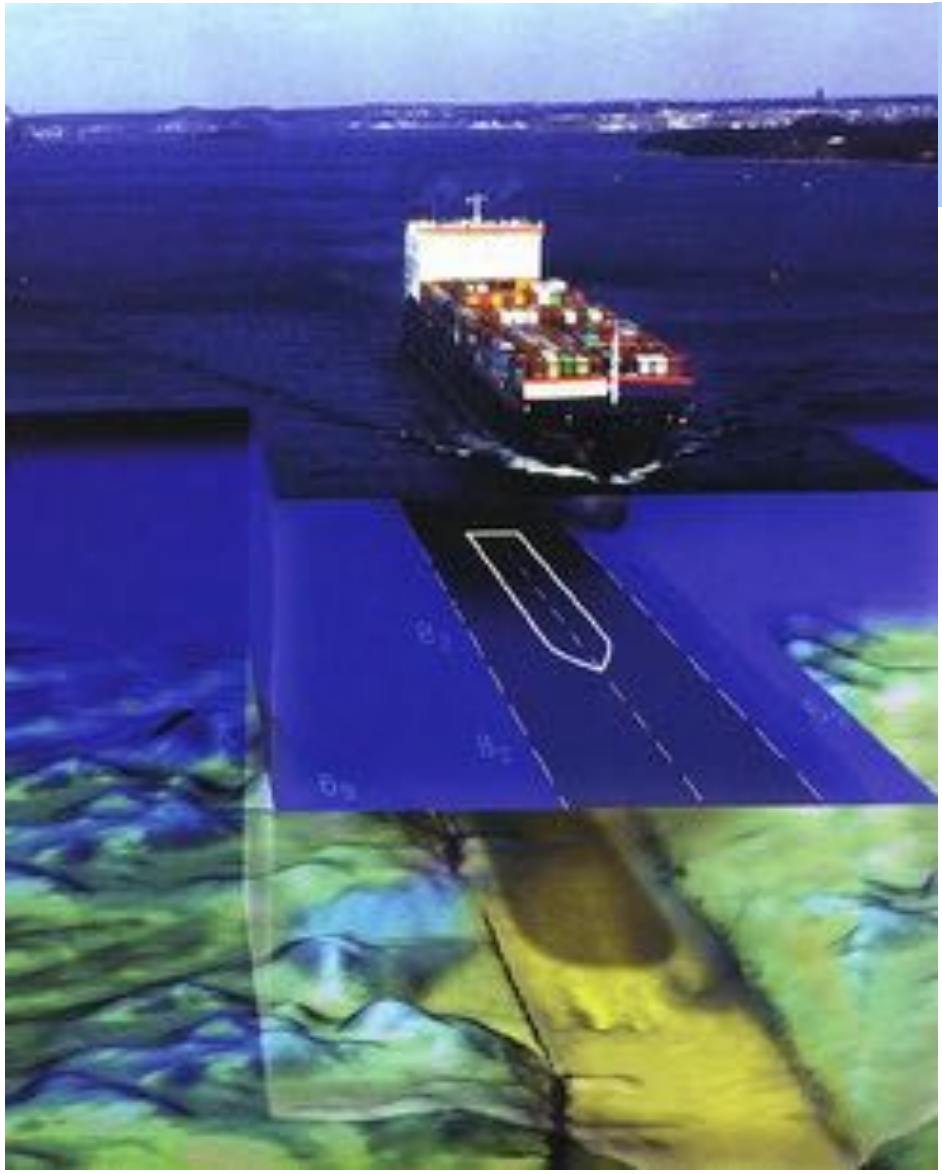
Carries out 11 fisheries patrols

Supports 11 scientific surveys

Deals with 3 reported pollution events

Surveys 3.5 km of navigation channel bottom

CCG Programs and Services
Marine Navigation



Effective transportation means: navigating smoothly and efficiently, movements without disruption, moving items quickly and making routes safer.

CCG plays a pivotal role in supporting and growing the country's economy by:

- Maintaining approximately 17,500 aids to navigation and an electronic positioning system (DGPS)
- Providing navigational safety information to mariners
- Surveying channel conditions, informing mariners on available water depths and helping to manage current and water levels
- Supporting smooth and uninterrupted flow of goods along Canada's waterways
- Promoting safe waterways for both commercial and recreational traffic
- Playing a leadership role in implementing e-Navigation in Canada

CCG Programs and Services
Icebreaking

Why It's Important

- Maintains commerce on East Coast for 12 months of the year
- Ensures year-long ferry service
- Prevents floods
- Ice cleared from harbours and wharfs maintains operations
- Supports Arctic sovereignty
- Supplys remote communities
- Supports Arctic economic development
- Escorting ships through ice covered waters, ice information and routing advice keep ships moving

CCG Programs and Services
Marine Communications and Traffic Services

Vessel Traffic Management

CCG operates 12 Marine Communications and Traffic Service Centres throughout the country

- ~200 remote radio sites
- 2 Central Data Centres

Our Ears on the Water

- Monitors for distress and safety calls and provides coordinated responses
- Broadcasts maritime safety information
- Issues and disseminates Notices to Shipping to inform mariners about hazards to navigation and to share other important information

Staying on top of vessel traffic

- Strategically monitors and contributes to planning of vessel movements
- Provides navigational information and assistance
- Screens vessels and issues clearance to ships prior to entry into Canadian waters

A more modern and innovative approach

MCTS Centres are leveraging state-of-the art technology to provide more effective and efficient service

CCG Programs and Services
Search and Rescue

The Minister of Fisheries and Oceans is responsible for Maritime Search and Rescue (SAR)

CCG Mission

- To save and protect lives in the maritime environment
- Work in partnership with federal departments, volunteers, organizations, municipalities, provinces and territories, to provide this service

CCG Outcome

- Saves on average 15 lives per day

When others are trying to escape the storm, the CCG is there to assist

CCG Programs and Services
Environmental Response

Protecting our Environment - CCG lead agency for ship-source pollution

- CCG is the lead federal agency for all ship-source oil spills and pollution incidents in waters under Canadian jurisdiction
- Onus is on the polluter to immediately respond to and address spills, but the Canadian Coast Guard is called in when a more effective and comprehensive approach is required
- In Canada, the polluter is always held responsible and accountable for spills
- Reassures Canadians that their government is strategically positioned to respond to potential marine pollution incidents, ensuring minimal impact
- The CCG has responded to more than 7000 marine incidents since 2010

CCG Programs and Services
Maritime Security

The CCG plays a critical role in supporting Canada's maritime and national security.

CCG's contributions fall into four categories:

1. Enhancing Maritime Domain Awareness to support threat identification, monitoring and analysis;
2. Providing vessels, helicopters and trained personnel to support federal security and enforcement partners;
3. Developing priorities and policy in collaboration with the maritime security community; and
4. Working with partners to analyze marine intelligence (such as the RCMP, National Defence, Transport Canada, Canada Border Services Agency, and U.S. Coast Guard)

Recruitment Needs and Challenges

- **Extensive hiring** – Ocean's Protection Plan
- **Retirement** – over 10% of the workforce is eligible to retire
- **Needs** – increase capacity in marine infrastructure project management, training and vessel procurement
- **Hiring groups** – engineers, technologists, certified marine personnel (marine engineering), project managers, project officers, support staff, and instructors
- **Functional Areas**
  - Ship Design and Maintenance
  - Electronics & Informatics
  - Maritime & Civil Infrastructure and Environmental Response
  - Integrated Logistics Support

Recruitment Needs and Challenges (Cont'd)

Challenges

- Competing with marine and other industries since everybody is competing for same qualified people.
  - National Shipbuilding Strategy has created a huge demand for engineers and technologists.
  - Oil & Gas industry
  - Construction industry
- Shortage of qualified marine personnel interested in shore-based positions; locations; pay differences, bilingual employees and diverse workforce.
- Officer Training Program and MCTS program.
  - Attracting enough people into our programs
  - Keeping our members within the CCG

Career Development and Retention Initiatives

- CCG has developed career development and on-going training programs.
- **CCG marine training**
  - Professional Development Program for engineers,
  - Marine Maintenance Equipment Training,
  - Marine Electronic Development Program,
  - Search and Rescue coordination,
  - incident management and
  - instructional techniques
- **Programs being developed** –
  - environmental response specialists,
  - expanding Inshore Rescue Boat student employment program and
  - comprehensive onboarding program for new employees.

The Canadian Coast Guard College

- The college offers a 4 year Officer Training Program (OTP) as well as a 6 month Marine Communication and Traffic Services (MCTS) program.
- Officer cadets can train in either marine engineering or navigation. Training in both programs follows IMO STCW regulations.
- **Training for both programs** – classroom, simulation and at sea
- **OTP** – receive diploma, bachelor degree and Transport Canada certification.
- **MCTS** – on the job training in a MCTS Centre.

Needs and Challenges
Ship Design and Maintenance

- **Needs** – NSS provides CCG a stable environment to recruit new graduates from universities as well as experienced marine professionals to work in ship design, maintenance and repair.
- **CCG role** – Contribute in building up future generations of engineers and technologists on ship design, maintenance and repair.
- **Contributions** – Supporting Co-op program on engineering and recruiting graduate engineers from universities. Typically, CCG hires 6 to 8 Co-op engineering students every term.
- **Strength of Co-op program** - CCG needs have been partially met by supporting the program and bridging graduates. This have been very successful.
- **FSWEP** – Allows us to hire non Co-op students thereby providing greater exposure to a broader educational sector. Can include High School students, collage students and university students.

Needs and Challenges
Ship Design and Maintenance (Cont'd)

Challenges

- Ship production
  - All team members have to develop the required knowledge and skills, to prepare them for ship procurement and maintenance environments
- Reverse mentoring
  - Everybody has the capacity to learn; the senior people teach the new recruits who in turn teach the senior people.
- Regulations, standards and Class rules
  - Regulatory environment is changing with Delegated Statutory Inspection Program (DSIP)
- Opportunities for innovation
  - Green technologies, increased operational efficiency and flexibility, Internet of Things, semi/autonomous ships
  - Challenges are different for current Fleet vs new vessels
- Life Cycle Materiel Management
  - CCG needs to adapt to a changing maintenance environment current vs new vessels
- HR Process
  - How to compete with Private Sector Hiring practices

Needs and Challenges – Maritime Civil Infrastructure & Environmental Response

Needs

- Engineers (civil, mechanical)
- Technicians and Technologists (civil, mechanical, electrical, electro-mechanical, environmental)
- Trades
  - Welders
  - Riggers
  - Mechanics
  - Electricians

Needs and Challenges – Maritime Civil Infrastructure & Environmental Response

Challenges

- Sought after trades - competing with other industries
  - e.g. Oil and Gas, construction.
- Demanding work environment:
  - Remote locations, dangerous work
  - Rapid mobilization and deployment of personnel to carry out emergency repairs.
  - Deployments can extend to several weeks.

Needs and Challenges
Electronics & Informatics

NEEDS

- Electrical engineers, technologists, and technicians capable of performing Life Cycle Management activities on:
  - Wireless communication systems
    - e.g. VHF/HF/MF radios & networks, satellite communications
  - Secure Operational Networks
    - i.e. secure data networks with high availability
  - Integrated real-time applications and sensors
    - e.g. Vessel Traffic Management system with radar and AIS sensors,
  - Modern Electronics
    - e.g. echo-sounders, ECDIS (electronic chart display and information system)
- Computer Scientists and IT Specialists skilled in:
  - Cyber security
    - risk assessment, threat modelling, incident response planning
  - Software application development & maintenance
    - corporate, server-based, web-accessible.

Needs and Challenges
Electronic & Informatics

- Challenges
  - Staff turnover - sought after skills within government and private industry.
  - Ongoing educational requirements - bleeding edge technology (e.g. cyber security, ever-evolving OS platforms)
- Mitigations
  - Building a Learning Organization
  - Partnering with Industry, Academia and OGDs
  - Strong reliance on new graduates and coop students