National Defence Défense nationale

Maritime Engineering Journal

68

Since 1982

Canada's Naval Technical Forum

Fall 2011

MANOEUVRING HMCS *ONONDAGA* into position for permanent display at Rimouski's *Site maritime historique de la Pointe-au-Père* took a bit more effort than anyone imagined

– **Lt(N) Peter Sargeant** explains

Also in this Issue:

- The Naval Materiel Management System – a NAMMS update
- More Mar Eng QL6 service papers from our navy technical branch NCMs

Canada

MODEL POWER!

Marine model maker **Tom Power** plies his exacting craft at Halifax's Maritime Museum of the Atlantic.

Photo by Brian McCullough

Maritime Engineering Journal

68

(Established 1982)
Fall 2011

Director General Maritime Equipment Program Management

Commodore Patrick T. Finn OMM, CD

Commodore's Corner

Forum

Feature Articles

Book Reviews

News Briefs

CNTHA News

Senior Editor
Capt(N) Marcel Hallé
Chief of Staff MEPM

Project Manager
Lt(N) Chris Hircock

Production Editor/Enquiries
Brian McCullough
brightstar.communications@sympatico.ca
Tel. (613) 831-4932

Graphic Design and Production Services
d2k Marketing Communications
www.d2k.ca
Tel. (819) 771-5710

The *Journal* is available on line at the website of the Canadian Naval Technical History Association – www.cntha.ca

The *Maritime Engineering Journal* (ISSN 0713-0058) is an unofficial branch publication of the Canadian Forces published by the Director General Maritime Equipment Program Management. Views expressed are those of the writers and do not necessarily reflect official opinion or policy. Mail and requests for free subscriptions may be sent to: **The Editor, Maritime Engineering Journal, DGMEPM (6 LSTL), NDHQ, 101 Colonel By Drive, Ottawa, Ontario, Canada, K1A 0K2**. The editor reserves the right to reject or edit any editorial material. While every effort is made to return artwork and photos in good condition, the *Journal* assumes no responsibility for this. **Unless otherwise stated, *Journal* articles may be reprinted with proper credit. A courtesy copy of the reprinted article would be appreciated.**

COMMODORE'S CORNER

By Commodore Patrick T. Finn, OMM, CD, Director General Maritime Equipment Program Management

Complex naval materiel program calls for increased focus from all of us

The recent industry submissions for the National Shipbuilding Procurement Strategy in July placed the Royal Canadian Navy one step closer to one of the largest fleet renewals in our history. The last time a fleet replacement of this magnitude commenced was in the mid-1980s, and it signalled a boom-bust cycle in ship construction in Canada. Through the competitive selection of two Canadian shipbuilding yards for future federal fleet construction projects, the NSPS is expected to eliminate the boom-bust approach seen in the past. The selection of shipyards is a significant milestone in the fleet renewal that will be driven by the Arctic Offshore Patrol Ship, the Joint Support Ship and the Canadian Surface Combatant projects. Combined with the ongoing *Halifax*-class modernization and the upgrades to the *Victoria*-class submarines, these projects are creating the conditions for a very busy and extremely important period for the Maritime Engineering Branch.

Transformational as it might be, the NSPS is but one initiative underway that will help us prepare for fleet renewal. Although many of the changes at hand might appear to be disparate, they do have a collective objective. They are helping us to rebalance the Navy's effort such that we are better positioned to drive the recapitalization of the fleet. Lest anyone think this means we will not remain attentive to the importance of operations today, I can assure you that success today remains very important to our success tomorrow. That being said, if we place all of our energy on the short-term activities we will not succeed at providing new ships to serve Canadians well into the future. It is all a question of how we manage our effort.

The need to shift effort toward the new fleet has been the catalyst for various initiatives currently underway. The work of the Naval Transition Planning Team, for example, is fundamentally about reallocating personnel to Force Development activities. In the same vein I have launched a strategic initiative that is examining our approach to work management within MEPM with the ultimate aim of establishing the processes and balance that will ensure we can support the Major Crown Projects in their work to design and build new ships. Another initiative – the recent "refresh" of the Naval Materiel Management System, the *NaMMS Manual* and the soon-to-be-released update of the *Naval Engineering Manual* – was undertaken both to develop policy and direction that will guide us in the operation of today's fleet, and to present information concerning the basis of design for our next ships.


Photo by Martine Simard

HMCS *Calgary* is the first of five West Coast based Canadian patrol frigates to enter the three-year-long *Halifax*-class modernization and life-extension program.

All of these initiatives are focused on preparing us for fleet replacement. For the people in our Branch, the various change initiatives mean that an increasing number of you will be drawn toward project management activities related to recapitalization. This is a natural consequence of the work required to deliver a new fleet, and will engender a flow of people into and out of project offices.

As engineers, technologists and technicians within the Royal Canadian Navy our role is ensure that there is a technically ready fleet available today to respond to the call of the government on behalf of all Canadians. Equally important is our role in driving the recapitalization of the fleet to ensure that a technically ready fleet will be available to respond in the future. This is a massive undertaking that will provide challenges and opportunities for everyone within the Branch.

FORUM

CANADIAN FORCES NAVAL ENGINEERING SCHOOL HALIFAX – A MAR ENG QL6 COURSE TECHNICAL SERVICE PAPER ADAPTATION

Editor's note: The QL6 course technical service paper gives senior non-commissioned personnel an opportunity to develop their ability to study a technical problem, devise solutions and present their findings. It is a valuable training project and no small challenge. The *Journal* is pleased to support this important CFNES initiative.

PROPOSED SOLUTIONS FOR VIBRATION ANALYST TRAINING

By PO2 Patrick M. Lavigne

[Supporting references are contained in the author's source document.]

The Canadian naval vibration analysis program has undergone a number of changes with the 2007 introduction of the efficient Commtest vb1000™ portable vibration analyzer and associated Ascent® software. Training which was intended for the discontinued Data Trap was modified slightly to allow vibration analysis (VA) training to continue in a similar format.

Vibration analysis is an equipment health monitoring (EHM) tool, but is greatly underused in the Canadian navy by comparison with private industry. The new vb1000™ analyzer was purchased under the sound-reduction program and not as a maintenance tool, despite the fact that it is extremely accurate at detecting precise defects, including bearing defects which were impossible to detect in the past. The vibration analyzer is currently being used mostly as a troubleshooting tool, which is not its primary use.

The planned maintenance schedule for *Halifax*-class ships requires a VA sample to be conducted on 110 different machines every six months regardless of operating hours. Maritime Command Order G6 also specifies that VA be conducted:

- when maintenance is conducted on rotating parts;
- when a defect is suspected;
- when repairs are completed; and
- when directed by a higher authority.

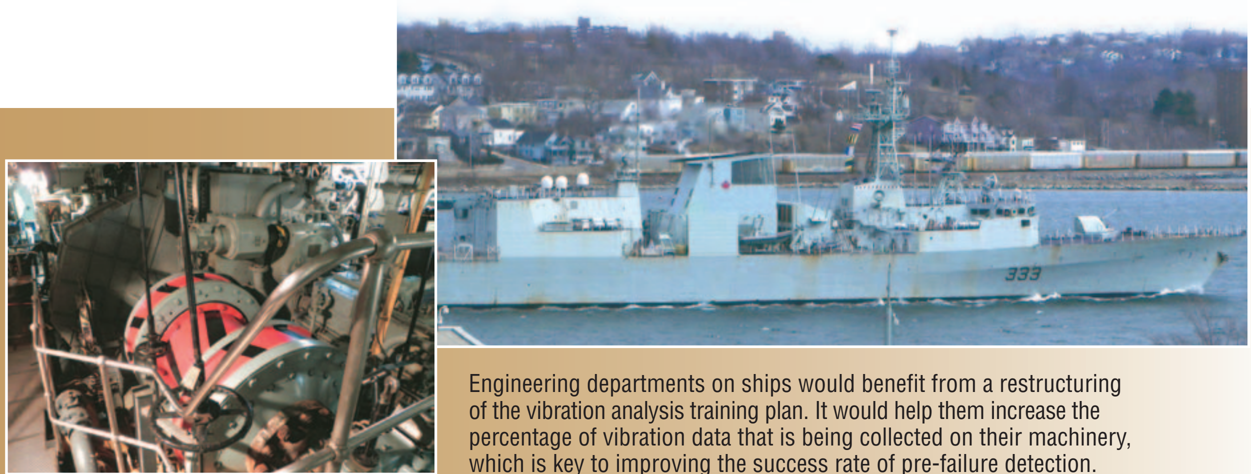
Previous vibration meters were not user-friendly. They were time-consuming to operate as their memory capacity was small, and each piece of machinery to be sampled had to be loaded and sampled separately. Technicians were compelled to set up a laptop in a clean, dry space and travel back and forth from the spaces where sampling was being conducted. Uploading and downloading information was complicated and failed numerous times. The data was not necessarily lost, but it was a time-consuming process that needed to be repeated until a successful download could be accomplished.

The associated software was also very complicated and hard to navigate. Access to machinery data was anything but user-friendly. The chart for each point in the program was in a separate window, requiring many windows to be opened to confirm that the machine was within the acceptable range. A number of different types of defects were nearly impossible to detect, and advance warnings were not identified prior to catastrophic failure.

Program Update

When the vb1000™ analyzer was purchased for all ships, fleet maintenance facilities, Canadian Forces naval engineering schools and Canadian Forces fleet schools, training guidelines were not provided. The schools where left to seek outside sources for upgrading their instructors on modern data collecting. At the same time, the Director of Maritime Training and Education cancelled the fleet vibration specialty monitoring course, leaving instructors on both coasts with the challenge of attempting to modify the QL5 for the Mar Eng and Mar E occupations, even though regulations state that it is the responsibility of the life-cycle materiel managers to define specialized training requirements unique to the equipment for which they are responsible.

The two coasts were now taking different avenues for running the VA program. The loss of the fleet vibration specialty monitoring course meant there was no longer any program in place to qualify unit managers and ensure a fleet standard for analyzing vibration data. It was a strange turn of events considering the navy's push to reduce the hours required for shipboard maintenance by using EHM tools like the VA meter.



Photos by Brian McCullough

Engineering departments on ships would benefit from a restructuring of the vibration analysis training plan. It would help them increase the percentage of vibration data that is being collected on their machinery, which is key to improving the success rate of pre-failure detection.

Advantages of the VA Program

The benefits of introducing a comprehensive vibration analysis program as a preventive maintenance tool are hard to dispute when some industry sources report numbers such as:

- maintenance costs reduced by 50 percent;
- unexpected failures reduced by 55 percent;
- repairs and overhaul down by 60 percent;
- spare parts and inventory reduced by 30 percent; and
- 30-percent increase in uptime.

The advantages of using VA according to the navy's own sources are substantial:

- safety and convenience;
- no need to shut down equipment;
- ability to determine the seriousness of a problem and the rate at which the machinery condition might be deteriorating; and
- pinpointing trouble spots to know exactly where repairs must be made.

Vibration analysis can identify a broad spectrum of defects, from misalignment and unbalance (the most common found in the industry), to excessive gear tooth wear and electrical problems. The software is now capable of extrapolating numbers from data collection to detect bearing failure much earlier than in the past. A well-run program can detect change in mechanical noise long in advance of machinery failure, thereby allowing better maintenance planning.

Disadvantages of the VA Program

A 2008 FMF Cape Scott engineering report listed a number of deficiencies of the vibration analysis program throughout the fleet. Of note was that ships were conducting on average only 20 percent of the VA data collection required as part of the six-monthly preventive maintenance schedule. At present there is no enforcement by fleet technical authority of vibration analysis data collection on board ship.

A number of deficiencies have also been identified with the training. Too much material, it seems, is being offered to students just as they are being exposed to the new program, and the updated training plan based on the Data Trap quality standard plan (QSP) is not specifically designed for the vb1000™ portable vibration analyzer and associated Ascent® software. The Mar Eng and Mar E QL5 QSPs cover all aspects of the theory and practical application of data collection and analysis, but most students simply do not use the analyzer post-course primarily due to frustration and a lack of understanding of its capabilities and benefits.

A Proposed Solution

Accurate and timely machinery analysis depends on the frequent collection of vibration data, so anything that can be done to bring the amount of data collection in the fleet closer to the required numbers is worth investigating. Cutting the QL5 vibration analysis syllabus back to data collection alone could be one way of achieving more frequent data collection on board ship. Technicians could then focus solely on capturing the vibration data which would routinely be sent to the fleet maintenance facilities for evaluation. Machinery alarms could be sent via e-mail.

The effect of this is that more technicians would be able to collect VA data because the vb1000™ would no longer be a tool used exclusively by the VA specialists. Understanding the ship's machinery cards and vibration block layout would soon become areas of expertise for all technicians. Having an understanding of where to take readings and how to take them is extremely important to the success of analysis. The frequency of data collection might also benefit from changing the six-monthly based preventive maintenance routine to a more targeted routine based on hours run.

In short, the vb1000™ is a tool that all technicians are capable of using and it should be identified as a distribution account item that would be kept in the tool crib. One drawback to this is that in Halifax the software must be maintained on a laptop as it is not recognized for use on the Defence Information Network. Downloading and uploading data is therefore difficult since the laptop must be stored in a secure area and reserved for this application only.

There would still be a need to reinstate a fleet vibration analysis specialist course to train ships' VA managers. This course would teach alarm bands, unit measurement settings, route creation and simple fault analysis to ensure ships have the ability to conduct independent troubleshooting. There would also be a need to qualify engineering school and FMF personnel to higher levels as necessary to act as instructors and analysts. Commercially available computer-assisted VA learning modules might offer an affordable partial solution toward this aspect of the program.

A Second Possible Solution

At a time when personnel shortages are an issue for the navy, creating five or six billets for civilian VA specialists at the fleet maintenance facilities might be another option for managing shipboard vibration data collection. Many industries have created sections of specialists in VA and other equipment health monitoring techniques who have the experience to collect data correctly and efficiently, and who can prepare comprehensive reports for managers.

In a naval application this would eliminate the need for ship's staff to conduct vibration analysis. Civilian VA technicians would be available to support full-power trials, for example, and could meet deployed ships as required, perhaps even joining a ship on the last leg home to conduct a full machinery vibration data collection. Within a few days a ship's engineering department could have in its hands a comprehensive report on the state of all their machinery.

This method might seem to be more costly due to the increased salary costs, but if it offers accurate diagnosis of impending machinery failure it would easily pay for itself. The cost of an unexpected failure can quickly surpass the cost of an engineer's annual salary within minutes of a breakdown.

Conclusions

Engineering departments on ships would benefit from a restructuring of the vibration analysis training plan. It would help them increase the percentage of vibration data that is being collected on their machinery, which is key to improving the success rate of pre-failure detection, and a better-run program would help ships plan their short work periods with more reliable information concerning the state of the machinery.

Reinstating the fleet vibration analysis course would seem to be the best option as ships' engineering staffs would benefit from a better understanding of the VA program. Hiring civilian VA data collectors is also a good option, but sailors would lose some of their ability to troubleshoot machinery problems and conduct maintenance, particularly while deployed. Losing such skills would not be in the fleet's best interest.

The Commtest vb1000™ portable vibration analyzer can be a very effective EHM tool, but it was brought in with less than adequate formal training. The analyzer needs to be reintroduced in a way that ships' engineering staffs feel both qualified and comfortable using it. This will lead to more comprehensive VA data collection, which in turn should lead to less disruption from surprise machinery failure.

A training deficiency report should be initiated to convene a proper QSP board to assess the fleet's vibration analysis and other EHM training requirements. Changes should be implemented that will allow the vb1000™ to become a more functional part of shipboard maintenance in the hands of the ships' engineering personnel.

Petty Officer Second Class Patrick Lavigne is the Boiler Room I/C (in charge) marine engineering technician on board HMCS Preserver.

Acknowledgment

The advice CPO2 Dave Paul is gratefully acknowledged.

Reference

Petty Officer Second Class Patrick M. Lavigne, "Vibration Analyst Training Review," Mar Eng QL6 Course Technical Service Paper, Canadian Forces Naval Engineering School Halifax, November 24, 2009.

NaMMS Review and Update – Revised Naval Materiel Management System Policy Document Reflects Current Best Practices

By LCdr Stéphane Ricard and Mr. Glenn Murphy

Canada's naval materiel support community has some reading to catch up on with the release of the newly revised *Naval Materiel Management System (NaMMS) Manual.* The update was long overdue. The Royal Canadian Navy's main policy document governing naval maintenance had fallen into a state of disrepair since its last update in 1994 and was no longer in step with current maintenance practices.

In the 17 years since its last update, the *NaMMS Manual* has remained virtually static while our naval maintenance organizations, policies and practices have continued to evolve to meet the fleet's changing requirements and priorities. The high-level document that should have been directing this activity was left to wither. The lack of a relevant maintenance policy document deprived our naval materiel support community of the focused vision and standardized work processes needed to maintain and support Canada's naval assets in a consistent manner.

The release of the new edition of the Navy's top materiel policy document represents much more than a simple release of a v.2011 edition of the *NaMMS Manual.* It is actually part of a wider review and update of the overall Naval Materiel Management System that has been "re-tuned" to keep it relevant well into the future. Even the name has been changed from naval "maintenance" management, to naval "materiel" management to reflect the expanded scope. The entire system has been reconstructed to accommodate best practices, including an upkeep and continuous improvement process that will make the *NaMMS Manual* one of the most progressive documents in the RCN.

NaMMS objectives

In the Spring 2000 edition of the *Journal* Commodore Jim Sylvester asserted as DGMEPM that "...the NEM [Naval Engineering Manual] and NaMMS Manual, together with professional judgement, will form the basis of our advice... to Command." He was acknowledging how indispensible these two documents are in guiding our operation and maintenance of naval assets, and in guiding our own professional advice to Command. The situation remains just as true today.

Photo by Brian McCullough

Leading Seaman Nicole Power (Marine Engineering Mechanic) works on her harbour watchkeeping package in the machinery control room of HMCS *Montreal* in March 2011. As the top naval materiel policy document, the *NaMMS Manual* ensures that the materiel support community works to a consistent and universally accepted standard. This is especially important in a military organization where personnel are expected to be highly mobile.

"At some point the diminishing relevance begins to erode the authority of the document until it is in such "disrepair" that it becomes a crisis in and of itself."

The *NaMMS Manual,* published under the authority of the Assistant Deputy Minister (Materiel) and the Commander RCN, provides the policy and direction necessary to effectively and efficiently support ships, submarines, auxiliary vessels and associated systems throughout their entire life cycle, from concept design to disposal.

The objectives of the Naval Materiel Maintenance System itself can be summarized as follows (paraphrased from *NaMMS Part 1*):

- to acknowledge the Canadian Forces' corporate responsibility to meet the requirements of the *Canada Shipping Act* where possible, by operating its vessels safely and in an environmentally responsible manner, notwithstanding the exemption provided for military organizations;
- to establish a framework for the development of ship and system requirements;
- to ensure that naval materiel can perform its required function;
- to promote effective use of available naval engineering and maintenance resources, and to optimize maintenance activities;
- to provide a framework for the continuous improvement of system availability and maintenance effectiveness and efficiency; and
- to provide a framework that enables sound materiel management decisions at all organizational levels.

As the top naval materiel policy document, the *NaMMS Manual* ensures that all of our actions in the materiel support community are performed to a consistent and universally accepted standard. This is especially important in a military organization where personnel are expected to be highly mobile. Standardization ensures, for example, that an engineer or technician can perform the same maintenance activity anywhere else in the fleet, secure in the knowledge that things are done in the same way.

In addition to these benefits, the *NaMMS Manual* is also a very effective training tool. In fact, the *NaMMS Manual* used to be known as the "naval maintenance bible," an essential reference for naval officers and non-commissioned members preparing for their engineering and technical qualification boards.

The problem when documents are in decline

All policy and guidance documents trend toward decreasing relevance as time passes, which is why it is necessary to constantly reassess policy and procedures to ensure the governing documents remain in step with significant changes. The frustrating reality, of course, is that this activity is often pushed aside by higher priority work, often related to more immediate operational requirements. At some point the diminishing relevance begins to erode the authority of the document until it is in such "disrepair" that it becomes a crisis in and of itself.

Document degradation causes many organizational problems. As a document first begins to fall away from the reality of the day, the reaction is fairly minor. Stakeholders will notice that referenced documents have been cancelled, or that organizations have been restructured. Further degradation can lead to cynicism about leadership and direction as the more fundamental concepts mentioned within the policy become irrelevant. Eventually, the lack of relevant guiding policy becomes an acceptable excuse for local authorities to attempt to restore order by creating their own policies and guidelines, often by seizing onto components of the older policy that apply to their own particular issues, but which might no longer be practised universally. All of this leads to a loss of cohesion and to potentially conflicting practices.

NaMMS Review and Update Project

In January 2009, the Director of Maritime Management and Support (Naval Engineering Management) – formerly DMMS 3 – initiated the much-needed NaMMS Review and Update Project. The primary objective was to bring the *NaMMS Manual* up to date with the current DND and Navy materiel management organizations, policies and practices. The project also used the opportunity to introduce new naval materiel management tools and concepts, in particular the principles of naval materiel assurance (NMA).

Stakeholders from various naval organizations were assigned the responsibility of reviewing and updating all 14 parts (chapters) of the *NaMMS Manual*. With the assistance of subject matter experts, many naval organizations from the coastal formation technical authorities to the class desks played leading roles in this process. The Naval Engineering Test Establishment in La Salle, Québec also played a key role by tracking changes made to the document by the various OPIs and subject matter experts to ensure there was no conflicting, omitted or duplicated information.

As one might expect, a project of this magnitude comes with its share of challenges. When updating a document as important and far-reaching as the *NaMMS Manual,* expectations will invariably differ depending on which organizations are represented, people's personal interests, their experience and so on. While this sometimes led to friction, at the end of the day the stakeholders managed to achieve consensus on every topic. That this was possible was due in no small part to the exceptional dedication and professionalism demonstrated by the people who participated in this project.

The work on *NaMMS Part 2 (Naval Materiel Assurance)* is perhaps the best example to illustrate the collaborative spirit that drove the NaMMS review and update. The activity timeline shown below illustrates how multiple organizations were able to come together to develop the NMA framework.

- Winter 2009 – Maritime Equipment Program Management (MEPM) Technical Regulation of Materiel Integrity Working Group (TRMI WG) created;
- Spring 2009 – TRMI framework developed;
- Summer 2009 – TRMI WG expanded to include representation from coastal formations and major capital projects;
- Spring 2010 – basic TRMI principles approved by Maritime Engineering Council;
- Summer 2010 – TRMI merged with Naval Ship Assurance to create Naval Materiel Assurance and Regulation (NMAR);
- Fall 2010 – NMAR evolved into Naval Materiel Assurance (NMA); and
- Spring 2011 – NMA framework included in NaMMS.

The new NaMMS structure

The new *NaMMS Manual* consists of 14 parts, an enhanced glossary of relevant terms, an expanded list of acronyms, and one annex describing the newly created NaMMS upkeep and continuous improvement process.

Significant changes to the *NaMMS Manual* include:

- name changed from Naval *Maintenance* Management System to Naval *Materiel* Management System to reflect the expanded scope of the *NaMMS Manual* beyond maintenance alone;
- more focus on *what* and less on *how*; the *NaMMS Manual* is primarily a policy and high level guidance document, so detailed procedures and practices were moved to more appropriate orders and directions;
- introduction of naval materiel assurance (NMA) principles;
- the role and importance of management information systems as they pertain to naval materiel management activities;
- rationalization of the naval maintenance process, which now includes more focus on performance management;

"At the end of the day the stakeholders managed to achieve consensus on every topic."

Photo by Brian McCullough

Leading Seaman Kevin Lawrence monitors the machinery control console on board HMCS *Montreal* (FFH-336) in March 2011. What people will get out of the updated *NaMMS Manual* depends on how they interface with the overall naval materiel management framework.

- revision to the process for conducting configuration management;
- introduction of quality management principles as they pertain to naval materiel management activities;
- introduction of the naval maintenance effectiveness review process, a "living" equipment maintenance review process based on the principles of reliability centred maintenance; and
- development of the NaMMS upkeep and continuous improvement process.

What you'll get out of NaMMS

What people get out of the updated *NaMMS Manual* depends on how they interface with the overall naval materiel management framework. Not all sections of the manual will apply to everyone, but it is fairly safe to say that if you have anything to do with naval materiel support NaMMS applies to you.

Adherence to NaMMS is mandatory. This is to ensure that everyone is working in a consistent manner, and allows the Navy to operate more effectively and efficiently. NaMMS acts as a check to ensure that what the naval community is doing aligns with the current approved naval materiel management policy.

Whether you are looking simply to brush up on the policy regarding something you do regularly, or are looking for high-level naval materiel policy for a new project, the *NaMMS Manual* is your primary reference document. As a "living" document this is also the place to find any new concepts that are being introduced by the Navy, so keeping track of these new concepts can provide a useful indication of the significant trends taking place in materiel management.

Conclusion

Cmdre Sylvester offered a bit of closing advice in his commentary in 2000. The *Naval Engineering Manual* and the *NaMMS Manual,* he said, "should not be expected to provide simple prescriptions to solve all the problems of our complex business – they are, however, ignored at one's peril."

The release of the updated *NaMMS Manual* marks an important step forward in the initiative to align the Navy's materiel management framework and policy documents with current DND policy and practice. The new *NaMMS Manual* has built on the experience and knowledge of the naval engineering and maintenance community to establish a new baseline for naval materiel management that should restore its relevance to the naval community.

LCdr Stéphane Ricard is the manager for Naval Materiel Supportability and Policy in the Maritime Equipment Program Management division in Ottawa.

Mr. Glenn Murphy was a senior engineer at the Naval Engineering Test Establishment in LaSalle, Québec during the NaMMS review and update.

Canadian Forces Naval Engineering School Halifax – A Mar Eng QL6 Course Technical Service Paper Adaptation

A PROPOSED UPGRADE FOR THE *IROQUOIS* CLASS ENGINE ENCLOSURE FIRE SUPPRESSION SYSTEM

By PO2 Tony Hounsell, Illustrations courtesy the author
[Text references and cost analyses are contained in the author's source document.]

The *Iroquois*-class ships have been fitted with the same engine enclosure fire suppression system since the class commissioned in 1972. The system is used in both the FT-4A main and 570-Kf cruise engine enclosures, and is controlled through, and by, the onboard Integrated Machinery Control System (IMCS) and Fenwal control cabinet. Unfortunately, the system draws from the ship's saltwater fire main to suppress fires inside the enclosures. Since the well-known corrosive and other damaging aspects of sea water make its use for this purpose problematic, this paper offers several alternatives.

Technical Background

The engine enclosure fire suppression system used on board the *Iroquois* class has three modes of operation: manual, local and automatic. In all three modes when activated, the incorporated control system immediately sends a stop signal to the air dampers and fans to prevent air from fuelling the fire. Furthermore, audible and visible alarms are telegraphed to the operator. Each mode has its own distinct operation.

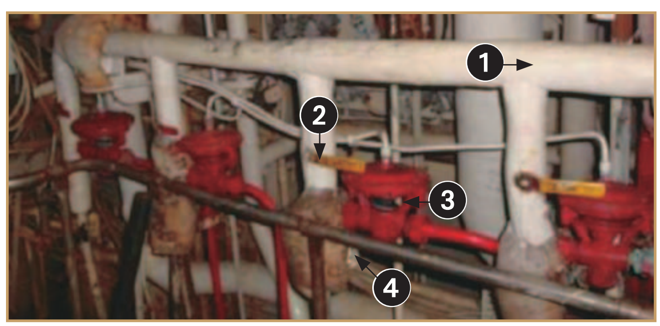
In **manual mode** the operator uses the IMCS to send a remote signal from any control console to the extinguishing valves. This signal will open or close the valves via a pneumatically operated, electrically controlled solenoid. Once the extinguishing valves are operated to the open position, sea water is supplied at 125 p.s.i. from the fire main to the nozzles located around the engines. In **local control** mode the operator physically opens and closes each individual extinguishing valve. The **automatic** control relies on sensors located inside the enclosures to determine the condition within. Should both the heat and optical ultraviolet flame detectors be set off concurrently, automatic activation will occur.

The fire suppression system uses subassemblies inside each enclosure to detect and extinguish fires. The subassemblies include UV optical flame detection sensors, ambient heat detection sensors and fire suppression nozzles. Each enclosure is fitted with four nozzles, but the number of sensors differs between the two sizes of engine enclosure (Table 1). When the system is activated, sea water from the fire main is distributed to the enclosure through a manifold and control valves. The control valves (Figure 1) consist of isolation valves, drain valves and extinguishing valves. Eventually, the sea water makes its way to the nozzles inside the enclosure (Figure 2).

Engine	Optical Sensors (SFD 500)	Heat Detectors (UFD 500)	Nozzles
Main (FT-4A)	6	11	4
Cruise (570-Kf)	2	5	4

Source: Adapted from C-97-336-000/MS-001 Operation and Service Instructions Fire and Overheat Detection System, 1969-11-16

Table 1. Enclosure subassemblies



1. Fire main Supply
2. Isolation Valve (4 ea)
3. Extinguishing Valve (4 ea)
4. Drain Valve (4 ea)

Figure 1. Fire suppression control valves.

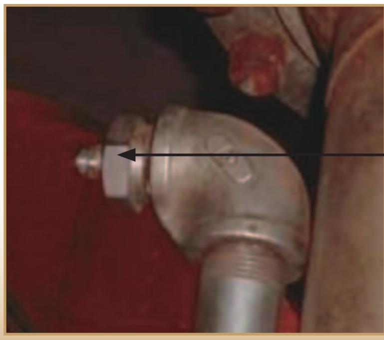


Figure 2. A fire suppression nozzle inside the engine enclosure.

Problems with the Fire Suppression System

Using sea water to suppress engine enclosure fires presents a number of problems. To begin with, sea water has well-known corrosive and crystallization properties which can damage control valves, nozzles and piping in general. Corrosion can prevent the correct operation of the control valves by oxidizing metals in the system, and can have serious damaging effects on the engine casing as well as on the mechanical and electrical systems of the engine itself. Crystallization caused when sea water evaporates can build up and hinder the operation of the fire suppression system. Both properties can impair the mechanical movement of valve spindles which will prevent the valve seats from sealing properly, and will foul the nozzles.

Damage to control valves and nozzles adversely affects the operational ability of the fire suppression system, and can lead to substantial consequences for equipment and personnel. For example,

- failure of the control valves to open could leave the engine enclosures without a fire suppression system which could lead to injury, loss of life or the loss of the ship itself;
- fouled nozzles can prevent the proper atomization of the water, thus severely compromising the integrity of the intended use of the system; and
- damage to the system can also cause local flooding which could increase bilge levels and affect the stability and combat readiness of the ship.

Furthermore, allowing cold sea water to flow into the engine enclosure can result in serious consequences from the thermal shock of the cold water hitting the hot engine. Damage from this, or from corrosion or crystallization buildup, could be so severe that the entire engine could be rendered inoperable and require replacement and overhaul.

With personal experience as an IMCS technician on board HMCS *Athabaskan* (DDH-282), the author routinely had to change-out or repair all three types of control valves due to seawater corrosion. The maintenance down-time negatively affected the operational flexibility of the ship in terms of engine availability, power demand and fuel economy needed to remain on station, but the alternative of a malfunctioning fire suppression system also had its negative side.

Proposed Solutions

For each of the options being proposed, the current control system including IMCS interfaces has been maintained in its entirety. Of significance is that for all options the seawater fire main has been removed as the single source of firefighting medium, thus eliminating the problematic saltwater component. It should be noted that the number and placement of fire suppression nozzles are notional, and would require fire engineering system specialists to design an approved layout.

The three proposed options are as follows:

1. install a freshwater fine-water spray (FWS) system similar to that currently in use on board *Halifax*-class ships;
2. install a freshwater mist system, using the seawater fire main as a backup; and
3. use the freshwater system alone to combat enclosure fires.

Option 1 – (Fresh) Fine Water Spray

Fine-water spray systems use a pressurized tank and special nozzles to atomize the water being used to suppress a fire. Atomization reduces the size of the water droplets, but creates more of them than a normal spray system. The more water droplets there are, the greater the overall surface area of the water to provide faster heat transfer from the fire to the water. In other words, the greater the droplet size, the *less* heat transfer occurs. Furthermore, smaller drops of water evaporate faster, creating a blanket of steam to help smother the fire.

Each fine-water spray system requires a tank to store and pressurize the water. For the approximately 300-m^3 volume of the main engine enclosure the tank would need to have a capacity of 550 litres. Also required is a means for pressurizing the water via a high-pressure air system directed through a reducing station and an in-line strainer to prevent nozzle fouling. Figure 3 (see next page) shows the proposed arrangement of the system. Due to the availability of parts already in the supply system, the *Halifax*-class fine-water spray system could be used.

There are many advantages to using a (freshwater) fine-water spray system:

- no adverse effect on the environment;
- safe for personnel;
- low cost to activate;
- low maintenance; and
- little to no damage to the engines from system activation.

The two disadvantages of the system are the cost of implementation, approximately $50 K not including the cost of materials, and the need to retrain personnel on board ship.

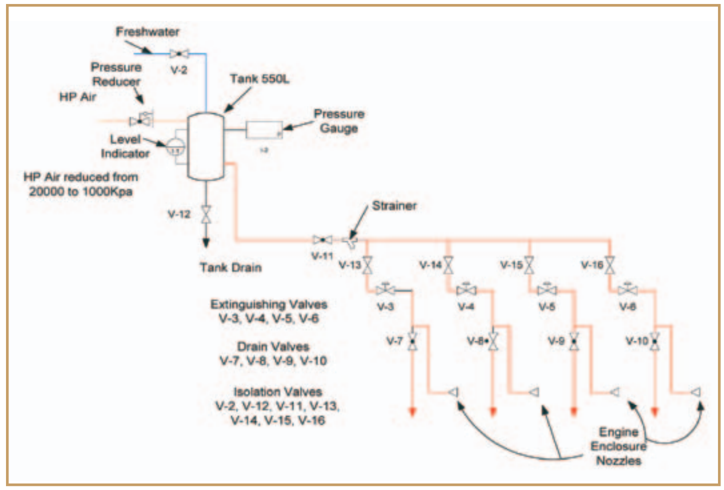


Figure 3. **[Option 1]** Fine-water spray system schematic.

Option 2 – Freshwater Mist with Fire Main Backup

This option would use all existing enclosure subassemblies and control valves, but with the fire main relocated within the system. A pressure vessel would have to be installed and connected to the inlet of the existing manifold control valves. The system would use the medium-flow nozzles already in place. The seawater fire main acts as an emergency backup to the freshwater system to ensure the system does not run dry (Figure 4).

The fresh water and HP air are used to charge the tank to the required operating pressure which is set just above the fire main pressure to ensure there is no premature opening of the pressure regulating valve. Once charged the system is active and can be activated by the control system. If a fire is still not under control after the 550-litre tank has emptied, the pressure in the system will drop, thereby allowing the pressure regulating valve to open and direct water from the fire main into the enclosure.

The main advantages of this system are the same as for Option 1, **less the possibility of damage to the engines.** The potential for saltwater damage should the fire main backup be employed is the major disadvantage of this option. This system would require approximately $31K to implement (not including materials), and ship's personnel would have to be retrained.

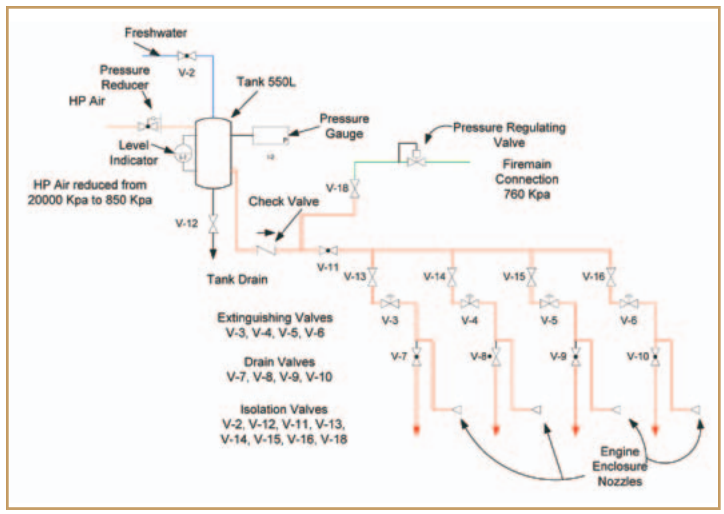


Figure 4. **[Option 2]** Fire suppression using a freshwater system with fire main backup.

Option 3 – Dedicated Freshwater Mist System

Installing a dedicated freshwater mist system (with no fire main backup) would require a policy change within Ship's Standing Orders and Engineering Officer's Technical Instructions to mandate that, when the main or cruise engines are starting or on line, freshwater pressure must be maintained. The system would use the fitted freshwater system, supplied at 275 KPa by either the forward or after freshwater pump.

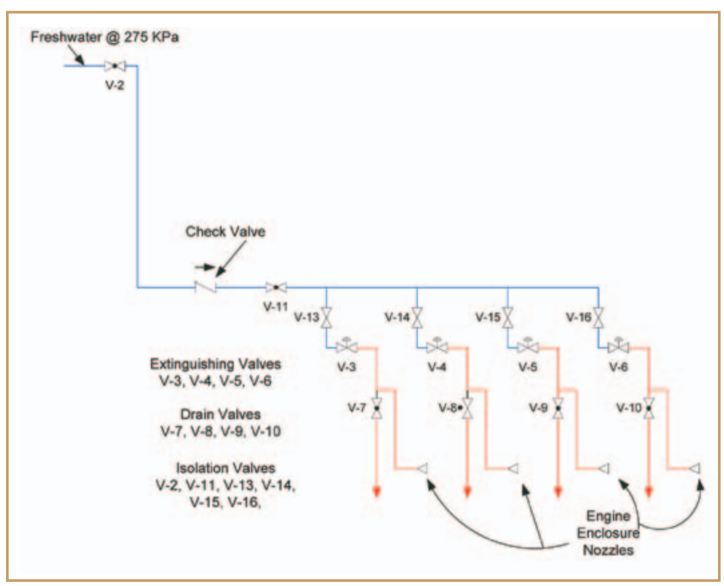


Figure 5. **[Option 3]** Fire suppression using fresh water only.

Features	FWS	Freshwater with Firemain	Freshwater
Safe for the Environment	Yes	Yes	Yes
Safe for Personnel	Yes	Yes	Yes
Low Activation Cost	Yes	Yes	Yes
Little/No Maintenance	Yes	No	Yes
Low Initial Cost	No	No	Yes
Required Training	Yes	Yes	No
Changes to Publications	No	No	Yes
Salt water Required	No	Yes	No

Table 2. System Comparisons

The freshwater mist suppression system would incorporate most of the subassemblies fitted in the existing system, including the control valves and enclosure items such as optical sensors and heat detectors. The one exception is the nozzles. The low operating pressure of the freshwater system would require the installation of new low-pressure mist nozzles.

As can be seen in Figure 5 the freshwater supply enters the suppression system through an isolation valve and then a check valve. The check valve ensures that no impurities are allowed to go back into the potable drinking water. Fresh water is then directed to the control valves. When the system is activated the fresh water will then be directed into the low-pressure mist nozzles.

This system offers the same basic advantages as Options 1 and 2, namely:

- no adverse effect on the environment;
- safe for personnel;
- low cost to activate; and
- low maintenance,

plus a major advantage of Option 1:

- little to no damage to the engines,

and the added advantages of:

- relatively low initial cost of approximately $31K not including materials; and
- **no requirement for training** since the system is virtually the same as the current fitted system.

The only disadvantage to this system would be the need to change publications to mandate the requirement for reliable pressure from the freshwater system.

Conclusion

The engine enclosure fire suppression system plays a crucial role in the safe and efficient operation of the main propulsion system, and in the safety of personnel, machinery and ship. Any one of the three proposed solutions would be a much needed improvement over the current seawater-only fire suppression system in the engine enclosures on board the *Iroquois* class destroyers.

While all three options provide the same basic advantages (Table 2), the dedicated freshwater mist system using the ship's fitted freshwater system in Option 3 offers the best package. It has no seawater component, is economical to install, and crews would require no new training. A new standard operating procedure to operate the suppression system would provide adequate direction for personnel.

It is recommended that an engineering change proposal be launched to upgrade the *Iroquois*-class engine enclosure fire suppression system. The benefits in terms of the improved reliability of the system (safety), the ease on the maintenance burden (workload), and the reduced engine down-time (operational flexibility) would easily outweigh any of the costs involved in upgrading the enclosure fire suppression system at the earliest opportunity.

Petty Officer Second Class Tony Hounsell is the Main Machinery Room I/C (in charge) and IMCS technician on board HMCS Iroquois.

Acknowledgments

The author offers thanks to the following for advice during this project: Twila Johnson, PO1 Ian McNaughton, CPO2 Robert Carroll, Gilles Labrie, Robert Steeb, PO1 Steve Cooper, PO2 Wayne Martin and Sea Training Atlantic.

Source document containing full references:

Petty Officer Second Class Tony Hounsell, "A Proposed Upgrade for the (*Iroquois* Class) Engine Enclosure Fire Suppression System," Mar Eng QL6 Course Technical Service Paper, Canadian Forces Naval Engineering School Halifax, November 6, 2009.

HMCS *Onondaga*'s River Home

By Lt(N) Peter Sargeant

When the decommissioned Oberon-class *submarine HMCS* Onondaga *was being transferred to a specially constructed museum berth near Rimouski, Québec in 2008, not all went according to plan. It took the combined effort of several diverse teams of commercial and DND specialists to move the balky vessel the last few metres into position.*

HMCS *Onondaga* (Figure 1) the first Canadian submarine to be preserved as part of a museum, has a wonderful "new" home on the south shore of the St. Lawrence River. The vessel has been open to the public for two years, but just getting her into her permanent berth at Le Site historique maritime de Pointe-au-Père near Rimouski, Québec was quite the undertaking.

Onondaga (S73) was one of three *Oberon*-class diesel/electric submarines built for the Royal Canadian Navy in Chatham, UK. The boat was launched in 1965, commissioned two years later, and went on to serve Canada with distinction until July, 2000. She was acquired by Le Site historique maritime (formerly Le Musée de la mer) in 2005, with custody transferred in June 2008.

The museum contracted a local engineering firm to move *Onondaga* to her permanent home, the plan being to take advantage of the highest tide in August 2008 to haul the submarine up a specially constructed ramp using a cable and block assembly attached to a strong point at the bow (Figure 2). The ramp consisted of a central guide rail to prevent lateral movement of the cradles *Onondaga* was to rest on, and two side rails to guide rollers on either side of the ramp. Five cradles would support the sub at frames that coincided with transverse bulkheads that would be strong enough to support her landed mass. The cradles were positioned at the bottom of the ramp and linked by chains. As the sub was hauled up the ramp, one by one the cradles would be pulled into position to align with the corresponding frames. Due to limitations in the length of the cable used in the pulley system, the operation had to be completed over several high tides.

The first haul began on August 30, 2008. At 0223 hrs the keel made contact with the first cradle and the haul-out proceeded for 37 metres until the submarine was partially out of the water. The second and third cradles had been pulled into alignment by the chains but had not yet made contact with the keel. The fourth cradle had begun rolling into position, and the fifth was still at the bottom of the ramp. The aft end of *Onondaga* remained afloat.

While the tide was receding, fog rolled in and it was impossible to check the alignment of the submarine over the ramp. Unseen, the wind and tidal current pushed the aft end of the submarine toward the port side of the ramp. *Onondaga* was no longer centred over the blocks. As the tide continued to recede the submarine toppled to starboard, grounding firmly along her starboard side (Figure 3). She came to rest with a heel of approximately 45 degrees, delaying further attempts to pull her into position.

Fortunately, *Oberon*-class submarines are essentially surface vessels capable of submerging for periods of time. *Onondaga* has a surface-ship style bow rake, a substantial bilge keel, and the moulded draft and tumblehome similar to that of a surface ship courtesy of the saddle ballast and fuel tanks. By contrast, contemporary submarines such as the *Victoria*-class are optimized for subsurface operations. Their near circular cross-section makes them much more vulnerable should they become grounded when surfaced.

Figure 1

Figure 2

Figure 3


Figure 4


Figure 5a


Figure 5b

On October 2 the museum's contractor attempted to right the submarine using a combination of the submarine's buoyancy, a port-side block and tackle connected to the pressure hull, and starboard-side hydraulic lifting rams (Figure 4). This combination started to right the submarine, but one of the wire cables broke and the operation stopped with the submarine heeling 15 degrees to starboard. A second righting operation on October 10, 2008 was successful.

On October 17 an attempt was made to refloat the submarine to tow her back to Rimouski for the winter, but the tug was unable to dislodge her. *Onondaga* heeled to starboard and her aft end shifted to port approximately 10 metres, causing the bow to shift to starboard (Figures 5a, 5b). This starboard shift turned out to be a boon as it afforded an opportunity for the track to be inspected and repaired, and for new rolling cradles to be installed. A new plan was devised to right the submarine and repair the track and cradles before proceeding.

With her centre of gravity again centred above the keel, the tilting moment was reduced and *Onondaga* was thus secured, supported transversely by hydraulic rams and cables on either side. The after hydroplanes rested partly on a rock at low tide, which prohibited any roll to starboard once the tide had ebbed. At low tide the submarine grounded at the rudder, and at high tide the aft end retained enough buoyancy to float and move with any sea state or wind (Figures 6a, 6b). *Onondaga* was firmly grounded forward, centred over a block that had been welded to the ramp.

At this point, in response to a request from the director of Le Site historique, two DND naval architects – one from the *Victoria*-class design authority, and the other a submarine specialist from the Naval Engineering Test Establishment – were sent to review the contractor's plan. A six-person clearance diving team from Fleet Diving Unit (Atlantic) was also sent to assist in preparing the submarine and track, and to help in aligning the submarine over the blocks during the docking evolution.

When the DND teams arrived on Monday, November 10 the local engineering firm was working to a tight schedule. The highest tide of the month was forecast for 1515 hrs the following Saturday, leaving just enough time to prepare for the move. The high tide was predicted to be 4.7 metres, and every centimetre was needed for the submarine to clear the rock beside the after hydroplanes, float over the rolling dock blocks at the aft end and align herself with the tracks. Unfortunately, the contractor had difficulty finding and retaining commercial divers to carry out the substantial and tricky underwater work, and the schedule had suffered. They were very enthusiastic to have a team of DND clearance divers on site for the week.

The dive team immediately began surveying and clearing the track on which *Onondaga* would travel on the rolling cradles (Figure 7). After the submarine had keeled over the contractor had placed crushed rock and gravel along the starboard side of the submarine to support the hull. With the movement of the waves and tides the rocks had scattered over the track, stacking up in some areas as much


Figure 6a


Figure 6b


Figure 7

as one metre thick. Excavation equipment moved the bulk of the gravel at low tide, and the dive team finished the job. Once the track was clear the divers laid rollers down the length of the side tracks for the rolling cradles.

There was more to deal with. The ramp had sustained extensive damage (Figure 8) to both the central guide and the side tracks from impact with the submarine and the rocks. It was decided to pull the submarine up the track as far as possible toward the severely damaged area. Due to the damage sustained by the ramp during the previous attempt only three rolling cradles would be supporting the submarine. A new cradle was therefore fabricated, equipped with a plastic bearing surface between the plate supporting the submarine and the body of the cradle. The sub could thus pivot about a retaining pin (Figure 9) on the supporting plate when being manoeuvred into position. Unfortunately, the placement of the new cradle was not perfect.

The new cradle ended up farther forward than its planned position, and overnight the submarine rolled down the ramp, causing the supporting cables to slacken and the hydraulic rams to tilt aft. *Onondaga* was once again in danger of keeling over. The new cradle was equipped with side supports extending around the keel and up to the structure of the submarine, but these were located around main ballast tank No.2 where the thin plating would crush if the submarine were to experience a significant transverse moment. There was not enough time remaining before the highest tide to weld the cradle to the pressure hull, so under careful monitoring the work to repair the ramp and cradles continued (Figure 10).

One cradle had to be removed and realigned as it had encountered large rocks on the ramp. The contractor initially attempted to force the cradle free by pulling it up the track with a crane, but the cable parted. The cradle was finally removed at low tide by lifting it free. The dive team put slings around the larger rocks so they could also be removed with the crane. The dive team then placed all of the rollers on each side track by hand and guided the cradles as they were positioned by crane. Low tide was the only time the crane could access the after end of the submarine, or when any significant work could take place on the submarine or the ramp. A sense of urgency and constant concurrent activity prevailed.

Everything now appeared to be as ready as it could be to move *Onondaga* up the ramp to her permanent berth, but there were still several damaged areas and weak points in the central guide track which could impede, misalign or derail the rolling cradles. Any one of these situations could lead to disaster.

On November 15 good fortune was with us for once. The tide was a full 15 cm higher than predicted, which would allow the submarine to easily clear the impeding rocks and centre her keel over the ramp. The after ballast tanks were blown to obtain the maximum possible buoyancy, and a tow truck was brought in to pull the stern to starboard (Figure 11). Once the sideways movement of the submarine had stopped, the dive team entered the water and signalled when the keel was centred over the ramp. It was time to begin pulling *Onondaga* up the ramp.

The submarine moved approximately three metres up the track. The keel was now firmly seated on three cradles. The hydraulic rams had been disengaged and the cables had gone slack. There was very little apart from gravity holding the submarine upright. The technical team advised that it would not be safe to do a close-up underwater inspection, so it was decided to stop the pull and inspect the situation at low tide when more safety measures could be put in place.

Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13a

Figure 13b

At low tide the following morning the transverse stability of the submarine remained in question. There was slack in the main block-and-cable system used to pull the submarine up the ramp. During the pull a crane had lifted the free-end pulley to ensure the cable did not twist and that the pulley would not get fetched up. After the pull the crane had lowered the pulley back to the ground, leaving slack in the system which could allow the submarine to roll back unexpectedly. With a fresh 30-knot breeze coming from 45 degrees off the starboard bow the technical team again advised that it would be unsafe to make a close inspection of the keel blocks beneath the surface. As it happened, shortly afterward, *Onondaga* did slip down the ramp about one metre. It was a tense moment as the contractors had been working close to the submarine. Fortunately this was the only unintended movement that day, and after a period of monitoring the hydraulic rams were re-seated (Figure 12).

At this stage the tasking had already extended past the proposed end date and the DND teams had to return to their home units. The technical team left the contractor and museum staff with recommendations for pulling *Onondaga* the last 20 metres to her final position.

When the DND team left, an underwater camera showed *Onondaga*'s keel grounded exactly on target in the centre of the cradles, but also revealed damage to the centre guiding track. More repairs were made and the final pull was conducted on December 1. The submarine moved 10 metres before encountering yet another damaged section of track that completely derailed a cradle. It was at this point that a decision was taken to permanently halt the operation. *Onondaga* was resting 10 metres short of her intended position, but was high enough that a sea wall and permanent structure could begin to be built to keep her stable and safe for public display (Figures 13a, 13b).

For the DND teams acting as outside technical advisors in this unusual operation, it was a valuable experience. We made recommendations, but not decisions. We did not have to answer for costs, labour, time or resources, and held no liability. All of us involved in the project – the museum, the contracting firm, the DND teams – were working toward the same end through different avenues and following different rules.

The museum has to be commended for its courage and persistence in accepting a warship and preserving it for everyone to experience and enjoy. Had Le Site historique maritime de la Pointe-au-Père not shouldered this task, *Onondaga* would likely have been scrapped. On June 13, 2009 *Onondaga* opened her hatches to continue her service on land as the only submarine in Canada accessible to the public.

To see how *Onondaga* looks today, and to get directions to Le site historique maritime de la Pointe-au-Père near Rimouski, Québec, visit the museum's website at: **http://www.shmp.qc.ca/index.php**.

Lt(N) Peter Sargeant is a Naval Architect who was previously with the Victoria Class Design Authority. He is currently the Marine Systems Engineering Officer in HMCS Fredericton.

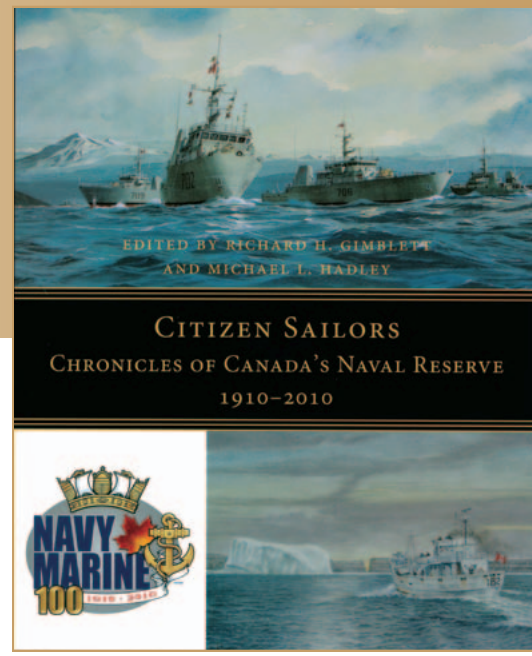
BOOK REVIEWS

By Brian McCullough*

"Twice the Citizens"

Citizen Sailors – Chronicles of Canada's Naval Reserve
Edited by Richard H. Gimblett and Michael L. Hadley

Dundurn Press (Toronto)
ISBN 978-1-55488-867-2
249 pages; Illustrated; Index; $39.95



Winston Churchill once said (famously) that reservists are "twice the citizen." They maintain their commitment to the military on the one hand, while balancing the responsibilities of home, school and work on the other. Take it from someone who's been there, it's not always easy. The unsung heroes in the equation are the families, teachers and employers who manage the "workarounds" to let us go off and tackle a completely different set of priorities. For Canada's "citizen sailors" of the Naval Reserve, the dual identity is a way of life.

Since its formation in January 1923 as the first *permanent* volunteer naval reserve force in Canada, the Naval Reserve has fulfilled a number of roles, from backstopping the regular navy in times of need to taking a place in the line as go-to specialists in their own right. *Citizen Sailors – Chronicles of Canada's Naval Reserve* captures all of this remarkable story of commitment and transformation in a beautifully illustrated commemorative volume released as a Navy 1910-2010 centennial project.

The book is anchored by a series of eight chronicles written by contributors who clearly have excellent knowledge of the significant milestones in the Naval Reserve's nearly 90 years of existence. As a former reservist myself I was overwhelmed by the attention to detail and the intimacy of the conversation I found in this historical record. The opening chronicles by Louis Christ, W. David Parsons, Barbara Winters, Richard Mayne and Michael L. Hadley are simply outstanding in their warm, contextual commentaries on the history leading up to the Unification of the Canadian Forces in 1968. I guarantee you will want to read these sections more than once.

A great part of the book's special appeal for me was the way the authors told it like it was. Ian Holloway's excellent chronicle, "The Quest for Relevance," pretty much describes the Naval Reserve I walked in on in 1971 not knowing the difference between an "Aye aye" and a "Yo ho ho." He describes the post-Unification period with uncanny accuracy – and you'll want to read Holloway's biographical note to understand exactly what an achievement this was – when we were relegated to doing not much more than training our own to train more of our own. The lack of operational focus created a cultural gulf between us and our regular Navy counterparts, but as Holloway points out, "...the mood of the Naval Reserve throughout the 1970s and 1980s was characterized by a palpable *joie de vivre.*" And he's right. We were irrepressible.

Contributor Bob Blakely's jauntily titled chronicle, "This ain't your Dad's Naval Reserve anymore," picks up the story of the Naval Reserve's remarkable emergence once again as a "sharp-end" player in the Canadian Forces. He himself rose to become a command qualified ship driver and went on to lead Canada's Naval Reserve as a commodore from 2004 to 2007. In one of the most poignant passages in the book Blakely gives a belated personal salute to the long-serving senior officers who never had the opportunity to become qualified in their classifications. They showed up, he writes, "...week after week [to] keep the land-bound Naval Reserve divisions going...We should have honoured them for that."

The final chronicle makes a fine end cap. Penned by Hugues Létourneau, "The Naval Presence in Quebec" is a fascinating overview of the Navy (reserve and otherwise) in *La belle province.* It is a critical and revealing examination of the evolution of all things naval in this Canadian "maritime" province, and offers an insider's perspective on the francophone naval experience inside and outside of Quebec. It even has its lighter moments. (Did you know that a team of RCNVR footballers from Montreal won the Canadian Football League's Grey Cup in 1944?) The province of Quebec today is the veritable power hub of the Naval Reserve, home to six Naval Reserve divisions, Naval Reserve Headquarters *and* a fleet school. As Létourneau carefully points out, "In Quebec today, 'Navy' means 'Naval Reserve.'...To all intents and purposes, there is no other navy in Quebec...."

Fraser McKee, "the acknowledged dean" of Naval Reserve history, closes off the chronicles section with a sensitive and thoughtful epilogue that hands us off handsomely to the final hundred pages of the book – the appendices! Be prepared for some excellent end matter. Karl Gagnon's definitive "fleet review" of the vessels of the Naval Reserve is the first of its kind (his ship and aircraft illustrations are stunning), and the detailed muster of Naval Reserve divisions compiled by Richard Gimblett and Colin Stewart takes on the flavour of a cross-country class reunion. Quite remarkable.

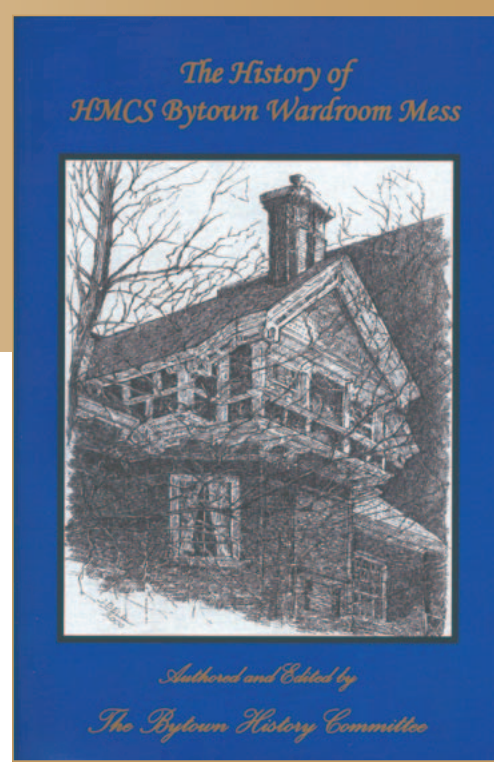
I was delighted also that the story of women in the Naval Reserve has been so well interpreted throughout the book. Their history might be seen as a cloak of many colours of frustration and success, but Canadian women persevered like few others to claim their rightful place in the band of sisters and brothers that is today's Naval Reserve.

In a strange twist of irony my only real criticism relates to the book's title. *Citizen Sailors – Chronicles of Canada's Naval Reserve* makes only passing reference to how the notion of the "citizen sailor" has changed since 1996 when the Naval Reserve began crewing the new maritime coastal defence vessels on a full-time basis. Fifteen years later the debate is still white hot over whether the cadre of "full-time" reservists manning the MCDVs, many of whom might have no other job, even belong in a Naval Reserve whose primary function (many believe) is to provide a surge pool of trained personnel in times of mobilization. But maybe that's where we already are. As Cmdre Dave Gagliardi wrote in the online forum of *Canadian Naval Review* in 2007, "The reality is the Naval Reserve has already mobilized."

There is no question that the editors and contributors of this fine commemorative history of Canada's Naval Reserve have achieved something quite extraordinary. They told the story well, and in doing so delivered just about exactly what was promised in the introduction – a series of snapshots of crucial periods which, "taken together, form a complete picture, a seamless narrative overview, of Naval Reserve history."

HMCS *Bytown* – Ottawa's Navy Wardroom

The History of HMCS Bytown Wardroom Mess
The Bytown History Committee
© 2010 HMCS Bytown
ISBN 978-0-9867470-0-7
100 pages; Illustrated; Appendices; Index; $15.00



If HMS *Victory* were to sail up the Rideau Canal as far as the main National Defence Headquarters building in downtown Ottawa, the ship's gunners could easily find the range of HMCS *Bytown* anchored due south at the corner of Lisgar and Cartier streets.

Not that Admiral Lord Nelson would have encouraged such reckless target practice, especially if it were any time past seven bells in the forenoon watch. Like many other naval officers in the Canadian capital, come the noon hour, the Hero of the Nile would likely be making

BOOK REVIEWS

his way over to 78 Lisgar for a preprandial libation and a convivial chat with fellow officers before taking on a bite of lunch. He would have felt right at home.

Climbing the wide front steps and passing through the big front doors of Ottawa's navy wardroom is to step back in time to the warm and familiar world of an old-style navy mess. A ship's bell hangs inside the entrance. Display cabinets invite closer inspection, filled with Navy memorabilia that includes a section of plank from HMS *Victory* and a model of the ship itself. A quiet dining room awaits its first customers, attentive staff standing ready to serve. From the main floor, wooden banisters and dark wainscotting follow the stairs as they curve aloft to the lounges and meeting rooms on the upper decks, all the way up to the Crow's Nest. Secret passageways and private nooks wait to be discovered, and the ghosts of members past watch over everything. It is "Hogwarts by the Rideau" with a twist of Navy.

HMCS *Bytown* might not have been around in Nelson's day, but that didn't stop the nine-member Bytown History Committee from researching and documenting the story of a mess that has had its share of ups and downs since it first began serving naval officers in the early 1940s. Fancy balls and baptisms, funding problems, stolen paintings and a mysterious order of Seagulls all find their place between the covers of *The History of HMCS Bytown Wardroom Mess.* There is even a recipe for that favourite of dark rum drinks – Bytown Moose Milk!

Published on the occasion of the 2010 Navy centennial, *The History of HMCS Bytown Wardroom Mess* reads as if it were a labour of love for its authors. Alec Douglas, Pat Barnhouse, John Bell, Jim Day, Jake Freill, Fred Herrndorf, Bill Mercer, Mike Young and "GG" Armstrong made a first-rate job of the book, finishing the research begun by former mess president Captain(N) Tony Delamere who died in 2002. Sadly, committee member "GG" Armstrong himself did not live to see the book published.

But that, too, is the story of the mess, a place of comings and goings, a place where friends meet and where they say farewell until the next time even if it is at "the going down of the sun." You can be sure that more than one glass will be raised to their memory.

The Bytown History Committee has given us a delightful history of the mess. The book is just full of surprising insights and personal anecdotes that celebrate HMCS *Bytown* in all its guises. The authors even managed to write this Navy 100th anniversary offering in exactly...100 pages! It isn't clear whether the synchronicity was intentional or not – this was a committee job after all – but what a fascinating "ten-square" of pages they have produced.

Bravo Zulu, boys!

The History of HMCS Bytown Wardroom Mess is available for purchase for $15 from mess manager Mario Levesque – (613) 235-7496; **MARIO.LEVESQUE3@forces.gc.ca** *(Thank you, Mario, for supplying the crest and the book ordering information.)*

In our next issue: Reviews of *The Seabound Coast – The Official History of the Royal Canadian Navy, 1867-1939; A Sailor's Stories;* and *Warships of the Bay of Quinte.*

* Have you noticed a new book that you would like to review for the *Journal*? Contact us so that we can discuss your project and see about ordering a review copy. We prefer to have the perspective of reviewers who are working within (or have retired from) the Canadian military/civilian naval materiel support community.

NEWS BRIEFS

AWARDS ARE NOT THE ONLY REWARD FOR A YEAR IN SHRIVENHAM

By Brian McCullough

How typically English. An invitation arrives asking you to a garden party at Buckingham Palace. ("More tea, luv?")

Then it's *your* turn to play host (although not to the Queen) for a Canada Day pancake breakfast in the back garden of your English rental home. ("More maple syrup for those pancakes, guys?")

How typically Canadian.

If this sounds like a crazy collision of cultures, it is exactly what Naval Combat Systems Engineer LCdr Drew Schlosser and his wife Katherine found themselves immersed in when Drew – he's now the DMSS 6 subsection head for naval guns and targets at NDHQ – signed on for a year of military postgraduate studies at Cranfield University in Shrivenham in 2009-2010. The campus in Oxfordshire, 115 km west of London, is home to the Defence Academy of the United Kingdom.

"We were ambassadors," Katherine says brightly. Even before leaving home they purchased Vancouver 2010 Olympics merchandise to take with them across the pond.

Photo courtesy Katherine Schlosser

LCdr Drew Schlosser, wife Katherine (pregnant with Baby Jane) and young son Adam in England.

Katherine, who is a senior policy analyst with Sport Canada, handed out the distinctive red scarves and mittens as prizes for an Olympics-themed colouring contest at the local nursery school. The Canadian maple leaf gear was a great hit with the English tots and their parents.

The trip overseas was a family affair all the way. Their son Adam (now three years old) was toddler-in-residence, and for the last few months of the trip Katherine was sporting a Baby on Board sign for daughter Jane who turns one in November.

It is mid-September, now, and the family has been back in Ottawa for well over a year. I am visiting Drew and Katherine at their home to chat about their UK experiences. They are relaxed. The children are asleep upstairs, and in the corner of the living room an electronic baby room monitor is guarding channel 22.

I have come specifically to ask Drew about the awards he picked up at his master's graduation at Cranfield in July. (Convocations are always held the following year.) He tells me that before she conferred upon him the degree of Master of Science in Guided Weapon Systems (GWS), chancellor Baroness Young of Old Scone pointed to a table holding the academic prizes and said to Drew, "You've got some hardware there."

And indeed he did. Drew had picked up not one, but *two* major prizes: the GWS Course Trophy as the top student in his course, and the MBDA Rapier Trophy as "the student who made the best contribution to his course as chosen by his peers." And all under the eye of HRH Anne, The Princess Royal, who was in attendance to receive an honourary degree.

I can see that Drew is proud of his awards, but this is not what he wants to focus on. Instead, he gives a nod to LCdr Mike Bowe, his department head in HMCS *Algonquin* from his 2003-2004 A/HOD tour. It was Bowe who mentored him in his early postgrad deliberations. Drew, a math and computer science graduate of Royal Military College, was immediately attracted to the MSc (GWS) program at Shrivenham.

"The course subject, first and foremost, was the most interesting thing on [the list]," he says. "The pointy end stuff is the most interesting. It was a one-year program, which was nice."

The intensive program proved to be a good fit, he adds, calling it "a well rounded course of study for a combat systems engineer." Which is not to say it was easy. The compressed workload alone was tough, but there was also the responsibility of being the only Canadian representative on the course.

"This program was not for the faint of heart," says Drew. "They feed you so much information, you have to get smarter or you fail...In the classroom, I'm representing the Canadian education system, the Canadian military training system."

Photo by Katherine Schlosser

Katherine says she also noticed the change in her husband's progress. "It was all coming together. There was this completeness of understanding."

When Drew and his nine colleagues on the Guided Weapons program were given a class project to design a missile, they pooled their talents. Drew acted as project leader and lent his expertise on the missile's seeker (which just happened to be the subject of his master's thesis). By the end of the project they had to demonstrate a computer model of their missile design in a synthetic environment. "It was awesome," Drew says.

The multidisciplinary program covered off every aspect of guided weapon systems, including subjects such as thermodynamics, aerodynamics, fluid dynamics and explosives. It was a lot to take in, Drew says, but "then you start to put it all together. It's a really interesting study of trade-offs. We began to understand what it takes to design a missile."

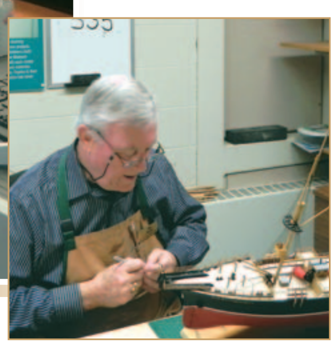
As I prepare to close my notebook I ask him, What was the best thing you took away from all this?

There is no hesitation in his response. "Academically and professionally it allows me to contribute in a whole different way," he says. "I can make a contribution that I otherwise couldn't."

MODEL POWER!

Marine model maker **Tom Power** volunteers his nimble-fingered and painstaking craft two days a week in the ship model shop of Halifax's Maritime Museum of the Atlantic. Power, 69, a retired city fire chief, has worked on some amazing models over the years, including pond models of a motor torpedo boat and the frigate HMCS *Halifax* (not shown). His model of HMCS *Athabaskan* (DDH-282) is one of two he made, each taking 600 hours to construct. The model on his bench (also seen on our inside front cover) is the cable repair ship *Mackay-Bennett,* contracted by the White Star Line to recover bodies following the *Titanic* sinking. Next April marks the 100th anniversary of the 1912 tragedy in which more than 1,500 people lost their lives.

Says Power, a member of the Maritime Ship Modelers Guild, "Model making is my therapy. It keeps me sane."



NEWS BRIEFS

ON THE FIELD OF HONOUR

Commodore (ret.) Jean-Claude Michaud, president of the Last Post Fund for Québec Region, spoke to veterans and guests at the National Field of Honour in Pointe-Claire, QC during the Last Post Fund's annual commemorative ceremony on June 5, 2011.

Photo and historical details courtesy Brian Murza

Brian Murza's father, John, appears second from the left in this photo taken in April 1945 on board HMCS *Carlplace* (K664). The River-class frigate was escorting the S-class submarine HMS/M *Sportsman* (P229) back to Holy Loch, Scotland from the submarine's refit in New London, Connecticut. The men in the photo are Leading Torpedoman Pete Lowery, Submarine Detector John Murza, Torpedoman Charlie Thwaites and Torpedoman Bob Monk.

THE LAST POST FUND'S ANNUAL COMMEMORATIVE SERVICE POINTE-CLAIRE, QUÉBEC JUNE 5, 2011

By Brian McCullough

When I accompanied my father, 86-year-old RCAF veteran **Sgt Lawrence McCullough,** to the Last Post Fund's annual remembrance in Montreal last June, I came away with something I never expected – a personal and humbling perspective on the depth of some people's appreciation for the sacrifices made by Canada's veterans.

The man responsible for this was a stranger, a 52-year-old naval researcher by the name of **Brian Murza.** Brian had shown me a photo of his dad, navy **Submarine Detector John Murza,** taken on board HMCS *Carlplace* in 1945. As we chatted I was overwhelmed by the strength of his need to acknowledge the great gift given to all Canadians by our military veterans. After the ceremony I introduced him to my dad, and as they shook hands the significance of the moment suddenly struck me. Here was a stranger, whose own veteran father had died in 1990, saying thank you to my own father for his freedom. It was a powerful moment.

"It was really an honour to meet your father and thank him for my freedom that I have today," Brian wrote afterward. "As you know, freedom is not free, and our W.W. II veterans should be thanked."

Well spoken, Brother. And thank *you.*

Veterans attending the ceremony endured the sweltering June heat without complaint. In fact, they appeared to be the coolest ones on parade. That is my father in the blue blazer, retired RCAF Sgt Lawrence Mortimer (Mort) McCullough, 86.

PRESERVING CANADA'S NAVAL TECHNICAL HERITAGE

CNTHA NEWS

Canadian Naval Technical History Association

JAMES DOUGLAS HEARNSHAW (NOV. 22, 1922 – SEPT. 6, 2011)

CNTHA News *Est. 1997*

CNTHA Chairman
Pat Barnhouse

CNTHA Executive Director
Tony Thatcher

Directorate of History and Heritage Liaison
Michael Whitby

Maritime Engineering Journal Liaison
Brian McCullough

Newsletter Production EditingServices by
Brightstar Communications (Kanata, ON)
in association with
d2k Marketing Communications (Gatineau, QC)

CNTHA News is the unofficial newsletter of the Canadian Naval Technical History Association.

Please address all correspondence to the publisher, attention Michael Whitby, Chief of the Naval Team, Directorate of History and Heritage, NDHQ
101 Colonel By Dr
Ottawa, ON K1A 0K2
Tel. (613) 998-7045
Fax (613) 990-8579

www.cntha.ca

The Canadian Naval Technical History Association regrets to announce the death of James Douglas Hearnshaw, a founding member of the CNTHA. He was a professional engineer and a life member of the Royal Institute of Naval Architects. He was 88.

Photo courtesy Scott Reid

Douglas grew up in England before coming to Canada in 1951. As a boy at Barnard Castle School his interest in art led a headmaster to suggest that he take up drafting, it being a much more remunerative occupation. He went to work for Furness as a naval architectural draftsman before switching over to naval architectural design. In Canada, Douglas began work in the shipbuilding industry, first for Canadian Vickers in Montreal, Quebec, then for Marine Industries Ltd. in Sorel. At the age of 49 he obtained a BSc from Sir George Williams University in Montreal and was accepted as a professional engineer by the Province of Quebec (and later became a P.Eng. in Ontario). Douglas went on to enjoy successful careers with Environment Canada and Transport Canada, where he was involved with the Arctic Research Vessel program. Following his retirement he earned two degrees in philosophy at the University of Ottawa, and took up tutoring children with learning difficulties.

In his final years Douglas was both persistent and tireless in his efforts to preserve Canada's naval technical heritage through the Canadian Naval Technical History Association. He was the driving energy behind the association's flagship Canadian Naval Defence Industrial Base (CANDIB) oral history interview project, producing 37 quality interviews for the archives of the DND Directorate of History and Heritage. Douglas maintained high standards for this work. His success in setting up key interviews and his meticulous editorial review of the transcripts has resulted in a series of unique historical records that will serve future researchers well.

Douglas Hearnshaw was a respected engineer, a valued mentor and a friend. His congenial presence at our meeting table will be deeply missed by everyone. He earned our admiration and our respect as a true gentleman and as a team player.

Douglas joins his beloved Marjorie (nee Lewis) who died Dec. 16, 2010. They were married 57 years.

Farewell, friend.