

FMF CAPE BRETON – AJISS INDUSTRY TOUR

1. Trades Service Centre

Group 7

- Trades Service Centre# 3 manages work centre specific inventory and flow-thru material requirements within the 'Defence Resource Management Information System' (DRMIS, an SAP solution).
- The 'Equipment Tracking Application (ETA)' is used to manage tool and equipment loan/life-cycle management as well as the temporary storage of work order pack-ups (as 'Work-In-Progress').
- There will be five Trades Service Centers and a Central Storage Facility end-state. Each location is/will be outfit with dual purpose (indoor/outdoor) Material Handling Equipment to facilitate material conveyance throughout the Ship Repair Zone (SRZ).

2. Electrical Work Centre

Shop 144 Electrical Work Centre

- A work centre that facilitates the installation of ship board wiring ,
- Motor winding and overhaul,
- Controls for intricate shipboard systems,
- Routine maintenance facility of batteries used throughout the fleet
- A motor test room which allows the complete testing and tuning capability of all types of motors and controls.
- Load banking capability for all Naval Vessels Generators including set to works and paralleling.

3. Mechanical Work Centre

Shop 131 - Pipe Fitting - Responsibilities & Services:

- Manufacture, install and repair all ship and land based piping systems. Manufacture all hoses and reusable fittings.
- Install and repair: Dental and medical piping systems, life support piping systems (recompression chambers), and all firefighting systems (halon, CO2 and auto- sprinklers).
- Fabricate specialty gauge panels and instrumentation.
- Hot/cold bending of all sizes of pipes and tubes to exact specifications.
- Repair and manufacture all piping systems on HMCS VICTORIA Class submarines.

- Test facility for pipe and tube piping systems up to 6,000 psi; and repair facility for all plumbing fixtures, hot water tanks, toilets, etc.
- Supply jetty services for shops (air, water, steam, oily water and black water).
Specialties:
- Computerized bending machines (pipe/tube).
- Fabricate pipes/tubes for fixed wing and helicopters to aircraft standards; and manufacture fittings, TEE/branches.
- Manufacture and repair heat exchangers and cooling/heating coils.
- Lead pipe and lead liner repair and burning. Pipe extrusion equipment.

Shop 132 - Internal Combustion Engines - Responsibilities & Services:

- Repair, overhaul, test and troubleshoot all diesel and gasoline engines from 2,000 to 9,000 BHP.
- 900 HP engines dynamometer facility for testing internal combustion engines, large electric motors and generators for diesel electric. Future expansion to include HP compressors and chiller compressors.
- Fuel injection and governor test facility to support all CF needs (CPF, Tribal Class AOR, etc.).
- Repair, overhaul and troubleshoot: marine, reverse reduction gears; low, medium and high pressure air compressors; engine component parts; and ancillary units.
- Recognized Hale P250 CF repair depot.
Specialties:
- Fuel injection and governor testing, troubleshooting, repairs and overhaul.
- Workforce capable of working on any diesel engine and making any model in the CF or CFSS for overhaul, test, repair, etc.
- Dynamometer test facility.

Shop 133 - Mechanical Fitters - Responsibilities & Services:

- Repair to all mechanical components, auxiliary and ancillary fitted on HMC ships from anchor windlasses on the bow to steering gear at the stern of the ship.
- Repair to all components required for fueling shipboard helicopters.
- Repair and overhaul for main reduction gearing, shafting, propellers, rudders, underwater valves, steering, pumps, condensers, heat exchangers and compressors.
- Repair and overhaul of mechanical systems, main hydraulics, and HP air systems fitted on VICTORIA Class submarines.
- Repair and overhaul of quality documentation for all first-level fittings onboard VICTORIA Class submarines. Repair and maintenance to main gear boxes fitted onboard HMC ships.
- Mechanical repairs and support to fitted shipboard systems and national inventory (3rd line repair and overhaul). Gas turbine change out and installation modifications.
- Change out, align, troubleshoot and repair gas turbines fitted in CF ships.

Shop 134 - Controls and Hydraulics (Cooling and Heating Systems) –

Responsibilities & Services:

- Service, maintenance and installation of various domestic, commercial, industrial and marine refrigeration, and air conditioning systems.
- Hydraulics systems, high purity electronic cooling and dehumidification systems.
- Complete high capacity ODS (ozone depleting substances) recovery, reclaiming and recycling.

Oil Burner Services:

- Overhaul, repair and maintenance of: Auxiliary boilers and steam generators on all class ships and shore establishments, steam cleaners and other oil-fired equipment.
- Repair, hydrostatic test and fill CO₂ fire extinguishers and CO₂ gas bottles for Base Supply, DND Fire Halls, Damage Control School and ships.
- Perform Preventative Maintenance (PM) routines on halon systems.

Control Services:

- Repair, overhaul and calibrate various components on propulsion, combustion steam temperature and water level systems on all class ships and shore establishments.
- Calibrate AOR controls for various control valves and calibrate various components of IMCS systems.
- Provide support to CPF and Tribal class control systems.

Responsibilities & Services:

- Repair to all mechanical components, auxiliary and ancillary fitted on HMC ships from anchor windlasses on the bow to steering gear at the stern of the ship.
- Repair to all components required for fuelling shipboard helicopters.
- Repair and overhaul for main reduction gearing, shafting, propellers, rudders, underwater valves, steering, pumps, condensers, heat exchangers and compressors.
- Repair and overhaul of mechanical systems, main hydraulics, and HP air systems fitted on VICTORIA Class submarines.
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4. Chemical Cleaners, Electroplating and Paint

Electroplating shop:

- New 'state-of-the-art' plating facility.
- Electroplating and chemical cleaning services to the fleet and other units; brush plating; aluminum cleaning with steam, power washers and paint strippers.
- Waste water treatment facility for all chemicals within the Work Centre.

Specialties:

- Chemical cleaning of all metals.
- Capabilities and Types of Plating: Zinc, silver, copper, bright nickel, chrome-decorative, gold, rhodium, electrolyses nickel.

Paint Shop (Booth only):

- Application of coatings for the purpose of preservation, decoration or safety applied through various means (brush, roller, air spray, airless spray and electrostatic powder coating).

Specialties:

- Overall prime and paint of ships' components and compartments, interior and exterior.
- Electrostatic powder coating facility.

5. Machine Shop/WC141

Machine Shop 164

Purpose of the shop is to support various trade's machining requirements. It has the capability to manufacture various parts in volumes from one to thousands. Also capable of heat treating activities.

- The shop has various conventional manual and full CNC machines as well as specialized equipment such as:
 - Gear hob and bevel gear generator
 - CNC wire bender
 - Lapping machine
 - Tool and cutter grinders
 - Cylindrical grinders
 - High Speed pallet horizontal CNC milling machines
 - Various twin spindle CNC Lathes

- Machinists and Tool and Die personnel are employed in the shop.

6. Heavy Metal Fabrication Shop

112A Heavy Metal Fabrication Responsibilities

and Services

- Design layout, manufacture, repair all installation of items constructed from all metals 1/8 inch thickness and greater
- Fabricate or repair all Ship's structural integrity, water tight enclosures, doors and hatches
- Fabricate or repair all Ship's hull fittings and structures, masts, platforms, equipment seating's and racks
- Repair all Auxiliary boiler refractory and tube repairs
- Conduct all Pressure testing of compartments and tanks

Specialties:

- CNC Plasma, Water-Jet and Laser cutting
- Chain Testing, Blacksmith forging and propeller repairs

Shop 113 Welding Department

Responsibilities and Services:

- perform All ferrous and non-ferrous welding services to FMFCB work centers
- CWB certified in Shield Metal Arc (SMAW), Gas Metal Arc (GMAW), Flux Core Arc (FCAW) and Tungsten Inert Gas (TIGW) welding processes

Specialties:

- High Pressure Pipe Welding
- Specialized Submarine welding processes

7. Sheet Metal

Shop 114- Sheet Metal

Responsibilities and Services:

- Design layout, manufacture, repair and installation of items constructed from all metals 1/8 inch thickness and less
- Manufacture and repair of heating ventilation air conditioning (HVAC) system trunking

- Manufacture and repair of metal furniture, stainless steel kitchen galley and hospital equipment
- Manufacture specialty items for DND ceremonial and ornamental requirements
- Temporary ventilation services for FMFCB work centres and contractors
- 3rd line overhauls of ship Sonar Domes

Specialties:

- CNC Water-Jet and Laser cutting
- Manufacturing and repair of poly-vinyl chloride and polyethylene components
- Inspecting and replacing ship ventilation filtration system compo

8. Combat Work Centre

Purpose and Systems:

- Full service technical support to 3rd level on all manners of Surface and Sub-surface Navy Electronic C4ISR, including TECHVALs, EC installs, Set To Work, Troubleshooting, Repair and Overhaul, Go-no Go Testing, Preventive Maintenance, Trials, and Global Mobile Repair Team support including ships in theater.

Major Systems supported:

- HF, UHF, VHF, transmitters, receivers, suites, and associated antennas and couplers.
- Secure systems, including new and legacy Serial Encryptors, IP Network Encryptors, Classified IP Network architecture and equipment, Bandwidth Management Devices (Riverbed), Classified Message Processing systems, and Cryptographic IFF systems..
- Install, STW and repair new and legacy commercial and military satellite comms systems and antennas. Operating over Proprietary Military satellites and commercial Wideband Global System Satellites.
- Support to Land-based installations such as CFFSE, MARPAC, CFB Aldergrove, NESTR(P), CFMETR and CFB Comox for ship specific equipment fitted ashore.
- Command control monitoring system (CCMS), Internal/External Comms(SHINCOM) which includes ships' entertainment systems and SatTV; emergency locating devices such as EPRIRES, SARTS and VICTORIA Class 639 Buoyant Beacon.
- Large and small Navigation and Air Search Radars and antennas. SMART-S, SG180, Sea-search, Pathfinder,
- Electronic Warfare, Surveillance, and Direction Finding systems and antennas.(Elisra, SEOSS, SIRIUS, IFF, SRD504)
- Reprogrammable Advanced Multimode Shipborne Electronic Countermeasure System (RAMSES).
- Command &Control Systems and software configuration (CMS330, Link)
- Navigational Aids, such as Laser Ring Gyro's, Data Distribution Systems(NavDDS), Chart Plotters, SHINNADS, GPS systems and associated software, OS's and antennas, Doppler Speed Logs.

- Hull Mount 510 Sonar, and Passive Towed Array CANTASS, and Towed Nixie Active Torpedo Decoy Sonars, Underwater Telephones.
- Full support to Sea King Helicopter AQS Dipping Sonar systems.
- Acoustic and Degaussing support to the Naval Test Ranges.
- Repairs to electronic test and measurement equipment.
- COMSEC Custodian staff carries out the duties and safeguard the Commanding Officers' COMSEC holdings.

Shop Capabilities:

- In order to enable the level of support necessary in Area A, we have several examples of naval systems installed in the various rooms in the Work Center.
- These "Reference Systems" are used for in-house repair and testing for components removed during shipboard repairs, or 2nd and 3rd Level testing and repair for the CFSS.
- (HF, UHF, Satcom, GPS, Gyro, VHF, Shincom, Main Broadcast, CSNI, Message Handling).
- The Work Center is being supported by the Navy and HCM Project by procuring the majority of CSIC systems destined for installation in the Work Center.
- The Work Center is supported by a "Tool Crib" which provides many types of electronic test and measurement equipment and tools required to carry out the tasks.
- The Work Center was designed to be physically flexible to future upgrades with the implementation of removable floor plates, wiring trays, conduits, chilled water, air pressure, multitude of varying electrical receptacles etc throughout the Work Center.
- Rooftop Antenna Farm for live testing of antennas in shop via systems in the Work Center. Perform as "copy partner" to ships systems under repair in the fleet.
- Small component cleaning area in-house, bead blast, parts washer, sink, fume hood, light metal work area.
- High Bay work space for antenna repair and tear down.
- Close proximity to all other trades required.

Special Skills:

- Workforce backed by strong Electronics Theory via post-secondary educations.
- Several staff trained by OEM to factory maintenance levels.
- Diverse workforce is a blend of private sector civilians and ex CF personnel working alongside CF members posted to FMFCB, which amplifies our insight into requirements and equipment operations.
- Succession development includes folks with decades of experience mentoring replacement staff for several years while they become experts.
- Marine Electronics Apprenticeship Program sees Apprentices working in all CSE discipline areas before graduating, and then they begin their development into SME's on one or more systems.
- Technicians have the ability to reverse engineer and study complex electronic circuitry or schematics and offer support to that system where no other support otherwise exists.
- 3rd Level repair capability to a variety of circuit boards and components.

9. Weapons Work Centre

Group 6

Work Center 161

- Optics- Periscopes, SIRIUS, Theodolites, Big Eyes, CSAT, Sextants
- Gauge calibration.
- Precision machining.

Work Center 162A

- Surface Weapons-mechanical – Removal repair overhaul and install weapons mechanical systems aboard surface vessels and submarines.
- Inspection of Naval Ordnance.

Work Center 162B

- Life Support Systems-, Recompression Chambers.
- Breathing Air- BIBs, MSA, SCBA

Work Center 162C-

- Hydraulics-testing, O/H and STW on hydraulic motors, pumps valves.
- Manufacturing hydraulic hoses.
- Deck Cranes and Boat Davits.

Work Center 163

- Electrical/Electronic support for all Weapons Systems aboard both Surface Vessels and Submarines

Sheet Metal Shop:**Purpose:**

To fabricate any non-structural sheet metal component on HMC ships in support of Engineering Changes, Corrective and Preventive Maintenance

Capabilities:

- Large newly modernized shop with all machinery strategically located
- Separate grinding area
- Two Euromac CNC punching machines capable of being programed and with an accuracy of 0.0156"
- Two Amada hydraulic computerised flangers with a capacity to bend ¼" mild steel in a 10' length
- Hydraulic shears with a capacity to cut ¼" and 10' in length

Special skills and expertise

- Maintenance, repair or replacement of all galley equipment
- Fabrication and maintenance of all HMC ships cabinetry
- Responsible for all internal non-structural bulkheads and doors
- Preventive Maintenance or replacement of all HVAC systems on board
- Responsible for CBRN filtration system (citadel)

Plate and Boiler Shop:

Purpose:

To fabricate any structural or non-structural metal component on HMC ships and Submarines in support of Engineering Changes, for Preventive and Corrective Maintenance

Capabilities of the shop area:

- Shop has a large footprint in a strategic location between Metal Stores and Sheet Metal Shop, it has a large assembly area "blocs" for assembly and welding
- Plasma/Oxy-Acetylene burning table, capable of cutting mild steel and non-ferrous metals such as stainless steel, aluminum and brass etc.
- Large brake, 350 ton capacity
- Large shears, capable of cutting an 8 foot wide plate $\frac{3}{4}$ " thick
- Small shears, capable of cutting an 8 foot wide plate $\frac{1}{2}$ " thick
- Small, medium and large rolls, large rolls capable of rolling 1" thick MS plate 8 feet wide and 1 $\frac{1}{2}$ " thick MS plate 4 feet wide
- Propane forge and mechanical operating hammer
- Dedicated aluminum grinding area with separated ventilation system from steel grinding

- **Special skills and expertise:**
 - Extensive knowledge of Naval Structural Specifications
 - Trained to operate pneumatic chisels for cold removals of welded components
 - Hydrostatic tank testing
 - Boiler repairs and overhaul

Welding Shop:

- **Purpose**

To carry out all welding operations on board ship and submarines in support of all preventative and corrective maintenance plus install of new equipment

- **Capabilities:**

- Plasma/Oxy-Acetylene burning table, capable of cutting mild steel and non-ferrous metals such as stainless steel, aluminium and brass etc.
- Numerous stationary, mobile and portable welding machines
- TIG welding areas for SS, Aluminum, Copper-Nickel and other special requirement.

- **Special skills and expertise:**

- CWB certified on various metals and processes including high pressure components
- Air Arching for lesser temperature impact to material
- Trained in welding with temperature controlled processes
- Cu-Ni pipe welding capability
- Victoria Class hull welding qualifications

Pipe Shop:

Purpose

To fabricate and install all pipes for HMC ships and Submarines with all material from mild steel to rubber.

Capabilities:

- Hydraulic Pipe Bender capable of bending 1/8" – 6" Schedule 80 pipe. This is also used to duplicate specialized pipe bends within Def Stan and military standards.
- Metal Embossing/Tag machine used for tagging and identification.
- Hose crimping hydraulic machine capable of crimping hoses of 1/4" – 2" with Android CNC capability
- Diagnostic imaging camera that can capture high resolution digital imaging with internal memory and scone homing device for locating clogs.
- Electric drain auger capable of clearing lines up to 6" diameter at 100 ft length.

- **Special skills and expertise:**
 - Mobile High/Low pressure hydro-testing ability
 - Fabrication of all hoses and fittings on all hydraulic, High Pressure Air, water and fuel systems on HMC ships
 - First level and High pressure brazing certified for Submarine work

Nav Arch: NDT: Being done by LCdr Hawkins and Mike McIssaac

Marine Machinery Shop

Purpose:

The Marine Machinery shop is responsible for the repair, installation, overhaul and testing of equipment and systems fitted onboard surface vessels, submarine platforms as well as shore establishments and training facilities. **Capabilities**

- Propulsion Power Transmission Systems- shafting, propellers, gearboxes, main shaft bearings, lubrication systems and pumps, fuel and lube oil separators, steam turbines, stern and bulkhead seals as well as main flex couplings.
- Seawater services- pumps, valves, heat exchangers, lazy rods and strainers.
- Material moving equipment- vertical stores conveyors, dumbwaiters, pad eyes, transfer pumps, sewage pumps and portable rigging equipment, air handling.
- Submarine masts- induction and exhaust masts and associated drive equipment
- High pressure air components- HP air compressors, valves, vessels and reducing stations
- Line handling equipment- capstans, windlass, winches and retractable bollards
- Steering equipment- rudders and hydroplanes
- Trash processing equipment- compress melt units and shredders
- Doors and hatches- hangar doors, galley doors, bulkhead doors and submarine hatches.
- Mounts- Inspect, adjust and maintain machinery mounting arrangements.
- Hydrostatic testing- hydrostatic testing of pressure vessels including HP air bottles and diver's equipment.
- Breathing air standard cleaning facility (O2)- certified O2 standard cleaning for breathing air vessels and equipment as well as recompression chambers and associated equipment and fittings. NOC flushing for breathing air systems.
- On-site machining-Outside Machining; seats, flanges, bores, key seats.

Special Skills and Expertise

Mechanical Component Testing Facility- capable of testing pumps, high and low pressure air compressors and components.

Submarine 1st level Systems work and OE

Under Water Weapons

Purpose

Complete all Planned and Corrective Maintenance of Ship and Submarine Underwater Weapons Systems, Periscopes, Masts and Submerged Signal Ejectors

Capabilities:

- Ships:
 - MK 32 Tubes including TSP and Torpedo Handling/Stowage System
 - Repair and Overhaul of units and components of the system including HP air valves
 - Hydrostatic Testing of Breach Bottles
 - Testing of Torpedo Handling Tongs
- Submarines:
 - Torpedo Tubes including Weapons Discharge and Handling System
 - Fire Control and TTVC Consoles
 - Mk 9 Submerged Signal Ejector
 - Search/Attack/Comms and Radar Masts
 - CO2 Absorption Units
 - HP Air Valves

Special Skills and Expertise

The FMFCS Underwater Weapons/Periscope shop houses 4 trades (Electronic, Mechanical Instrument Systems, Electrical, and Mechanical) of highly skilled technicians who are formally trained in the repair and overhaul of weapons systems.

Optical Alignment of Periscopes

Bearing alignment of Masts and Periscopes

Metal Finishing

Purpose:

To Support all Preventative and Corrective Maintenance with Metal Finishing and Chemical Treatment Services

Capabilities

- Electroplating, anodizing and other conversion coatings of various parts for HMC ships and submarines as well as other units as requested.
- Uses chemicals and/or steam cleaning to remove paint, grease and other materials from parts and components to allow for repair and reuse of material.
- Chemical flushing of various onboard systems for cleaning purposes.
- Operate in house waste water treatment plant for disposal of used chemicals.

Special skills and expertise

Specialist Training in Metal Finishing and Chemical Cleaning of all Metal surfaces and equipment.
Training in use of HAZMAT chemicals involved with the above processes.

Marine Insulators

The purpose of the shop:

To Support all Preventative and Corrective Maintenance including removal and install of old and new equipment with Marine Insulation services, including pipes and bulkhead insulation removal and installation.

Capabilities

Fabricate, install and remove insulation on HMC ships and submarines in support of numerous shops at FMFCS as well as onshore facilities.

Perform asbestos abatement when required onboard HMC ships, submarines and onshore facilities when requested.

Special skills and expertise:

Working with HAZMAT materials for Insulation / Lagging and Asbestos

Governor Shop

Purpose:

The Governor shop repairs, overhauls and maintains governors, injectors and fuel systems on all types of internal combustion engines for the naval fleet and auxiliary vessels.

Capabilities:

The Governor shop performs engine break-ins and trials alongside and at sea as well as tests engine fuel components prior to installation. All in service Governor Overhauls, Shop and on Engine Set to work Injector and Fuel Pp testing

Special Skills and Expertise

Governor set to work is a specialist skill that requires a high degree of knowledge and training

Internal Combustion Engine (ICE)

Purpose:

The shop performs Preventative and Correct Maintenance on all types and sizes of internal combustion engines

Capabilities

As well as onboard repair, the shop is capable of full Engine overhauls for: Diesel engines on all ship Classes and Submarine Class.

It also provides support to various other units in repairing outboard motors, Tohatsu fire pumps, diesel driven generators, and small vessels engines.

Special skills and Expertise

Diesel Engine Set to Work and Trials including Main Power Trials at Sea

Hydraulic shop

Purpose: The FMFCS Hydraulics shop is responsible for the maintenance, diagnostic and repair/service requirements of HMCS ships, submarines and shore based hydraulic systems as well as R&O/Testing of various hydraulic components

Capabilities

- Hydraulic System Diagnosis and repair - Submarine Main, External and Steering/Hydroplanes systems. And Ships hydraulic marine equipment.
- Hydraulic systems cleanliness testing- ISO standard
- Maintenance and Repair of Shipboard and Submarine Hydraulic systems- variable Pitch Propulsion Systems, Steering, GT starters, deck cranes, RHIB cranes, helicopter Haul down systems, Hydraulic power units, hydraulic winches and windlasses.
- Flushing of hydraulic systems- portable large volume flushing and pressure testing of ship and submarine hydraulic piping.
- Repair/Replacement and testing of Hydraulic Components

Special Skills and Expertise:

The Hydraulic Work Center at Cape Scott houses the Hydraulic Test Facility Complex, which has four test benches for testing Accumulators, Valves, Pumps and Motors up to approximately 200 HP, 5000psi and 80usgpm.

Heavy Electrical Shop

Purpose

The shop performs planned and corrective maintenance on Ship Power Generation and Distribution systems. Also overhauls searchlights, ballast units, tacho units, servo motors and other electrical equipment as it relates to shipboard equipment throughout the fleet.

Capabilities

Full overhaul of Motors and Generators including Rewinding, Also overhauls searchlights, ballast units, tacho units, servo motors and other electrical equipment as it relates to shipboard equipment throughout the fleet.

Special Skills and Expertise

Rewinding of electrical motors

Electrical Test Facility

Purpose

The Electrical Test Shop carries out planned, corrective maintenance and testing on Power Generation and Distribution Systems and Electrical Equipment as fitted in the Fleet.

Capabilities

Wide range of Test Equipment and Power Supplies for performing testing on electrical motors, breakers and other types of electrical equipment in-shop, onboard surface vessels and submarines. The test shop conducts load bank trials on various surface ships, generator systems, and completes test forms when trialing systems onboard submarines.

Special Skills and Expertise

The testing of electrical components requires a high degree of knowledge and training, the shop personnel are trained to a different standard than other Electricians in FMF.

Refrigeration and Air Conditioning Shop

Purpose: The Refrigeration and Air Conditioning shop provides installation, maintenance, overhaul and repair of refrigeration and air conditioning equipment and systems on board MARLANT ships and submarines supported by FMFCS

Capabilities

- Maintain and repair Ship and Submarine Fridges, Chillers and air conditioning units
- Additional services provided also include installing, diagnosing, repairing, overhauling, calibrating and testing of pneumatically operated HVAC systems
- Provide service, repair and testing of the Citadel system to protect the ship and staff against biological, chemical and nuclear contamination
- Responding to emergencies involving refrigerant leaks in order to limit release of ozone depleting and global warming gases.

Special Skills and Expertise:

Recovering, cleaning, storing and handling of Ozone Depleting Substances (ODS) Refrigerants. Including decommissioning of refrigeration and air conditioning equipment.

Machine Shop

Purpose: Core activities include manufacturing and repairing components for Surface Ships, Submarines and various Work Centers within FMF Cape Scott.

Capabilities

- CNC Milling and turning centers
- Water jet Table
- Conventional Machining
- Large capacity Horizontal Boring Mill
- Large capacity Vertical Lathe
- Surface and Cylindrical Grinding
- EDM (Electro Discharge Machines) Wire and Die Sinker
- Dynamic Balancing, i.e. flywheels, electric motors
- Tool Manufacturing and Sharpening (Precision Tool making)
- Heat Treating, inc. Special Materials
- Laser Additive Manufacturing – still under development but has been used for some repair work

Special Skills and Expertise:

- Gear Manufacturing, The Cape Scott Machine shop has a selection of gear generating equipment for straight, helical and bevel gears.
- Engraving, The Engraving section of the Machine shop has a wide range of engraving equipment, which can work in a variety of media and contours.
- Dimensional Inspection services: the FMFCS machine shop provides extensive modern dimensional inspection services; including stationary precision Coordinated Measuring and on-site machinery dimensional inspections.

Above Water Weapons Guns and Missile Shop

Purpose

Carry out all Planned and Corrective Maintenance on Gun and Missile Systems

Capabilities:

Maintaining the following Above Water Weapon systems for HMC Ships:

- Guns - 57mm, 76mm, and 20mm CIWS (Close In Weapons System); and
- Missile Systems -GMVLS (Guided Missile Vertical Launch System), Harpoon, ESSM (Evolved Sea Sparrow Missile) and Multi Acquisition Soft kill System.
- LMDE (Limpet Mine Disposal Equipment) and various caliber artillery weapons

Full overhaul of the 57mm Gun and missile systems including the .50 cal heavy machine gun mount and the 12lb Saluting Gun.

Special Skills and Expertise

The FMFCS Above Water Weapons team (electronic, electrical, mechanical) consists of a team of highly skilled technicians who are formally trained in the repair and overhaul of complex weapons systems.

Fire Control Shop

Purpose

Complete all Planned and Corrective Maintenance on Fire Control Radars, Optical Equipment and associated systems.

Capabilities

CEROS200, CWI systems, Big Eyes, Binoculars, Carriages, Pedestals, Sextants, Compasses, Range Finders, Waveguide Driers, Manifolds, Dehydrators , Waveguides and all subassemblies and components of the above.

Special Skills and Expertise

Specialist training on all of the above equipment, Optical Alignment training.

Warehouse Operations Section:

- Purpose of this section to receive and process all incoming material to FMFCS which includes locally procured materials, consumables, tools, equipment and Royal Canadian Navy spares and other material from the Departmental Supply Chain. All material movement and processing tracked and controlled using departmental enterprise system known as DRMIS.
- Material is held for use by shops for the work in progress with minimal long- term storage
- Reverse logistics exit point for material returns, repair and overhaul and disposal of assets and material back into the Departmental Supply Chain
- Full inventory control, stocktaking, asset visibility and material accountability
- Technical inspection and Quality assurance of received material
- Hazardous materials handling, storage and shipping
- Warehouse facility and staff have 10+ years' experience as users of Inventory Management module of SAP (known as DRMIS)
- Entry point and direct liaison with departmental LCMM's (Life Cycle Material Managers) as well as external supply chains, standalone vendors of material and logistics suppliers
- Metal stores sub section with extensive metal products ready for sue including plate and pipe with variety of grades as well as customized storage and distribution within FMFCS facilities

Procurement and Contracting Section:

- Purpose of this section is to support FMFCS maintenance project requirements with full range of procurement and contracting support options including acquisition of goods and services as well as initiations of the requisition of RCN Supply chain spares and material requirements
- Manage the procurement process for goods and services effectively and efficiently
- Implementation of Procurement strategies (project based)
- Sourcing and Category (Commodity) Management by managing, forecasting requirements and ensuring timely delivery logistics
- Contract Management including process improvement, lessons learned and stakeholder feedback
- Vendor Supplier Management through performance management, inspection and job site contractor oversight and technical verification
- Financial management including supplier performance, payment performance, invoicing quality and reconciliation processes by vendors to streamline payment
- Procurement Technology including use of electronic and on line tendering services and solutions
- Specification / Requirements Definition of complex marine and navel maintenance work projects
- Workforce /Resource maximization with skills gap analysis and effective training including recertification and trade specialization requirements

Material Expediting Section:

- Purpose of this section is monitor material movement and inbound logistics of Departmental Supply Chain as well as locally procured material required to support FMFCS maintenance projects
- Direct liaison between FMFCS project managers, planners and schedulers with inbound material from the procurement pipeline and/or the departmental Supply Chain
- Work from order initiation to final delivery and/or consumption of material with dedicated resources utilizing DRMIS and customer service to maximizes schedule flexibility

Tool Crib Section:

- Purpose of this section to manage the issuance and distribution of equipment and tools that are centrally controlled. This includes managing, tracking and maintaining all FMFCS tools and consumables in direct one on one FMFCS shop personnel customer support at various locations throughout FMFCS facilities. All tool usage and movements tracked and controlled using standalone solution with direct linkage to DRMIS.
- Tool use, conditioning, certification status are monitored and tracked from cradle to grave with proper disposal, replacement and replenishment as required
- Act as POC for all inbound and outgoing material needs for all shops including facilitating urgent requirements

Cable Shop

Purpose

The shop performs planned and corrective maintenance of various electrical equipment and associated cabling

Capabilities

Installation of all equipment cabling ship wide, including installation of bulkhead and through deck penetrators. This includes all power cables to equipment not just PG and D

Special Skills and Expertise

As required to conduct the above

Fully conversant with Fibre Optic Cabling and terminations.

Gas Turbine Shop

Purpose

The Gas Turbine Handling Facility (GTFH) conducts most Preventative Maintenance and Corrective Maintenance on Gas Turbines onboard HMC Ships. This includes supporting field service representatives (FSRs) and ship's staff with troubleshooting and repair of engines including engine change outs.

Capabilities

Change out and set to work of all current in service GTs

The shop can be deployed overseas with pre-loaded containers to conduct engine changes on deployed ships

Special Skills and Expertise

Fully conversant with all in service models of GTs

Rigging Shop

Purpose

To provide Rigging and Materials Handling support for all aspects of Preventative, Corrective Maintenance including all equipment removals and installation. Also provides testing services for lifting and safety equipment.

Capabilities

Removal and installation of all equipment via shipping routes from Ships and Submarines

An integral part of the rigging shop activities is in the fabrication, inspection, installation of rigging wire, slings, Marine ladders and other equipment.

The shop operates and a state of the art test bed that is capable of 100,000 lbs pull capacity.

The vast majority of rigging support is provided using the following equipment:

- Three Large scale Jetty Cranes (Nine Ton Lift Capacity)
- One 100 ton Mobile Crane (100 Ton Lift Capacité)
- One 40 Ton Crane (40 Ton Lift Capacité)
- One 35 Ton Crane (35 Ton Lift Capacité)
- Several overhead cranes of varying capacity
- A fleet of six fork lifts
- Various smaller equipment including: ropes, slings, chain falls, test equipment

Ability to Contract out for additional Crane Services as required

Special skills and expertise

- Use of the Loading Test Bed
- Provincial Licencing for Jetty and Mobile Crane Operators
- Master Riggers training
- Fabrication of lines and hawsers

Sail Loft Shop

Purpose

To provide Life Raft Preventative and Corrective Maintenance for the Fleet. Also to provide Sail Loft support services for all aspects of Preventative, Corrective Maintenance including all equipment removals and installation.

Capabilities

Life Raft Maintenance (Including removal and installation for ships). Life Jacket repair maintenance

Divers Wet Suit repair maintenance

Manufacture of Hangar curtains Manufacture of ship's awnings

Special note: Shop is cleared to hold "ammunition" for life raft work.

Special skills and expertise

Lift Raft work is specialist in nature and requires a high degree of skill and training

Plant Maintenance

Purpose: The Plant Maintenance work centre provides internal equipment and facilities life cycle maintenance activity in support of FMFCS Production activities.

Capabilities

- Corrective and planned maintenance for plant equipment including: Production shop tools and equipment, Building and Jetty Cranes, and Ship Lifts (Synchrolift and Marine Rail).
- New Machinery installations, equipment relocations and Production facility modifications.
- Manufacture of air/water/welding hose assemblies.
- Provides annual lifting appliance certifications (Building & Jetty Cranes) in accordance with local engineering authorities and the applicable local/federal regulations.

Special Skills and Expertise: Provides temporary and portable power supplies for Production equipment on jetties and naval platforms

Antenna Shop:

Purpose

Conduct Preventative and Corrective Maintenance, of all radars and antennas -

Capabilities

Our shop is equipped with:

- An elevated, large Radar/Antenna platform for all disassembly, reassembly and testing purposes, including but not limited to the SPS-49, SG-150/180, DA-08 and LW08 Radar.
- A custom stabilization platform for calibrating and testing the SG-180 medium range Radar.
- A full sized paint booth.
- Three and fifteen tone indoor overhead Bridge Crane for all lifting requirements.
- Power and signal cables (including connectors), antenna waveguide,
- Radar Cooling units such as the SPS-49 and SG-150/180, and
- Waveguide Air Dryers for all required antennas/radars.

New systems the shop has become involved with are:

SMART-S, SIRIUS, ELISRA, PMSC, STSCU, SEOSS and NESTRA.

Special skills and expertise

Hydraulic/Pneumatic Overhaul and Test Facility.

Climbing and working at height and are very well versed in RADHAZ precautions and lock-out procedures.

A high degree of knowledge and experience allows technicians to repair equipment that is no longer supported.

OEMs for new equipment often seek assistance from the antenna shop for support and to conduct repairs.

Control Systems

Purpose

The Monitoring & Control Systems work centre is responsible for the maintenance and repair of MSE fleet and shore based equipment that monitors and controls the operation of almost all marine systems equipment and any processes related to this equipment.

Capabilities:

- Maintenance of the IPMS ship Machinery Control and Monitoring System
- Maintenance of the Submarine Control and Monitoring System
- Maintenance of RAST and CRAFT Systems
- Shop holds special equipment required to calibrate numerous types of gauges and controls systems components

Special Skills and Expertise:

High degree of specialist Electronic and Instrumentation Technician Skills with specialist training.

Sonar and CANTASS Shop

Purpose

Conduct all Planned and Corrective Maintenance (Mechanical and Electronic) on Ship and Submarine Sonar Systems and Canadian Towed Array Sonar System.

Capabilities:

Submarine Sonars – 2008, 2040, 2007, 2046, 2004, 2071, 2073, Mark 8 Bathy, Multi-Purpose PC, BSSU, 778, 780 and PRS;

Surface Sonar – HMS 510, Underwater Telephone, SPS, Echo Sounders, Maps, C5 Dome S.E.T.'s, Nixie and Bathy; and

CANTASS – Towed Array Group System, Cable, and Module Repair.

Special Skills and Expertise

The shop has an extensive in-house repair and overhaul facility to carry out more complex and extensive repairs to the circuit card and modular level (CANTASS). Including special pressure testing of CANTASS cables and submarine components.

Sonar Electronics and Fire Control Electronics

No direct notes

NAVIGATIONAL AIDS SHOP:

Purpose

To carry out Preventative and Corrective Maintenance on various Navigational Systems

Capabilities

- Stabilized Horizon Bar Reference System (SHRS)
- CCTV Camera Systems (p/o IPMS) – Upper decks only
- SHINNADS
- Mk49 Inertial Gyro System
- Shipboard Clock System
- SRD331 Doppler Speed Log
- Wind Direction & Speed Detection and Display Systems
- Sea Tel Satellite TV System
- Navigation Data Distribution System (NDDS)

Special skills and expertise

- Maintenance of equipment of this nature requires a high degree of knowledge skill and training,
- Ability to carry out all Meter Testing/Calibration for most ship and submarine systems.
- Extensive experience/knowledge of these systems garnered through both formal training and “hands-on” experience.

CREW SHOP:

Purpose

The purpose of the shop is to complete Planned and Corrective Maintenance on Radar and Electronic Warfare Equipment

Capabilities

- Long Range and Navigational Radar systems,
- Command and Control Systems
- Electronic Warfare systems or Surveillance systems

Special skills and expertise

- In shop testing through the use of new test equipment, such as the newly installed DLPS test bed and soon to be installed ELISERA and 3D Radar systems.
- One time, specific technical and faultfinding training received from the primary FELEX contractor (LMC Canada).
- Technicians receive specialist training for the equipment they maintain

Communication Shop

Purpose

To carry out Planned and Corrective maintenance on Communication equipment for HMCS Ships and land facilities

Capabilities

- HF Transmit and Receive
- Seclan
- Satellite Communications systems (DAMA and STSCU)
- Interior communications Systems (Shincom and Main Broadcast)
- Sarts and Epirbs (distress beacons required for ship to go to sea)
- SARSAT 639 Buoy (distress beacons required for sub to go to sea)
- Shincom 3100

Special skills and expertise

- Working on Ship and Submarine Communications Equipment requires a high standard of training and usually requires specialist coursing
- Maintain systems that the OEM is no longer supporting
- Repair equipment down to circuit board level

Submarine Electrical Shop

Purpose

The shop performs planned and corrective maintenance on submarine Power Generation and Distribution systems.

Capabilities

- The Sub Electrical shop is responsible for installing, overhauling and assisting with trials on
 - 440V AC and DC systems
 - 115V 60Hz and 400Hz Systems
 - 24V DC systems
- Motor Generator sets and Associated PG and D systems
- Submarine Main Propulsion Motor and associated Control Systems

Special Skills and Expertise

- Fully conversant with Submarine Direct Current Systems – DC is not widely used in the RCN so skill set is unique
- Installation of Pressure Hull penetrations and conduit that has to withstand deep dive pressures.

Battery Shop

Purpose

To conduct all Planned and Corrective Maintenance on Batteries and related systems

Capabilities

- The Battery shop commissions, maintains, tests and decommissions all types of batteries (submarine main battery, UPSs, forklift batteries, etc.) wet and dry cells.
- Maintains various ship's systems such as shaft grounding (active and passive), cathelco and cathodic protection. Manufactures and maintains shore power and load bank cables.
- Battery shop rebuilds/repairs National Inventory equipment such as lights, battery chargers, and UPSs and battery packs for HMCS frigates emergency lighting.
- The shop provides DC load bank services for various applications for the fleet.

Special Skills and Expertise Battery work is in itself a specialist area especially with regard to the wet cell technology and the sizes of battery cells used in the submarine fleet

Shipwright Shop

Purpose:

To Support all Preventative and Corrective Maintenance including removal and install of old and new equipment with Shipwright services, including manufacture of wood items.

Capabilities

- Erect and inspect staging internal, external, at deck level and up masts.
- Wood working such as building cabinets, galley baker tables, work benches, skids, pallets, shadow boxes, plaques, podiums, mock ups for the submarines when ECs are being assessed, engine generator cradles, shipping crates, etc.
- Shipboard tile work and acoustic tile work for Victoria Class Submarines.
- Fabricate and install ship's crests out of both wood and vinyl tile.

Special skills and expertise:

- Responsible for docking ships and submarines on the Synchrolift and marine railway.
- Specialist training in staging erection and inspection to Federal standards

Paint Shop

The purpose of the shop:

To Support all Preventative and Corrective Maintenance with all Painting / Coating Services

Capabilities

- Scale and paint numerous spaces and equipment onboard HMC ships.
- Perform red lead removal onboard HMC ships when required.
- Spray booth painting in shop on equipment that is to be reinstalled onboard HMC ships.
- Various form of grit blasting such as powder blasting, glass bead, walnut shells etc., to clean metal in preparation for work.
- Powder coating booth.

Special skills and expertise

Specialist Training in all aspects of Ship and Submarine related Painting and Coating. Red Lead abatement