25

1996 2021

WE SERVE THE FLEET

FMF

CAPE BRETON

CELEBRATING 25 YEARS

SERVING THE PACIFIC FLEET OF THE ROYAL CANADIAN NAVY

A Message

from Rear-Admiral Bob Auchterlonie Commander Maritime Forces Pacific / Joint Task Force Pacific

Commander, Fleet Maintenance Facility Cape Breton, Captain (N) M Drews, Commander, Fleet Maintenance Facility Cape Scott, Captain (N) J.R.M. Thibault, FMF Defence Team Members, Shipmates, Navy Team, Industry Partners, Community Partners, and Families,

As we celebrate the 25th anniversary of the Fleet Maintenance Facilities (FMF), the backbones of our coastal HMC Dockyards, I am reminded of the incredible work completed daily within these world-class repair and maintenance facilities.

The FMFs have served the Royal Canadian Navy (RCN) since their inception on April 1, 1996 when the Ship Repair Unit Atlantic/ Pacific (SRU A/P), the Fleet Maintenance Group Atlantic/ Pacific (FMG A/P), and the Naval Engineering Unit Atlantic/Pacific (NEU A/P) amalgamated to form what we now know as the Fleet Maintenance Facility Cape Breton in Esquimalt, British Columbia, and Cape Scott in Halifax, Nova Scotia. It was at this time that the workforce integrated as military and civilian members, forging the way for the diverse and versatile Defence Team we see today.

With every surface ship and submarine that leaves our dockyards, the FMFs have continued to prove themselves as an outstanding model and critical asset for engineering and maintenance support to the RCN's Pacific and Atlantic Fleets. Even in these unprecedented times, as we live through a global pandemic, the FMFs have remained true to their mottos of "*We Serve the Fleet*" (FMFCB) and "*Our Purpose is to Serve*" (FMFCS). They have, unwaveringly, continued in their delivery of ships and submarines required by the RCN for operations worldwide, proving their ability to change course quickly as required through their agile and dedicated workforce.

It has been a privilege to see the outstanding dedication of the Defence Team members at work within these facilities. Their commitment to excellence is second-to-none, which has only been reinforced throughout this past year. The workforce within these highly specialized facilities are comprised of several departments, all of which play a crucial role in the repair and maintenance of Canada's Pacific and Atlantic Fleets. With a production team represented by 18 dynamic and highly specialized trades, I am continually shown that there is no task too big or too small for the skilled hands and minds within the FMFs.

These ships are homes to our sailors and the pride of the FMF team who take all measures to ensure they are providing the highest quality work.

Undoubtedly, the FMFs could not have achieved all of their successes without the help of our Industry Partners who have been there continuously to provide support and for that I say thank you. Time and time again I see the relationships between FMF workforce and Ship Staff as they often work side by side. For that I say thank you for your continued commitment to work together to serve the needs of our Country. These dockyards have a long history of serving the Navy and every Defence Team Member should be proud of their contribution to the operations of these world-class facilities.

FMF has demonstrated readiness over the past 25 years – readiness to help, readiness to lead in innovation, and readiness to make our ships fighting fit. Thank you Fleet Maintenance Facility Cape Breton and Cape Scott; congratulations on 25 years of excellence.

Yours Aye,
Rear-Admiral Bob Auchterlonie

Federal Government Dockyard
Trades and Labour Council (West)

Congratulates the
Fleet Maintenance Facility Cape Breton

on their 25th Anniversary.

We're looking forward to working with you for the next 25!

Federal Government Dockyard
Trades and Labour Council (West)
250-383-7622 (ph)
250-383-1874 (fax)
councilwest@shaw.ca

councilwest.ca

A Message

from the Commanding Officer, Fleet Maintenance Facility Cape Breton

Workforce, Families, Colleagues, Industry and Community Partners,

Thank you for celebrating with us as we forge ahead into our 25th year as Fleet Maintenance Facility Cape Breton (FMFCB).

Not only has serving as Commander FMFCB been my great honour, but it has also given me the opportunity to see first-hand the inner workings of this world-class repair and maintenance facility, as well as the hard-working, dedicated people who make the work we do possible.

FMFCB is all about the people, the team of dedicated individuals who take on any task, at any time, in order to support the Fleet. Our highly skilled and versatile, integrated civilian and military workforce boasts an impressive and broad range of capabilities.

Since FMFCB was established in 1996, it has proven itself to be a critical asset and premiere model for engineering and maintenance support to the Royal Canadian Navy's Pacific Fleet. Our vast and highly specialized technical and engineering capabilities enable us to provide the Government of Canada with a depth of naval operational support at a moment's notice, something that sets us apart from any other organization.

Indeed, working through the global COVID-19 pandemic has demonstrated FMFCB's ability to serve the Pacific Fleet and has reinforced the importance of the facility as a strategic asset to the Royal Canadian Navy and the Government of Canada. While recent events have proven challenging, we continue to deliver the ships and submarines that the Navy relies upon to sustain operations around the world. However, we could not have done this alone, and for that we thank our Industry Partners who continue to provide us with support and quality workmanship time and time again.

The future of FMFCB and its strategic Industry Partners is assured as a high operational tempo will continue as new classes of ships are introduced. The Government of Canada recently renewed its commitment to NATO, which includes the potential addition of a high-readiness frigate in support of Canadian interests abroad. While the introduction of modern warships to the Fleet will signal another period of change, FMFCB will continue as it always has in delivering world-class support to the Royal Canadian Navy.

The future will certainly bring challenges, but I have no doubt that we will rise to meet them as we have done countless times before. Undoubtedly, the most critical element to achieving success is you – our excellent and dedicated workforce who make up FMFCB's defence team. Recognizing what lies before us, we will ensure that we remain effective, efficient, and adaptive to an ever-changing environment.

Our motto, *We Serve the Fleet,* is a constant reminder of the work we do, as we remain ready to serve the Fleet today while continuing to prepare for tomorrow. Thank you to everyone who has contributed to FMFCB's successes throughout the years.

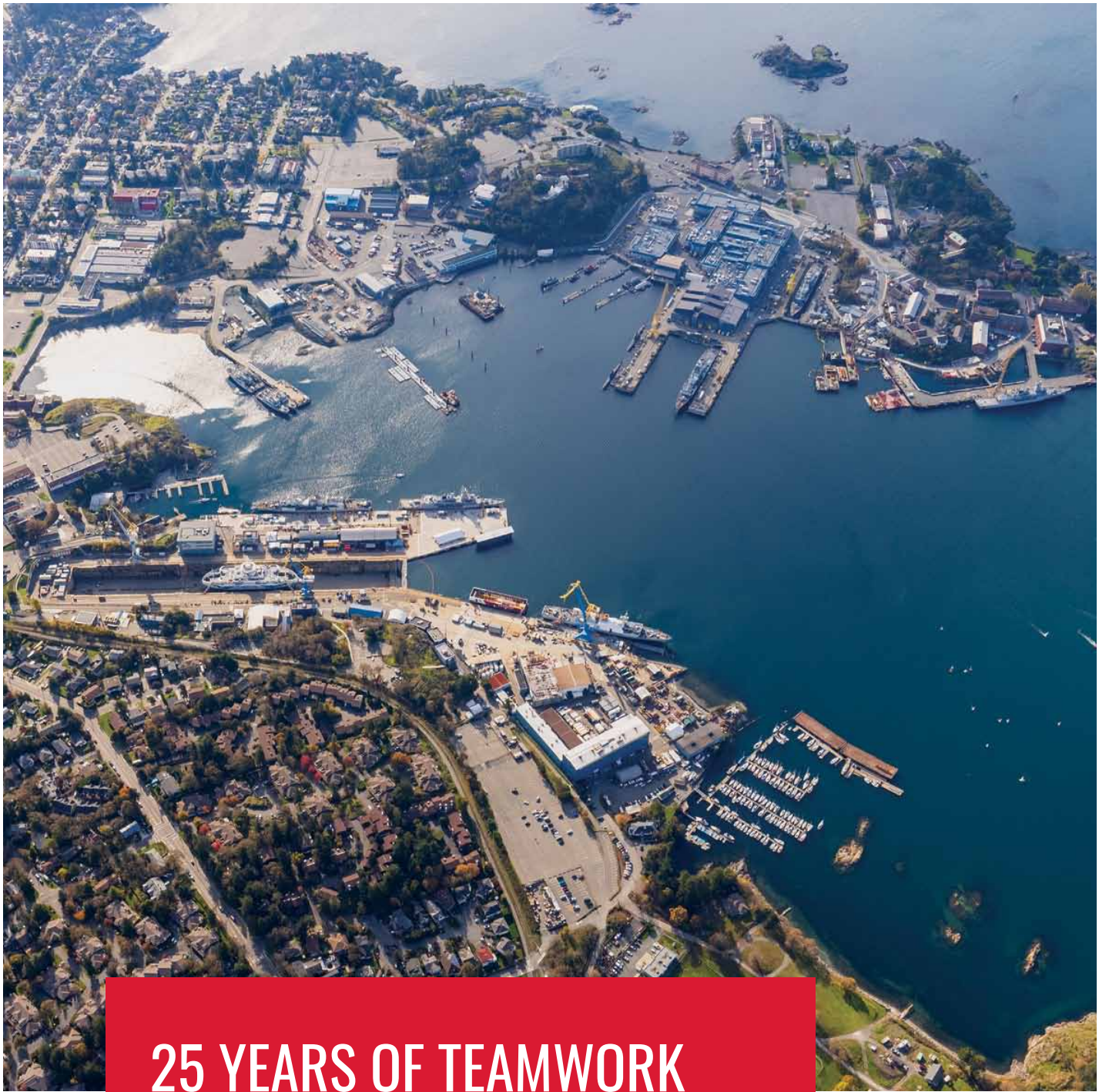
Yours Aye,
M. Drews
Captain(N)
Commanding Officer

Contents

Our First Nations Neighbours

FMFCB would like to respectfully acknowledge our neighbours, the Songhees and Esquimalt Nations for sharing their traditional territories on which we work each day. The name Esquimalt comes from the Central Coast Salish language. It is pronounced "Es-whoy-malth" meaning "place of gradually shoaling water".

Produced by Lookout Newspaper Creative Services



25 YEARS OF TEAMWORK

Seaspan Victoria Shipyards congratulates the team at Fleet Maintenance Facility Cape Breton for 25 years of service to Canada's fleet.

seaspan.com

seaspan
VICTORIA SHIPYARDS

About FMFCB

Fleet Maintenance Facility Cape Breton exists today to support the operations of the Royal Canadian Navy's Pacific Fleet. It is responsible to the Commander Maritime Forces Pacific for the provision of effective and efficient naval engineering repair, and maintenance to support the operational capabilities required in the Pacific Fleet and other organizations within Maritime Forces Pacific.

In addition to supporting the ADM (Material) Group in the provision of services to the Fleet, FMFCB performs work for the Air and Land Forces, as well as for other government agencies.

It is the most versatile facility of its type of the Canadian West Coast, with a highly skilled and adaptable work force who have an impressive and broad range of capabilities. Together they support the readiness and sustainability of the surface and submarine fleets.

FMFCB was formed April 1, 1996, by amalgamating the former Ship Repair Unit Pacific (SRUP), Naval Engineering Unit Pacific (NEUP), and Fleet Maintenance Group Pacific (FMGP) into one unit.

FMFCB is led by a Commanding Officer, in the rank of Captain (Navy), and the unit is organized into seven departments:

- Operations;
- Production;
- Engineering;
- Unit Support;
- Finance;
- Strategy; and
- Process Integration.

In 2021, the FMFCB team was comprised of approximately 964 civilians and 125 military Defence Team members in a fully integrated workforce. This large, diversified workforce of civilian tradespeople and military technicians carry out repairs and refits ranging from structural survey and repair to overhauling computer and communication systems.

Specialists manage engineering services that include naval architecture, marine systems, and combat systems engineering.

Military personnel come from a number of sea operations and technical trades including marine and combat systems engineers;

CONTINUED ➔

marine systems, hull, electrical, and naval weapons maintainer-technicians; boatswains; and communications occupations.

THE EVOLUTION OF FMFCB

When FMFCB stood up in 1996 it was mostly as a second-line maintenance facility. That changed in 2005 with *HMCS Victoria's* Extended Docking Work Period, which, by early 2010, stood at over 1.4 million labour hours.

The submarine's extended docking work period drove improvements in ship repair, document management, quality management, planning, organization, and critical project management skills.

In addition, FMFCB and sister facility FMF Cape Scott (FMFCS) provided the necessary production and engineering resources to provide urgent modifications to armored vehicles deployed to Afghanistan.

WORKFORCE RENEWAL

FMFCB continues its work force renewal activities such as participating in apprentice and co-op student programs. It also participates in innovative initiatives including outreach to target diverse employment groups, the Employment Equity Trades Orientation Program, the Secondary School Apprentice program, and women in trades. On-going collaboration with industry partners in the West Coast Shipbuilding and Repair Forum has brought together government, educational, and commercial organizations.

MISSION, VISION AND MOTTO

A mission statement answers the question "What do we do"? FMFCB's job – unchanged since the dockyard opened in 1865 – is found in the unit motto: "*We Serve the Fleet.*"

Recognizing our significance to DND, we adopted a broader mission statement: As a strategic asset, working with local and Canadian Industry, FMFCB provides timely and effective engineering and maintenance services to the navy and Canadian Armed Forces.

A vision statement should answer the question "Where are we going?" The pace of naval operations can change quickly. Indeed the geopolitical and security environment of the world has changed considerably since FMF was stood up in 1996. Change will define our future. Teamwork has been central to success in the past and it will continue to be essential to our future success.

OUR VISION

To be the hub of the military-civilian industry engineering and maintenance team delivering services to customer-agreed quality, scope, schedule and cost.

OUR CUSTOMERS: CANADIAN FLEET PACIFIC, CANADIAN SUBMARINE FORCE AND OTHERS

Canadian Fleet Pacific's mission is to generate, operate, and maintain combat-capable, multi-purpose maritime forces, on order from the Commander of Maritime Forces Pacific/Joint Task Force Pacific, in order to meet its mission and tasks emanating from Canada's defence objectives.

Canadian Fleet Pacific provides capable ships and highly trained personnel in support of joint maritime and multilateral operations and exercises with other government departments and allied forces.

Canadian Submarine Force is a strategic maritime security asset for Canada, providing an unseen capability in intelligence and surveillance gathering, the sufficient capacity to maintain a presence in domestic waters, and the ability to contribute to operations in support of North American security.

ABOUT OUR CREST

The design is based on the crest of HMCS Cape Breton. The gear wheel, which has been changed from white to gold, refers to the machinery of the engineering branch. The ermine sports are from the arms of Brittany, from which Cape Breton takes its name, and the thistles symbolize the Scottish heritage of Cape Breton.

At the Helm

A look back at the officers in charge of FMFCB

1994-1997
Captain (N) B. Blattmann CD

1997-1999
Captain (N) D.V. Jacobson

1999-2001
Captain (N) R. Westwood

2001-2004
Captain (N) R.W. Greenwood

2004-2009
Captain (N) A.F.G. Rueben CD

2009-2010
Commodore M.S. Adamson CD

2010-2013
Captain (N) D.E. Smith CD

2013-2017
Captain (N) C.G. Earl CD

2017-2019
Captain (N) B.E. Hooper CD

2019
Commander A. Bagga CD

2019-2021
Captain (N) M. Drews

FMF FLEET MAINTENANCE FACILITY
L'INSTALLATION DE MAINTENANCE DE LA FLOTTE IMF
CAPE BRETON

People are the Heart of FMFCB

The real heart of FMFCB is the people, a team of more than 900 civilians and 150 military members. These skilled professionals coordinate and execute the complex business of keeping the Pacific Fleet operational. Each person is a key component in the process, and they are divided into seven departments, each with its field of expertise:

- Operations – Planning, scheduling, coordination;
- Engineering – Specifications, trials, diagnostics, technical authority, subject matter experts;
- Production – Skilled tradespersons who do the physical work, material management;
- Unit Support – Support services, administration, safety, calibration, industrial engineering, and environment;
- Finance – Comptroller - manages the money;
- Strategy – Long term planning; and
- Process Integration – Maintains standards and process.

While we cannot capture the stories of all our extraordinary employees, the following stories demonstrate the diversity of our work and the expertise of our people.

ANDREW YANCOFF

Electronics Technician
Shop: 152 B, Radar

I am proud to be part of a diverse team where we all have a common goal, which is to support our country and the defence of our country."

CODY TRAVIS

Electronics Technician
Shop: 152 B, Radar

I am proud that I can serve Canada and the fleet as a civilian."

NZOLA SWSASISA

Electronics Technician
Shop: 152 B Cantass/Radar

Firstly, I am proud that I am helping Canada to be a safe place. Also, I love working on electronic communications and this is the best place to do that."

History

of the Federal Government Dockyard Trades and Labour Council (Esquimalt)

WRITTEN BY DES ROGERS

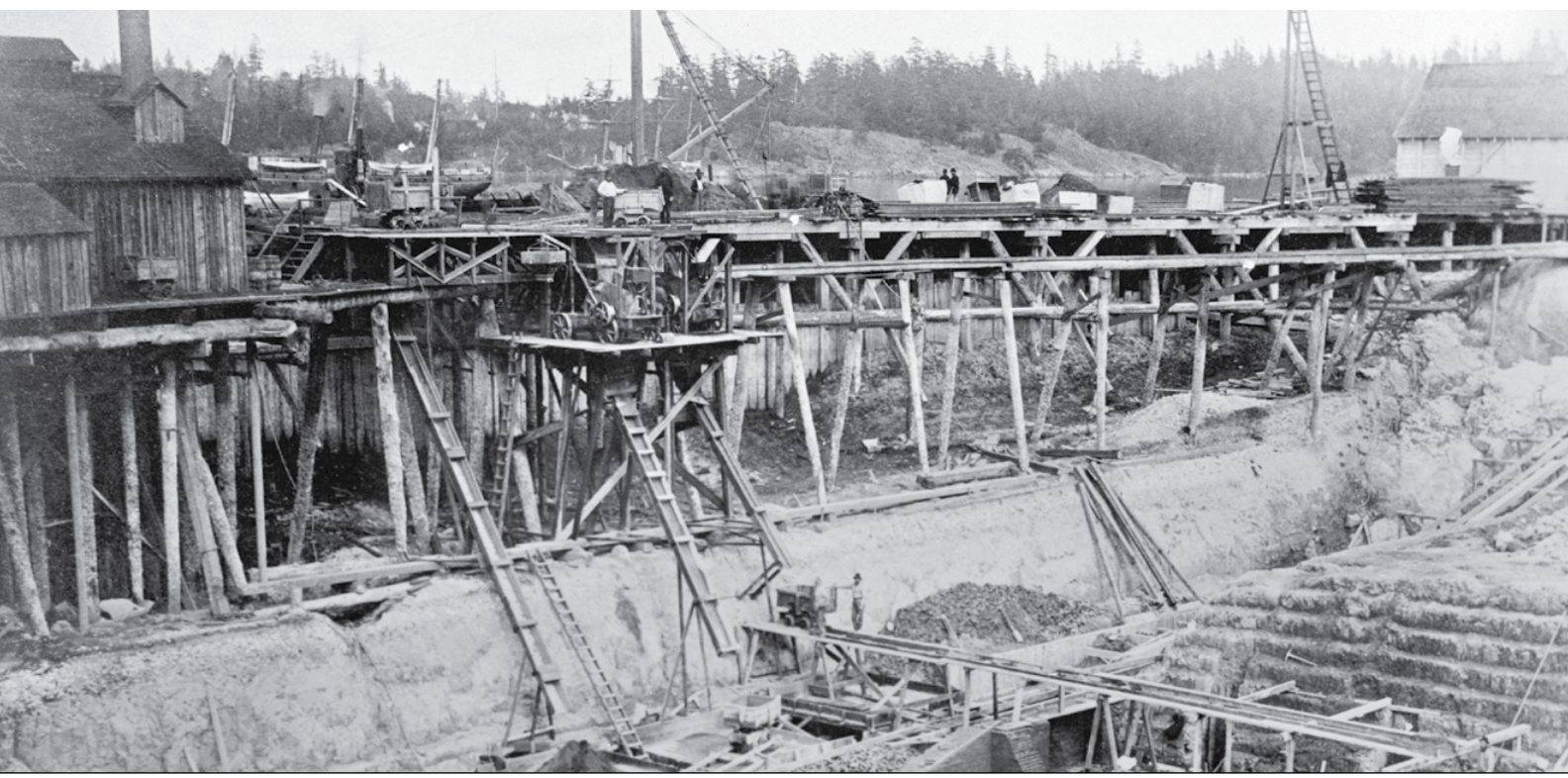
In 1862 a group of Shipwrights came together to officially establish the first Union in the Esquimalt Naval Dockyard, the Journeymen Shipwrights Association of Victoria and Vancouver Island.

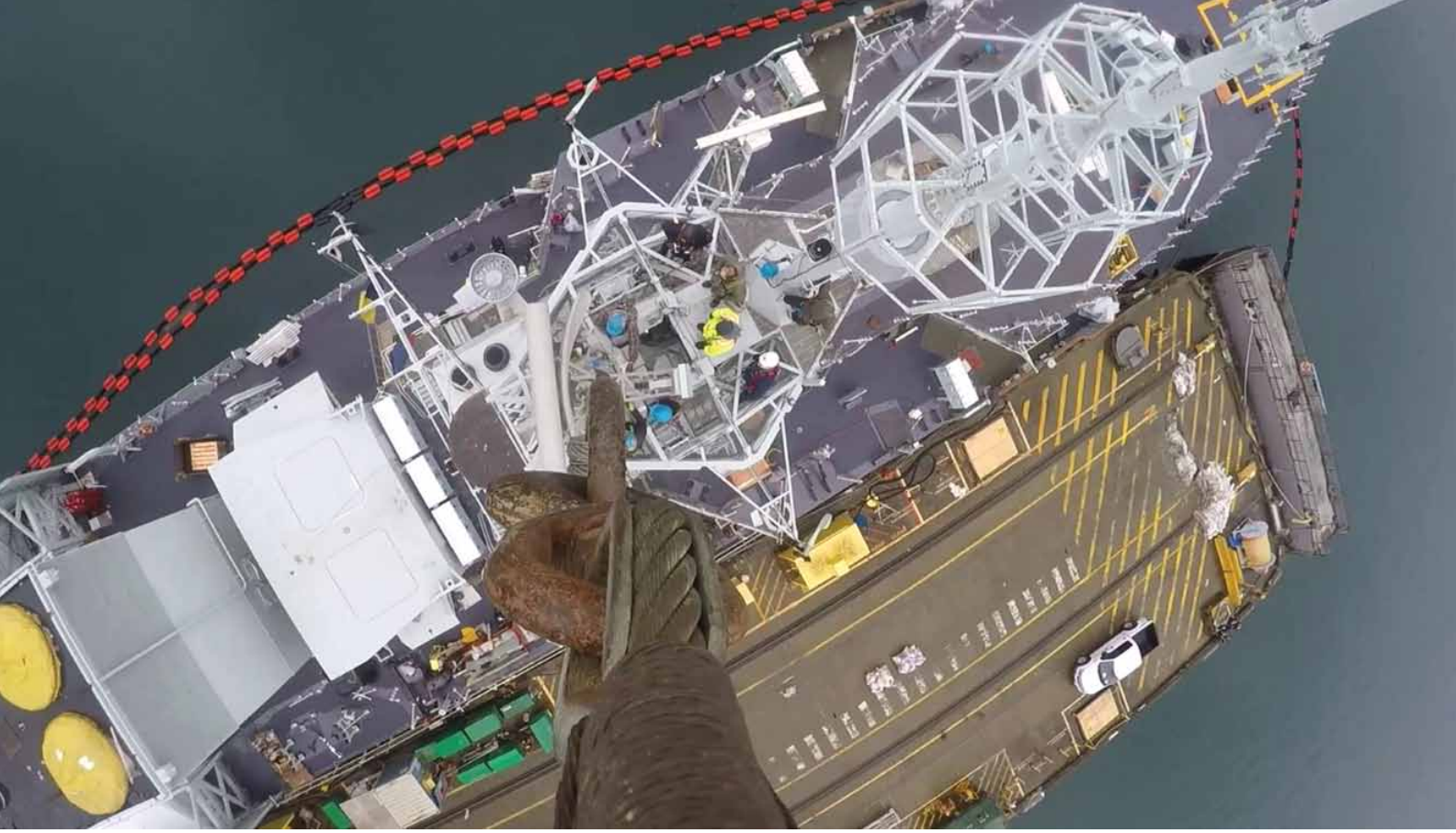
With an aim the same as Unions of today, they adopted a Constitution and elected officers who worked to protect workers' rights, ensure the health and safety of members, regulate hours of work, and negotiate wages.

The Shipwrights Union also held the original dockyard Employee Assistance Program (EAP) in the 1920s called the Red Feather Association. The premise was, if a Union member or the member's family was in trouble and needed assistance, the Association members would insert a red feather into the brim of their hardhats. This would indicate to other members there was a co-worker in need and allow them to donate as they were able.

Local Unions continued in existence (although independently of a formal

Esquimalt naval drydock under contruction circa 1887.





collective organization) until June 1944 when the Dockyard Shop Stewards Council was formed. This Council continued until 1966 when it was disbanded and the Esquimalt Trades and Labour Federation was formed. This formation happened in anticipation of coming legislation in the following year that would allow for organized collective bargaining in the federal public sector.

February, 1967: The new legislation known as the *Public Service Staff Relations Act* (Bill C-170) was given Royal Assent.

January, 1968: Federal Government Dockyards Trades and Labour Council was certified by the Public Service Staff Relations Board to represent the East and West Coast Dockyards.

From 1968-1976 the East and West Coast Ship Repair Units were one National Bargaining Unit.

August, 1976: The Public Service Staff Relations Board (PSSRB) granted a separation of the two groups and the Federal Government Dockyard Trades and Labour Council (FGDTLC) (Esquimalt) became the sole National Bargaining Agent for the Ship Repair Group on the West Coast, representing all Ship Repair West (SRW) members within CFB Esquimalt, at Canadian Forces Ammunition Depot (CFAD) Rocky Point, and the Canadian Forces Maritime Experimental and Test Range (CFMETR) at Nanoose Bay, BC.

The FGDTLC (Esquimalt), commonly called "The Council", holds the exclusive bargaining rights for all negotiations, grievances (including adjudication, arbitration or mediations), and any additional services that may be required for the overall benefit of the membership. The structure of the FGDTLC (Esquimalt), which sees 11 Affiliate Unions under one umbrella organization, was modelled after the National Joint Council, which has representatives of all 18 National Bargaining Agents and acts as a liaison organization between Labour and the Employer (Treasury Board of Canada) at the national level. Each of the 11 Affiliate unions elects or appoints three delegates, and those members comprise the Council from which the executive officers are elected.

The Council's role now is much the same as it was back in 1967 and earlier, that being to represent its members in all matters pertaining to their wages, benefits, health and safety, and day-to-day issues as they arise at both the local and the national level.

The Council is a proud supporter of the women and men who comprise the membership and who consistently deliver the very best support available to the Pacific Naval Fleet and its international partners. The skill and professionalism of the Ship Repair West group is second to none, and all feel a strong sense of ownership in the fleet that they maintain on a daily basis, both at home port or anywhere around the world. ☼

From Sea to Station

History of HMCS Cape Breton Bell

WRITTEN BY ANDREA KYFIUK

In the foyer of D250 – FMFCB's main building – there is gleaming brass bell encased in a glass case for all to see. Etched into the bell's waist are the letters HMCS Cape Breton, highlighted with red paint.

HMCS Cape Breton.

This is the ship repair facility's namesake, a warship with a rich history and strong ties to the west coast.

The display serves as recognition of a navy from yesteryear and a nod to bygone days of ship repair in HMC Dockyard. It is one of the few relics that remain from the ship before it was deliberately sunk Oct. 20, 2001, off Snake Island, near Nanaimo by the Artificial Reef Society of British Columbia.

HMCS Cape Breton (100), the second warship to bear this name, was built in Vancouver and first sailed as HMS Flamborough Head under the British flag during the end of the Second World War. The Royal Canadian Navy acquired it in 1952 and renamed it Cape Breton upon commissioning the next year. It served as a repair ship and training establishment for technical apprentices on the east coast for five years. A year later, it was converted into an escort maintenance ship at Esquimalt dockyard until it was paid off in 1964.

Service life did not end there. It continued to function as a towed mobile support facility and accommodation vessel - Fleet Maintenance Group (Pacific) - until it was replaced by a brick-and-mortar shore building in 1993, known as the Ship Repair Unit Pacific (SRUP).

The ship was acquired by the Reef Society and prepared for its new life as an artificial reef. The stern section and triple expansion engine were removed and returned to their birthplace – Burrard Dry Dock in North Vancouver. The bell was given to the CFB Esquimalt Navy and Military Museum for safekeeping until FMFCB's shop consolidation project was complete.

HMCS Cape Breton sails out to sea, circa 1962.
Photo courtesy Charlie Dobie,
www.rcnhistory.org

HISTORIC

ORDNANCE SLABS REBORN

A piece of HMC Dockyard's rich ship repair past has been preserved on a feature wall within Dockyard's Ship Repair Zone.

WRITTEN BY PETER MALLETT

Large concrete slabs engraved with the word "ORDNANCE", once part of the façade of long-demolished building D192, have been incorporated into the landscape design delivered by the Fleet Maintenance Facility Cape Breton shop consolidation project. They are now displayed as a centre piece of a south-facing parkette located on Hospital Road near the access road leading towards the FMFCB main entrance.

D192, built in 1940, was the administrative headquarters for FMF's predecessor, the Ship Repair Unit (Pacific). The large concrete slabs were part of that building's front entrance motif.

Project director for the ongoing consolidation project Clive Orford, of NDHQ's Assistant Deputy Minister (Infrastructure & Environment) organization, says incorporating the slabs as part of the revamped ship

Recently restored and installed Ordnance slabs as they now appear in front of Fleet Maintenance Facility Cape Breton.
Photo by Peter Mallett

The Ordnance slabs discarded on Signal Hill awaiting their rebirth.

repair complex celebrates CFB Esquimalt's rich ship building and repair past.

"There always is a lot of history and commemoration about ships and sailors who wore the uniform, but very little in the way of a nod to the thousands of workers who have worn overalls and carried tool boxes and performed the fundamental task of making sure our ships were seaworthy and ready for deployment," said Orford.

At the start of demolition for D192 in 2001, he asked that the slabs be retained and ultimately repatriated to the site.

"The intention was to create a little enclave or intersection to provide a spot within the Dockyard adjacent to its huge FMF complex, to commemorate this historical legacy," said Orford.

During the demolition, two of the slabs came out of the façade easily, but the last one was a little more difficult and was chipped upon removal.

The Shop Consolidation Project began in 1988 and is nearing completion with the fifth and final phase expected to be completed later this year.

Former Dockyard Building 192 in the background of this image of the former Dockyard Fire Hall. The Ordnance slabs are at the top of the building façade.

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50 YEARS
1971-2021

Alumni

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Millwright Apprentices Braden Shaffer, Stewart Symes, and Robert Oak at the Fleet Maintenance Facility Cape Breton Machine Shop, inspect equipment as part of their day-to-day job.

Now hiring at FMFCB'S

The Apprenticeship Program

WRITTEN BY ASHLEY EVANS

PHOTOS BY LEADING SEAMAN BRENDAN GIBSON, MARPAC IMAGING SERVICES

Apprentices are the next generation of highly skilled tradespeople at FMFCB. They are young, well trained, and ready to fill the vacancies left by retiring employees in the ship repair unit.

A path to employment is carved over four years with both hands-on and vocational training, ending with a trade certification. Apprentices start off with a base hourly wage of about $19, with regular incremental increases over four years climbing as high as $36 an hour for some trades. They also have the benefit of receiving their Red Seal Certification through the B.C. Industry Training Authority.

A DAY IN THE LIFE OF AN APPRENTICE

A typical day for Kyle Hubicka's apprenticeship at Fleet Maintenance Facility Cape Breton starts when he hikes up his overalls and heads out to locate the journeyperson he's matched with for the day. A journeyperson is a qualified and skilled person in a trade.

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AVAILABLE APPRENTICESHIP OPPORTUNITIES WITHIN FMFCB

- **Metal Fabricator***
- **Sheet Metal***
- **Welder***
- **Lagger***
- **Painter***
- **Pipefitter***
- **Millwright*** ***(feeds into mechanical fitter, weapons fitter, plant maintenance)***
- **Refrigeration Mechanic***
- **Diesel Fitter***
- **Marine Electrician***
- **Machinist***
- **Tool and Die** ***(extension of machinist)***
- **Joiner***
- **Shipwright**
- **Electronics Technician**
- **Rigger/Sailmaker**
- **Electroplater**

Carries Red Seal designation

Their Work Centre Supervisor then goes over the work order they are set to complete, and Hubicka and his Journeyperson go over their game plan for the day ahead.

From there, they grab the tools and parts needed to complete their task, which can be in the shop or on board a ship.

Hubicka is a third-year millwright apprentice, scheduled to graduate in 2022. A millwright is a skilled worker who manipulates industrial machinery, also known as industrial mechanics. In his apprenticeship, he rotates through the weapons, mechanical fitters, and machine, maintenance, diesel, and controls shop learning the unique skills of each trade. At the end of his apprentice, he will play a role in choosing his shop.

He is also the Apprenticeship Association President, a role that represents all apprentices within dockyard in a professional and organized manner. His second priority is to assist any apprentice looking for clarification or direction within their apprenticeship.

FMFCB has brought approximately 375 apprentices through the facility over the past 25 years.

"FMF Cape Breton has modern, fully equipped workshops, and a fantastic cross section of tradespeople to learn from and be mentored and guided by," says Des Rogers, National President of the Federal Government Dockyard Trades and Labour Council (Esquimalt) and co-chair of the Ship Repair West Apprentice Oversight Committee. "Our apprentices are given every opportunity to excel in their chosen field, both in the workplace and during their formal training periods. Many senior personnel in FMFCB started their careers on the shop floor and are staunch supporters of the apprenticeship program."

His career was launched through the program, learning his trade on the shop floor between 1981 and 1985. Now he welcomes new apprentices, explaining the role of the unions, expected benefits, and what to envisage from the program at the ship repair unit.

The typical apprenticeship runs four to five years, with learning hours split between classroom instruction and on-the-job training. Some trades, such as pipefitting, require pre-apprentice training which replaces the first year. Electronics must start with a two-year Electronics Technician Certificate. There are typically 50 apprentices in the facility at any given time, with 10 to 15 new starts annually.

"You've got an amazing opportunity to learn your trade with a highly educated, versatile workforce," says Rogers to those apprentices within dockyard. "Take advantage of all of the opportunities you have here." ☼

SCHOOLING OPPORTUNITIES

WOMEN IN TRADES TRAINING:
http://camosun.ca/learn/school/trades-technology/community-partnerships/women-in-trades-training.html

INDIGENOUS PEOPLES IN TRADES TRAINING:
http://camosun.ca/learn/school/trades-technology/community-partnerships/indigenous-peoples-in-trades.html

TRADES EXPLORATION PROGRAM AVAILABLE FOR HIGH SCHOOL STUDENTS; TRADES AWARENESS, SKILLS & KNOWLEDGE (TASK):
http://camosun.ca/news/press-releases/2014/november/task.html?reroute_notice=archive

GERRY RATCHFORD

> *One of the best posts I ever had was in Cyprus, and we were lucky enough to be there when it was peaceful and quiet."*
>
> Commissionaire Gerry Ratchford

You're NEVER TOO OLD to work

At 92, the Commissionaire stills mans the Fleet Maintenance Facility Cape Breton security gate, greeting and checking IDs of guests and employees as they enter the ship repair zone.

"I love the interaction. Going to work gives me something to look forward to and keeps me busy," says Gerry Ratchford, also a retired Major.

His humble, down-to-earth outlook may have something to do with his military career that spanned more than 40 years and included service in Canada's Merchant Navy, Royal Canadian Navy, Canadian Army, and Army Cadets.

Born on May 24, 1928, in New Westminster, Ratchford says he developed a keen interest in all things military early in life. At age 12, during the Second World War, he sold newspapers and magazines on the corner of Tenth Avenue and Eighth Street to the soldiers stationed at the army barracks.

He became so enamored with the soldiers and their way of life, he had a local tailor design a replica army uniform that he would wear while he marched alongside his heroes from the various regiments. The Duke of Connaught's Own Rifles were so

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impressed with his interest they had a service book made for him and adopted him as their mascot.

He joined the Royal Canadian Sea Cadets in 1942 and was one of the originals of RCSC Fraser. He served in the Canadian Merchant Navy from September 1946 to July 1949 and his service aboard seven different vessels took him to such faraway places as England, Japan, Jamaica, South Africa, Singapore, and Zanzibar.

> *Service aboard seven different vessels took Gerry Ratchford to such faraway places as England, Japan, Jamaica, South Africa, Singapore, and Zanzibar.*

Ratchford had a brief spell in the Royal Canadian Navy from July 1949 to November 1950. He then joined the Canadian Army in 1952 until his release in 1993. During that time his tours of duty included being a member of The Black Watch Royal (Highland Regiment) serving in Korea in the years after the truce was signed between North and South and being part of Canada's United Nation's Peacekeeping mission in Cyprus in 1970 and 1971.

"They were just great years, I loved them," he said. "One of the best posts I ever had was in Cyprus, and we were lucky enough to be there when it was peaceful and quiet."

After his release from the army, he became an instructor with the Canadian Scottish (Princess Mary's) Cadet Corps in 1972 and stayed in the organization, eventually rising to the rank of Major before his retirement in 1993. In a military career spanning more than 40 years he was awarded 10 medals including a Canadian Volunteer Service Medal (Korea), Canadian Peacekeeping Service Medal, United Nations Service Medal (Korea), United Nations Forces Cyprus, Canada 125 Commemorative Medal, Queen's Golden and Diamond Jubilee Medals, Canadian Forces' Decoration, Commissionaires Long Service Medal, and a Minister of Veterans Affairs Commendation.

Shortly after retiring from the military he returned to B.C. and started working as a security commissionaire, a job he has worked ever since.

Ratchford says he has no plans to retire any time soon.

Michelle Chowns, Rigger / Sailmaker showcases two Department of National Defence style face masks produced by Fleet Maintenance Facility Cape Breton at the outbreak of COVID in 2020.

stepping up

to face COVID-19

WRITTEN BY ASHLEY EVANS

PHOTOS BY LEADING SEAMAN MIKE GOLUBOFF MARPAC IMAGING SERVICES

When COVID-19 swept across the world in early 2020, and it became clear a pandemic had erupted, strict health measures were put in place.

Most employees were told to work from home. Citizens were told to wear masks, but early in the pandemic face cover supplies could not meet demand. This left communities and businesses to find creative ways to protect their citizens and employees.

At CFB Esquimalt, military and civilian staff united to fabricate non-medical face coverings through a joint directive: DND/CAF COVID 19 Public Health Measures and Personal Protection released by the Chief of the Defence Staff and the Deputy Minister of Defence.

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Jodi Sigsworth, Sailmaker, examines the fabric that was used to produce non-medical face masks for DND employees.

Multiple teams began manufacturing them at the base including FMFCB.

Ian Baxter, Group Manager 2, said his team recognized a requirement for non-medical cloth face coverings early on and started planning designs.

"We narrowed it down to two designs that we thought were the most practical, from ease of manufacturing, best fit, and best use of fabric. Fleet Maintenance Facility Cape Scott did something similar, and their design was formulated into a Canadian Forces Technical Order."

After designs were approved in early April, the call came for the FMFCB team to assist in the fabrication of non-medical face coverings intended for use by DND personnel in settings where it would be difficult to maintain physical distancing.

A team of over 100 employees from multiple shops began on the project. This work supported 655 face coverings for FMFCB staff and put over 3,000 into the national stock system for controlled distribution.

"I was impressed at the positive attitude of all the employees and volunteers supporting this project," said Steve Ringma, Group 2 WorkCentre Manager. "It was great to see everyone pulling together to support this requirement. They all understood the importance of this project for the CAF and FMF to be able to get back to any sense of a normal posture."

The sail loft, with its mix of journey persons and apprentices, were on the cutting edge of this project – working both remotely from home and in the FMF. They created an assembly style manufacturing system – people cutting material, people outlining the areas to be stitched, and then people sewing the mask.

"I was amazed at how fast employees could cut material and make packages for tradespersons and workforce members at home to sew," said Ringma.

But they needed a large amount of material to be efficient, so Group 7 took the lead in procuring materials from all over the island and mainland.

Once the masks were produced, the Lagging shop cleaned and packaged them in packets of two with an accompanying information sheet on how to wear them.

"It has been heartwarming to see the sense of pride within the workforce as they came together on a common goal, and to aid in the fight against COVID-19," said Baxter. "The message I received loud and clear was that everyone was happy to give back after DND put their health and safety first."

The Cable Guys

who power the Pacific Fleet

Larry Fletcher and Steven Faust are usually the first friendly faces returning sailors or visiting sailors see when their ship comes alongside a jetty in HMC Dockyard.

WRITTEN BY PETER MALLETT AND ASHLEY EVANS

They have dubbed themselves the "electrical ambassadors" because they are the ones who hook the ships up to on-shore power.

"Larry and I are the first faces sailors meet when they return home. We also really enjoy interacting with visitors from other countries, making the most unique aspect of our job customer service," says Faust. "We take pride in being the electrical ambassadors for the base, and making shore power hook-ups as easy and efficient as possible."

The two electricians work in the Electrical Shop of Fleet Maintenance Facility Cape Breton and provide, maintain, and repair shore power for HMC Ships and those of visiting navies.

Fletcher, 54, joined FMF four years ago after working several decades as a technician in the data communications, and film and television industry. He made his way to FMF in 2017 after working five years at Seaspan Shipyard where he became a qualified electrician and earned his ticket with the local branch of the International Brotherhood of Electrical Workers.

Faust, 39, carved a much quicker path to FMF. After graduating from Camosun College, he worked as a commercial electrician in the housing industry. He upped his credentials by joining FMF's apprenticeship program.

The biggest part of their job is maintaining, testing, repairing, and even manufacturing cables inside the Electrical Shop's cable repair facility.

They have a large inventory of 40 different cables to maintain because the cable requirements for each vessel in the navy and other navies are different. A frigate, for example, needs 12 varieties of cables organized in four sets. Each cable is approximately 300 feet long.

Getting the cables on board is no easy task, and is normally performed by small teams of three or four sailors. It is their job to haul the lengths of heavy cable up from the jetty to the deck of the ship. This can be gruelling work, notes Fletcher, who says each 50 feet of cable weighs approximately 150 lbs.

Cables are stored on the many jetties at the base. Each cable contains at least three sets of wires, approximately one inch in diameter per cable bundle in each set.

They are weather proof and have a durable rubber boot coating on the outside of the wires. Fletcher notes that over time the hot and cold temperatures and ultraviolet rays do a lot of damage to the boots that protect the cables and they often need to be replaced.

"Unlike many jobs in the private sector, the quality of work we do at FMF comes not from speed, but from being

thorough and deliberate," says Fletcher.

They also construct cables when they need to be replaced or upgraded.

Other sets of cables with different voltage requirements are at the ready for visiting ships who often have different connectors and voltage requirements. If need be, the two will make unique cable sets from scratch using pre-supplied wires and other electrical materials.

Constructing cables includes priming and vulcanizing the protective rubber boot material to the metal wires that carry the current using an eight-ton hydraulic crimping tool, and then connecting them to the plugs that look like giant wall prong plugs.

"Excuse the pun, but it works well despite many pluses and minuses," says Faust. "The connectors and cables we build can be very difficult to construct, its half chemistry and science, and half art. This is something I wasn't taught in school."

Powering the fleet is not just about them. Both men acknowledge they are one piece of a large team that gets ships in and out of port safely. They work closely with Queen's Harbour Master crews who run the escort tugs to guide ships into port, and, dressed in yellow safety vests, throw the ropes to returning sailors to attach their vessel to the jetty.

There are also FMF pipe fitters who work to hook up the water and sewage for the ships, and many other individuals behind the scenes that make the completion of their work possible.

In the end, both Fletcher and Faust say they wouldn't trade their job, and still marvel at the work they do as they enter Dockyard.

"I love the fact that as an electrician I am probably working in the best place in the world," says Fletcher. "Walking in to Dockyard every day and seeing these giant ships and submarines in the harbour that I help maintain is inspiring and makes me very proud of the work I do every day." ☼

> *We take pride in being the electrical ambassadors for the base, and making shore power hook-ups as easy and efficient as possible."*
>
> **Steven Faust**

The Art of Making Kisbees

WRITTEN BY PETER MALLETT

If you've wondered who creates the decorative Kisbee rings that adorn Royal Canadian Navy warships and units of CFB Esquimalt, you aren't alone says their maker.

Craftsman Ryan Yeomans works his magic on those doughnut-shaped flotation devices from an art studio in Fleet Maintenance Facility Cape Breton. For the past 13 years he has been the man responsible for transforming the safety rings into ceremonial display items.

"They are the first thing you see when you cross the brow on a ship, but most sailors think they come from a warehouse and are made on an assembly line. They don't realize how much work goes into creating these, and that they are all done by hand."

It's a complicated labour-intensive process involving continued attention to detail, says Yeomans.

The lifebuoys are made of plastic, filled with foam and orange in colour when they come to his shop from manufacturer Aer-o-buoy.

He removes the manufacture's rope that covers their circumference. A thicker more attractive gage rope will be attached later by workers from the rope shop.

He then washes the ring, sands it, and sprays an epoxy sealer and polyurethane finish before adding coats of navy blue and white paint. It can take up to two days for the paint and layers of protective coating to dry.

It is at this point Yeomans' steady hands are showcased.

What's In a Name?

Kisbee Rings are named for inventor Thomas Kisbee, who was born in Farcet, Huntingdon, England, in 1792. Kisbee served as the First Lieutenant in HMS Driver, the first steam paddle ship to circumnavigate the world (1842-1847) where his invention was first used. Widespread practical use of the rings, then made of cork, became the norm when Britain's Royal National Lifeboat Institution started using them in 1855. In recent years, due to safety concerns over injuring the casualty or nearby swimmers and doing more harm than good, the Kisbee Ring has been phased out in favour of the torpedo buoy.

Source: Nauticapedia

He carefully outlines the ship or unit's name on the blue ribbon he's painted on the ring. Then he fills the letters with sizing glue, waits an hour for it to dry, and applies 23 carat gold leaf sheets. The sheen from the gold is what makes the letters pop, and gives prestige to the ring.

After that, he adds a drop shadow and maple leafs.

"For this part you really need a steady hand and there is lots of eyeballing involved," said Yeomans. "It takes practise and it's not something that comes overnight. I have been learning over the years how to better refine my skills."

He learned the ins and outs of his craft under the guidance of former FMF Paint Shop worker Stu Guilbault, who recently retired. Yeomans, 50, has some experience in this line of work; he once worked 16 years as a body repair, paint and air brushing, and pin striping specialist at various auto body shops.

While most of his work is on regular painting projects, the Kisbee ring is by far the most rewarding part of his job.

"It's great to know that some of these Kisbee rings are now sailing around the world on our warships and it gives me a feeling of great pride knowing I was the one who created them by hand."

Kisbee ring making is unique to Esquimalt. On the east coast, the rings are created via computer.

"It's an old-school technique that I don't want to ever see go by the wayside," he said.

ACOUSTIC SOUND RANGE

Discerning the decibels

Every time a frigate, Maritime Coastal Defence Vessel, and even an Orca Class training vessel undergoes repairs, it must be analyzed from top to bottom, starboard to bow, before being deemed fit to sea. A list of milestones must be met and one of those milestones is an acoustic ranging where all the noise the ship generates is analysed.

Testing is done by the Fleet Maintenance Facility Cape Breton's sound range officer, who uses the navy's acoustic range facility in Pat Bay, located in the Saanich Inlet near the Victoria International Airport.

A ship's sound signature has important tactical and security implications, says Pat Irvine, Influence Range Specialist. The signature is the radiated noise a ship emits at sea, which can make it susceptible to passive acoustic sensors of enemy vessels and vulnerable to mines and torpedoes.

The acoustic signature is made up of several individual elements.

"This can be from equipment such as generators and pumps. It is also from the simple sound of the water flowing over the ship's hull and propellers, as well as propeller cavitation. Propeller cavitation occurs when the propellers put too much pressure on the water passing by the blades and causes air bubbles to be produced and then popped. It's surprising how loud the popping is," says Irvine.

Ranging is always done at night to avoid shipping traffic that would mix with the ship's noise and corrupt the data. Also, to minimize interference from planes landing and taking off at the airport – the underwater hydrophones are directly along the flight path of the airport. Additionally, to ensure the environment is quiet enough for the range staff to hear all of the equipment being tested on the ship.

The Pat Bay Sound Range has two pairs of analog seabed hydrophones connected to the shore through four separate three-kilometre cables. On the shore, in a steel trailer, is where the range staff work. Computers convert the hydrophone signals to digital format and analyze the recorded data.

The trailer where acoustic sound range staff work.

The work is generally the same for each vessel type and consists of two parts: static ranging and dynamic ranging.

In static ranging, the ship is moored at a four-point mooring to keep the ship in one place stationed over two underwater hydrophone on the sea bottom. The ship will set up in different equipment configurations to allow the shore range staff to record and isolate different groups of equipment. This way, generated noise can be attributed to the responsible equipment.

During dynamic ranging, the ship sails at varying speeds over a second set of hydrophones. Again, the ship will setup in different equipment configurations and speeds in order to assign generated noise to the responsible machinery.

"Regular sound ranging can allow for the early detection of failing equipment. For example, if the generated noise of a piece of equipment is suddenly much louder than normal, it can indicate an issue," says Irvine.

Also, by looking at the noise levels the ship is generating an analysis can be done to determine the ship's detectability and susceptibility to surface and underwater threats, he adds.

Range use varies from year to year depending on the needs of the fleet, but typically it is used up to eight times a year. The range is not just for warships. The range has assisted Transport Canada and Defence Research and Development

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Canada, who are looking for ways to mitigate noise from civilian vessels to lessen their impact on the whale population.

"We have also conducted ranging of a B.C. ferry and the three new Coast Guard scientific research ships that they just deployed," says Irvine.

The sound range officers' credentials include an electronics degree and up to three years of on-the-job training. The underwater acoustics field, as applied to the sound range, is an extremely specific speciality and not generally found in the public sector, says Irvine.

> *Regular sound ranging can allow for the early detection of failing equipment. For example, if the generated noise of a piece of equipment is suddenly much louder than normal, it can indicate an issue.*
>
> Pat Irvine

The future of manufacturing, ONE LAYER AT A TIME

WRITTEN BY PETER MALLETT
PHOTOS BY LEADING SEAMAN BRENDAN GIBSON, MARPAC IMAGING SERVICES

There's a new tool on the machine shop floor to help workers fabricate parts for warships and submarines. It's a Fortus 450 MC Polymer Printer - the size of a refrigerator - that creates three-dimensional objects by building up materials, rather than cutting them away.

It is better known as additive manufacturing, an industrial production system that creates lighter, stronger parts using thermoplastics and thermosetting plastics.

"It hasn't instantly revolutionized the way we do everything in our shop, but it has given us a new tool and greatly enhanced our capability," says machinist Levi Salo. "What additive manufacturing does provide is a means to complete some of the difficult jobs more efficiently and quickly."

This new technology uses data computer-aided-design (CAD) software or 3D object scanners to direct hardware in the printer to deposit material, layer upon layer, into precise geometric shapes.

In comparison, the traditional method of manufacturing parts can involve the labour intensive removing of material through milling, machining, and carving to get the required shape.

"The printer can manufacture complex structures like internal lattices or gussets or even building assemblies together," says Salo. "It also has the potential to save substantial man hours on many jobs, as once a software program is created the machine does the work by itself."

Machinists received 3D printer training last year, but it has taken some experimentation for them to be confident in using the machine.

Now they turn to it, especially when an unusual part is needed such as a hinge prototype for *HMCS Victoria*. The escape hatch required a perfectly fitted hinge, but the hatch itself wasn't a perfectly round shape.

"Instead of having our engineering department approximate the shape

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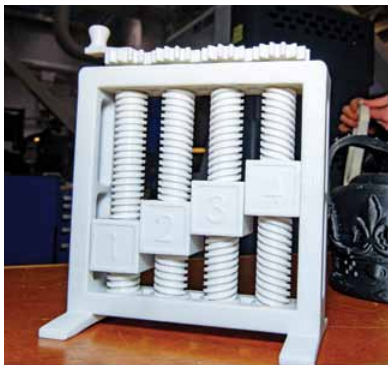
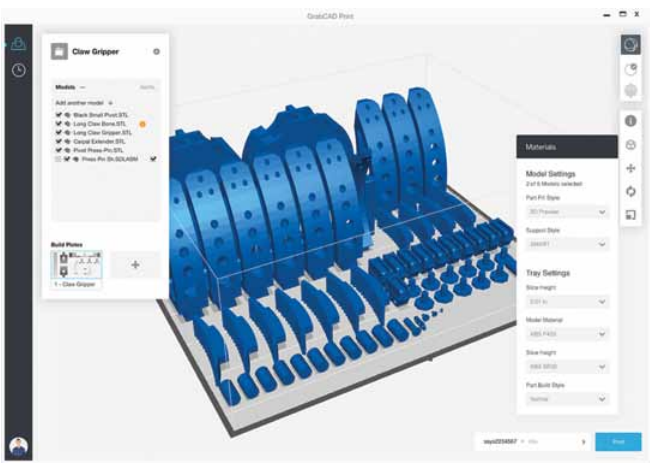


Above: Materials made with the 3D printer in FMFCB Machine Shop. Right: Levi Salo by the 3D printer.

and the machine shop to make a prototype out of metal, we printed out a prototype of the hinge to fine tune the exact fit," says Salo. "It was much easier and faster to alter the design and reprint instead of machining several prototypes out of metal. Once we had a perfect fitting design, we machined the final hinge out of metal."

Last year, they used the printer to create patterns to cast seven commemorative bronzed plaques. When COVID-19 struck, they created adjustable straps and face shields for firefighters who were unable to buy them due to a widespread shortage in the international supply chain.

"We have found so many unexpected things that we can use this printer for," says Salo. "Whenever there is a tough job that a supervisor will ask us to do, there are many times when additive manufacturing has become our solution."



The 3D printer uses data computer-aided-design (CAD) software or 3D object scanners to direct the printer to deposit material in layers.

The technology fits nicely into the Royal Canadian Navy's digital initiative that rolled out in February 2020. The intent is to equip the defence team with the right digital tools and capabilities, ensuring our navy remains world class.

There is more digital equipment to come for FMF Cape Breton in the months and years ahead.

Richard Turnbull, Machine Shop Work Centre Manager, says they are expecting a metal-producing 3D printer called Bound Metal Deposition. The process takes a powdered metal that is mixed with a binding agent and then heated and extruded onto a build plate. This shapes the part layer by layer. While this technology is not a good method for high-stress or pressure use items, it is ideal to make items such as valve handles, jigs, and clamps, says Turnbull.

A third additive manufacturing tool they are expecting is Selective Laser Melting technology. That tool uses a high-power density laser to melt and fuse metallic powders together.

The technology, says Turnbull, has the capability of producing parts that could otherwise not be created.

"Parts can be designed that are both structurally sound and as light weight as possible," he said. "All of this 3D printing equipment is amazing technology that is cutting edge and will enhance FMF's support of the RCN."

SUPER Calibration Centre

WRITTEN BY PETER MALLETT
PHOTO BY
LEADING SEAMAN BRENDAN GIBSON,
MARPAC IMAGING SERVICES

Accuracy is not a buzz word at the Super Calibration Centre, it's a requirement.

Nineteen highly skilled civilian technologists, and one military technician, spend their days calibrating test equipment used by the army, air force, navy, and civilians to measure or set parameters on everything from tools to gauges, weapons to engines.

When test equipment is not calibrated, then something like a compass on a fighter jet or sites on a machine gun could be compromised, making a catastrophe possible.

The calibration centre makes sure those instruments are accurate.

"DND has spent millions of dollars on test equipment to serve all its measurement and generation requirements. All this equipment has to operate within its original specifications and tolerances, and we ensure the equipment does what it is intended to do and is safe for the operator to use," says Guido Arnaud, who has worked at the centre since it was built 22 years ago.

It is located on Black Rock in dockyard overlooking the Strait of Juan de Fuca. It is part of Fleet Maintenance Facility Cape Breton and is one of four DND calibration centres, with the other three the Quality Engineering Test Establishment (QETE) in Ottawa, Ontario, calibration centre in Cold Lake, Alberta, and a calibration centre in Halifax, Nova Scotia.

The rock foundation was purposely chosen as it ensures no vibration will offset the machines used to verify that test instruments are still within the manufacturer's specification. Also, the building is sheathed in metal siding to ensure no electrical interference.

Within the centre is a strictly controlled environment. A double door entrance system minimizes dust particles from entering the Labs and sticky doormats collect dirt from shoes before a person fully enters. The goal is to keep dust particles from compromising the accuracy of the testing equipment. Workstations are pristine, wiped down every day.

There are two laboratories, one for mechanical calibration and one for electronic. Each room is regulated for temperature and humidity to replicate the national standards testing facility.

It's all about precision, says Arnaud.

As each device comes in for calibration, it is inspected and catalogued. Then the work begins. Technologists compare the device under test to a reference standard of a known value. The process determines any errors or verifies the accuracy of the device. Corrective adjustments will be made to reduce the measurement error.

The bottom line, says Arnaud, is that he and his team ensure all devices that come to the centre are operating within the required specifications and have no deficiencies.

Upon testing completion, a certification of integrity seal is affixed, and a calibration certificate created, stored, and made available to the customer if required.

Douglas Hunter, a Mechanical Calibration Technologist at Fleet Maintenance Facility Cape Breton Calibration Centre, works on calibrating a piece of equipment.

They are audited annually by FMFCB Management Systems and biannually by an outside agency to confirm compliance with the International Organization for Standardization certification.

Last year, they tested about 4,700 pieces of equipment. While that may seem like a lot of work, the normal annual total is between 6,000 to 7,000 items. COVID 19 played a part in fewer testing.

In his almost three decades at the centre, Arnaud has adjusted to the changing technology. There is now automated calibration equipment that decreases human errors and increases productivity. Add to that, some testing equipment has become smaller and more accurate.

One thing that remains a constant is the work they do is little known to most but required by all.

"Thankfully, people in the know appreciate our work and recognize that it is essential to the safety of the men and women of the Canadian Armed Forces," says Arnaud. "One thing I genuinely like about working at FMF is that my chain of command recognizes the importance of the work being done at the Calibration Centre and have given my staff and I full support. That in turn inspires my staff to provide a high quality of service to our customers." ☼

New Central Storage Facility

BRINGS ABOUT EFFICIENCIES IN MATERIAL HANDLING

WRITTEN BY ASHLEY EVANS, WITH NOTES FROM BRETT HOOD

The Central Storage Facility officially opened in October 2018 as part of the final stage of C4360 Fleet Maintenance Facility Cape Breton (FMFCB) Modernization Project – the creation of one consolidated ship repair facility.

The Storage Facility brought together nine independent locations throughout the region into one 24,700 square foot state-of-the-art facility with an open foot print, high white walls, and receiving dock.

It is home to both Group 7 Work Centre Managers, a Work Centre Supervisor who oversees daily operations, and a host of trades services personnel performing a variety of material management functions.

A few of these functions include Work-In-Progress Storage, Repair and Overhaul, a Records Control Officer, and First Level Submarine Material Handlers.

The facility is physically located at the south end of dockyard, in D250, adjacent from the main gate, and now serves as the primary receiving and shipping location for all FMFCB material requirements (with the exception of HAZMAT and Metals that are managed within purpose-built facilities on Signal Hill).

With the physical location within D250, items can come directly in, be processed, and then distributed to the shop floor on a daily basis versus the previous state that could take weeks. Additionally, shop personnel can visit the storage facility to look at material and work with personnel directly.

The Central Storage Facility's purpose is to provide material support to FMFCB operations with the primary functions being:

- Tool Kit Management;
- Work-In-Progress Storage (unique to the West Coast);
- Work Order Material Staging;
- VIC Class SPTATE Management;
- Planned Inventory Management;
- 3rd line Repair and Overall Asset Management; and
- VIC Class Expediting / 1st Level Inventory Management.

This end-state location consolidates all the above functions under one roof, and has delivered substantial efficiencies through a combination of design and the application of Lean/7S elements that include a linear and logical flow; intuitive location system; colour coding; large visual signage; and material segregation by category, commodity, and special storage characteristics.

"The team here came up with the colour coding system," says Hope

Hunt, Work Centre Supervisor. "This in-house initiated organization shows the team's ownership in the process here."

Hunt has worked at FMFCB for the past 14 years, and was part of the initial team to move into the CSF two years ago. With that move, she saw the phenomenal changes that took place when the nine original structures amalgamated under one roof.

"Everything has a place, and there's a place for everything," says Hunt. "This organization can be seen from floor to ceiling as items are effectively stored in an extremely well thought out and intentional way."

Efficiency and effectiveness has increased due to this streamlined organization. The Lean/7-S model will also move into the Trade Service Centres.

The location of the Storage Facility has substantially reduced reliance on TEME (Base Logistics) in support of material conveyance as the majority of all material movements can now be performed internally by Group 7 personnel.

The warehouse itself includes:

- Wire-guide forklifts;
- High capacity racking;
- Electronic loading docks;
- Ergonomic work stations;
- Four-ton overhead crane; and
- LED motion activated lighting.

While FMFCB's five Trades Service Centers remain the primary customer service interface, the facility has established a Service Counter, located at the south end of the Boiler Shop, open daily to provide Tool Kit and VIC Class SPTATE support.

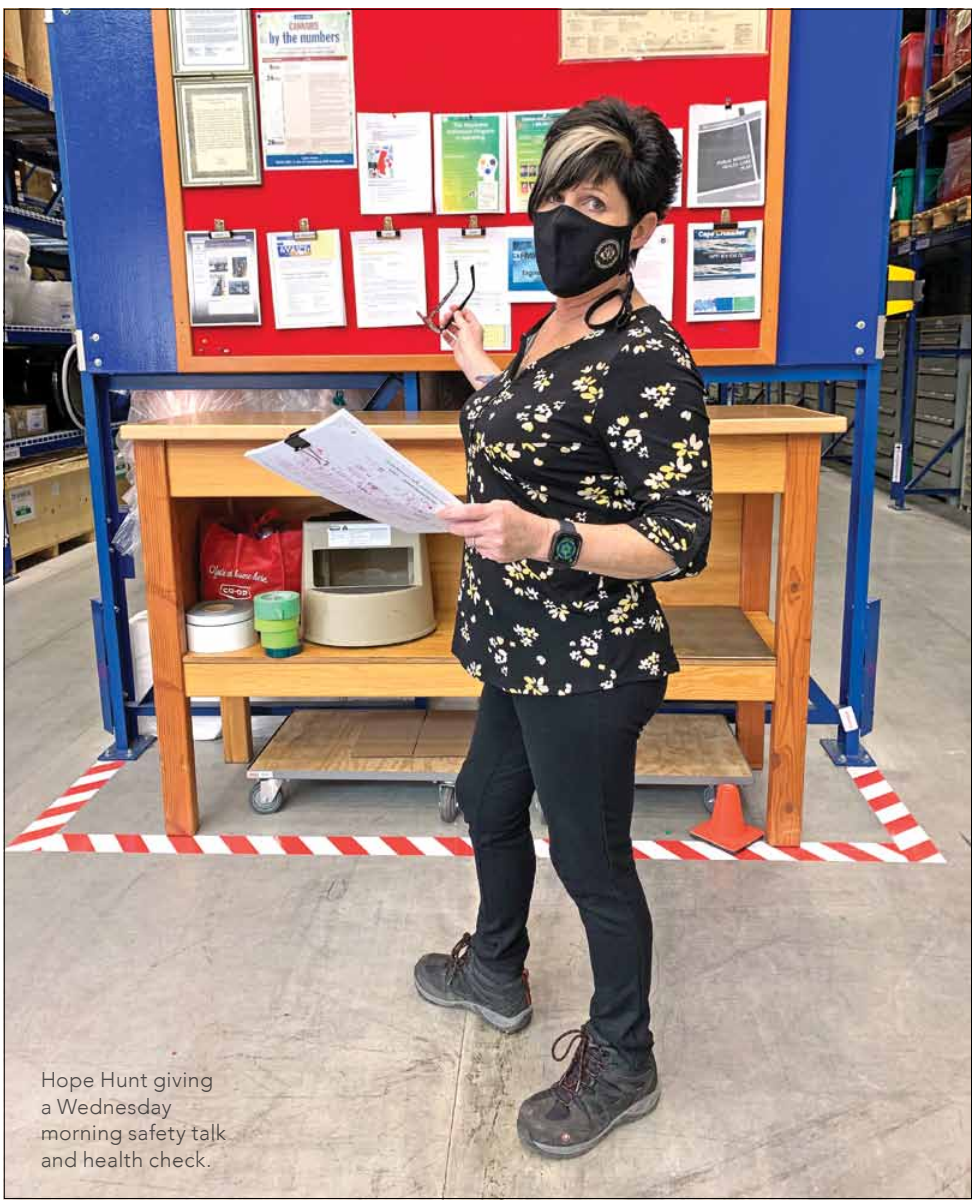
Of note, the following strategic initiatives have been implemented to support Central Storage Facility business:

- Use of Marine Industrial Labourers to facilitate Material Conveyance;
- Reestablishment of Records Control Function – strategic alignment / supports inventory expansion (an item must be catalogued to be managed as DRMIS Inventory); and
- In-Service-Support-Contractor Material Swing Space – i.e. MSC, our Ready-Use provider has an allocated area for crossdocking their material.

Looking into the future, the following initiatives are being considered to further improve operations:

- Collective metrics with Base Logistics and Industry;
- Wireless barcoding solution (eventually upgraded to RFiD functionality); and
- Imbedded technical inspectors – to allow for direct return/transfer of material in accordance to its disposition.

"I am so proud of the teamwork here," said Hunt. "The work is not always easy, but the team always gets it done."



Hope Hunt giving a Wednesday morning safety talk and health check.

Meet the Staff

MATT BLOGG

ELE4 Repair and Overhaul (R&O) Coordinator

Matt Blogg is a third generation Fleet Maintenance Facility Cape Breton (FMFCB) worker. He celebrated 17 years as a public servant on March 3, 2021.

His career at FMFCB began as a marine industrial labourer, and then he worked his way through various jobs before ending up in his current position in 2013.

His work in Repair and Overhaul starts with a receipt for a job followed by the filing of the work order. The FMFCB shop designated to work on the repair acknowledges the work order, which lets him know they are ready for the item to be brought to the shop.

When Blogg receives the item back, dependent upon whether or not the shop was able to complete the repair, he sends it back to the originating sender – the shop within FMFCB, a ship, or another facility.

Items come from a variety of places, spanning from shop floors, to ships, to army bases on the opposite side of the country. FMFCB does not do third line work alone; FMFCB works closely with our industry partners across Canada.

The move to this new facility has been positive, says Blogg. He no longer works alone and has another person to help with the work.

"It's nice having people to talk to and to have help when it's needed," he says.

The move has also made the work process more efficient. Before the move, Blogg had to strap materials to a pallet and send it off via truck or forklift to transport back and forth between different departments.

Now, it is all in D250 where the storage facility is located.

The most rewarding part of his job is when they have a High Priority Request come in that is stopping a ship from sailing and they are able to turn the job around quickly to help the ship sail again.

"A lot of the equipment on the ships are obsolete, so when we are able to take it, repair it, and get it out quickly, it is rewarding."

Matt Blogg counts life preservers to issue to the Sail Loft to have them inspected and issued back to the ship.

Julie Abbey on the radio as she heads to the Dockyard main gate to pick up material to bring back to the Central Storage Facility for processing.

Dru Atkinson picks First Level Submarine material to be issued to a work order once he double checks documentation.

DRU ATKINSON

ELE4 First Level Submarine Material Handler

Dru Atkinson began his career at FMFCB in 2009 working at Trade Service Centre 3 in building D8 while the new central storage facility was being completed.

"I handle all inbound material for the Victoria Class submarines. When there is first level material involved, I receive it, store it, and issue it as per first level requirement."

First level is critical material and refers to all systems on a submarine that make it dive and resurface.

The biggest shift moving into the new central storage facility has been the outstanding organization of materials.

"It allows me to segregate materials properly, which is law, and allows me to have easily organized inventory, which is critical."

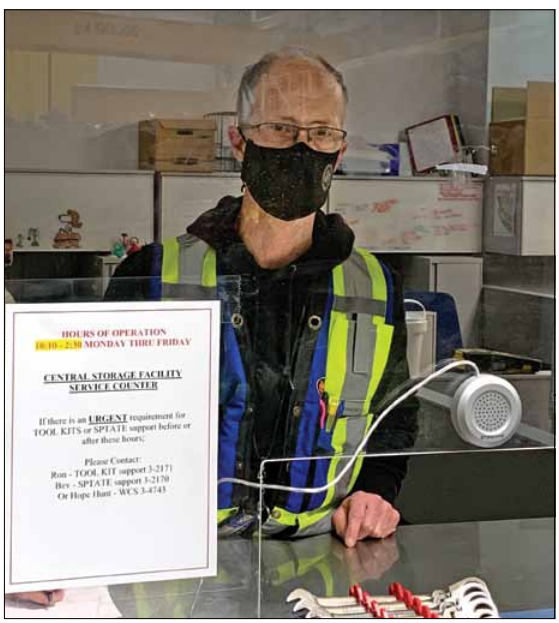
The most rewarding part of his job is the enjoyment of getting things fixed.

"It is interesting being on a different level of material. Surface ships are all the same process, but with the submarine I have to use a different process. It is most satisfying when things are urgent and I can help."

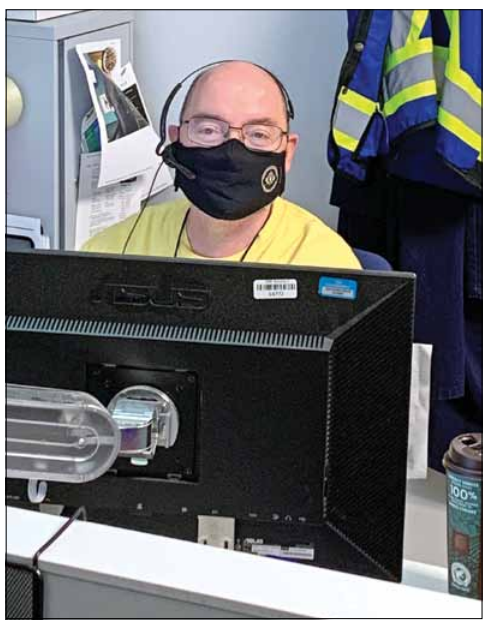
Atkinson adds the most challenging part of his job is, of course, when things do become urgent. When things happen with the submarine, they generally happen very fast and that requires bringing many moving parts together just to bring in one piece of material.

For example, in addition to the forms and documentation along with sourcing the parts, all first level materials require technical testing by Quality Control before it can be used.

"It absolutely blows my mind from a career standpoint that I issue any form of material at all that goes to a submarine."



Ron Mitchell hands out tools to tradespersons from the service window.



Paul Austin has the primary responsibility for DRMIS Material Support.

CENTRAL STORAGE FACILITY

Meet the Staff

THE TERMS

Work in Progress (WIP) is another storage piece both inside and out of the CSF.

This material is tracked uniquely, using a computer based program called (ETA) Equipment Tracking Application where labels are produced and affixed to the material being stored. This material is assigned a location and when required the material will be issued back to the end user.

Material is stored in categories:

Work in Progress – items which are part of an active work order that cannot be progressed for a variety of reasons;

System Support (tooling/spares) – Tooling/jigs/parts used for a specific system often kept as a kit;

PED Material – Plant equipment used to support production; and

Third Party – Where material is held on behalf of a contractor, Ships Staff, visiting ships etc.

Trade Service Center personnel liaise with the Work Centers performing the work as to the storage requirements and work with the CSF WIP Coordinator to store this material in dedicated storage areas. A variety of equipment is stored, from motors, valves, to missile launcher frames, ammunition lockers in support of the surface fleet and submarines to just a name a few.

Carlo Legg puts spools of material away into the High Bay racking using one of four narrow isle wire guided forklifts.

BRAD WHITE

ELE4 Records Control Officer (RCO)

Brad White has worked in FMFCB for 12.5 years, with the last two in his current position in the Central Storage Facility.

Prior to working at FMFCB, he served in the navy for 22 years in supply and as a hull technician. Not deviating far from that path, his primary role is to control the stock code records of mainly locally procured materials.

"I build stock codes for any new item we want to buy or use. We maintain it and control the material that way. It would be very difficult to control and manage without this [system]."

White echoes the sentiments of Atkinson and Blogg in sharing that the new facility has allowed a higher degree of efficiency because everything and everyone is located within one space. This has allowed for the discontinuation of constant transport back and forth between buildings and for co-workers to communicate more effectively with one another.

Brad White, the new Records Control Officer embedded into the CSF Group 7, and his co-worker Sharon Auchinachie.

He produces approximately 30 to 40 new stock codes a week. These codes enable the workforce to locate and store items in an easy and systematic fashion.

"The most rewarding part of my job is just being helpful and doing what I do. I came to this job with a lot of job knowledge that really, really helps. Not just us, but other shops as well. It is quite rewarding."

When creating a stock code, he is also required to produce a NATO Commercial and Government Entity Code (N CAGE), which is a part of the Canadian Government Cataloguing System record. In order for this to be built, he must provide the information about the primary manufacturer of the product, not the provider. He says this requires a healthy amount of sleuthing on his part, and can be quite interesting to find out where specific products originate from.

Having been in the navy, White has a deep appreciation for what FMF employees do for the ships.

"I saw how hard FMF worked to get the ships to sea, which is the biggest thing – we are providing a service for the navy."

John Greener who manages Work in Progress both inside the storage facility and outside in designated laydown areas.

Because of the type of work we do in dockyard, it is just so advantageous to have this sort of weight capacity and boom length. In the field of mobile cranes this is the Mercedes of cranes."

Stephen Ellington

Maximum Lift

The changing nature of Dockyard cranes

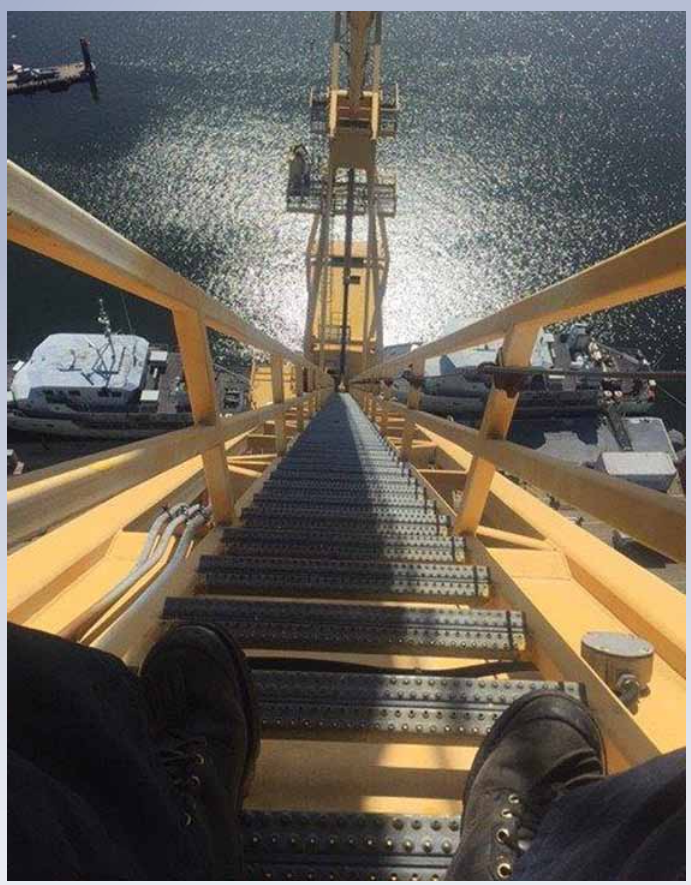
WRITTEN BY PETER MALLETT
PHOTO BY LEADING SEAMAN BRENDAN GIBSON, MARPAC IMAGING SERVICES

A mobile crane hoists supplies onto *HMCS Vancouver* prior to the ship departing for a sail.

The heavy lifters in dockyard – the giant jetty cranes – along with their smaller counterparts have undergone a technological transformation over recent years.

The six cranes in FMFCB's Material Management Coordination Centre, operated by 36 employees, do the work of moving equipment on and off HMC ships and other vessels.

"Nothing has really changed in the actual job and tasks we perform but the equipment we use to get the job done certainly has," says Stephen Ellington, Shop 124B Work Centre Supervisor. "While we still lift many of the same things and do it roughly the same way as we did decades ago, over time our equipment has become more sophisticated, so we are able to do more lifts at a faster rate."



Having worked 36 years in dockyard, he has seen the evolution of cranes.

He points to the new Leibherr 70-tonne mobile crane parked near C Jetty. It's one of three mobile cranes delivered in March 2020, with FMFCB getting one. The crane has a 50-metre telescopic boom that provides greater horizontal reach. It has a maximum load capacity of 70 tonnes and comes with reliable, modern technology such as cameras, screens, smart alarms, and sensors that help prevent accidents.

"Because of the type of work we do in dockyard, it is just so advantageous to have this sort of weight capacity and boom length. In the field of mobile cranes this is the Mercedes of cranes," says Ellington.

The crane operator can even stand outside the Liebherr and perform the setup of the crane with a hand-held computer pad.

The other five cranes used by Shop 124B may not be as technologically advanced as the Liebherr, but they aren't exactly slouching relics when it comes to capability.

The 30 tonne Grove RT mobile crane has one advantage over the Liebherr crane - it is more adept at getting into tighter spaces. It can also pick up and carry lifts to other locations, something the other mobile crane cannot do.

On the jetty, the towering Luffing, with a lifting capacity of 30 tonnes, does the lion's share of loading and unloading equipment and supplies on and off ships. Stationed on a track, it can move freely along C Jetty. Cameras were recently added to its booms.

"This means a crane operator doesn't need to be so reliant on hand signals and being blind of what the load is doing as it is being guided from the riggers below over radio communications," says Ellington.

The oldest crane, six decades old, is located by the graving dock on a much wider set of tracks and has a lift capacity of up to 15 tonnes. It assists in warship and submarine repair work by lifting equipment on and off.

The two Tower Cranes located on A and B Jetty live up to their name towering 165 feet in the sky. They have a lift capacity of 20 tonnes.

Along with evolution of cranes, lift equipment has also upgraded. Slings are now Teflon and Kevlar making them more durable, with smoother surfaces that do not scratch items.

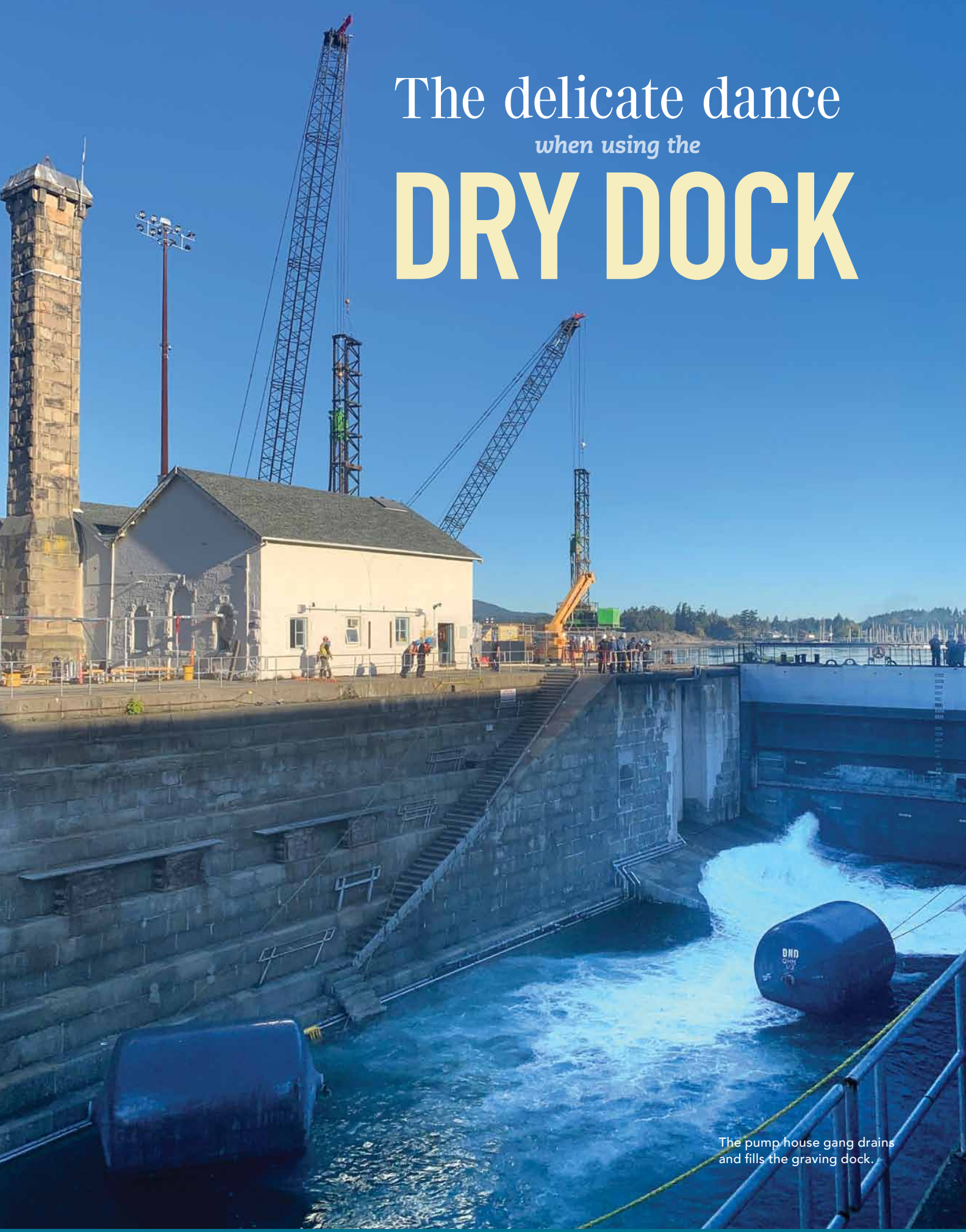
Wind speed sensors have also been added to the cranes, also an important development for safety, notes Ellington, as high winds can make a job dangerous.

"All of this technology makes our workplace much safer and safety is always the number one priority on our job site. In turn, this directly improves our efficiency and productivity since our relatively smaller workforce is better protected from potential accidents and injuries."

The delicate dance

when using the

DRY DOCK



The pump house gang drains and fills the graving dock.

HMCS Chicoutimi returns to the water March 6, 2015, after a period of maintenance in the dry dock.

Photo by Corporal Malcolm Byers, MARPAC Imaging Services

When a ship or submarine prepares to come into or leave the graving dock, the normally quiet pump house next door becomes a hub of activity.

Riggers, crane operators, and shipwrights under the guidance of the Dockmaster have the task of filling and draining the massive work area with water in order to bring a vessel in or undock it when the tide is right. When undocking, a series of checks are in place to fill the basin slowly to its 5.3-million-gallon capacity over six hours.

PREPARING DRY DOCK FOR AN INCOMING VESSEL

Before a vessel settles onto the keel blocks on the dry dock floor, the docking team spends days preparing the area.

Using a crane, they situate steel and wood supports according to the vessel's docking plan. Measurement markers on the side walls help determine exactly where the vessel should settle.

Reference points are established from the docking plan for the vessel positioning prior to flooding the dock.

When the dock is ready to receive the vessel, the two three-foot-wide flood valves in the caisson – the door to the dry dock – are opened part way.

The slow fill ensures the water pressure does not topple the carefully laid keel blocks.

After about two hours, the water level matches the harbour and the next operation comes into play – removing the 72-foot long, 13-foot wide and 35-foot deep caisson in order to bring the vessel in.

The crew pumps the water out of the caisson – it is filled with water to hold it in place – so it floats and can be towed away by an auxiliary vessel.

CONTINUED ➔

With the caisson out of the way, the vessel slowly maneuvers into place with the help of a tug and the vessel's lines attached to capstans on the dock.

REMOVING THE WATER

With the vessel perched over the keel structure, the caisson is returned, and the pump house starts up its two large pumps, which pulls 35,000 gallons of water per minute from the 145-year-old dry dock and empties it into Esquimalt Harbour.

The dry dock floor has a slight grade that directs water flow to a drain, which connects to a large tunnel that runs underneath the pump house. There, two impellers powered by the pumps above suck the water up a pipe that leads out to the harbour.

Once most of the water is removed, a medium-sized pump is powered up to remove the final few thousand litres of water.

A small "stripper" pump keeps the drydock waterless as work on the vessel transpires.

STABILIZING THE SHIP

As the water level drops, the docking crew sets to work ensuring the vessel settles in the right place.

Once it touches down, the pumps resume, and the crew stabilizes the vessel with bilge keel shoring for a submarine, or breast shoring for surface ships – six-foot timbers wedged into place between the vessel and the walls of the dry dock. Because vessels touch down at the back first, the crew starts there and works their way forward, placing nine timbers on each side with the help of the dry dock crane. When the last of the water runs down the drain, the crew further supports the vessel with four-, five-, and six-foot bottom shoring.

LEAVING DRY DOCK

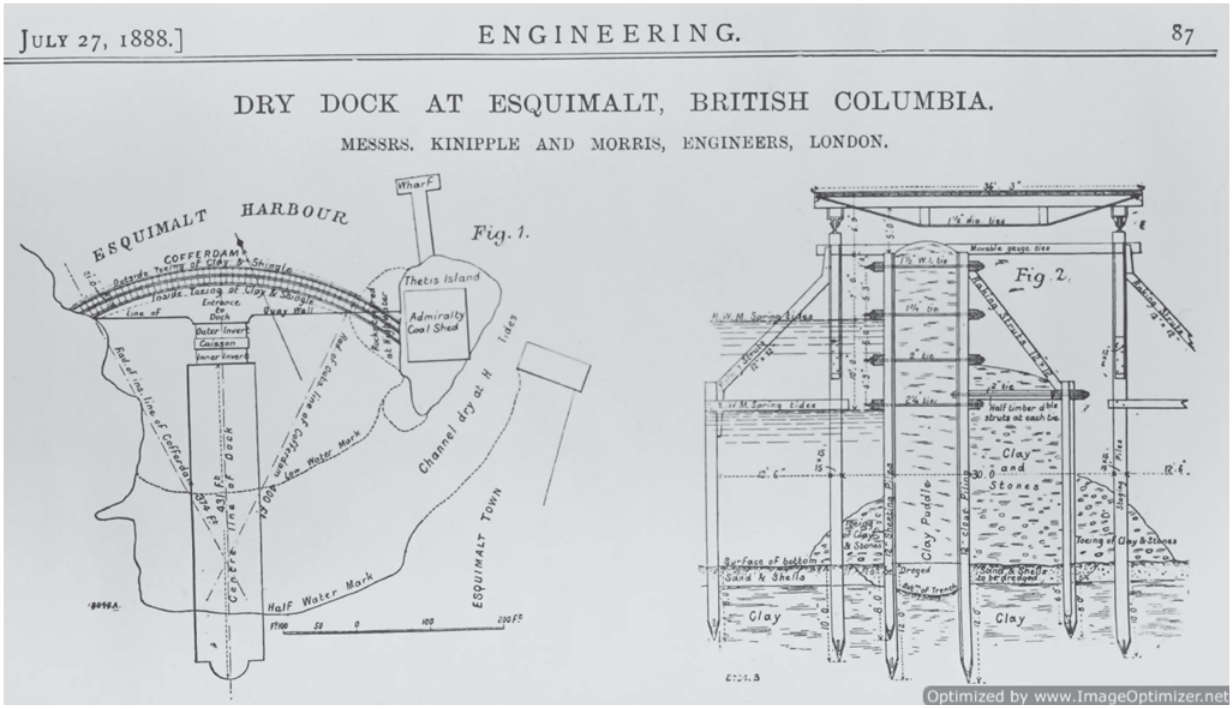
When the vessel leaves dry dock, this shoring will slowly be removed. The four- and five-foot bottom shoring will go first, before the crew begins to re-flood the basin. The breast shoring attached to wires hooked up to the dry dock crane is plucked away as the water level rises and they come loose.

If everything checks out, the flood valves are reopened until the water level matches the harbour, the caisson is drained, and the vessel can exit.

KEEPING CONTAMINATION OUT

Formation Environment partners with the pump house crew to regularly test the water in the drain tunnel to ensure harmful chemicals used during vessel repairs don't find their way into Esquimalt harbour.

Industrial work can produce hazardous byproducts. When that happens, the site must be cleaned before the pump house crew extracts any water from the basin floor.



JULY 27, 1888.] ENGINEERING. 87

DRY DOCK AT ESQUIMALT, BRITISH COLUMBIA.

MESSRS. KINIPPLE AND MORRIS, ENGINEERS, LONDON.

Fig. 1.

Fig. 2.

A ship enters Esquimalt dry dock circa 1915.

DRYDOCK MARINE SALVAGE

Saving the sea life

Have you ever wondered what collects, grows, and lives in the drydock each time the caisson is open?

WRITTEN BY ASHLEY EVANS

It essentially becomes part of the ocean floor for extended periods of time between dockings and a potential home for numerous life forms.

Prior to docking a Royal Canadian Navy warship or submarine, and in accordance with the DFO Fisheries Act, Fleet Maintenance Facility Cape Breton and Formation Environment work together to salvage marine life that has taken up residence in the dry dock, and ensure they are released back into Esquimalt Harbour.

When the dry dock is opened for any period of time, it gives aquatic species time to enter. When it is time to move a warship in for maintenance, the dry dock must close by moving the caisson in, the water drained, and the walls and dock bottom cleaned.

Salvaging the oceanic critters requires many branches and units to work closely over three full days with weeks of advanced planning.

"There are a lot of moving parts to complete a salvage and we're on a tight timeline to get the species out of the drydock and back into the ocean as quickly as possible," said Patricia Swan, a Formation Environment Officer who often works with FMF to

CONTINUED ➔

ensure the navy and DND meet all environmental regulations. “FMF environment does a great job coordinating all those involved and making it happen behind the scenes.”

Because of the potential for thousands of marine animals to be found, the evolution of the salvage is strategically planned to ensure all life forms are placed in fresh sea water immediately, correctly identified and documented, then brought to various drop points around Esquimalt Harbour.

“It’s challenging yet rewarding work. The diversity and number of species we relocate is pretty amazing,” said Swan. “A marine salvage is a unique thing. Salvages are often conducted in freshwater creeks or streams, but the nature of the ocean makes it difficult to isolate and capture species.”

During a marine salvage, Swan may work alongside FMF’s three environmental technologists. That position in FMF is unique because technologists work to ensure FMF

> *A marine salvage is a unique thing. Salvages are often conducted in freshwater creeks or streams, but the nature of the ocean makes it difficult to isolate and capture species."*
>
> Patricia Swan

complies with environmental regulations and directives, while managing programs to help FMF demonstrate due diligence in meeting environmental obligations.

There is quite a diverse range of species that come out of the dry dock salvage and each event can produce different species.

"We had a large school of opalescent squid which was pretty cool," said Swan. "We also caught some bay pipefish, which look like a horizontal, skinny seahorse. Pipefish and seahorse are from the same taxonomic family where the male carries the eggs in a pouch and cares for the young, which is uncommon in the animal world. We also captured multiple species of gunnel fish that look like eels but are taxonomically different."

Over 7,000 organisms can be released back into the harbour during a marine salvage, with more than 50 different species observed.

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Unusual Docking

WRITTEN BY LT(N) PETER SUMMERS AND ASHLEY EVANS

It was an unusual sight three years ago. Three vessels – the 250 Barge and two Camel Fender Barges – docked in the dry dock, a big difference from the usual sight of one, or none. But it shows the versatility of FMFCB's dry dock and their employees.

Although unusual, this is not the first time three vessels have been docked there. Records show this was fairly routine through the 1960s to 1980s, and was normally a combination of the small minesweepers (Bay class), gate vessels (Porte class), and various auxiliary vessels and barges.

The last three-vessel docking appears to have been Oct. 31, 1985, when HMCS Fundy, HMCS Miramichi, and YDG 3 were docked together.

There was one instance of a four-vessel docking, on Jan. 13, 1971, with HMCS Beaver (ex YSF 216), YMG 189, YMG 190, and YC 428 all docked together.

The last time YOM 252 (250 Barge) was docked at FMFCB was May 17, 1993, but since then has always gone to contractor yards for routine docking.

WHAT ARE THESE BARGES USED FOR?

YOM 252 is an environmental barge. It contains a number of tanks that receive liquids from ships that pump out their tanks or bilges to the barge. The barge then takes the liquid away to be properly discharged at a processing or storage facility.

This is very useful as it enables ships to offload liquids as part of their work periods without having to go over to the Colwood side of the base.

CONTINUED ➔

Camel Fender Barges are used for berthing U.S. Navy submarines. The barges have underwater structures that hang down about six metres (20 feet) below the waterline. One side has horizontal rubber fenders that press against the columns of a pier or jetty, while the other side has vertical rubber fenders that the submarine's hull will press against. This permits submarines to be tied up to jetties that are designed for surface ships and would otherwise be too tall, causing the submarine to bump against the jetty columns.

DOCKING PLAN FOR THE THREE VESSELS

The docking plan is a drawing that shows the dock blocks the vessel sits on within the dry dock. The Naval Architecture section is responsible for producing all docking procedures and specifications, as well as providing oversight for docking evolutions.

There were four people from Naval Architecture involved in the docking planning process: the Docking Officer and Assistant Docking Officer who developed all of the plans; a Structural Engineer who assisted with analyzing the strength of the Camel Barges and the suitability of various block layouts; and an Engineering Design Technologist who produced (and constantly updated) the drawings for the docking plan.

The docking plan is a drawing that shows the dock blocks the vessel sits on within the dry dock. The Naval Architecture section is responsible for producing all docking procedures and specifications, as well as providing oversight for docking evolutions.

The Docking Officer works closely with the Dock Master and the Project Leader to plan the docking evolution and coordinate the support required. This includes where the vessels will be located in the dock, how they will be supported, tug support, diver support, production support, environmental and safety considerations, working with Industrial Engineering, and any other stakeholders.

All docking plans begin with a set of calculations that check a variety of factors such as adequate blocks to support the vessel weight, enough support to prevent the vessel from overturning due to high winds or earthquake, that the vessel will land in a controlled manner that doesn't damage the keel, and that the vessel will remain stable once the water is removed.

DOCKING YOM 252 BARGE

The docking plan for the YOM 252 Barge was relatively simple due to the barge having a wide, flat bottom. A partial docking plan existed from a previous Docking Officer, so making the plan was mostly a matter of confirming the blocking would have adequate strength and stability to hold up the barge, and choosing a location in the dock.

Some difficulty arose due to the YOM barge size – it has a width of more than 18 metres (60 feet) and the clear width at the entrance of the dock is a little less than 19 metres (65 feet).

Additionally, because of its width, the barge needed to be placed on very tall blocks (two metres or 6.5ft) so it wouldn't contact the stepped walls of the dry dock. Further complicating the issue, two sections of vertical piping within the dry dock had to be removed on short notice by Industrial Engineering so they were not crushed when YOM was brought in.

DOCKING CAMEL FENDER BARGES

The docking plan for the Camel Fender Barges was much more complicated as Naval Architecture did not have the official drawings for the Camels. These barges are on loan to Maritime Forces Pacific from the USN as part of a memorandum of understanding where the Royal Canadian Navy keeps and maintains the barges so that USN submarines can berth in Esquimalt.

Therefore, the official drawings do not exist in any DND database. Naval Architecture had some drawings that they suspected (correctly) did not match the actual design of the Camels, so a dive survey was conducted to verify the structure.

Due to the low visibility in Esquimalt Harbour water, and due to the positioning of the Camels, it was difficult to produce accurate drawings of the underwater structure.

In the end, FMFCB was supported by a number of separate dives by Fleet Diving Unit (Pacific) divers and by a contractor with a live video/communication capability.

Due to the compressed schedule, by the time the drawings could be produced with confidence, the dock blocks were already being put in place. This in turn led to late updates to the docking plan and changes to the dock blocks that had already been put in place.

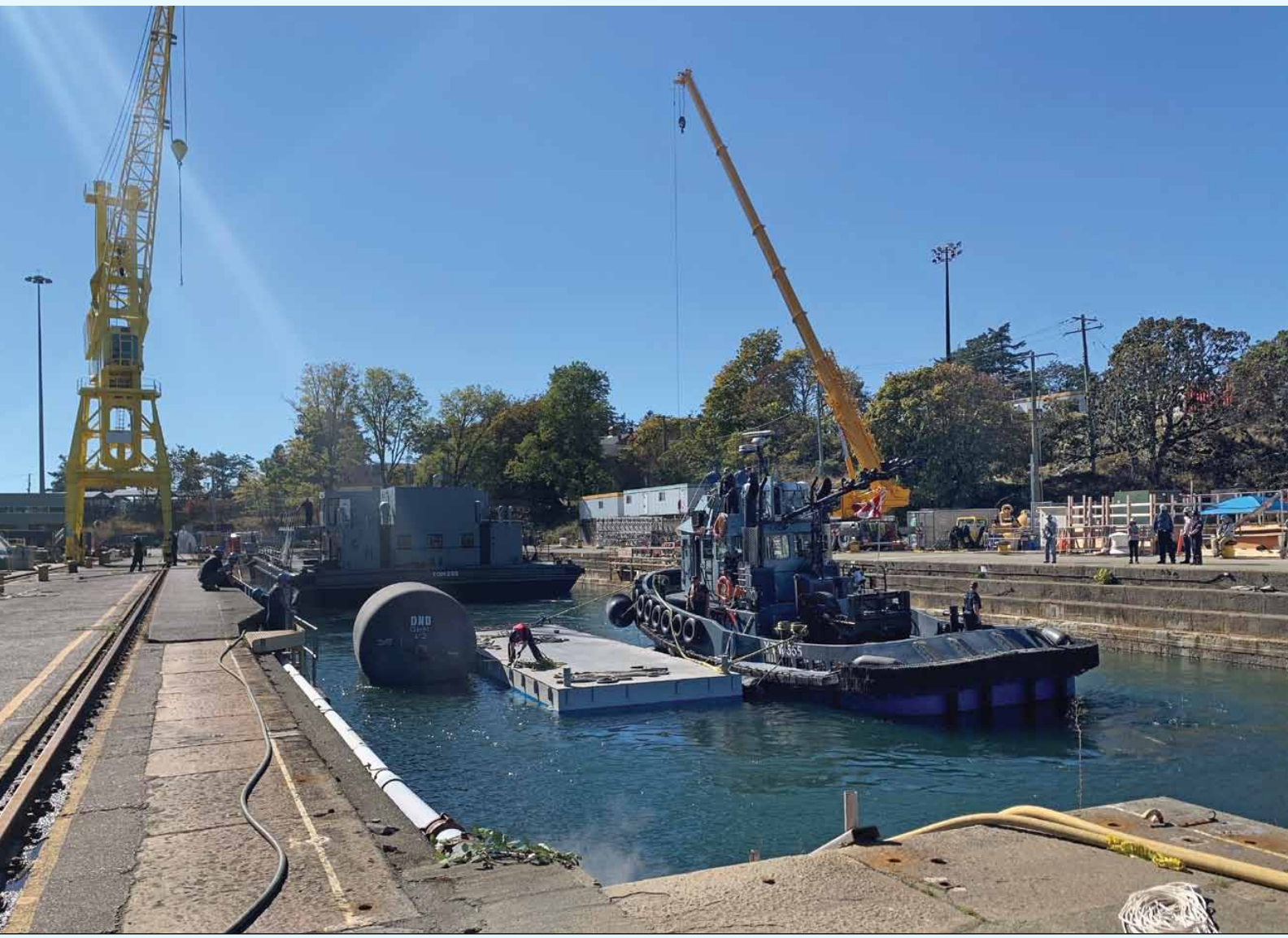
Unfortunately, this dive also found on one of the Camels, two of the 10 legs that would support the barge in the dry dock were extremely bent and could not be used. It's unclear how the legs, which are made of large steel I-beams, were damaged. However, the bent legs required Naval Architecture staff to confirm the clearance on the dock blocks to see if the legs would interfere with them while the dock was being pumped down.

From the information they had, it appeared this would be okay. They also added extra blocks to the docking plan to provide added support in case any of the blocks were knocked over by the bent legs.

Lt(N) Peter Summers, Deputy Naval Architecture Officer at the time, said the most rewarding part of this process was demonstrating FMF's capability.

"We had a significant challenge trying to dock the Camels with their unique underwater structure and so many unknowns about what it actually looked like. To further complicate things, we then added the YOM to the docking plan on short notice."

Despite all of this, everyone involved worked extremely hard to overcome these challenges and make the docking a success. "I suspect it would be very difficult to contract out a docking of that nature on a short timeline and find anyone willing to take on the challenge, so I am very proud of what FMF was able to accomplish," he said.



Foundry craftsmen

SHOW THEIR MEDDLE FOR METAL

WRITTEN BY PETER MALLETT

PHOTOS BY LEADING SEAMAN BRENDAN GIBSON, MARPAC IMAGING SERVICES

There is a trade at dockyard so old it dates to biblical time.

Metal casting, like that done at the Fleet Maintenance Facility Cape Breton Foundry, was first used over 5,500 years ago in Mesopotamia or what is now present-day Iraq.

That ancient technology continues in Shop 112B (the Foundry) located in D99, a small brick building located in front of the Admiral's headquarters.

A handful of tradespeople cast metal into shapes by melting them into a liquid, pouring it into a mold, and removing the mold material after the metal has cooled and solidified.

"It's a small shop and we are a very tight-knit group," says Jack Morgan, lead hand of Shop 112B. "Myself, and the men I work alongside are all skilled craftsmen. We are proud

Above: Jack Morgan prepares an aluminum castings in the foundry. Below: A sun dial casting made at the foundry.

of the work we do and always take the proper amount of time to get the job done right."

The Foundry is responsible for the creation of historical plaques, ship's ceremonial bells, tally plates, and crests and badges, and even army tent poles.

"It is a craft whose required perfection is measured in individual grains of sand," says Morgan.

He is joined by David McCormick, the number two in the shop, who has been with FMFCB since 1980 and previously worked as a steel fabricator on ships, and Matt Oldroyd, who began working at FMF in 2008, earned an apprenticeship in the foundry in 2011, and previously worked in the FMF Labour Shop and Boiler.

Their giant thermo-magnetic furnace is involved in the most critical process of foundry work: the heating of bronze, aluminium, and other metals into molten material.

The process for fabricating a bronze, aluminium, or brass plaque begins with a concept and design. The required text, and sometimes a specific graphic, are sent to the shipwright's shop. There, plastic lettering is fastened to a plaque-shaped wooden tray, or a bas-relief (sculpture) of a motif or graphic is created in high-density foam.

The creation is called a "positive" and is then coated with liquid rubber to create a negative. That negative is filled with resin in order to produce a "tough positive" that can withstand up to 2,000 pounds of pressure needed to create a compacted sand mold.

Foundry workers then begin the process of green sand casting, a forming process in

CONTINUED ➔

which molten metal is poured into a single use sand mold.

A critical part of the process is making sure that none of the tiny grains of sand stick to the metal or are embedded in the final product. If that happens, they need to start again.

It takes a lot of practice and perfection to get things right but it's rewarding, says Morgan.

"I enjoy every aspect of it. Working with your hands, using your mind to put an object in the sand and make an exact duplicate, it's challenging and satisfying work and a craft I enjoy passing down to younger generations."

It's the one-off jobs that require the most attention to detail but are also the greatest source of pride and satisfaction, says Morgan.

He points to one of his favourite projects: the submariner's cairn in dockyard, unveiled in 2014 for Canada's submarine service centennial.

Another of his favourite works sits high atop a hillside overlooking Onagawa Bay in Japan. They created the monument dedicated to Canadian Victoria Cross recipient Lt Robert Hampton Gray whose plane was shot down over Onagawa Bay on the final days of the Second World War.

"Those are the type of jobs that really do make me extremely proud of the work we do at the foundry. It's not dull work by any stretch of the imagination and every day there seems to be a new challenge that comes along and you are required to think about it and come up with a successful plan."

So, the next time you walk by a brass plaque or badge in dockyard, take a moment to reflect on how it got there. Millennia old skills are still being practiced just around the corner.

Jack Morgan prepares an aluminum casting in the foundry. Morgan, 67, worked as an apprentice foundry man at Victoria Foundries in the late 1990s. When it closed he found work on base, putting his skills to work in the Foundry.

> *Myself, and the men I work alongside are all skilled craftsmen. We are proud of the work we do and always take the proper amount of time to get the job done right."*
>
> Jack Morgan

IWLU 643 Proudly Celebrates 25 Years with FMF Cape Breton and 80 Years of Service to the Royal Canadian Navy

The International Association of Bridge, Structural & Ornamental Iron Workers

DOTH GRANT THIS CHARTER

To the Members of This Organization Hereinafter Designated As Ship Yard Riggers Local Union No. 643

Original Charter Granted on May 24, 1941

and to their successors legally qualified to establish a Local Union of the International Association to be located at Victoria in the Province of British Columbia and to be known as Local Union No. 643.

This Charter grants to Local Union No. 643 power to conduct the business affairs of said Local Union in compliance with the best interests of the trade. The autonomy of the Local Union is hereby ordained and secured.

PROVIDED That the said Local Union No. 643 conforms to the Constitution, Laws, Rules and Regulations of the International Association of Bridge, Structural and Ornamental Iron Workers, and in default thereof this Charter may be suspended or revoked according to the laws of this ASSOCIATION.

Should the said Local Union No. 643 be dissolved, suspended or forfeit this Charter, then the persons to whom this Charter is granted, or their successors, bind themselves to surrender the same with such other property as shall properly belong to this ASSOCIATION.

In consideration of the due performance of the above the International Association of Bridge, Structural and Ornamental Iron Workers hereby binds itself to support the said Local Union No. 643 in the exercise of all its rights, privileges and autonomy as an affiliated Local Union.

In Witness Whereof, We have subscribed our names and affixed the seal of the International Association of Bridge, Structural and Ornamental Iron Workers this Twenty-fourth day of March A. D. One Thousand, Nine Hundred and Ninety-eight

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Congratulations to the defence team and all industry partners on celebrating the 25th Anniversary of the Fleet Maintenance Facility Cape Breton. We are proud of the hard work and dedication of everyone involved on operating a successful naval facility on the West Coast.

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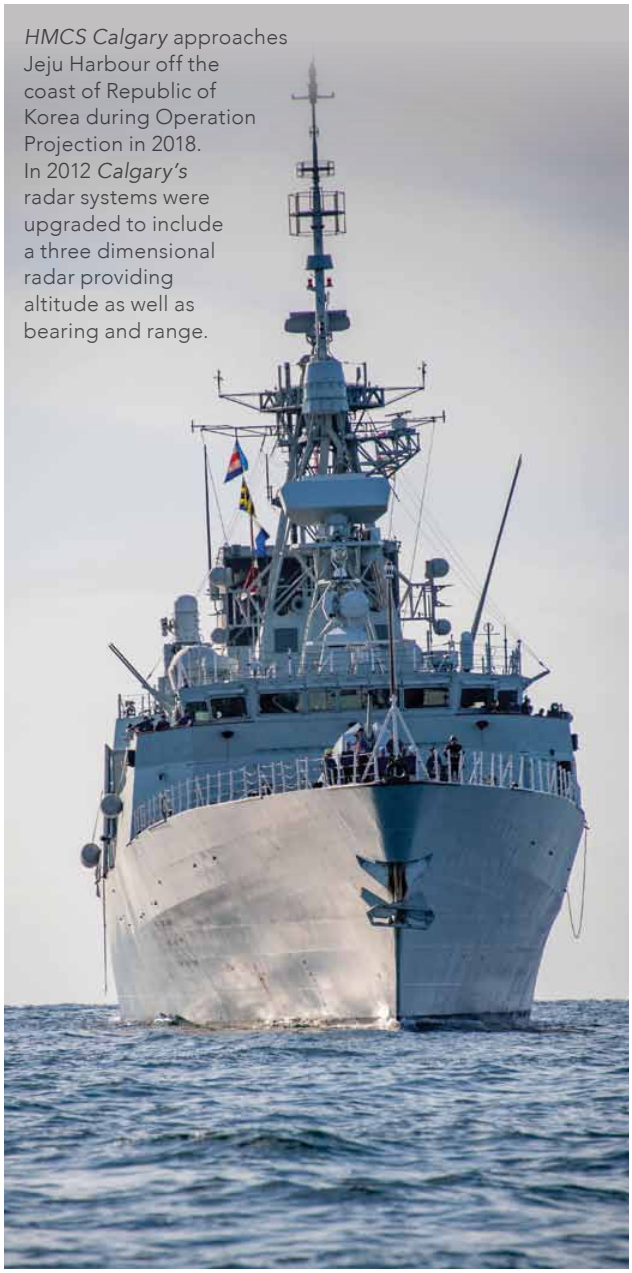
New Capability Injected into FMFCB

IN SUPPORT OF UPGRADES TO HALIFAX CLASS

WRITTEN BY RYAN SOLOMON



HMCS Calgary approaches Jeju Harbour off the coast of Republic of Korea during Operation Projection in 2018. In 2012 *Calgary's* radar systems were upgraded to include a three dimensional radar providing altitude as well as bearing and range.

Canadian Patrol Frigates, also known as the Halifax Class, form the backbone of the Royal Canadian Navy (RCN). Commissioned between 1992 and 1996, their role has shifted with evolving maritime threats, which has been accommodated with equipment enhancements that ensure the navy remains mission capable for the modern day until relieved by the new Canadian Surface Combatant Fleet in the 2030s.

These equipment enhancements were part of the Halifax Class Modernization/Frigate Life Extension program that upgraded every ship in the class with a modernized combat suite, while simultaneously conducting an extended docking period to perform extensive maintenance routines on most of the systems.

It was considered the most extensive period of fleet renewal since the early 1990s when Canada's destroyer fleet was upgraded in the Tribal Class Update and Modernization Project.

The Halifax Class upgrade program was watched with intense interest by many international navies wanting to see how successful Canada would be in modernizing the bulk of its fleet's combat systems.

The program's success encouraged other navies such as the Royal New Zealand Navy to follow suit, even choosing to have their ships' upgrades completed in Canada, which the Royal Canadian Navy and the Fleet Maintenance Facility Cape Breton (FMFCB) have supported.

PROGRAM PARTNERSHIPS - DND AND PRIVATE INDUSTRY

The Assistant Deputy Minister (Materiel) was the overall project lead. Within the various Canadian shipbuilding industry partners conducting the upgrades work, Lockheed Martin Canada was the lead, supported by Seaspan on the west coast.

FMFCB and FMF Cape Scott on the east coast readied each vessel

CONTINUED ➔

HMCS Calgary was the first of 12 frigates to cycle through the Halifax Class Modernization Frigate Life Extension Program. Noticable highlights on the ship involve significant upgrades to the Machinery Control Room and the Operations Room. Alkarim Nathoo, engineer with L3 Mapps tests the new equipment in the Machinery Control Room. The touch screen monitors will be used throughout the ship.

for their conversions and then enabled the re-activation of the platforms back into service.

The start of the Halifax Class Modernization also aligned with the stand-up of FMFCB's Operations Department in 2012.

The work to complete this intensive program fostered new relationships that required elaborate co-operation and coordination amongst all stakeholders and contractors, while blending in other extensive maintenance as part of the combined technical program.

The efforts by FMFCB Operations to support this project helped form the foundation of a grander naval engineering and maintenance enterprise. It fostered strategic partnerships to increase available resources to maintain Canada's naval assets. It also laid the groundwork for what would become the Waterfront Management Program, which supports contractor work completed within FMFCB dockyard.

AN EVOLVING FMFCB

With the changing needs of the frigate fleet, FMFCB and FMFCS needed to expand their employees' capabilities. There was several new equipment test and reference systems injected into both FMFs so employees could support the operation and maintenance of the new suite of Combat System Integration Components.

Maintenance Requirements Review, a form of business case analysis, were conducted to validate which new test bed systems would be installed within the FMFs. The chosen equipment was then complemented by training sessions for engineers and tradespersons to ensure their skillsets were ready for their supporting roles.

The resultant test capability has significantly strengthened FMF's role as a strategic provider in both corrective and preventative maintenance support; this value has been consistently proven over the years with support to those new systems on board the ships.

These systems include:

- SMART-S 3D Radar System, the primary system to detect and track long range air targets;
- Navigation Radars (S and X band) used to safely navigate the ship;
- Electronic Support Measures (ELISRA) used to conduct Electronic warfare activities;
- Command Management System (CMS) Test Equipment, a scaled down version of the Command Management System that forms the "brains' of the ships combat system;
- Link Test Equipment (DLPS) Digital Link Processing System that enables the sharing and link of various data/information from multiple different ships into a large recognized maritime picture;
- IFF (Identify Friend or Foe) communication challenge system to classify detected targets; and
- RDU/VSU Radar Display Unit and Video Surveillance Unit, display integration units that fuse the various data feeds into a common display system that also provides diagnostics on equipment health.
- The CEROS 200 Fire Control System, used to help prosecute targets and guide missile and gun fire on board ships, will be installed around 2022.

The ability to expand the management of NEM resources and the in-house technical capability to support mission critical systems have been a huge benefit to the Royal Canadian Navy. These successes have demonstrated a support model that will serve the RCN and Canadian interests well into the future.

FMFCB AND VICTORIA SHIPYARDS LTD

Work Together

TO SUPPORT HMCS VANCOUVER'S REPAIRS

WRITTEN BY BRUCE JOHNSON

When it comes to work being done on the Canadian Patrol Frigates (CPF) and Submarines, there are many processes - and acronyms - to keep in mind; it is never as simple as the ship arrives at the facility and then leaves.

Many things can occur within the weeks and months as a ship transitions through major repair periods. Case in point are the last two years in the life of *HMCS Vancouver.* The ship's journey through the current repair cycle has been particularly dynamic, and a little more challenging for everyone involved.

Initial planning for *Vancouver's* docking cycle began more than a year before the ship arrived at the Fleet Maintenance Facility CB and followed a fairly standard repair sequence. Generally, this sequence starts with a detailed plan to remove major equipment (Extended Work Period 1;EWP1), followed by the actual Docking Work Period (DWP) and major repairs and reconstruction, then undocking, re-installing systems, and set up to work (Extended Work Period 2; EWP2), followed by a trial period (Tiered Readiness Program; TRP).

Vancouver entered Extended Work Period 1 (EWP1) in Dec 2018 after off-loading ammunition at

Canadian Forces Ammunition Depot (CFAD) Rocky Point and de-fueling at F jetty in Colwood. Once back within the Ship Repair Zone (SRZ), much of what made *Vancouver* a "ship", was off-loaded. Ships staff removed their personal belongings, sleeping areas and offices where cleared out and then affected systems, parts, and other materials, were either removed or preserved in place.

EWP1 (removals) required approximately 40,000 hours of work by ships staff and the FMF. Once this was completed, *Vancouver* was turned over from the Royal Canadian Navy (RCN) to ADM (Mat) custody. The major contract for *Vancouver's* work period was awarded to Victoria Shipyards Ltd. (VSL) with much of the work to be done in the Esquimalt Graving Dock (EGD) across from HMC Dockyard.

In late April 2019 *Vancouver* moved over to VSL and into the graving dock. Getting the ship out of water and into dry dock allows all of those systems below the waterline to be critically inspected and repaired before the next four year cycle begins. In the case of *Vancouver* (the oldest ship on the west coast), these inspections revealed a myriad of age-related issues that had not been observed while the ship was operational, all of which needed to be addressed and repaired.

Despite increasing the scope of work, the time allotted to complete the docking and repairs could not be greatly increased without affecting other units within MARPAC as well as VSLs EGD timetable.

EGD had already been committed and extending the VAN docking was impossible. In order to complete all of the major work and docking requirements ADM (Mat), FMFCB, and VSL had to work closely together to develop a plan. Key to this plan was the completion of *Vancouver's* docking dependent work in FMFs dry dock.

Early September 2019, after weeks of intensive work, *Vancouver* was re-floated and undocked at EGD and made its way over to A Jetty with its rudder securely on board the flight deck. Major work was continued onboard *Vancouver* by VSL at A jetty while work progressed on New Zealand frigate HMNZS Te Kaha over at the EGD. In early December 2019, *Vancouver* once again moved back to the VSL confines to continue contracted work while alongside the south-wall jetty.

The plan to re-dock VAN was essential to the overall success of the repair program as replacements to major steering and propeller (CRPP) components were required. Complicating the docking was the additional weight of the rudder on the flight deck, which changed the weight balance of the vessel. The previous CPF docked was *HMCS Winnipeg* more than five years previous, so some of the

CONTINUED →

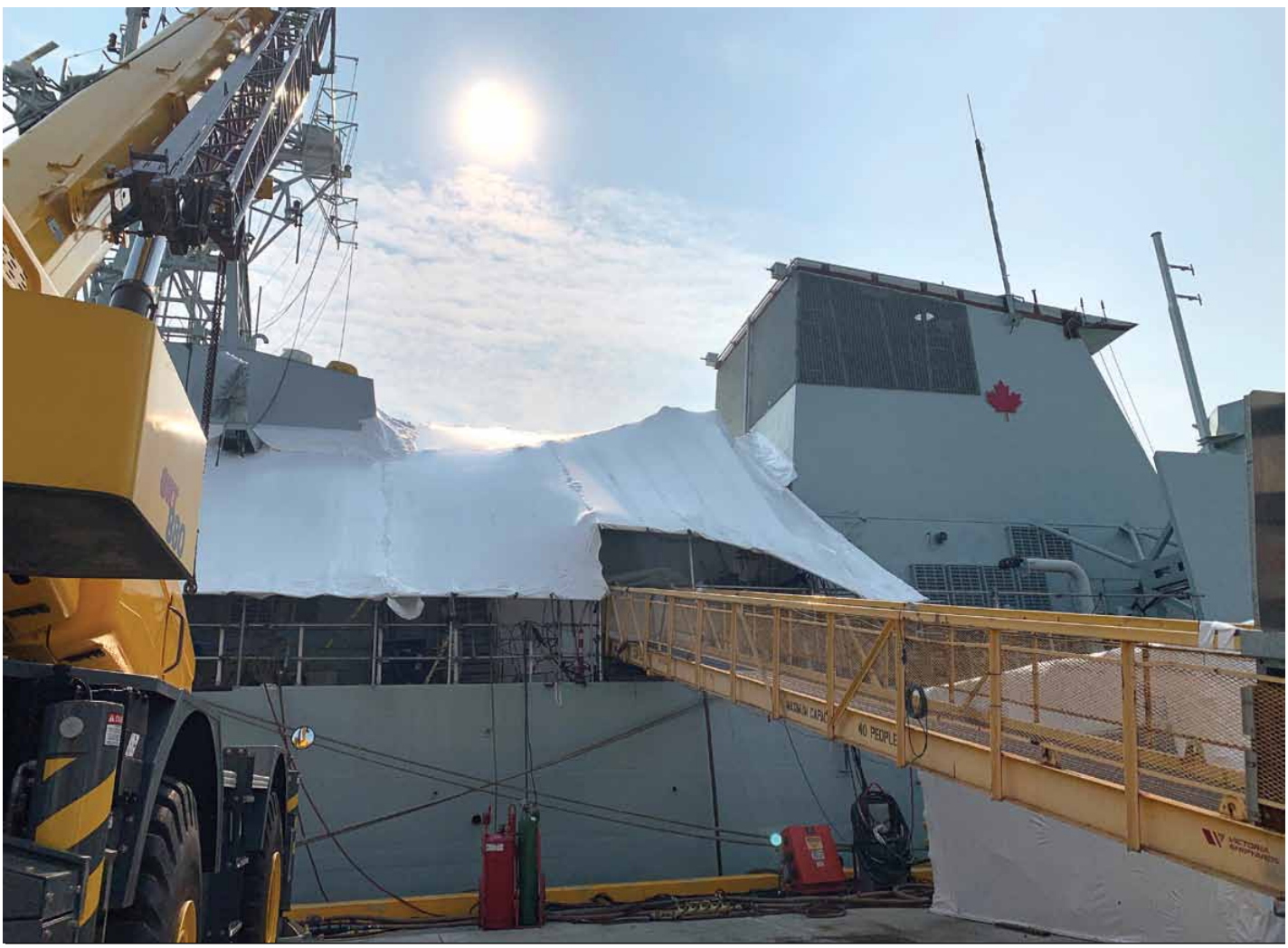
experience and expertise was no longer available. To further challenge the docking officials was the fact that *Vancouver* has a slightly unique bottom profile to other ships in the class. The plan of where to position the many "chocks" or supports for the ship had to be carefully considered.

The process to put *Vancouver* into the FMF dry dock was multi-faceted and involved many individuals and teams. To prepare the dry dock, the caisson was first floated in to place. Then, the dock water was slowly pumped out. As the dock emptied, the Formation & FMFCB Safety and Environment sections, with assistance from UVIC marine sciences students, worked to complete a marine salvage of the dry dock which saw the removal of over 7,000 marine species. In the weeks following, the FMF workforce were hard at work to complete cleaning of the dock and placement of the support chocks.

Replacing a CPF rudder proved a major challenge for everyone as this was not a typical fix for FMF Cape Breton. At first glance, the dock does not appear to have enough space to allow rudder replacement. A collaboration of efforts involving past Shipwrights, and dock masters as well as FMFCB & VSL Engineers, and operations was necessary to devise a docking plan that would permit the rudder replacement within the limited space between the ship and dock bottom.

On 6 March 2020, still under control of ADM (Mat) but now within FMFCB dockyard, *Vancouver* was re-docked and VSL contractors and FMFCB worked all-out to complete a work package that seemed to only grow in scope and complexity. Of primary concern was replacement of most of the steering components including rotary vane actuators, rudder and bushings. Initially, our FMFCB workforce were projected to progress this work, however, due to the increased growth work over the course of the docking period, and work required on other MARPAC vessels, additional resources were required. Victoria Shipyards Ltd. (VSL) was contracted to progress the rudder repairs and replacement with assistance from FMFCB Engineers, Production, and Naval ship staff. Work on these systems was very successfully completed prior to undocking 11 May 2020 and *Vancouver* proceeded back to VSL confines.

Over a 14 month period, involving



The value of having both the Esquimalt Graving Dock and the FMFCB dry dock available as strategic assets and to support our fleet cannot be overstated. They were an essential part of the successful cooperative working relationship between the RCN, FMFCB and VSL.

two dockings, a lot of steel-work with the majority being on the hull, was done on *Vancouver* by VSL. Replacement of hull sections is a complex task requiring expertise in Naval Architecture, metallurgy, 3D drawing and precise manufacturing techniques. Using various assessment techniques, FMFCB Engineers recommended specific sections that required replacement. These sections needed to be carefully measured and cut out.

The new plate needed to be precisely formed, the old sections removed, and the new sections welded it into place. Guidance for this task was provided by Naval Engineering and Architecture who would determine the architectural specifications of the replacement section, then write a technical specification detailing how the repair needed to be done. Under ADM (Mat) guidance, these specifications were used by contractors to undertake repairs.

On 12 November 2020, *Vancouver* was at last moved back to the FMFCB ship repair zone and custody was turned back over to the RCN. In total, VSL, the prime contractor, had completed over 700,000 hours of work over a 24 month period, often working 20 hour days. Even when working in the FMFCB dry dock, they committed a 200 person workforce to the project. Adding to this total, in 2020 alone, FMFCB provided 30,000 hours of support to the *Vancouver* project through technical assistance, Engineering, and production support. While docked in FMFCB, Waterfront Management planned and provided the infrastructure to support the workforce, including places to eat, washrooms, and wash stations. But, work never stops and with the completion of the ADM (Mat) docking project, *Vancouver* now entered the next phase of the program.

12 November was also the start of the EWP2 schedule. What is normally a very busy time became slightly more challenging as the prime contractor completed the much needed Gas Turbine (GT) Intake Steel Corrosion repairs. SS began moving back onboard, ships stores were being re-stocked, major systems left onboard were de-preserved. Shipboard marine systems needed to be brought online as soon as possible including power generation, and basic lighting and ventilation. As FMFCB workers began installing ancillary systems and setting them to work, much of the maintenance on shipboard systems which could not be done while the ship was under contract, was now started.

The *Vancouver* program will continue into spring 2021 as the EWP2 and Tiered Readiness Trials Program (TRP) continue to bring more and more of the ship back to an operational state. The next 6 – 9 months of activity will involve completing equipment installations and planned maintenance as well as testing and trialling many of the various systems onboard. During this time, ships staff will also continue to progress work onboard as well as complete refresher training in preparation for a return to Operational status.

Throughout the past 24 months, despite the restrictions of the global pandemic, and regardless of where the ship was located, work progressed. The value of having both the Esquimalt Graving Dock and the FMFCB dry dock available as strategic assets and to support our fleet cannot be overstated. They were an essential part of the successful cooperative working relationship between the RCN, FMFCB and VSL. The work conducted by the many professional tradespersons, Engineers, labourers, planners, and support staff from the various work forces, was simply astounding. The complexity and success for the *Vancouver* program is a testament to how well various corporate, government, and private industries can work together to a single goal.

A lot of hard work has gone into this program. As always, the continued dedication to excellence of the DND-Industry team is essential, especially in these uncertain times. Looking to the future, strategic partnerships will play an even more important role in supporting the RCN, it's fleet, and sailors.

A FABULOUS, FUNCTIONAL Re-design

of HMCS Vancouver's Captain's cabin

WRITTEN BY ASHLEY EVANS

In November 2020, *HMCS Vancouver* entered the final phase of an extensive two-year refit when it was returned from Seaspan Victoria Shipyards to the navy. Part of the final work was a complete overhaul of the Commanding Officer's cabin by a host of FMFCB trades people.

Shipwright Tim Wiltshire acted as the quasi-contractor for the job, pulling together Shops 122 (Shipwrights/Joiners), 123 (Painters), 144 (Electricians) and 114 (Sheet Metal). They spent almost 500 hours building and installing custom-made cabinets and lighting.

"The most rewarding part of the project was seeing the finished product come together as a functional and attractive whole. I really enjoyed co-ordinating between the shops," says Wiltshire, who has worked at FMF since 2007, starting the year before as a student.

The commanding officer's cabin is above the operations room and below the bridge for quick access to both via a ladder. It is lavishly furnished with a combination sitting room, office, scullery, and dining room, with a separate sleeping quarter for guests, and another for the Captain.

It is where special guests are entertained with an elegant meal prepared by the ship's cooks and delivered by the captain's steward, and where meetings are held with ship's leadership staff. Hence the importance of a visually tasteful and well-constructed cabin.

Sapele was used for the custom-built bar, entertainment unit, desk, wardrobe, bookshelves, side tables, and cabinets. Mahogany is the usual chosen wood, but its harvesting can no longer be sustained. Sapele comes from West Africa and is a

Tim Wiltshire in the Captain's cabin upon completion.

close match in both visual appeal, wood processing, and working characteristics.

"There was at least one lift of ½" sapele plywood, one lift of ¾" sapele plywood, and several hundred board feet of solid sapele used for this project," says Wiltshire.

Building and installing various cabinets was a treat for Wiltshire, Jon Kirstiuk, and apprentice Adam Rainsford. The longest part of the job was constructing the cabinets, which took months and a lot of patience. It also took some ingenuity to keep everything stable on an unstable platform.

"Typically, cabinets installed in a house just have regular hinges or drawer slides installed on them. There is nothing needed to stop the cabinets from opening as a house isn't going to move in normal circumstances. Because a ship can list and goes through heavy seas, drawers and doors can fly open without being secured. For the doors I used self-closing hinges and magnet catches, and for the drawers I used self-closing drawer slides with cup magnets mounted on the back. The wardrobe has a very neat self-closing sliding door system that worked well without magnets. All the open cabinets have a raised lip installed on each shelf to keep items secure on the shelf."

> *The most rewarding part of the project was seeing the finished product come together as a functional and attractive whole."*
>
> Tim Wiltshire, Shipwright

Once built, and before installation, everything was lacquered or varnished by painter Ryan Yeomans whose attention to detail and level of quality ensured the space would remain attractive and protected for the rest of its life.

Lighting was the other part of the cabin work. Curtis Johnson, Jordan Webb, and Apprentice Nick Thomas completely revamped the electrical and lighting systems, moving wires behind panels, re-mounting pot lights, re-wiring all the electrical receptacles, and installing under-cabinet lighting.

"They possessed extreme patience with my specificity," says Wiltshire wryly.

Working with the electricians to fabricate the new pot lights was Chris Roy. He also fabricated new fridge grill covers and a new custom backsplash in the cabin kitchen.

"I feel a sense of pride that all of us were able to make something awesome, which every Commanding Officer and their guests will be able to enjoy for the rest of the life of the ship. It's also very cool that the cabin will be part of Canada's diplomatic face while *Vancouver* is abroad." ☼

25 Years of Excellence

In 1996, Fleetway was still a relatively young company born out of the Canadian Patrol Frigate Program. It was a company working in support of a strengthening navy, providing engineering and maintenance support to frigates, destroyers and replenishment ships being dispatched with urgency to global security flashpoints.

History is rich with the significant contributions of the Royal Canadian Navy to international security. The fleet has been employed time and again as the first element of national power to help on the world stage, ready to deploy with remarkably efficient preparations, lightweight logistics sustainment and effective overseas engineering and repair.

It is readily apparent to Fleetway that an enabled, agile and joint public and private effort stands behind the readiness of the fleet and sustains it on mission. As a naval engineering company, we are privileged to be working alongside thousands of Fleet Maintenance Facility staff members in this sovereign endeavor.

We congratulate serving and retired employees of Fleet Maintenance Facilities Cape Breton and Cape Scott in the celebration of the 25th Anniversary in your unit's history. We are honored to call you partners in naval readiness and look forward to many years of continued collaboration as the fleet modernizes through the National Shipbuilding Strategy.

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NESTRP seaward view, April 2015.

The Naval Electronics System TEST RANGE

WRITTEN BY ASHLEY EVANS

Whenever a warship undergoes a repair or change to its communication, radar, or electronic warfare and support systems it must undergo testing by FMFCB range staff at the Naval Electronic Systems Test Range to verify it operates correctly.

The facility resides in Albert Head about 300 metres from shore, but the view of the ship under test is obstructed by the tree line. So, range staff rely on electronic systems – GPS, radar, and an optical tracking device on the roof of the building to view the ship.

The evaluation process has the ship circling a set point as data is collected to determine how signals are transmitted or received on board. As the ship is travelling in one direction, range staff can see if the signal transmits all the way around the ship.

"We have a system that transmits and receives communication and radar signals to and from the ship. We can then analyze these signals to determine if their electronic systems are functioning correctly," explains Constantine Angelopoulos, Ranges Manager.

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Dal Minhas (left), Electronic Systems Range Technologist, and Pat Irvine (right), Acoustic Range Technologist, at the NESTR(P) facility in Albert Head.

For certain trials, FMF technicians are also on board the ship.

"When we are testing the receive capability of the ship's systems, they will be on board to measure the received signals and calibrate the equipment based on what they detect."

Canadian Fleet Pacific staff build the trial program for each ship as it completes a docking or refit. This involves several trials, both alongside and at sea. These are reviewed, in conjunction with the ship, FMFCB, and the Fleet Technical Authority.

"The decision as to whether a ship is 'good to go' depends on an assessment of the results of these trials, and a risk assessment in situations where some trials were not conducted or their results were not clear passes," says Angelopoulos.

The entire set of trials, which can include marine systems, combat systems, and the electronic, acoustic, and magnetic ranges, can take many months to complete after the ship comes out of a refit.

"These systems are complex and expensive to acquire. A ship at sea is in a very hostile environment and the safety of the crew depends entirely on the proper functioning of the many systems, electronic and mechanical. Testing and trials prove to the crew and to the Admiral that these systems are functioning correctly, thereby giving us confidence their missions can be performed successfully and safely."

> *Testing and trials prove to the crew and to the Admiral that these systems are functioning correctly, thereby giving us confidence their missions can be performed successfully and safely."*
>
> Constantine Angelopoulos, Ranges Manager

Derek Hughes, a Non-Destructive Testing Technician at Fleet Maintenance Facility Cape Breton works with specialized equipment in the Non-Destructive Testing Shop.

Non-Destructive Testing

SUPPORTS THE FLEET, ARMY, AND AIR FORCE

WRITTEN BY ASHLEY EVANS, PHOTO BY LEADING SEAMAN BRENDAN GIBSON

Derek Hughes and trainee Casey Ogilvie spend their days analyzing raw materials, equipment, weapons, hulls, and even welds to ensure no defects, no flaws, and no structural issues exist.

They do this through non-destructive testing techniques in order to examine the properties of a material, component, or system without causing damage.

"Non-destructive testing is critical. It aids a technician if they notice what might be a crack in a bulkhead and need to confirm the true length of the crack or if they are conducting a scheduled inspection for preventative maintenance," says Hughes, who has worked in Shop 143 – Non-Destructive Testing/Quality Control for 13 years.

His work takes him through most shops in Fleet Maintenance Facility Cape Breton, working with employees to certify their work, equipment, and raw materials.

One testing method is the portable Ultrasonic Flaw Detector that uses high frequency sound propagation

to identify cracks and other discontinuities, and thickness in many materials. Sound patterns are recorded and displayed on the detector's screen, allowing Hughes to analyze the test results to understand the flaw size and depth, and ultimately make a determination in accordance with acceptance standards.

The two employees also qualify raw barstock and plate used to manufacture metal products. Their testing ensures it's free of voids, inclusions, or other discontinuities before items such as fasteners are created by the machine shop.

It's the same for welds. Welds are used to join two or more metal parts. Because these connections may encounter loads and fatigue over time, there is a chance they could fail if not created to proper specification. Using non-destructive testing, Hughes determines if any indications found constitute the weld to have defects or be defect free.

> *Not just anyone can do this work. It requires high level math skills and extensive training before a technician can be non-destructive testing certified.*

Not just anyone can do this work. It requires high level math skills and extensive training before a technician can be non-destructive testing certified.

"All of my work supports the navy, but we also support the air force and army. When I first started working here, we had this big project for the army making armoured belly kits for the Light Armoured Vehicles in Afghanistan. We manufactured everything from raw stock, and we inspected it [through Non-Destructive Testing]. So many shops were involved, it was a true team effort."

The project leader was told that without the belly kits, no one would survive a 25-kilogram Improvised Explosive Device (IED) direct hit. With them, soldiers could survive up to a 100kg IED blast.

"That was one of the times I thought 'Wow, this is really incredible, we are really making a difference."

ENSURING A SMOOTH
Missile Fire

WRITTEN BY ASHLEY EVANS

Halifax-class frigates carry a formidable array of weapons systems including eight Harpoon long-range, surface-to-surface missiles; 16 Evolved Sea Sparrow surface-to-air missiles; a Bofors 57mm rapid-fire gun; a 20mm Phalanx anti-missile close-in-weapons-system (CIWS); eight 12.7mm heavy machine guns, and 24 anti-submarine homing torpedoes.

To ensure these weapons are in fit-for-fighting shape, a team of FMFCB engineering subject matter experts (SME) conduct missile readiness checks when called upon.

"An MRC (Missile Readiness Check) is a technical verification of all the systems and interfaces required to successfully complete a missile firing exercise. It provides a snapshot of the technical status of a participating unit's technical state," explains Lt(N) Chad Strickland, Surface and Air Weapons System Officer.

FMF Engineering Combat Systems Shop 232 - Surveillance, and Shop 234 - SAWS (Surface and Air Weapons Systems) primarily support the readiness checks, both alongside and at sea, even if the ship is abroad.

The process begins with the Fleet Technical Authority (FTA), who has the authority, responsibility, and accountability to establish, monitor, and approve technical standards. In consultation with FMF and ship's staff, they determine which systems are critical for a missile exercise and will release a message detailing the required trials. These trials are then completed by the FMF engineering team with the results given to the FTA. FTA will then release a missile readiness review, and this completes the missile readiness check.

"Exercises that involve firing a missile consume significant resources in terms of planning, system preparation, sea days, cost, etcetera. Missile readiness checks ensure a firing ship is properly prepared before proceeding onto a range; it increases the odds of a successful firing," says Lt(N) Strickland.

The subject matter experts at FMFCB have extensive training and years of experience working with combat systems, but each expert has specialized in one or closely related systems.

"Due to the complexity of combat systems, it would be difficult for one person to become an expert in all areas. The FMF engineering SME is normally assigned one system and will provide engineering advice on that system as required. The SME will also be the conducting officer of any trials on their respected system," explains Lt(N) Strickland.

Getting the FMF team to sea during the pandemic has been tough, he says, and sometimes he has to fall back on remote assistance. "It's very difficult to troubleshoot a system (with ship's staff) not being physically on site and communicating via email and phone," he says.

But there are rewards for a job well done.

"Seeing and hearing a missile launch after the effort put in by our team is rewarding, or maybe it's just relief."

MANAGING WASTEWATER

WRITTEN BY ASHLEY EVANS AND ROD MILLER

As with any industrial facility, there is liquid waste that must be managed in an environmentally sound manner. For Fleet Maintenance Facility Cape Breton (FMFCB), which resides just metres from a harbour brimming with sea life, processing effluents properly is heightened.

The Wastewater Treatment Plant, located on the backside of building D250, treats the liquid waste from the electroplating and chemical cleaning shop 125.

Shop trades people clean and prepare metal parts from machines and equipment, typically mechanical items, for other maintenance shops to do further work. These parts, now free of paints, grease, oils, rusts, and oxidations, may receive other processes, or be worked upon more easily.

After chemical cleaning, staff may also do polishing, electroplate with zinc, copper and chrome, or do process conversion coatings such as anodizing, chromates, and phosphating.

The shop floor is grated in order to collect acid/alkali, cyanide, and chromium waste waters, all material used by the electroplating and chemical cleaning shop.

These substances and rinsing effluents are pre-processed first to destroy cyanides, reduce hexavalent chromium, and neutralize any pH extremes.

After that, the wastewater streams are combined and employees remove any dissolved metals such as iron, copper, chromium, zinc, lead, nickel, and cadmium through coagulation, flocculation, and precipitation in a Metals Precipitation Unit. Any precipitated metals and other contaminants are collected via settling and filtration. A filter press removes these and other precipitated solids, allowing for the disposal of only solids rather than water. Solids are barreled as Hazardous Waste and sent away for proper disposal.

The remaining water is processed again through a large vacuum evaporator. This unit is like a 'still', but boils off water at a low temperature, around 50° Celsius, under a high vacuum. The moisture is then condensed back into clean water. Clean water is returned to municipal sewer as the shop cannot yet reclaim it to the level required for electroplating.

Even the ventilation of the 60 heated and unheated tanks are scrubbed via five huge process specific air scrubbers. That effluent is also collected and run through this system, allowing the ventilated air to be cleaned.

Each employee of Shop 125 Electroplating has taken the National Association for Surface Finishing Environmental Stewardship: Pollution Prevention and Wastewater Treatment courses.

They strive to exceed CRD mandates and directives of other governing organizations, not only achieving the minimum allowable amounts of pollutants, but attaining zero effluents.

They are currently replacing their vacuum evaporator with a newer unit that can process considerably greater volumes. Additionally, the shop recently updated their Metals Precipitation Unit.

The Electroplating Shop doesn't process all FMFCB waste streams; oils and fuels are handled by Real Property Operations.

When all the upgrades are complete, the shop should be able to process more than 10,000 litres of wastewater per day.

Terry Schafer works on the rat guards.
Photos by Leading Seaman Brendan Gibson, MARPAC Imaging Services

A Rigger at Heart

WRITTEN BY ASHLEY EVANS

It was 1980 when a 25-year-old Terry Schafer first stepped foot in Her Majesty's Canadian Dockyard Esquimalt to start his rigging apprenticeship.

At that time, he reported to his assigned journeyperson in building D115, now known as the New Wave Café that is adjacent to "A" jetty.

Schafer was first introduced to rigging when he was a boatswain on board *HMCS Yukon*. While the ship was in dry dock, he peered over the side to watch the riggers working at dock bottom; he was instantly drawn to their craft. After four years of service, he decided to leave the navy in pursuit of a civilian career in rigging.

During his four-year apprenticeship, Schafer attended Pacific Vocational Institute for in-class and hands-on learning.

Riggers are responsible for the rigging of ropes, cables, and chain systems used aboard ships and around dockyard. They ensure items are properly secured to cranes; aid in moving materials on and off ships; and splice wire and synthetic rope used to create jumping ladders, bridles, crash mats, safety nets, flight deck nets, and slings. They also are responsible for testing their wire rope assembly to ensure it meets the required safety standards.

A NEW LOFT

In the 1990s, FMFCB began its modernization project, dubbed C4360, to replace the antiquated and widely dispersed industrial facilities with a 35,000 square metre consolidated space: D250 and D252.

The Rigging Loft was one of 26 workshops that moved into five work centres housed within the two buildings.

Today, five riggers work out of D252. Another 35 riggers work on cranes, ships, and the 250-crane barge. The team in D252 specialize in the manufacturing and installation of rigging.

Workplace walls pay homage to the historic trade with

black and white images of bygone days, and samples ropes and knots.

Their work still employs old-style rigging used for scramble nets on the side of ships, fall arrest equipment, winch wires on cranes, and the shipboard beartrap to haul down a helicopter to land and keep it secure when departing in a wide range of weather conditions.

What has changed is the testing of materials and the accompanying certification. A 250,000 lb pulling machine tests all assemblies created by the riggers. This machine tests to twice the working load of an item and certifies the item at 2/5ths of its breaking strength.

"The onus of accountability has been put on to us now," says Schafer. "We need to look at all of the details, like engineering specifications, before we can work."

The current Rigging Loft team come from an array of backgrounds with unique expertise. Over the years, Schafer has worked with an incredible set of teams and individuals who have each displayed this. This includes Jim Fleet who worked in the Cable Enterprise Ship laying the Trans-Pacific Telephone Cable. Bernie Anderson oversaw the rigging at the SEDCO 409 Oil Rig, originally built at Ogden Point. Scott Green is a third-generation dockyard Rigger whose father was the foreman who originally hired Schafer.

There are currently two rigging apprentices, one working in the Rigging Loft and one on an alternate crew.

Bruce Brown and Apprentice Dane Eastwood craft rails for the frigates.

"It is fun to work together and to pass these skills on to the apprentices," Schafer said.

Over the years, 75 apprentices have gone through the Rigging Loft with approximately 60 hired on as journeypersons following graduation.

Schafer's advice to newcomers, "Enjoy your work down here because a career takes a long time."

THE MAN BEHIND

HMCS Regina's Commemorative Admiralty Paint Scheme

WRITTEN BY ASHLEY EVANS

It's been over a year since *HMCS Regina* was decorated with a new paint scheme, and the excitement and acknowledgement of this impressive work has continued to be a near-constant in conversation at Fleet Maintenance Facility Cape Breton (FMFCB).

Who designed the stunning Commemorative Admiralty Paint Scheme? Naval Architecture Senior Engineering Technician John Crocker.

Crocker began his career in private industry until 1998 when he started working for FMFCB.

Like most projects, *HMCS Regina's* paint scheme began as a tasking request. Crocker gladly took it on, first connecting with a naval historian at Director History and Heritage in Ottawa, ON, who provided briefing notes and details regarding different schemes from the past.

After careful deliberation with other members of the FMF workforce, Crocker decided on a Second World War version of *HMCS Ottawa*. He used a 3D Cad program called Bentley Microstation that allowed him to see most of the ship in a 3D model. He was able to take a profile image of the ship and project the patterns of paint on the hull. He changed the patterns a little to accommodate the different hull

shape, while adding modernization to the paint scheme.

After a couple of weeks of design, Crocker presented three versions to the Naval Architect Officer who then sought a decision from the Admiral regarding which scheme would be used.

The paint scheme was then applied to *HMCS Regina* by the paint shop and military members on board the ship.

"It has given me great satisfaction seeing the ship finished and that most everyone likes it," said Crocker. "There was a lot of excitement and encouragement from my colleagues in engineering as I was working on it."

HMCS Regina admiralty paint scheme.

Life

AT FLEET MAINTENANCE FACILITY CAPE BRETON

PHOTOS BY LEADING SEAMAN BRENDAN GIBSON
MARPAC IMAGING SERVICES

Undoubtedly, the strength of the Fleet Maintenance Facility Cape Breton resides in the talents and expertise of the minds and hands at work within this impressive dockyard complex. Many of the faces have changed (or aged) over the last 25 years, but the same sense of pride in delivering first-class engineering, maintenance and repair services to the Royal Canadian Navy remains as keenly focused as ever. The wide range of skills of the people in the offices and shops continues to be invaluable, especially when the going gets tough and the timelines are tight. With every turn of a wrench, with every engineering change that is designed and implemented, and with every apprentice trained — when the addition of innovation and creativity makes all the difference – it is the people who ensure success in reassuring the Admiral, and sailors who take the vessels to sea, that the fleet's technical well-being is in very good hands.

25
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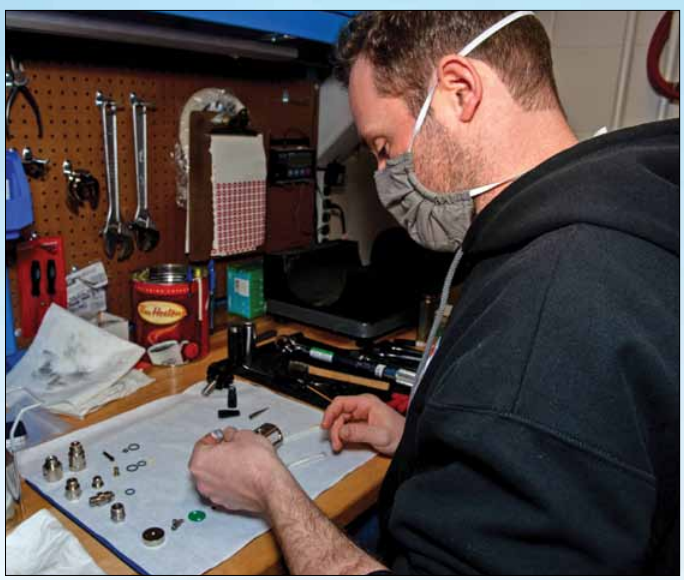
CAPE BRETON

Sheet Metal fabricator Ryan Kehn and Welder Lincoln Shilling work on material for the Sheet Metal Shop.

Russel La Rose, a Sheet Metal Fabricator working at the "notcher".



Andy Small rebuilds firing heads for high pressure air bottles.

Scott Bonner and Jucksir (Jack) Josan, Electrical/Electronics Technicians.

Carly Smethurst, an employee at the Sail Loft sewing covers for the frigates.

Gaganjit (George) Nijjar, Equipment Testing Marshaller.

Jeremy Snieder a sail maker at the Sail Loft, works on netting used at the Albert Head obstacle course in the FMFCB Rigging Loft .

Andrew Yancoff, a Radar Technician, works on the 3-D radar on the roof of building D250.

Weapon maintenance workers assist in guiding part of the Canadian Towed Array Sonar System on a barge prior to being reinstalled onboard *HMCS Calgary*.

FMFCB Electroplater at work in the Electroplating Shop.

A few yarns

DAN DERINGER

Retired FMFCB Employee: 1974 - 2010

When I became a Lead Hand in Shop 16 (Paint Shop), now Shop 123, we were paid every two weeks by cheque.

Lead Hands would go pick them up from Eileen King at Payroll and at quitting time hand them out to the crews.

One day, I picked them up as per usual and headed down to the ship to check on a few jobs and plan out the work for the afternoon shift.

Around 1530 I headed to building 130 - the old coal shed - to hand out the cheques. I felt, then looked into my parka pocket only to discover there were no cheques. I must have lost them. So I frantically headed back to the ship and retraced my steps, all the while not mentioning to anyone my dilemma. I could not find them anywhere so I headed back to the lunchroom to break the news.

I knew the guys were going to be pretty mad. I sat there trying to figure out what I was going to say as they streamed into the lunchroom. I removed my hard hat to break the news, only to find I had stuck the cheques up under my hardhat liner. You can't imagine the relief I felt at that moment.

When I became the Foreman of Shop 15, now Shop 111, we were cleaning the tubes in the boiler on the 250. I was relatively new to the Shop and asked Dave Bernard and Joe Lukas, two of the shop charge hands, to show me where their crews were working. We headed down there and you could hear the needle guns and chipping hammers banging away.

When I got the the opening to the boiler there were hoses strung down to the far end and I could make out a couple bodies there amidst the dust.

Dave and Joe seemed to be in a hurry to leave but I remained peering into the boiler, as it didn't seem right to me. Upon close inspection I found there was no one there; they had duct taped a couple needle guns against the bulkhead and left them running, had an airline on low blowing the dust around, and suspended a pair of white disposable coveralls to give the appearance of someone in there. This set up was more work then the job I figured, and I got a bit of a chuckle out of SRUP/FMF shenanigans.

Some of my fondest memories of FMF were the fundraising events we were able to organize thanks to the support of then Commanding Officer, Capt(N) Alex Rueben and all the shops. Our first event was a paintball shoot out in the shipwright shop, then a carnival event, tricycle race, a Wild, wild west event with bull riding, cow pie tossing, arm wrestling, a NASCAR race, an Olympic event complete with snow we had brought in mid-September for snow shoe races, and lastly, we held a Pirates of the Caring Beings Boat Race in between the jetties.

It was times like this that all the shops could down tools and have fun while helping others.

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