National Defence / Défense nationale

Maritime Engineering Journal

Canada's Naval Technical Forum

Spring 2007

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Canada

Is this YOUR ship?

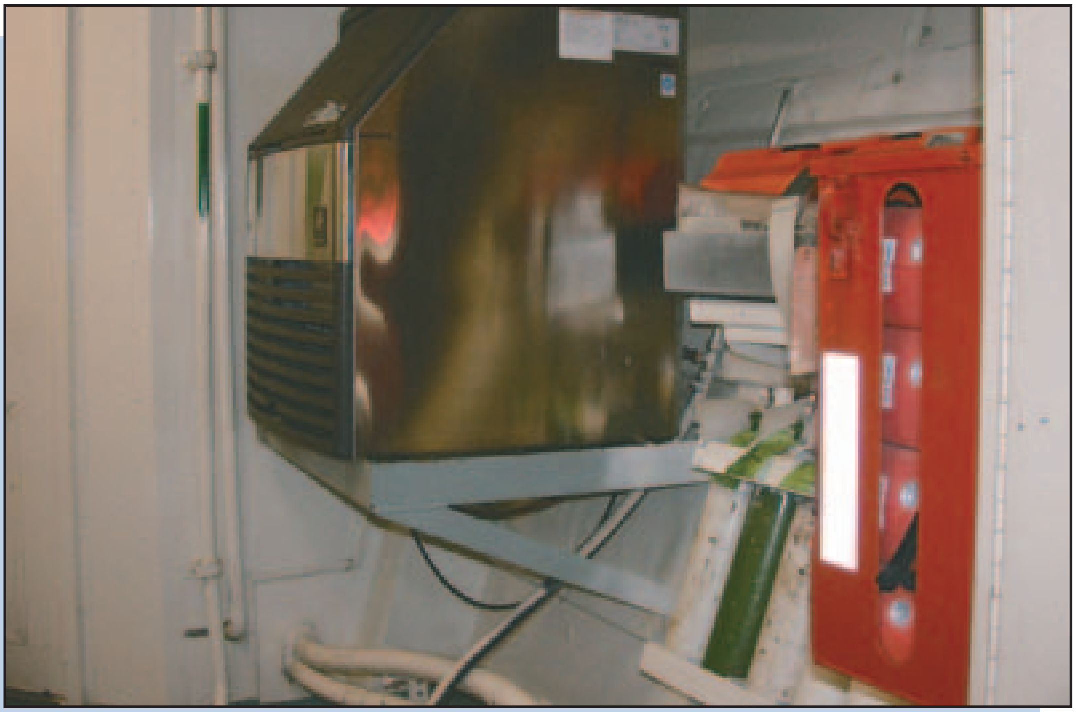

Photo by CPO1 Jeff Morrison

This ice machine was mounted outside the Master Seaman & Below cafeteria in one of our ships. Everything to do with this unauthorized installation contravened regulations designed to preserve the ship's approved configuration. Not only was the support bracket welded to ship's structure, but a cold water supply was "tapped" to feed the unit. There was no sign of a shut-off valve. The ice machine was fitted with a small drain line that empties directly into a scupper, and the electrical hook-up certainly did not fall in the category of an approved connection. Apart from some of the obvious safety issues, here, an expensive "surprise" is waiting down the road when the ship eventually goes into a docking work period. Because there is no record of this installation in the ship's official configuration and maintenance documents, it is almost certain that the unexpected need to remove the bracket and make good the jury connections will result in an arising from the contractor that could cost the navy tens of thousands of dollars. ***— See the rest of the story inside***

Maritime Engineering Journal

SPRING 2007

(Established 1982)

Director General
Maritime Equipment Program Management
Commodore Richard W. Greenwood, CD

The *Journal* is available on the DGMEPM website located on the DND DIN intranet at http://admmat.dwan.dnd.ca/dgmepm/dgmepm/publications

Cover Photo: Staff with Fleet Maintenance Facility *Cape Scott* in Halifax created this challenging, custom repair of a cracked main gearbox lube oil supply line in HMCS *Ville de Québec* without having to weld onto the gearcase. The step-by-step story of the repair begins on page 7. *(Photo courtesy FMF Cape Scott)*

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Commodore's Corner

Sustainable solutions are the key to effective operational support

By Commodore Richard W. Greenwood, CD
Director General Maritime Equipment Program Management

The scope of articles in this edition of the *Maritime Engineering Journal* has prompted me to reflect on the variety of issues, employment and points of focus we deal with in our collective endeavour of naval technical support. Whether it's the nitty-gritty of resolving a recurring in-service failure, graphically demonstrating the need for more careful adherence to the principles of shipboard configuration management, examining the issues of technological maturity and rapid delivery of capability, or debating the large-scale capability design issues relating to fleet renewal, it merely reflects the diversity of activity that the naval technical branch and supporting public service and industry teams experience on a daily basis.

Looking at all this leads me to comment on several interrelated points, the most obvious of which is the common thread these activities share in their importance to the primacy of operations. Notwithstanding that our wide-ranging activities have their effect across very different timeframes and areas of operation, the clear overall objective of our technical support effort is (as it must be) to facilitate the achievement of maximum effectiveness in operations within the constraints of resources. It is also clear that expediency in fielding some new capability or achieving a given level of systems effectiveness is not enough. It is equally important to ensure that any new capability we do introduce "has legs." We need to be able to sustain what we create. In other words, our larger objective is the *reliable sustainment* of effective operational capability. This is a key distinction.

One of the great challenges we face in fulfilling our technical support role lies simply in maintaining the big picture on our objective and not allowing ourselves to become distracted by sub-optimal solutions. Nowhere are the dangers of this type of distraction more glaring, at least in our sphere of effort, than where they relate to naval ship procurement projects. Permitting an environment in which "creeping requirements" become the order of the day, or letting ourselves become unduly swayed by expedient opportunities during a project's definition phase can result in potentially serious, long-lasting "solutions" that are either unaffordable or unduly limited. Disciplined engineering systems analysis is no less essential at the requirements definition phase than it is during the in-service support phase of the life-cycle process.

Developing new capability, whether we are talking at the equipment level or the ship system level, is not a simple case of finding the right balance between "technology-push" and "requirements-pull." It involves careful analysis of the maturity of given technologies so that we can walk that fine line between evolution and revolution as we provide responsible and proactive technical leadership to the navy. To accomplish this we must, above all, accept the inevitability of change and establish adaptability itself appropriately within the hierarchy of requirements.

It falls to the naval technical support community to remain flexible with respect to future operational developments, both in the near and far terms. Our responsibility is to consider always how we may best apply the intellectual discipline of our training and experience in providing sustainable solutions to operational requirements, whether or not those solutions are necessarily in the technical domain of our initial training, or in the broader domain of wider CF taskings.

Forum

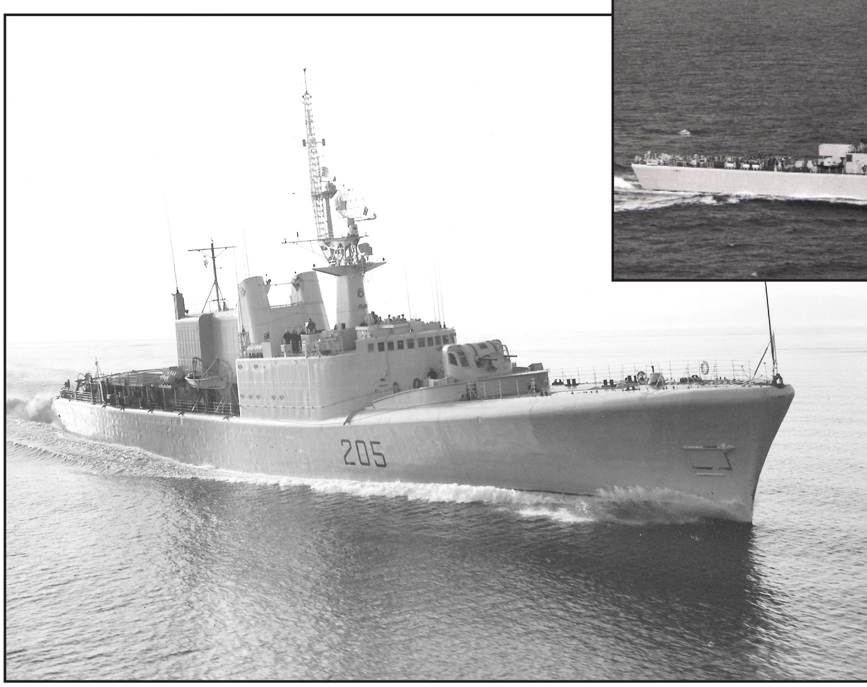
A Canadian Common Surface Warship Concept

Article by LCdr Bruce Grychowski

One of the exciting things about being involved with a new ship program is the opportunity to examine what we are hoping to achieve in light of what has gone before. Over the next 10 to 20 years Canada will replace its current fleet of three *Iroquois*-class destroyers, 12 *Halifax*-class frigates and 12 *Kingston*-class maritime coastal defence vessels. The burning question in most people's mind, of course, is replace them with what? The navy is setting out on the most difficult process of identifying the requirements for a new class of ship that could potentially be the only class of surface combatant in the navy. Unlike the present fleet mix, the new ships must be truly general-purpose and capable across the full spectrum of naval missions.

Developing a single class of warship to replace an existing fleet of mixed classes is not unprecedented in Canadian naval experience. While the 20 steam-driven DDE-205 *St. Laurent*-class anti-submarine (ASW) destroyer escorts built in the 1950s and 1960s were never intended to be the sole destroyer-type warships in the Canadian fleet inventory, circumstances dictated otherwise. In fact, the 205-class and its variants comprised the bulk of Canada's naval surface combatants for nearly 30 years — a remarkable achievement.

During their three decades of service the *St. Laurent*s, or "cadillacs" as they were known, evolved into several variants — the seven-ship Improved *St. Laurent* (ISL) class of DDH helicopter-carrying destroyers, the four-ship Improved *Restigouche* (IRE-257) class, the three-ship unmodified *Restigouche* class (HMC ships *Chaudiere*, *Columbia* and *St. Croix*), the four-ship *Mackenzie* (DDE-261) class, and the two-ship *Annapolis* (DDH-265) class. While the original *St. Laurent* design was for a 2,800-ton ASW destroyer escort, the final two ships of the design, HMCS *Annapolis* and HMCS *Nipigon*, were 3,000-ton vessels built specifically as DDH anti-submarine escorts. That the variant classes differed in their combat systems and air capability was a testament to the excellence of the original design in facilitating the addition of new weapons and sensors, including most significantly a flight-deck and hangar. Across the classes the hull form, propulsion system, auxiliary equipment, electrical system, naviga-

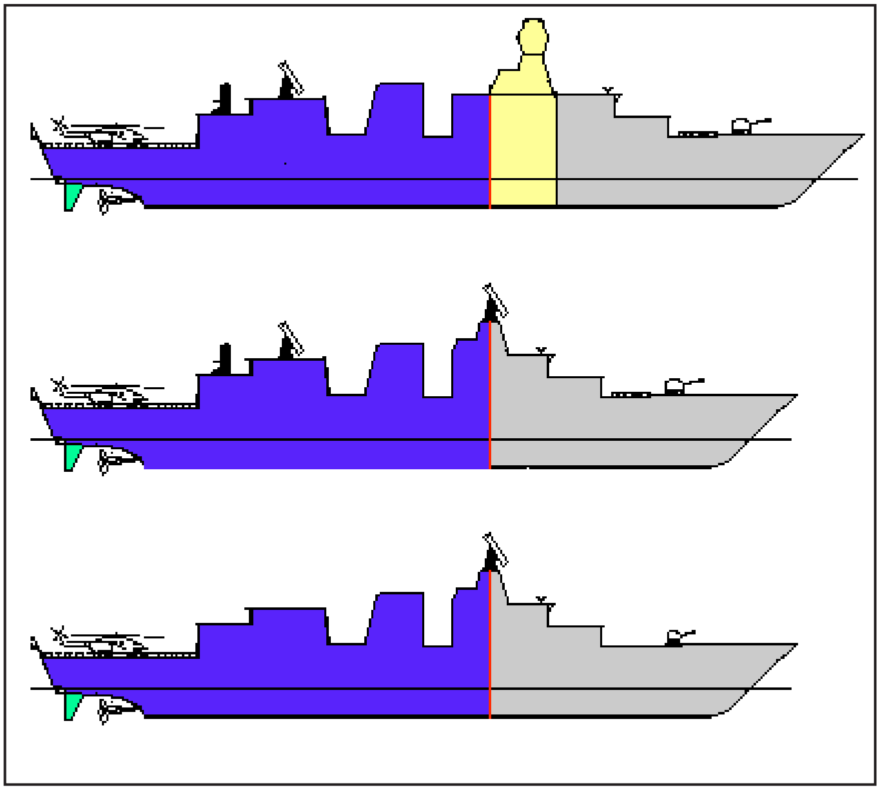


HMCS *St. Laurent*, seen at left after her own conversion to carry a helicopter. The 205-class and its variants such as the Improved *Restigouche*-class destroyer escort HMCS *Terra Nova* (above) comprised the bulk of Canada's naval surface combatants for nearly 30 years. *(All photos by DND)*

tion system and accommodation arrangements remained the same, offering significant economies in terms of training and support.

The *St. Laurent* design was also the basis for a general-purpose frigate that was designed in the late 1950s. The GP frigate program was ultimately scrapped, but the design for the star-crossed ship was to be 20 metres longer and 1,000 tons more in displacement than the 205-class. The GP frigate's planned hull form was similar to the *St. Laurent* design and would have been propelled by the same Y-100 steam main machinery system. The design also incorporated improvements to accommodations, combat systems and hull strength. The ship was intended to become the fleet's air warfare frigate and, as such, influenced the design of the DDH-280 *Iroquois* class commissioned into service in the 1970s.

In effect, the GP frigate and the *St. Laurent* ships were the equivalent of today's "spiral development" concept of dividing a common ship class into variants by capability. Although the detailed operational requirements for a single-class surface combatant are still being studied by the navy, the program could certainly result in a build of common design, with some ships differing in size and capability outfit to meet a broad spectrum of operational requirements. The benefits of building to a common hull and general arrangement would be felt immediately through reduced construction costs, and over the long term through more economical single-class crew training and life-cycle material support.



A possible common class of surface warship designed to maximize core capability, with specialization for individual ships: command and control variant (top); general-purpose ship (middle); patrol vessel (bottom). ***(Diagram courtesy the author)***

A Common Class Concept

A possible future Canadian warship program could consist of three principal major variants on a common class, maximizing the principle of core capability in all fleet units bolstered by specialization in individual ships. The variants, as I envision them, would comprise a **command and control** ship, a **general-purpose** ship, and a **patrol** ship, each having capabilities particular to its employment.

The *command and control* ship would be the largest of the three variants and would conceivably fill a force-level area air-defence role for the fleet. A capable sensor and fire-control suite and a large missile inventory would have to be carried to support this role. As this variant would also be used as a task group command ship, it would also be outfitted with additional systems for specialized command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) — functions critical to supporting task group level activity.

The smaller *general-purpose* ship would be arguably more "nimble" than the larger command and control variant, optimized for anti-shipping operations, underwater warfare, naval fire support and support to forces ashore. A major component of its defensive suite would be a mine countermeasures capability to allow it to operate safely in littoral waters.

For reasons of economy the *patrol* variant would be more or less the same as the general-purpose ship, but would have only a subset of the GP ship's sensors and weapons. The design would be modelled along a "fitted-for-but-not-with" scheme to allow for full outfitting should the need arise. The patrol vessel would be capable of area surveillance and boarding activities, and would be best suited for domestic operations — roles currently fulfilled by the naval reserve with the *Kingston*-class maritime coastal defence vessels (MCDVs). Of note, a patrol vari-

The *St. Laurent* design was the basis for a general-purpose frigate (above) that was designed in the late 1950s. Twenty metres longer and 1,000 tons more in displacement than the 205-class, the GP ship was intended to become the fleet's air warfare frigate. The GP frigate program was ultimately scrapped, but its design in turn influenced the design of the DDH-280 *Iroquois* class commissioned into service in the 1970s and modernized (top) in the 1990s.

ant of the common class could result in savings in training costs for the naval reserve and allow a smoother integration of reservists into other fleet units to fill temporary manning shortfalls in either of the other two variants. It is possible that personnel and sustainment savings would offset the acquisition and operating costs of a ship that would be substantially larger than the MCDV.

Modularity

The concept being described is a common class design based on the general-purpose ship's requirements, but to stretch the hull and alter the superstructure for the command and control variant. As mentioned, the patrol ship would be a stripped-down, "fitted-for-but-not-with" GP design. All three ship variants would have common accommodations, propulsion systems, communication and navigation outfits, command and control set-ups, self-defence capabilities, boats, auxiliary systems, electrical power production and distribution systems, and a flight-deck/hangar arrangement. All ships would be capable of employing modular, special-purpose systems to permit optimization for particular operational roles.

The common surface fleet concept is actually based upon a combination and extension of modular concepts similar to those found in use by navies around the world today — such as in the USN's commercial standard twenty-foot-equivalent unit (TEU) container system, the Blohm and Voss MEKO concept and the Danish StanFlex 3000 concept. Modularity of naval systems embraces a concept of efficiently *replaceable* modules for maintenance, *interchangeable* modules for capability and *additional* modules for cost savings.

Replaceable modules could sensibly be used for such equipment as diesel generators, auxiliary machinery and weapons to allow easy change-out for repair and/or replacement. An interchangeable module, in the extreme, could involve swapping-out the main gun in favour of an additional missile launcher, or changing a large-calibre naval fire-support gun for a medium-calibre, rapid-fire air-defence gun. Interchangeability also includes TEU container modules for accommodation, autonomous unmanned underwater vehicles for mine countermeasures, ship's boats, special-purpose boats and unmanned aerial vehicles. It could also include purpose-built modules for towed sonar systems. In ships that are "fitted-for-but-not-with," modules could provide a "plug and play" capability for weapons and sensors, including communication systems and their associated antennas, fire-control radars and electro-optical systems. Modules could also be outfitted to accommodate special crew detachments as required for a helicopter air detachment or trials staff.

A Workable Solution

There is no question that a common class of ships could be produced to functionally replace all three surface combatant classes at sea with the navy today. The benefits in design, production, operations, personnel and sustainment costs would still have to be analyzed to validate the concept in a Canadian naval fleet context, but it seems likely that a common class design could meet the navy's requirements. The concept is not new for us, as it has already been demonstrated as workable with the *St. Laurent* class and, for that matter, with the 1950s-era general-purpose frigate even though it was never built. The modularity component could provide affordable flexible capability well beyond any ship design past or present.

The core of the next generation of Canadian warship should have maximum commonality, specialization to meet mission roles, modular flexibility and spiral development in a continuous building program. The fewer ship classes within the fleet, the smaller the cost of design and acquisition. Moreover, a move away from feast and famine shipbuilding programs will reduce start-up costs and the significant learning curves associated with each program. A construction facility with a long-term building program can produce economies in time and cost, especially if many features of the design are common across the class and over time.

The goal of generating capable, affordable and sustainable ships can be achieved. Too much specialization will adversely impact design, construction and sustainment costs. The solution may therefore lie in maximizing commonality, designing in flexibility through system and equipment selection, and developing modular equipment and systems that can be moved on and off the ship as mission requirements dictate. In a constantly changing world this concept could meet Canadian naval requirements well into the future.

HMCS *Kingston*: The patrol variant of a conceptual common class would be best suited for the roles now filled by the naval reserve with the *Kingston*-class maritime coastal defence vessels. *(DND photo)*

LCdr Grychowski is the combat systems manager for the Single Class Surface Combatant Project in Ottawa. The opinions expressed in this article are his own, intended for discussion only, and do not represent official opinion or policy of the SCSC Project.

Maritime Engineering Journal Objectives

- To promote professionalism among maritime engineers and technicians.
- To provide an open forum where topics of interest to the maritime engineering community can be presented and discussed, even if they might be controversial.
- To present practical maritime engineering articles.
- To present historical perspectives on current programs, situations and events.
- To provide announcements of programs concerning maritime engineering personnel.
- To provide personnel news not covered by official publications.

Machinery Repair:

Step-by-step Repair of a Main Gearbox Lube Oil Supply Line in HMCS *Ville de Québec*

Article by Bob Steeb

Illustrations courtesy the author, FMF *Cape Scott*

There have been a number of failures in *Halifax*-class ships of the lube oil lines that supply the bearings of the main gearbox. The fall 2005 issue of the *Maritime Engineering Journal* contained an article[1] on the technical investigation into this problem and its cause. This article describes a particularly challenging repair made to one of the failed lines.

In October 2005 the patrol frigate HMCS *Ville de Quebec* (FFH-332) experienced a cracked lube oil supply line to bearing No. 111 on the starboard gearbox at the external pipe/gearcase weld (*Figs. 1 and 2*). This bearing is the aft journal of the upper primary gearwheel. The leak was temporarily repaired with Devcon® Plastic Steel Putty (A) (*Fig. 3*).

A permanent repair consisting of a custom flange arrangement had to be carried out as DMSS 3 had prohibited welding on the gearcases because of inherent safety concerns and the possibility of damage to the gearing elements due to stray currents. The difficulty with this particular repair was that the gearcase is curved where the oil pipe penetrates the casing, and a flat surface was required for the gearcase, gasket and custom flange. Also, the drill/spot-face jig had to have a radius machined that corresponded to the gearcase curvature at this location. This repair method eliminated the need to weld on the gearcase itself and shifted the weak point from the previous weld on the gearcase to a flanged pipe segment that can be easily replaced if necessary in the future.

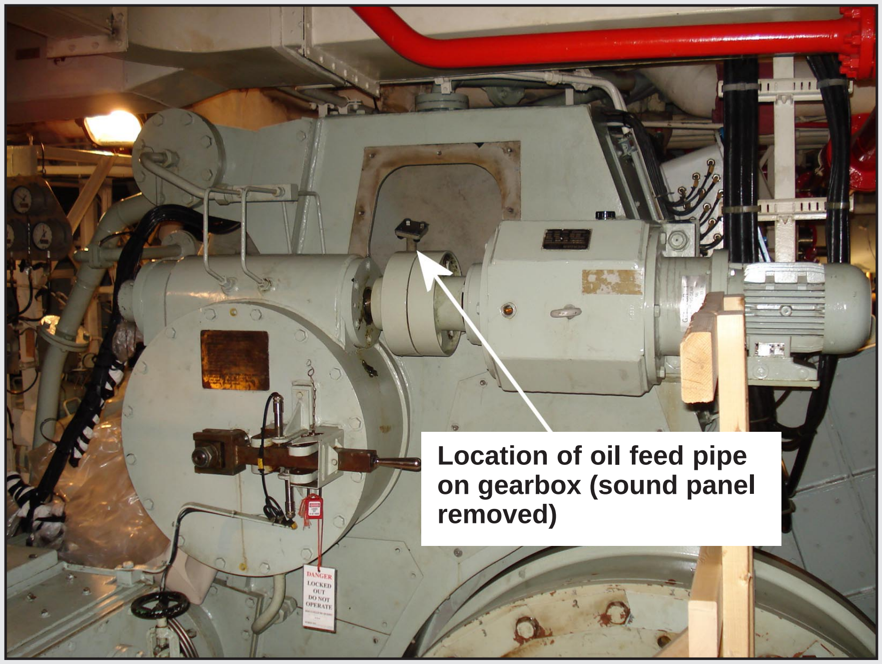


Fig. 1

The permanent repair described here was carried out by Fleet Maintenance Facility *Cape Scott* in Halifax in June 2006.

Reference:

[1] Lyczko, Stanley & Claude Tremblay, "Main Gearbox Lube Oil Supply Line Cracking in *Halifax*-class Ships," *Maritime Engineering Journal*, Fall 2005, pp. 18-20.

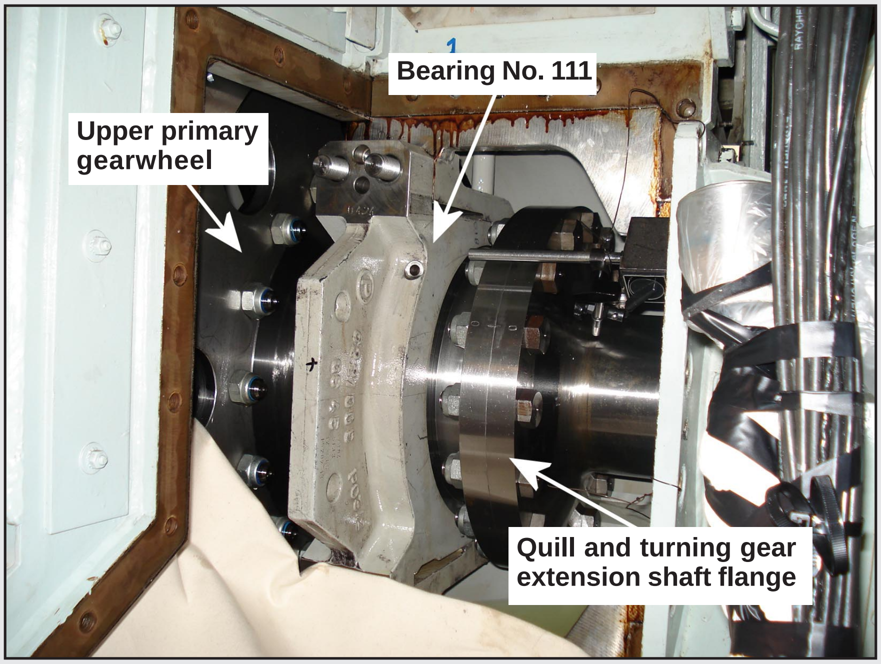
Bob Steeb is a former navy marine systems engineering officer (commissioned from the ranks) and is currently the Gearing and Gas Turbine Machinery Inspector at Fleet Maintenance Facility Cape Scott *in Halifax, Nova Scotia.*

Fig. 2

Fig. 3

Follow the repair →

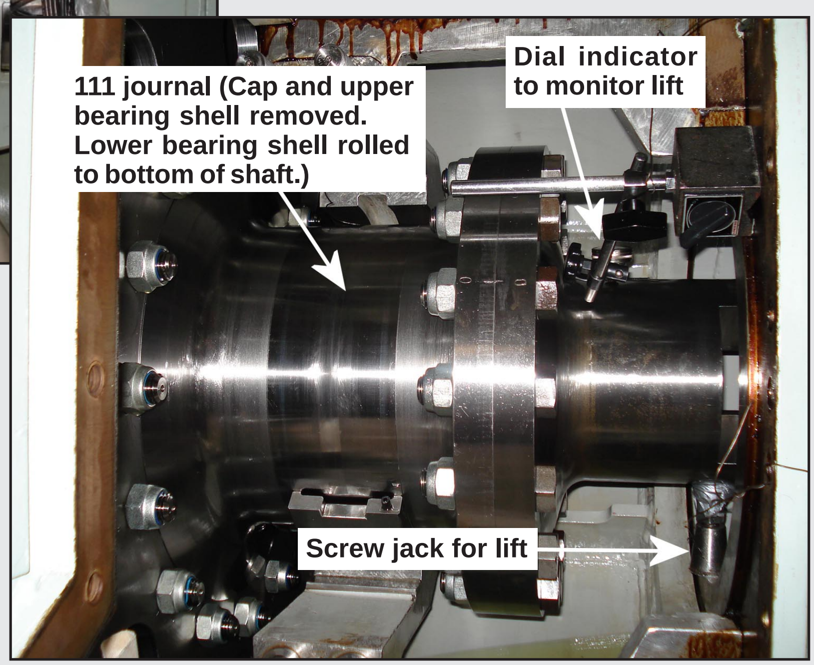
The Repair — Step by Step



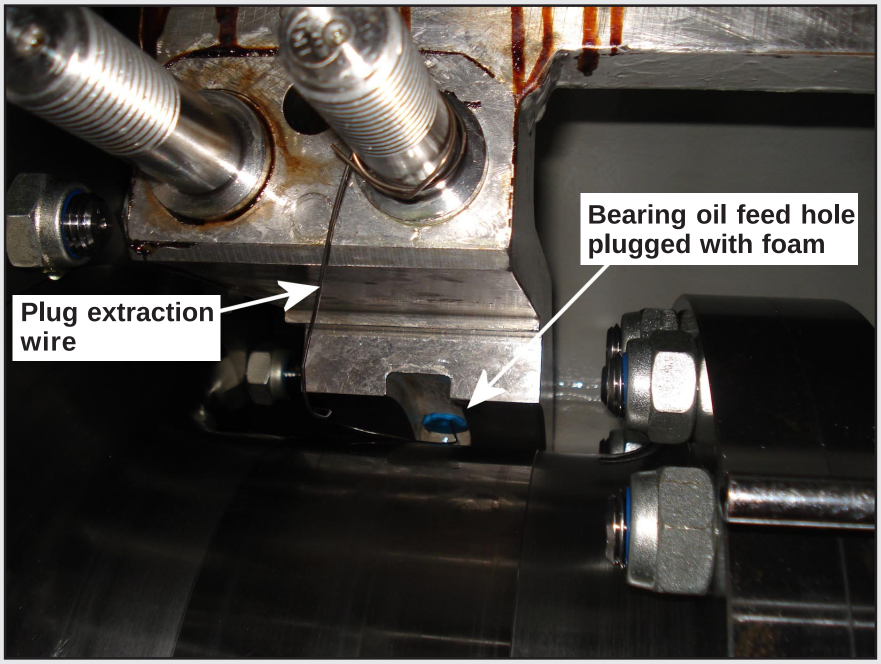
STEP 1

The gearcase cover and interference items were removed to gain access to bearing No. 111. The bearing cap nylock nuts, steel plates and locating dowels were also removed.

STEP 2

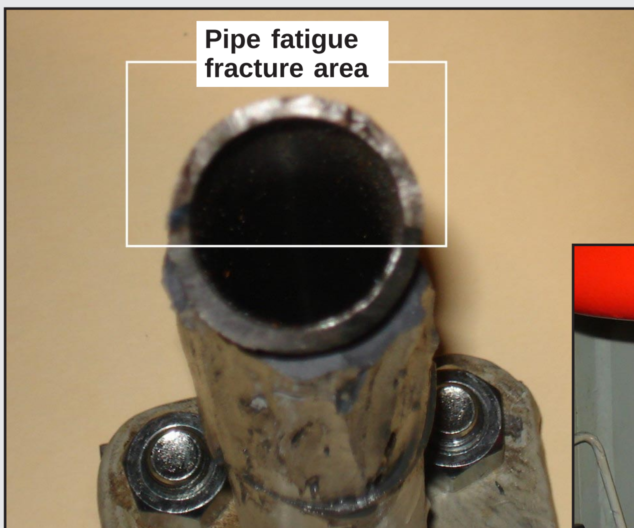


The journal cap and upper half of the bearing shell were removed, and a dial indicator was fixed above the turning gear extension shaft to measure the lift required to roll out the bearing. A screw jack was used to lift the shaft into the bearing oil clearance.



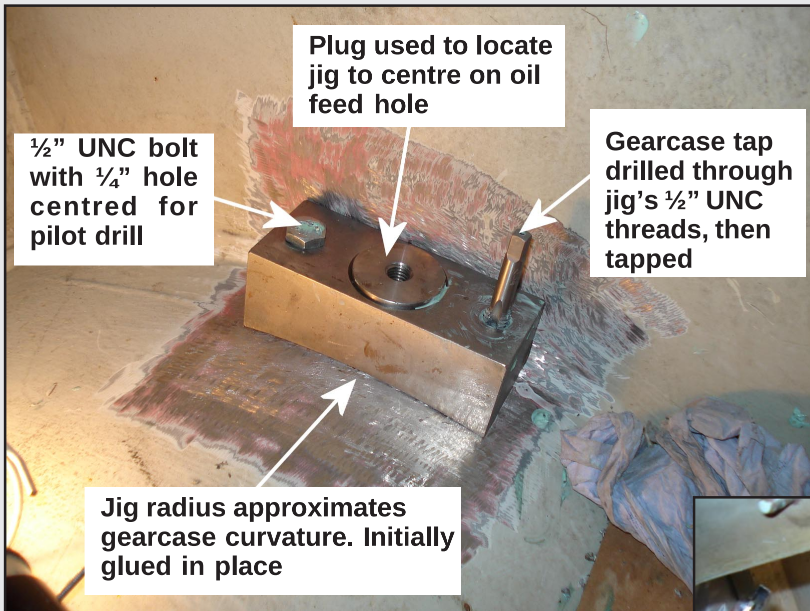
STEP 3

The lower half of the bearing shell was rolled toward the bottom of the shaft until the oil supply hole from the bearing pedestal was uncovered. This hole was then stopped using a dense foam plug with an extraction wire fixed to it to prevent dirt from entering the gearbox while the oil feed pipe was being cut.



STEP 4

On the outside of the gearcase the temporary Devcon® repair material was removed and the feed pipe was cut at the weld. The pipe broke free when it was cut approximately half-way through its diameter, exhibiting a fatigue crack that was consistent with previous lube oil supply line failures in the *Halifax* class. Another foam plug and extraction wire were inserted into the oil feed line on the external side of the gearcase, and the weld/pipe area was ground to bare metal.



STEP 5

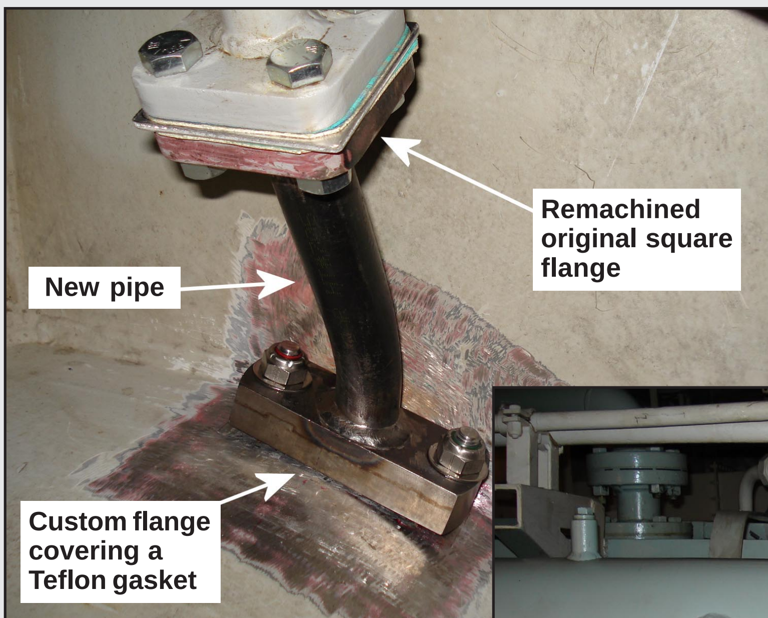
A custom jig was manufactured to attach to the gearcase so that a flat gasket surface could be milled in situ. The main block of the jig was centred on the oil feed and glued temporarily into position on the gearcase. After drilling two quarter-inch pilot holes, holes were drilled through the gearcase for two half-inch UNC thread studs that would be used to fasten a custom flange. The cuttings from this procedure were captured from the underside (interior) of the gearcase. The jig was then used to guide a custom-end mill manufactured to spot-face the curved oil inlet area to take a flat gasket. The mill’s side-cutters were ground off so that only the end of the mill would cut. The milling was done by hand due to the limited access.

STEP 6

After spot-facing the gasket surface, the internal oil feed to the bearing was thoroughly vacuumed, cleaned and flushed. As planned, the plugs had captured most of the debris. The cleaning was done by spraying and bottle-brushing liberal quantities of brake cleaner from the spot-face area to the internal bearing feed. A vacuum set up at the oil feed into the bearing captured everything.

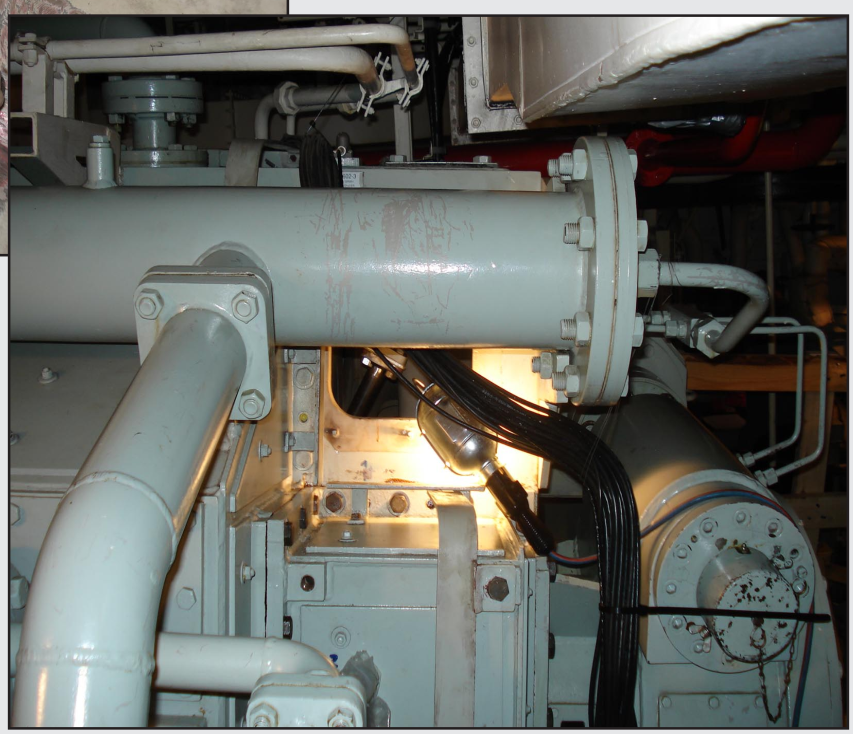
STEP 7

A custom flange was machined to attach a short replacement section of oil pipe to the gearcase. The old square flange was machined and used to connect the upper end of the new pipe to the oil supply. Both flanges had sockets machined to accept the new piece of pipe. The replacement pipe section was fabricated from readily available one-inch schedule 40 steel pipe, whose internal diameter of 1.049” is close to the nominal 25-mm internal diameter of the original pipe. The greater wall thickness of the schedule 40 pipe would provide added strength. The two flanges and the new pipe section were test-fitted, then welded in the shop. An eighth-inch-thick Teflon gasket was machined for the spot-face/custom flange joint, allowing just enough gasket material to protrude above the spot-face for a good “squeeze.” Two B-16 custom studs were machined, fitted and glued into the gearcase as permanent fasteners for the custom flange.



STEP 8

The bearing, gearcase and interference items were reassembled and the main lube oil system was run for an extended period. No leaks were detected.



TML — A Technology Maturity Level Measurement System for the Department of National Defence

Article by LCdr Brent Hobson

Under the current DND equipment/system acquisition process, the operational, engineering, scientific and procurement communities all play major roles. The technology transition process involves a series of linear steps by which information relating to equipment and systems being developed or purchased is systematically passed for action between these groups. Unfortunately, there is no common system that allows the various organizations to have the same clear understanding of a given technology's maturity level at any point in the process. This makes the task of determining the risk associated with bringing a technology into service very difficult.

Maturity Measurement Concepts

A wide body of work has been completed with regard to technology maturity measurement in the United States and the United Kingdom. As a result, a number of different systems have been created to measure aspects of the technological maturity of equipment/systems being developed for military applications. The most commonly used systems are:

Design Maturity Levels (DML)[1] — establishes a series of design review targets over the life of a project to improve its chances for success;

Interface Maturity Levels (IML)[2] — rates a technology (equipment or system) with a confidence level as to how well it will integrate with technology already in the field;

Manufacturing Readiness Levels (MRL)[3] — measures the characteristics necessary for a producible and affordable commercial product. The US Missile Defense Agency has developed a five-tier measurement system known as *Engineering and Manufacturing Readiness Levels (EMRLs)*.[4] The agency uses this maturity measurement scale to support assessments of the maturity of the design, related materials, tooling, test equipment, manufacturing, quality and reliability levels, and other manufacturing characteristics. The UK Ministry of Defence has developed a similar scale based on a nine-level system.[5]

System Readiness Levels (SRL)[6] — looks beyond the straight technological aspects of getting a system to work and interact with other systems; reflects the degree to which documentation, training, life-cycle support considerations, etc., have been completed; and

Technology Readiness Levels (TRL) — The TRL concept originated with National Aeronautics and Space Administration in the early 1980s, and is used by NASA for integrated technology planning.[7] The basic system is also in use with the US and UK navies, and has been adopted by NATO.[8] The system bases its ratings on demonstrated system performance in the laboratory, in the field and operationally.

Among these systems, Technology Readiness Levels has found the greatest degree of acceptance and implementation in the US, UK and Australian navies. In Canada, the Defence Research and Development Canada (DRDC) organization is also implementing TRL for use with its Technology Demonstration Program.[9] However, as noted by William Nolte (US Air Force Research Laboratory, Wright-Patterson AFB, Ohio),

"The TRL scale measures maturity along a single axis, the axis of technology capability demonstra-

	T	P Programmatics			M
Tech'y Maturity Level (TML)	Tech'y Readiness Levels (TRL)	Interface Maturity Levels (IML)	Design Maturity Levels (DML)	System Readiness Levels (SRL)	Manufacturing Readiness Levels (MRL)[1]
0	0	1			
1	1	2	1		
2	2	3, 4	2		
3	3	5	3	1	3
4	4	6	4	2, 3	4
5	5	7	5	4, 5	5
6	6	8	6	6	6
7	7	9	7	7	7
8	8		8	8	8
9	9		9	9	9

[1]The UK Manufacturing Readiness Levels were selected due to the fact that there are nine levels and the UK MOD had already established equivalency levels with the TRL system.

Fig. 1. Cross-system Integration Levels

tion. A full measure of technology maturity, or in the commercial world product maturity, would be a multi-dimensional metric. It's not uncommon to find references to 12 or more dimensions of product or technology maturity. One writer speaks of 16 different dimensions of maturity. The TRL measures only one of the 16."[10]

In 2003 DND's Maritime Research and Development Oversight Group established the Maritime Technology Insertion Working Group to develop recommendations on improving technology transition processes for the navy. In an attempt to broaden the scope of technology maturity measurement in DND, the group developed a prototype called the Technology Maturity Level (TML) system.

The TML System

The Technology Maturity Level system utilizes the NATO TRL system as a baseline, but expands each level to incorporate measurement criteria from the other systems described in this article. It should be noted, however, that this prototype of the TML only incorporates a rough equivalency from the US and UK systems. Further work is required to fine-tune the matching-up of levels.

The table shown as *Fig. 1* illustrates that for each technology maturity level numbered vertically from 0-9, corresponding criteria from the other systems are shown horizontally across the table. Each level of the TML scale is comprised of three subareas whose criteria must be met when making determinations of technology maturity. The first subarea is the technology readiness level (T-TRL); the second subarea, *programmatics (P)*, combines the measurement criteria for interface, design and system issues; and the third subarea is *manufacturing readiness (M)*. To demonstrate the different types of measurement criteria that are included in a technology maturity determination, an extract of the resulting Technology Maturity Level scale is shown as *Fig. 2*.

TML Level	Description T = Technology Readiness P = Programmatics M = Manufacturing Readiness
3	**T – Analytical and Experimental Critical Function and/or Characteristic Proof of Concept:** • Analytical studies and laboratory/field studies to physically validate analytical predictions of separate elements of the technology are undertaken. Example R&D outputs include software or hardware components that are not yet integrated or representative of final capability or system. **P – Interfaces demonstrated at modular level in a synthetic environment:** • Identify key design risks • Training needs analysis started • Safety and environmental user requirements captured • Overall system availability requirements identified • High-level human factors analysis completed **M – Manufacturing concepts identified**
4	**T – Component and/or "breadboard" validation in laboratory/ field (e.g. ocean) environment:** Basic technology components are integrated. This is relatively low fidelity compared with the eventual system. Examples of research and development results include integration and testing of ad hoc hardware in a laboratory/ field setting. Often the last stage for funded R&D activity. **P – Interfaces partially demonstrated, system/subsystem in high-fidelity synthetic environment:** • Review of system requirements and specifications completed • Preliminary safety/environmental assessments complete • Supportability work breakdown structure completed • Subsystem reliability and maintainability case developed for subsystems. • Initial human-machine interface design completed • Key subsystem schematics completed • All subsystem specifications defined • Engineering and operational communities have negotiated a formal commitment to use the results of the research **M – Laboratory manufacturing process demonstrated**

Fig. 2. Technology Maturity Level (TML) Scale Extract

Applicability to DND's Defence Management System

The Defence Management System is the primary DND vehicle for bringing new systems and equipment into service, either through the capital acquisition process or through the in-service support stream.[11] As shown in *Fig. 3*, the DMS vehicle for seeking program decisions is the Synopsis Sheet (SS), with its three major decision points: *Identification – SS(ID)*; *Provisional Project Approval – SS(PPA)*; and *Effective Project Approval – SS(EPA)*. Any technology maturity measurement system that is being considered for use must line up with these major decision points. To use the Technology Maturity Level system as a tracking tool within the Defence Management System, the linkages shown in *Fig. 4* would apply.

Conclusion

Technology maturity measurement is a concept that is being employed in varying degrees by NATO and Canada's principal naval allies. Given the complexity of the DND material acquisition process and the interaction between the large number of sections, departments and individuals involved, some form of technology maturity measurement would serve the DND acquisition system

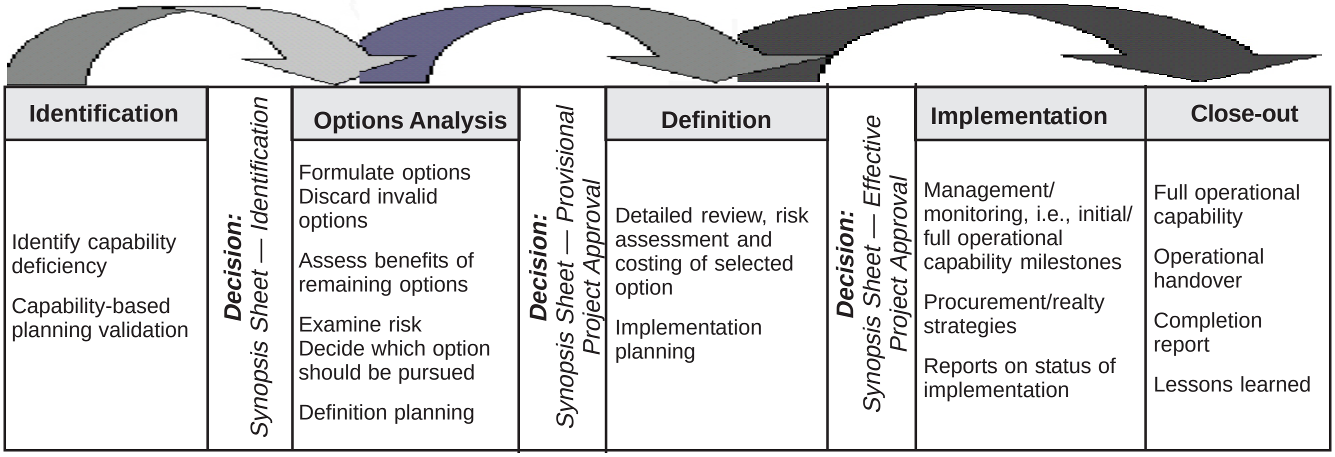


Fig. 3. Defence Management System Phases

participants well. Although a number of different systems have been developed to measure various aspects of technology maturity, no single one of them adequately presents a complete picture of technological maturity. The prototype Technology Maturity Level system was therefore developed to provide a composite of the major maturity submeasurement systems as a working tool for DND that can easily be utilized within the Defence Management System. Further details and complete references concerning this system may be obtained in the full report published by DRDC Atlantic (DRDC Atlantic CR 2005-279, May 2006).

DMS Phase/Decision Point	Technology Maturity Level
Identification	1, 2, 3
Synopsis Sheet — Identification	Level 3 Confirmed
Options Analysis	4, 5
Synopsis Sheet — Provisional Project Approval	Level 5 Confirmed
Definition	6, 7
Synopsis Sheet — Effective Project Approval	Level 7 Confirmed
Implementation	8
Close-out	9

Fig. 4. TML/Defence Management System Linkages

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LCdr Brent Hobson is the secretary for the Maritime Technology Insertion Working Group with the Defence Research and Development Canada (Atlantic) agency in Dartmouth, Nova Scotia.

Configuration Management

Is this *YOUR* ship?

Article and photos by CPO1 Jeff Morrison, with Brian McCullough

A treadmill stowed in the flats, an extra ice machine attached to a bulkhead, a coffee hotplate set up in a convenient location — non-conformance to a ship's authorized configuration plan can show itself in many ways. Frequent informal visits to ships by Fleet Technical Authority and Sea Training staffs, and formal engineering and maintenance (E&M) inspections and configuration management audits have uncovered numerous such non-conformities. Unfortunately, unapproved modifications such as the ones described in this article can cause all sorts of difficulties that may not be obvious at first glance.

Within a class, compartments are supposed to have the same name from one ship to another, and ships are all supposed to carry the same equipment in the same location. There are good reasons for this. Sailors moving from ship to ship must know exactly where to go in the event of an emergency pipe, and know exactly what equipment they can expect to find there. Confusion can have serious safety repercussions. Compartments must be indicated on the class incident board by their official names, not by some new name created on the whim of current or previous ship's staff. Likewise, damage control equipment and other safety gear must not only be consistent from ship to ship, but accessible at all times. When that action alarm goes off, there just isn't time to clear a treadmill out of the way of a fire-fighting locker...*and put it where?*

Unauthorized furnishings, generally what could be termed "creature comforts," have been a longstanding problem in ships. Furniture, paneling, freezers, exercise equipment — all of this must be approved, and meet rigorous standards for fire-retardancy, safe stowage and, in the case of electrical equipment, correct hook-up. Of particular concern are the non-approved electrical devices (ice machines, bunk lights, hotplates, etc.) which pose significant fire and electrical short hazards. In some cases, fitted ship's equipment such as electrical runs and water pipes have been altered to accommodate unauthorized "improvements." One ship even removed a bulkhead-mounted locker containing an emergency burning and welding kit...and replaced it with a poorly secured freezer.

Snack attack —

It's hard to believe, but this poorly secured fridge and coffee brew station were installed in a ship's machinery control room. Note the third coffee pot sitting in the "waiting station" up top. The vented panel to the right is the machinery control console which contains controls for 5,000-plus machinery sensors. If the contents of that one pot of full-bodied dark roast coffee were to somehow find their way into the open vents of the MCC, the ship could suffer inconvenient failure of such nice-to-haves as the main machinery, steering and valve controls.

Making unauthorized changes to a ship's configuration — I won't even begin to describe the problems associated with buckshee software "upgrades" — doesn't only compromise ship and shipboard safety. From a maintenance perspective, maintenance facilities or shipyards competing for work periods generally look at class drawings and related documentation when preparing their bids, not at individual vessels. If something has been modified, removed or added and does not show up in the official class documentation, the confusion could lead to substantial extra costs and time delays. Furthermore, significant damage can occur when sizeable changes have been made to a ship, especially when done by persons not qualified to do so. Grinding off welds, removing equipment seats or welding things to a ship's hull can inadvertently cause unseen catastrophic damage.

It is also very important that weight growth in naval vessels be kept to a minimum. Weight gain and the redistribution of weight in ships are always significant concerns as the uncontrolled movement of weight aboard ship can critically affect a ship's stability performance and capability.

So why do so many ships not conform to standards? Non-compliance is often attributed to quality-of-life issues that lead a ship's senior personnel to bypass the engineering change (EC) process and have the work done by ship's staff. In some cases, as with fitness equipment, for example, the lack of policy and/or direction leaves ships to purchase whatever they like. Unfortunately, treadmills, free weights, etc., often end up in areas not suitable for such equipment, and are not appropriately secured.

Not all configuration problems can be blamed on comforts and luxuries. For example, when engineering changes have been approved but no priority has been assigned to them, ships are put in a position of either doing without, or implementing the changes themselves. Mission fits are a bit of a different story as they are generally fast-tracked to get a ship ready for deployment as quickly as possible. Unfortunately, these special temporary equipment fits are difficult to reverse once a ship has returned from deployment, especially if there was no temporary EC paperwork filled out at the front end. No paperwork means no specifications, end date or approval, and we are back to where we started with many of the problems associated with configuration non-conformance.

So look around your own ship. You be the "talent scout." Is there anything you see that could earn itself a featured spot in a future installment of *"Is this YOUR ship?"*

Exercise your right to breathe —

Picture this: The flats have suddenly filled with smoke. Visibility is zero. You have seconds to reach the EEBD locker containing emergency escape breathing devices that will give you 25-30 seconds of additional breathing time as you make your escape. But first, "see" who else might be stumbling by in the darkness and ask them if they wouldn't mind putting their own escape plans on hold for a moment to give you a hand throwing off a few lashings and moving a hundred kilos of exercise machine out of the way of the EEBD locker. Larger exercise equipment than this has also been found parked in front of fire-hose racks and hydrants.

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CPO1 Jeff Morrison is the staff officer for configuration management in Maritime Forces Atlantic. His job is to ensure the control of configuration items and layout aboard ships, as per CMS policy on configuration management. He presented this topic at the 2006 MARLANT naval technical seminar in Halifax.

Book Reviews

The Japanese Submarine Force and World War II

Reviewed by LCdr Blaine Duffley

The Japanese Submarine Force and World War II
by Carl Boyd and
Akihiko Yoshida
Blue Jacket Books
Naval Institute Press © 1995
ISBN 1-55750-015-0
272 pages, illustrated, indexed
$28.50

Despite its strategic importance and geographic scope, the war in the Pacific, particularly the naval component, tends to get somewhat less attention in general by Canadians due to our more significant role in the Atlantic. This observation is especially true when speaking of anti-submarine warfare in the Pacific theatre, and on the role of Japanese submarines in particular.

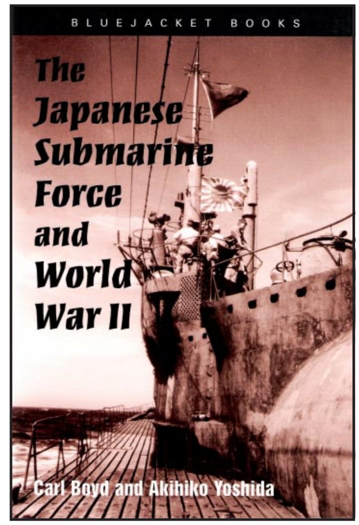
Carl Boyd, professor emeritus of history and eminent scholar emeritus at Old Dominion University in Norfolk, VA, and Captain (ret.) Akihiko Yoshida, Japanese Self Defense Force, have filled a notable gap with their detailed account of the Japanese submarine force's service in the Second World War.

The authors commence their chronology with a detailed account of the birth and development of Japanese submarine capability. The establishment of the Japanese submarine force in the early 20th century was part of the Imperial plan for naval dominance in the region. It began, in an industrial pattern to be much repeated, with the purchase in 1904 of five 54-foot (16.5-metre) Holland submersibles from the Electric Boat Company in Groton, CT. This preceded purchases from the British, French, Germans and Italians. With this rapidly attained and broad appreciation of submarine design the Japanese began their own construction programs, and by the end of the Second World War had built the largest submarines in the world. Notably, the Japanese I-400 displaced 5,223 tons surfaced, comprised two pressure hulls, could embark and recover three seaplanes, and had a range of 37,500 nautical miles. This was impressive capability even by modern submarine standards.

The main premise of the authors that flows throughout the book is that the Japanese submarine force was often misemployed by the Imperial staff. Had the Japanese conducted their submarine operations more effectively (read, similar to Allied or German doctrine) they would have had much greater impact. As it was, despite some impressive successes, the tale of Japanese submarines throughout the Second World War is more one of frustration and missed opportunities.

Some of the early technological advances, such as guns, seaplanes and advanced torpedoes (triple the range of USN torpedoes), were driven by open-minded innovation. As the war progressed, however, the functional employment of the submarine force — submarines were being used for resupply, as transport for midget submarines and for mass evacuations — became representative of the increasingly desperate state of affairs Japan was finding itself in.

One can't help but sympathize with the crew of submarine I-30. After conducting operations in the Indian Ocean and taking on supplies south of Madagascar, I-30 voyaged to Lorient, France to embark some sophisticated German technology.



Their mission was 80 percent complete when, on the return voyage to Japan the boat hit a British mine in Japanese-occupied Singapore and was lost.

Boyd and Yoshida make it clear through numerous examples that code-breaking Ultra (Enigma in the Atlantic) led to the sinking of many Japanese submarines. This situation led one Japanese commander to state that, "you could walk from Singapore to Tokyo on American periscopes." Ultra turned this perception into an unfortunate "reality" for the Japanese.

The authors sprinkle the book with numerous stories of missed opportunities by the Japanese that will pique the interest of readers who enjoy the "what ifs" of history. These include: What if the Japanese had rendered the Panama Canal inoperative? What if they had sunk the USS *Indianapolis* before she had delivered the atomic bombs? or, What if Japanese submarines had emphasized patrolling the eastern Pacific and effectively isolated Hawaii?

While the book is exceptionally well referenced and scholarly, it is perhaps most engaging when the authors highlight the personal sacrifice and frustration of the Japanese submarine service. When they were successful, the effects were devastating. As the authors posit, the Allies were fortunate that the Japanese successes were limited by the regular misemployment of Imperial submarines. This was generally demonstrated by the frantic retasking of submarines by the Japanese Imperial staff, rather than providing them with patrol orders that exploited the submarine's tactical advantages.

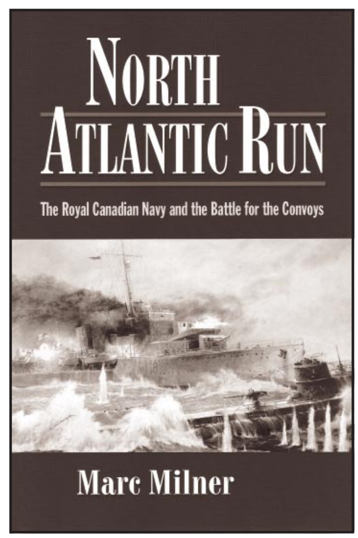
While *The Japanese Submarine Force and World War II* is highly recommended as an engaging read for anyone interested in naval warfare in general, it would be an essential reference for those with a particular penchant for submarine warfare in the Pacific. It provides a unique and important perspective regarding a theatre of war for which much has been written from the Allied perspective.

LCdr Duffley is currently serving as the acting section head for submarine combat systems engineering in DMEPM(SM) in Ottawa.

North Atlantic Run: The Royal Canadian Navy and the Battle for the Convoys

Reviewed by LCdr Patrick Smithers

North Atlantic Run: The Royal Canadian Navy and the Battle for the Convoys
by Marc Milner*
Vanwell Publishing Limited
(sales@vanwell.com) © 2006
ISBN 1-55125-108-6
paper, 327 pages
illustrated, indexed
$17.95



Anyone with an inkling of our naval history knows that the Royal Canadian Navy came of age during the Battle of the Atlantic. The performance of our corvettes, the tough little ships on the North Atlantic run, epitomized the can-do attitude that is still prevalent in the Canadian navy today.

I purchased and read the original hardcover edition of this book as a young and impressionable naval cadet during MARS II training. *North Atlantic Run*, originally published in 1985 to coincide with the navy's 75th anniversary, captured much of what the official histories still don't tell us and added some colour to what we were seeing in the old black-and-white training films at the Naval Officers Training Centre in the mid-1980s. Identical in content to the hardcover, this new paperback edition of naval historian Marc Milner's work contains volumes of information which had previously been unavailable to the general public. The book draws on first-hand accounts, personal recollections and memoirs of naval officers who served during the Battle of the Atlantic to examine the bureaucracy, material limitations and personalities that shaped our navy's role in the battle for the convoys.

Milner effectively illustrates how Canada's unofficial war aims — bolstering our national identity, benefiting materially from the war, and using what was first perceived as a short European conflict to build up the destroyer fleet — helped shape the RCN's contribution to the conflict. But that contribution was hindered from the outset by a shortage of trained and experienced personnel, and by professional rivalries between officers of the RN, RCN, and later the USN, charged with securing the North Atlantic sea lanes.

Interesting parallels between the navy of today and the wartime RCN can be drawn from the book. Then, as now, procurement and force generation were complex functions of people, things, money and time — all in short supply. The book recounts how the small RCN struggled to come to terms with a simultaneous need for rapid force generation and broad force employment. Early on Milner discusses how the demands of building the Tribal-class destroyers the RCN wanted, conflicted with manning and maintaining the Town-class destroyers and Flower-class corvettes the RCN had neither wanted nor expected.

Some passages relate clashes of will between flag officers in the RCN, RN and USN, and the impact these had on the war against the U-boats. Familiar RCN historical figures such as RAdm L.W. Murray, VAdm Percy Nelles and Captain J.D. "Chummy" Prentice are discussed in the book. The tug-of-war over ships and men between the commanders of Halifax- and Newfoundland-based forces receives as much attention as disagreements between the RN, RCN and USN over tactics, escort composition and command and control over the western Atlantic.

The book goes far beyond accounts of flag officers and Naval Service Headquarters' "paper war." Generous attention is paid to the main business of "fighting the ships." The drudgery of some convoy runs, as well as some of the more hair-raising brief encounters with enemy (and sometimes friendly) forces are recounted in detail. Also included is an account of the deadly fight for convoy SC 42, during which the RCN's first U-boat kill was overshadowed by the loss of 16 ships.

I offer only two criticisms of this edition of the book. First, Milner's new preface states that the 2006 edition is not a revision of his original work, despite later allusions to having an older and more-informed perspective. One would think that new information and, hence, new or better-supported conclusions could have been added to the work 21 years later. Second, like most naval histories, the book speaks volumes of ships and senior officers, but dwells little on the stories of the sailors who sailed the ships beyond how rotten their living and working conditions were at sea.

In all, *North Atlantic Run* is as good a book as it was when I first read it. I highly recommend it to anyone who wants to understand our navy's roots, or appreciate the story of the convoy battles beyond the popular tactics, raw statistics and dry official histories.

LCdr Patrick Smithers is a naval combat systems engineer with the Halifax-*class Modernization Program in the Directorate of Maritime Requirements Sea (DMRS 8) at National Defence Headquarters in Ottawa.*

[* Historian Marc Milner is also the author of *Battle of the Atlantic*, published by Vanwell in 2003 and reviewed in the Winter (March) 2005 issue of the *Maritime Engineering Journal*.]

News Briefs

Victoria-*class Service Level Agreement*

DGMEPM and the Defence Research and Development Canada (Atlantic) agency in Dartmouth, Nova Scotia have signed a service-level agreement for *Victoria*-class submarine scientific support services. The SLA will directly support the submarine design authority, making key contributions to several vital aspects of the *Victoria*-class submarine program. Services range from submarine structural and hydrodynamic analyses to forensic investigation and metallurgical examinations to support through-life management of submarine hull valves. The service-level agreement provides a framework for enhanced communication and streamlined service delivery, and aims to significantly improve collaboration between the two organizations.

— Cdr Derek Buxton

(Photo by Cdr Derek Buxton)

Cmdre Richard Greenwood (DGMEPM), John Porter (DRDC–A), LCdr Mark Russell (DMEPM–SM) and Dr. Ross Graham (DRDC–A) following their June 22, 2006 signing of a *Victoria*-class service-level agreement for submarine scientific support services.

Special naval exhibit

On Jan. 30 the Eastern Canadian Section of SNAME partnered with the Submariners Association of Canada (Central Branch) and industry to host the opening of a special naval exhibit at the Canadian War Museum in Ottawa. *Canada Under Attack — The Battle of the St. Lawrence (1942-1944)* gathered stories and artifacts, including the wreckage of ships and torpedoes collected by residents of the Gulf of St. Lawrence and Gaspé communities, to document the RCN's two-year battle against the German submarine threat in Canada's Gulf of St. Lawrence region.

Naval historian, Dr. Alec Douglas

Dr. Alec Douglas, a prominent Second World War naval historian and former Director of History for DND, presented an intimate keynote account of the naval battle for the St. Lawrence before an unprecedented crowd of 150 people attending this special historical event. Cdr Marcel Hallé, the acting director of the navy's submarine technical directorate in Ottawa delivered an update on the challenges currently being addressed with the *Victoria*-class submarines.

Special thanks went to BAE Systems Canada, L-3 Communications MAPPS, Lockheed Martin Canada, Thales Canada, Weir Marine Engineering, Weir Strachan & Henshaw Canada, the Submariners Association of Canada, and naval command historian Dr. Richard Gimblett for their assistance in making this memorable event possible. **— *Glenn Walters, Vice-chair Eastern Canadian Section, Society of Naval Architects and Marine Engineers***

(Photos by Brian McCullough)

German torpedo wreckage recovered from the Battle of the St. Lawrence.

SNAME professional development evening at NETE

The Society of Naval Architects and Marine Engineers held an evening of professional development at the Naval Engineering Test Establishment in Montreal on Nov. 14. With the co-operation of NETE commanding officer Cdr Joel Parent and site manager Serge Lamirande (Weir Marine Engineering), the event included a summary of the testing capabilities resident at NETE and a tour of the facilities.

One of the evening's highlights came from SNAME Central Region vice-president Peter Noble, chief naval architect and technical services manager for ConocoPhillips Floating Systems, Houston. In a mysteriously titled presentation, "Existential Adventures in Naval Architecture," Peter described his experiences in the key commercial marine sectors of liquified natural gas transportation and Arctic offshore resource development.

Thanks to involvement from Cdr Mike Wood (DMSS 2), this well-attended meeting coincided with the 11th Annual Naval Architect Conference and proved to be an excellent opportunity to expand people's professional network of contacts.

— Glenn Walters

The SNAME Eastern Canadian Section executive: Pierre Demers (past chair), Peter Noble (SNAME regional VP), Bruce Cutler (treasurer), LCdr Jocelyn Turgeon (chair) and Glenn Walters (vice-chair). ***(Photo courtesy SNAME)***

Suzie Dufresne — Executive Assistant to the CO at FMF Cape Breton

Suzie Dufresne has the distinction of having served as executive assistant to all five commanding officers of Fleet Maintenance Facility *Cape Breton* since the unit was stood up in 1996. Suzie joined Ship Repair Unit Pacific in Esquimalt from Royal Roads Military College following its closure in 1995, as she puts it, "just in time to be part of the amalgamation of SRU(P), Naval Engineering Unit Pacific and Fleet Maintenance Group Pacific that would create FMF *Cape Breton*." Capt(N) Bert Blattmann, commanding officer of SRUP at the time of the amalgamation, became the first CO of the newly created fleet maintenance facility.

Capt(N) Alex Rueben, the FMF's current commanding officer, sums up the praise and respect Suzie has earned for herself during the close to 11 years she has been executive assistant to CO FMFCB: "CO after CO, she has patiently taken us through our learning curves, functioned as the FMF nerve centre and corporate memory, and unerringly kept an extremely busy office on track."

That's high praise indeed, considering the FMF's importance as the navy's centre of maintenance excellence on the West Coast.

(Photo by MS Louisa Campeau)

Well done, Suzie!

(Photo : Brian McCullough)

Last October's MARPAC naval engineering mess dinner was the perfect occasion to find a "clean sweep" of all five officers who have served as Commanding Officer FMF *Cape Breton*. Their current or retirement ranks are shown, along with their dates of service as CO FMFCB: *From left to right*...Capt(N) (ret.) Bert Blattmann (first CO, April 1996 to July 1997); Capt(N) (ret.) Dave "Jake" Jacobson (July 1997 to February 1999); Cmdre (ret.) Roger Westwood (February 1999 to August 2001); Cmdre Richard Greenwood, DGMEPM (August 2001 to July 2004); and current CO, Capt(N) Alex Rueben (July 2004 to present).

News Briefs

MARPAC Naval Engineering Mess Dinner (Oct. 12, 2006)

(Photos : Brian McCullough)

Guest speaker RAdm Ian Mack *(left)*, chief of staff to the assistant deputy minister for materiel, with FMF *Cape Breton* commanding officer Capt(N) Alex Rueben at the MARE mess dinner. In good navy storytelling fashion, RAdm Mack delivered a professionally inspiring message through a series of short anecdotes.

— Cooks for a day

SLt Lance Mooney and Lt(N) Jérémi Thébeau, braved the barbecue smoke to flip some decent burgers and sausages for lunch on Day 1 of the MARPAC Naval Engineering Seminar last October.

MARLANT Naval Technical Officer Awards Mess Dinner (March 22, 2007)

A quiet moment during the MARLANT Naval Technical Officer Awards Mess Dinner held in the CFB Halifax wardroom in March. Naval historian Dr. Richard Gimblett was this year's guest of honour.

(Photo by Cpl Peter Reed, Formation Imaging Services)

2005 Naval Technical Officer Awards

Text by Lt(N) Dave Hooper,
CFNES Officer Training Division

Photographs by Cpl Jodie Cavicchi,
Formation Imaging Services

The Naval Technical Officer Awards are presented annually to recognize the achievements of our best junior naval technical officers in their pursuit of leadership and engineering excellence. The 2005 NTO awards were presented at the annual Naval Technical Officer Mess Dinner on March 30, 2006 at the CFB Halifax Wardroom.

Naval Officer's Association of Canada (NOAC) Award

The NOAC Award is presented annually to the candidate with the best academic performance and officer-like qualities on completion of the Naval Engineering Indoctrination Course. Cmdre (ret.) Mike Cooper, NOAC, presented the award shield and the book, *The Ships of Canada's Naval Forces 1910-1985*, to **NCdt Michael Noel**.

Mexican Navy Award

The Mexican Navy Award is presented annually to the candidate with the best academic standing and officer-like qualities on the NCS Eng Applications Course. Mexican Naval Attaché Capt(N) Chiñas presented the award plaque and Mexican naval sword to **A/SLt Jennifer Waywell-Jones**.

MacDonald Dettwiler Award

The MacDonald Dettwiler Award is presented to the best overall naval technical officer who achieved Head of Department qualification. John Moloney, MacDonald Dettwiler, presented the award plaque and naval sword to **Lt(N) Anthony March**. Runners-up were Lt(N) Morrell, Lt(N) MacDougall and Lt(N) Bank.

L-3 MAPPS Saunders Memorial Award

The L-3 MAPPS Saunders Memorial Award was renamed in memory of Lt(N) Chris Saunders. It is presented annually to the candidate with the best academic standing and officer-like qualities on the MS Eng Applications Course. Wendy Allerton of L-3 Communications MAPPS presented the award plaque and the *Modern Engineer's Journal* to **SLt Neil Ellerington.**

Weir Canada Award

The Weir Canada Award is presented annually to the best overall candidate who achieved the MS Eng (AIRY) qualification. Mike Davies, Weir Canada Inc., presented the award plaque and naval sword to **Lt(N) Mark McKiel**. Runners-up were Lt(N) MacArthur, Lt(N) Sargeant, and SLt Plante.

Lockheed Martin Canada Award

The Lockheed Martin Award is presented annually to the best overall candidate who achieved the NCS Eng (AIRX) qualification. Cdr (ret.) Bob Bush, Lockheed Martin Canada, presented the award plaque and naval sword to **SLt Rick Fifield**. Runners-up were SLt Chouinard, SLt Masood and SLt Gervis.

2006 Naval Technical Officer Awards

Photographs by
Cpl Peter Reed
Formation Imaging Services

The NTO awards recognize the dedication, hard work and technical excellence of NTOs in obtaining their training milestones during the previous year. Regardless of who wins of any particular award, it is a significant accomplishment even to be considered a candidate. The 2006 awards were presented at the Naval Technical Officer Mess Dinner on March 22, 2007 at the CFB Halifax Wardroom.

Naval Officer's Association of Canada (NOAC) Award

The NOAC Award is presented annually to the candidate with the best academic performance and officer-like qualities on completion of the Naval Engineering Indoctrination Course. Cmdre (ret.) Mike Cooper, NOAC, presented the award shield and the book, *The Ships of Canada's Naval Forces 1910-1985*, to **SLt Shauna Masson.**

Mexican Navy Award

The Mexican Navy Award is presented annually to the candidate with the best academic standing and officer-like qualities on the NCS Eng Applications Course. Mexican Naval Attaché Capt(N) Amezaga presented the award plaque and Mexican naval sword to **SLt Raphael Liakas.**

MacDonald Dettwiler Award

The MacDonald Dettwiler Award is presented annually to the best overall naval technical officer who achieved the Head of Department qualification. Phil Hancox, MacDonald Dettwiler, presented the award plaque and naval sword to **Lt(N) Darryl Gervis**. Runners-up were Lt(N) Tim Gibel, Lt(N) Mark McKiel and Lt(N) Simon Summers.

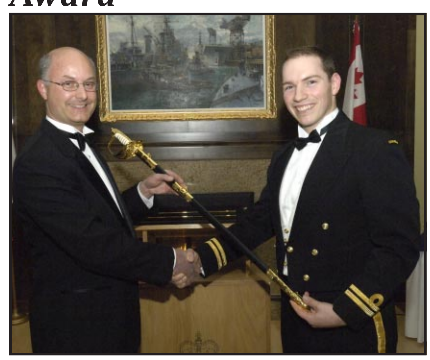
L-3 MAPPS Saunders Memorial Award

The L-3 MAPPS Saunders Memorial Award is named in memory of Lt(N) Chris Saunders. It is presented to the candidate with the best academic standing and officer-like qualities on the MS Eng Applications Course. Gwen Saunders joined Wendy Allerton of L-3 Communications MAPPS to present the award plaque and the *Modern Engineer's Journal* to **SLt Troy Hulme.**

Weir Canada Award

The Weir Canada Award is presented annually to the best overall candidate who achieved the MS Eng (AIRY) qualification. Serge Lamirande, Weir Canada Inc., presented the award plaque and naval sword to **SLt Patrick Larose**. Runners-up were Lt(N) Brad Pelley, SLt Caitlin Wade, and Lt(N) Mark Miele.

Lockheed Martin Canada Award



The Lockheed Martin Award is presented annually to the best overall candidate who achieved the NCS Eng (AIRX) qualification. Mark Dull, Lockheed Martin Canada, presented the award plaque and naval sword to **Lt(N) Robin Moll**. Runners-up were Lt(N) Adrian Leverton, SLt Johnathan Plows and SLt Cameron Fancey.

National Defence / Défense nationale

SPRING 2007

CNTHA News

CANADIAN NAVAL TECHNICAL HISTORY ASSOCIATION

The Royal Naval Engineers Quart Club

Article by Gordon Smith
Photographs courtesy the Canadian Quart Club

The Royal Naval Engineers Quart Club (RNEQC) was founded at the Royal Naval Engineering College at Keyham, Plymouth on July 1, 1930, the object being to form a beer drinking club and to discourage people's "gin habit." In December 1930 it was decided to extend the activities of the club beyond the bar and form a general sports club. Since then the club has taken on a more general character, with particular emphasis on charity work. It consists in the main of retired and serving engineering officers, with worldwide membership now over 1,200.

The Blacksmith Arms, Lamerton, Devon. This English pub was the site of the first meeting of the Royal Naval Engineers Quart Club in 1930.

The founding president was Lieutenant (E) H.C. Brown who, as a commander, was killed in action in 1941. The other founding members were engineering-lieutenants F.L. King-Lewis and F.B.A. Wilkinson (who died in 1989). King-Lewis was invalided out of the navy in 1934 and became a doctor. He became president of the Quart Club in 1947, the post having been vacant since Brown's death in 1941. He stayed on as president for 33 years until 1980, and when he died in 1997 the club turned out in numbers for his funeral.

Vice-admiral (ret.) Sir Louis Le Bailly, who served in HMS *Hood* as a junior engineer and retired from the Royal Navy in 1975, took over the presidency from Dr. King-Lewis at a monthly meeting at the Volunteer Inn at Yealmpton in December 1980. (VAdm Le Bailly also served as mess president at RNEC Manadon during the construction of the wardroom from 1956 to 1958.) In 1998 VAdm Le Bailly wrote to RAdm P.G. Hammersley, "When I first went back to Keyham on the staff as Lieutenant in 1941 there were only two Quart Club members. It was when we got the show on the road again that I was run in by the Crownhill Police for being drunk in charge of a bicycle as we raced from Roborough to Manadon." Hammersley went back in the records and found, "February 1941: The

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George at Roborough – It had been snowing hard but the meeting was well attended. Due to enemy action there was no gas and the room was freezing. Business was discussed for about 5 minutes and we repaired to the bar where there was a fire." By 1944 the club was thriving again but having difficulties with transportation, shortage of beer, and other problems caused by the war.

VAdm Le Bailly handed over the presidency to Adm Sir William Pillar in 1983 who led the club for 12 years. When RAdm Hammersley took over in 1995, he shared these thoughts during his after-dinner speech: "The Club is thriving, though it has sometimes been criticized and indeed its existence threatened. Some people feel that it is elitist, but I am not sure what is wrong with that as long as it is not divisive. If a group of congenial and like-minded people choose to get together to quaff some ale, why shouldn't they as long as they don't hurt others? If those same people go further and do a great deal of positive good for others, the Club's existence is totally justified."

The club survived a transfer of the headquarters branch from Manadon, Plymouth to Sultan/Collingwood in Portsmouth. According to Adm Hammersley, "The Club owes its existence and its strength to the influence of some great men over the years, to hard work, and dedication of successive Presidents and Secretaries and to the support of the membership which is today, wider and stronger than it has ever been." In 2005 the Quart Club presidency passed to RAdm (ret.) Mike Wood, the former Chief Naval Engineering Officer for the Royal Navy, and the man responsible for planning and staging the 50th anniversary of D-Day commemorations at Portsmouth.

On loan from the Royal Navy, Lt Cdr Nigel Kennedy lifts his glass in company with former president of the Canadian Quart Club , Gerry Lanigan. (Ottawa, 2006)

The idea of a Canadian branch of the Quart Club was first raised in late 1990 by Lt. Cdr. Steve Gosden, a Royal Navy exchange officer serving in the Directorate of Marine and Electrical Engineering in Ottawa, and Gerry Lanigan, ex-Royal Navy, who

The Canadian Quartists with their spouses at the Quart Club's January 2006 annual dinner hosted by John Frank at the Royal Ottawa Golf Club.

had immigrated to Ottawa 10 years earlier. A number of Canadian "Quartists" were known to be in the Ottawa area, so a couple of trial meetings were held at the HMCS *Bytown* Officers Mess to gauge interest, which proved to be strong.

In early 1992, after consultation with headquarters at the Royal Naval Engineering College, Manadon, approval was granted to establish a Canadian branch of the Quart Club in Ottawa, with permission to elect honourary life members locally. In June 1992 Jim (J.Y.) Clarke (now deceased) was elected as the first life vice-president, with Gerry Lanigan named as honourary secretary. The early meetings included such stalwarts as Bryan Allen (1956), Dudley Allan (1949), Jim Clarke (1950), Keith Davies (1957), Steve Gosden (1980), Charles Gunning (1956), Dick Hodgson (1963), Stan Hopkins (1950), Don Jones (1946), Jim Knox (1952), Bob Lane (1942), Gerry Lanigan (1966), and Mike Saker (1967).

Meetings were held about every six weeks, with attendance and membership increasing steadily. In 1994 a charitable element of the Canadian Quart Club's activities was established in the form of an annual donation to the Perley Rideau Foundation. Over the years the Remembrance Day cheque presentation at the Perley and Rideau Veterans' Health Centre has been well attended by hospital residents and members.

"Quartists" Dave Riis, Bryan Allen and Gerry Lanigan with Quartist-author Gordon Smith at their pub gathering last October. The Canadian branch of the Royal Naval Engineers Quart Club was founded in 1992.

In May 1999 J.Y. Clarke stepped down as branch president and was succeeded by Gerry Lanigan. Cdr Tony deRosenroll was elected honourary secretary in January 2000, but had to relinquish the post less than a year later when he was posted to the West Coast. Gerry became the ad hoc secretary until the author volunteered to assume the secretarial mantle in 2003.

Membership in the Canadian Quart Club, which is by invitation only, stands at about 50 active members, six of whom live outside the Ottawa area. The club meets every six weeks at different pubs throughout the Ottawa area. Our "highlight" meeting of the year is now hosted each January by John Frank of the Royal Ottawa Golf Club. It is a wonderful event, with spouses in attendance.

Gordon Smith is Honourary Secretary of the Royal Naval Engineers Quart Club Canada. More information and photos may be found at the club's website:

http://www.rneqc.ca/

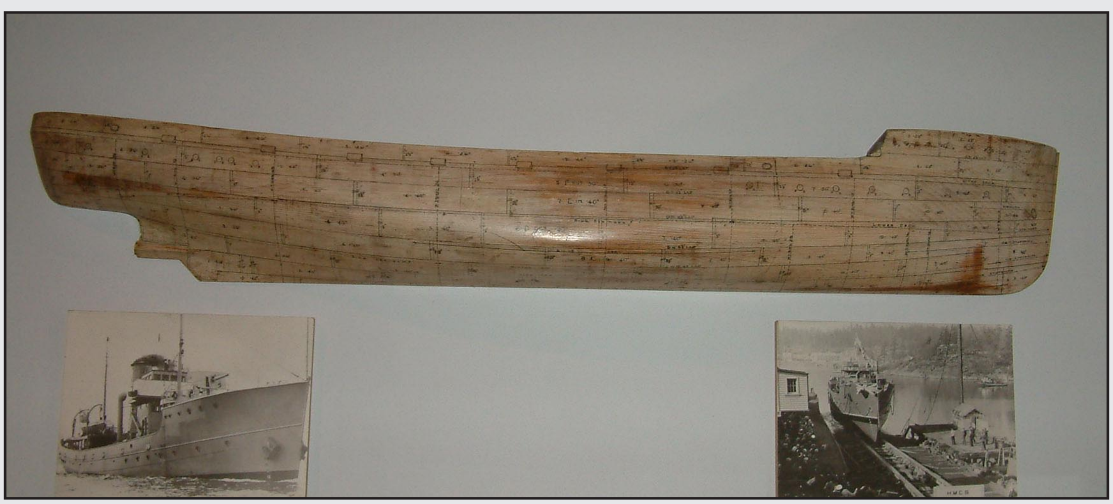
Cleaning House?

The Canadian Naval Technical History Association is working hard at preserving Canada's naval technical heritage. If you are planning to dispose of any unclassified/declassified naval technical documents, drawings, videos, or other material you think might have historical significance, please contact Warren Sinclair, Acting Chief Archivist with the Directorate of History and Heritage in Ottawa. Arrangements will be made to examine your material, and steps will be taken to preserve whatever may be historically significant. Warren Sinclair can be contacted at (613) 998-7060. Thank you for doing your bit to preserve Canada's important naval technical historical record.

CANDIB Oral History Interviews

Oral history interviews for the Canadian Naval Defence Industrial Base (CANDIB) Project are still going strong. At top, Gord Smith interviews RAdm (ret.) Bill Christie, while Don Wilson and Tony Thatcher (above left, centre) learn what they can from Frank Porter.

Museum Quality —



This beautiful builders hull-plating model of a Fundy-class minesweeper is one of several such half-models on display at the Maritime Museum of British Columbia in Victoria, BC. *(Photo by Brian McCullough)*