NORFOLK NAVAL SHIPYARD
FLEET MAINTENANCE
SUPPORT BRANCH

Lesson Topics
For
Operating Unit Training (OUT)

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INFORMATION FOR THE TRAINING COORDINATOR

- FMSB normally provides each attendee a student guide. The student guide is customized for the selected training and is provided to the attendee to keep notes and for information after the training. The classroom must have desk or tables to comfortably accommodate the student guide and any other reference material (workshops, handouts, drawings). Allowing students this space will greatly enhance the training and improve the students’ ability to retain information covered in the lessons. The student guides are “FOR TRAINING USE ONLY”.

- The hosting activity must identify and enforce the prescribed uniform of the day and military demeanor for attendees. The hosting activity should identify the senior attendee and designate that person as liaison for the class on military matters. FMSB is not in a position of military authority.

- Ideally, an E-7 or above should be scheduled to attend the training. In the event, an E-7 or above is not scheduled to attend, the hosting activity should schedule to have an E-7 or above visit the training at random intervals several times a day. This can be rotated among the various activities. FMSB cannot be responsible for attendees sleeping or leaving class.

- The hosting activity is responsible for the security requirements for FMSB and the attendees. FMSB will provide staff security clearance information in advance to the host. Time delays have been experienced due to that information not being conveyed to the proper authorities. When selecting a training location, the host must provide adequate overnight storage for training materials. As a minimum, most student guides are NOFORN and must be properly stored after hours.

- The hosting activity should carefully match the attendees to the selected topics. Sending craftsman to package writing topics or sending package writers to hands-on craftsman training is a waste of time and money.

- FMSB requests a list of attendees five (5) working days prior to the start of the training. The list may be sent by fax or e-mail (preferred). Please include full name, rate, applicable qualification status, activity and division. This list should identify the class military leader. Alternates should be assigned to fill billets in the event of a last minute cancellations.
FLEET MAINTENANCE SUPPORT BRANCH TRAINING TOPICS

### INTRODUCTION TO TECHNICAL WORK DOCUMENTS AND QA FORMS (5 To 6 Hours)

- Review the origin of basic maintenance principles and the development of processes (procedures) used to guide craftsmen in the performance of Quality Maintenance and ensuring Quality Assurance requirements are met where applicable.
- Explanation and examples of Formal Work Package elements.
- Controlled Work Packages, Objective Quality Evidence and comprehensive review, including block by block explanation, of QA Forms 9, 10, 17, 26, 34 and 34A.

**Target Audience**: Anyone who prepares or reviews TWDs  
**Class size**: Limited to the size of the classroom.  
FMSB request copies of applicable local instructions two weeks prior to the training.

### TECHNICAL WORK DOCUMENT DETERMINATION WORKSHOP (3 To 4 Hours)

- Poses different maintenance scenarios in which students are required to determine the appropriate TWD to perform the given maintenance action.
- Students develop decision processes to determine if the systems and components to be worked are Nuclear or Non-nuclear, Level I or Non-level, and whether the maintenance actions are within SUBSAFE and Hull Integrity Boundaries.
- Where CWPs are selected, students determine which QA forms are necessary to be incorporated to adequately document the work and required testing.
- Introduction to TWDs is prerequisite. Best if Controlled Material, and Testing lessons are also completed prior to the workshop.
- Can be tailored to specific type (SSN, SSBN, CVN, MTS).
- Requesting activity will be required to provide their own classified references, such as the applicable Reactor Plant and Steam Plant Manuals, General Reactor Plant Overhaul and Repair Specification, and Nuclear/Non-Nuclear Interface Diagram.

**Target Audience**: Anyone who prepares or reviews TWDs  
**Class size**: Limited to the size of the classroom.  
FMSB request copies of applicable local instructions two weeks prior to the training.

### WORK PROCEDURE CUSTOMIZING AND TAILORING (2 To 3 Hours)

- Provides Planners and Supervisors with guidelines and processes for:
  - TWD appearance and formatting.
  - Detail in procedural steps and step numbering.
  - Use of CAUTIONS and NOTES.
  - Use of margin symbols, work center designators, signature blocks, and Q-points.
  - Incorporating information from reference documents.
  - Use of Standardized Formal Work Packages.
- Overview of TWDs used for troubleshooting.
- Overview of Emergent Controlled Work.

**Target Audience**: Anyone who prepares or reviews TWDs  
**Class size**: Limited to the size of the classroom.  
FMSB request copies of applicable local instructions two weeks prior to the training.
<table>
<thead>
<tr>
<th>RECORDS (1 Hour)</th>
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<tbody>
<tr>
<td>• Review of higher authority record requirements for Nuclear, Level I, and SUBSAFE work.</td>
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<td>• “Stand Alone” philosophy.</td>
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<td>• Retention requirements for FWPs and CWPs.</td>
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<tr>
<td>• Other QA Record retention requirements specific to the maintenance organization.</td>
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<tr>
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<thead>
<tr>
<th>REVIEW AND APPROVAL (1 Hour)</th>
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<tbody>
<tr>
<td>• Review and approval requirements for various TWDs, including closeout review and final certification.</td>
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<tr>
<td>• Use of the QA Form 11 log.</td>
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<tr>
<td>• Use of the review and approval matrix.</td>
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<th>CHANGES TO TECHNICAL WORK DOCUMENTS (1 To 2 Hours)</th>
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<tr>
<td>• Pen &amp; Ink, including Technical Pen &amp; Ink changes.</td>
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<tr>
<td>• Rework Addendums.</td>
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<tr>
<td>• Revisions, including Attachments, Supplements, Voiding, Cancelling.</td>
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<tr>
<th>PLANT CONDITIONS (4 Hours)</th>
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<tbody>
<tr>
<td>Content: Barrier Criteria, Major Plant Conditions (Primary), Major Plant Conditions (Secondary), Temporary Support Equipment, Freeze Seals, Lineups and Tagouts, Source Documents.</td>
<td></td>
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<tr>
<td>Target Audience: Anyone who prepares or reviews TWD for Naval Nuclear Propulsion Plants at the Fleet Maintenance Activity.</td>
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<tr>
<th>CONTROLLED MATERIAL (NUCLEAR AND NON-NUCLEAR) (7 Hours)</th>
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<tbody>
<tr>
<td>Content: The main objectives of this lesson are to cover the basic requirements dealing with Controlled Material. This lesson combines the nuclear and non nuclear requirements as they relate to the source document (MCS- 7010), level of essentiality, material identification and control (MIC), segregation and handling and quality assurance forms. Workshops: Receipt Inspection Workshop, Self Assessment Workshop, QA Tag Workshop (if the QA Forms lecture is not requested) and Level of Essentiality Workshop.</td>
<td></td>
</tr>
<tr>
<td>Target Audience: Anyone who orders, controls, handles, or installs Controlled Material.</td>
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<tr>
<td>Class size: Limited to the size of the classroom.</td>
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<tr>
<td>FMSB request copies of applicable local instructions two weeks prior to the training.</td>
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# Nuclear Support Facilities and Controlled Industrial Facilities (3 Hours)


**Target Audience:** Anyone who prepares or reviews TWDs for NSFs/CIFs.

**Class size:** Limited to the size of the classroom.

FMSB request copies of applicable local instructions two weeks prior to the training.

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# RX Plant Alterations and Modification Status Reports - SHIPALTS: (4 Hours)

**Content:** Introduction, types of modifications, Ship Alterations (SHIPALTS), SHIPALT Approval Record (SAAR), SHIPALT Title, SHIPALT Identification, SHIPALT Instructions and Drawings, SHIPALT Material, SHIPALT Completion Reporting, Reactor Plant Ship Modification (RPSM) work packages, Ship Modification Instructions (SMI), Ship Modification Drawings (SMD), SHIPALT Cross Reference Parts Lists, RPSM identification, Field Change Work Packages, Field Change Instructions, Transmittal letter, Field change identification, A & I Items, A & I Instructions (AII), Status Reports, Type Commander Alteration Management Systems (TAMS), Nuclear Alteration (NUCALT) Data Procedure Reports, Post Modification Reports, Ship Selected Record Data.

**Workshops:** Reactor Plant Configuration Change Report (RPCCR) scenarios.

**Target Audience:** Anyone who prepares or reviews SHIPALT Documents.

**Class size:** Limited to the size of the classroom.

FMSB request copies of applicable local instructions two weeks prior to the training.

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# Training and Qualification (1 Hour)

**Content:** An overview of the training responsibilities, training requirements and topics, organization and implementation of the training plan, testing and evaluation processes, Qualification records. Information is referenced from the JFMM and PQS.

**Target Audience:** QAS/QAO.

**Class size:** Limited to the size of the classroom.

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# Submarine Safety – SUBSAFE (5.5 Hours)

**Content:** Background, SUBSAFE Program and Organization, Material Certification Requirements, Certification Process: Initial and Maintenance, Re-Entry Control Program, Reactor Plant Work Accomplishment Report (RPWAR), QAO Responsibilities: ISIC QAQ, Submarine QAQ, and FMA QAQ.

**Target Audience:** Anyone who prepares or reviews TWDs for SUBSAFE work, Submarine and ISIC QAQ/AQAO, QAS, supervisors, division officers.

**Class size:** Limited to the size of the classroom.

FMSB request copies of applicable local instructions two weeks prior to the training.
<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Duration</th>
<th>Content</th>
<th>Target Audience</th>
<th>Class size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SYSTEM REPAIR REQUIREMENTS:</strong> (4 Hours)</td>
<td></td>
<td>General Maintenance Precautions, Piping Procurement and Inspections, Minimum Pipe Wall Thickness, Fitting Procurement and Manufacture, Pipe Hanger Requirements, Lagging Requirements, Removal and Reinstallation, Using Substitute Material.</td>
<td>Anyone who prepares or reviews TWDs or personnel assigned to due system turnover inspections or MCAP inspections.</td>
<td>Limited to the size of the classroom.</td>
<td>FMSB request copies of applicable local instructions two weeks prior to the training.</td>
</tr>
<tr>
<td><strong>DEPARTURE FROM SPECIFICATIONS</strong> (2 Hours)</td>
<td></td>
<td>The Departure From Specification (DFS) topic introduces students to both the manual, naval message, and electronic versions of the QA form 12 as provided by Chapter 8, Volume V, Quality Maintenance of the Joint Fleet Maintenance Manual, COMFLTFORCOMINST 4790.3. The topic will introduce students to the terminology, types of approval, and administrative requirements for both submarine and surface ships. The topic will discuss how to determine if a DFS is major or minor, temporary versus permanent, as well as how, when, and who may grant approval. The topic will also discuss the electronic DFS system and will include familiarization with the various program screens, security, approval and account access.</td>
<td>Quality Assurance Officers and Assistant Quality Assurance Officers, Quality Assurance personnel, TWD Writers.</td>
<td>Limited to the size of the classroom.</td>
<td>FMSB request copies of recent audit findings two weeks prior to the training.</td>
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<tr>
<td><strong>LIAISON ACTION REQUEST (LAR):</strong> (1 Hour)</td>
<td></td>
<td>Reactor Plant Planning Yards/Prime Contractors/Support Organizations Services; Identifying the Addressee, LAR Format, Minimum Required Information, Copies, Responses to an LAR, Nuclear Liaison Inquiries</td>
<td>Anyone who prepares or reviews LARs.</td>
<td>Limited to the size of the classroom.</td>
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<tr>
<td><strong>UNRESTRICTED OPERATION MAINTENANCE REQUIREMENT CARD (URO/MRC) REQUIREMENTS</strong> (3 Hours)</td>
<td></td>
<td>Background, URO/MRC Program Requirements, URO/MRCs, Accomplishment of URO/MRCs and URO/MRC Program Responsibilities</td>
<td>Anyone who prepares or reviews TWDs for SUBSAFE work, Submarine and ISIC QAQ/AQAO, QAS, supervisors, division officers.</td>
<td>Limited to the size of the classroom.</td>
<td>FMSB request copies of applicable local instructions two weeks prior to the training.</td>
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</tbody>
</table>
## TECHNICAL REFERENCES (12 Hours)


Workshops: Packing Replacement, Recognize Parts of a System Diagram, Identifying CFE/GFE components, Component Replacement Manual Exercise, Identify Drawing Revision Source, Basic Valve Technical Data Research (0989-150-0000), Basic Valve Technical Data Research (0948-012-5000),

Note: A workshops are written and require reference material, which can be supplied by FMSB or the activity.

Target Audience: Anyone who prepares or reviews TWD.
Class size: Limited to the size of the classroom.

## REACTOR PLANT/STEAM PLANT CLEANLINESS (12 Hours/ 8 Hours Without Workshops)

Content: Introduction, definitions, determine systems/components, Volume V, JFMM review of cleanliness requirements, maintenance of Steam Plant Cleanliness (Temporary Covers/Plugs, Cleaning following maintenance, Completion of Work), control of Foreign Material (Desiccants and Preservatives, Detrimental Materials, Lubricant and Sealants, Tools and Maintenance Supplies, and Support Systems), establishing Steam Plant Cleanliness (Mechanical Cleaning, Chemical Cleaning, Flushing and Steam Cleaning), verification of Steam Plant Cleanliness (Visual Inspection and Flushing), control of foreign material and acceptance Criteria.

Workshops: Install cleanliness plugs in pipe and valve ports, use borescope to find objects in pipe and components, finding the correct size plug for the job.

Target Audience: Anyone who prepares or reviews TWDs for Reactor Plant, Steam Plant, Craftsman, Inspectors, Supervisors, Division Officers, and Quality Assurance Supervisors.
Class size: Limited to the size of the classroom.
FMSB request copies of applicable local instructions two weeks prior to the training.

## STEAM PLANT CLEANLINESS (8 Hours)


Workshops: Self Assessment, build cleanliness plugs (type B non-expandable and Snap plug), install cleanliness plugs in pipe and valve ports, use a borescope to find objects in pipe and components, and find the correct size plug for the job.

Target Audience: Anyone who prepares or reviews TWDs for Steam Plant, Craftsman, Inspectors, Supervisors, Division Officers, Quality Assurance Supervisors.
Class size: Limited to the size of the classroom.
FMSB request copies of applicable local instructions two weeks prior to the training.
STEAM PLANT VALVE GASKET SEALING SURFACE REPAIR: (2 Hours Lecture/Demo & 1 Hour Workshop)

Content: Lecture and demo on the use of the carbide cutter counterbore refurbishment tooling IAW NAVSEA 0948-LP-012-5000 Appendix 4/B.
Target Audience: Craftsman and supervisors.

Workshops: Supervised workshops for hands-on use of tooling. Workshop addresses all disciplines required for tooling use; Technical, quality assurance, and cleanliness. Workshops are 1 hour per group of 2 students. 32 hours of training (8 hours per day) will accommodate 60 students; 2 hours for lecture/demo and 30 hours for workshops (30 groups of 2 students per workshop cycle).

Class size: Limited to the size of the classroom for the lectures/demos and the agreed upon hours of workshops.

NOTES:
- Supervisors are encouraged to attend. Supervisors are not included in the count for workshops unless they participate as a student.
- FMSB recommends packaging this topic module with the steam plant cleanliness module topic and the steam plant valve seat repair topic module. Please refer to the notes for the Steam Plant Valve Seat Repair topic module for an example of the package hours.
- Number of students training will accommodate as discussed above is based on 1 instructor per workshop.

STEAM PLANT VALVE SEAT REPAIR: (4 Hours Lecture/Demo & 4 Hours/FAM Cycle)

Content: Lecture and demo on steam plant valve seat repair using carbide cutter seat repair tooling IAW NAVSEA 0948-LP-012-5000 Appendix 4/A.
Target Audience: Craftsman and supervisors.

Workshop: Supervised workshops for hands-on use of tooling. Workshop addresses all disciplines required for steam plant valve seat repair using the carbide cutter seat repair tooling; Technical, quality assurance, and cleanliness. Workshops are 3 hours per group of 2 students. 32 hours of training will accommodate 14 students; 4 hours for lecture/demo and 28 hours for workshops (7 groups of 2 students per workshop cycle).

CLASS SIZE: Limited to the size of the classroom for the lectures/demos and the agreed upon hours of workshops.

NOTES:
- Supervisors are encouraged to attend. Supervisors are not included in the count for workshops unless they participate as a student.
- Workshops are 3 hours per group of 2 students. 32 hours of training (8 hours per day) will accommodate 14 students; 4 hours for lecture/demo and 30 hours for workshops (30 groups of 2 students per workshop cycle).
- FMSB recommends including a modified version of the steam plant cleanliness topic module and the counterbore refurbishment tooling topic module with this topic module. The hours and number of students trained will change as follows: 32 hours of training (8 hours per day) will accommodate 12 students; 3 hours of lecture & workshops for cleanliness specific to repairing steam plant valves, 2 hours of lecture & demo for counterbore refurbishment tooling use, 3 hours of lecture/demo for carbide cutter seat repair tooling, and 24 hours of workshops (12 students) for FAM cycles using both seat cutter and counterbore refurbishment tooling.
- Number of students training will accommodate as discussed above is based on 1 instructor per workshop. FMSB will provide 2 instructors for modified version of training to accommodate 24 students total for 32 hours training.
**SYSTEM/COMPONENT RECERTIFICATION TESTING (6 Hours)**


Workshops: Nuclear pressure test determination workshop. Non-nuclear pressure test determination workshop.

**Target Audience:** Anyone who prepares or reviews TWDs.

**Class size:** Limited to the size of the classroom.

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**PRIMARY VALVE REPAIR REFRESHER (32 Hours)**

Content: This module covers a typical valve repair from start to finish, excluding welding. The course is based on the repair of a 1-inch standard Navy nuclear globe valve. This course incorporates the quality assurance and radiological controls work practices normally encountered during this type of work. Sub-topics include canopy cutting, valve bonnet removal, weld remnant removal, packing removal/replacement, seat repair, and bonnet reinstallation (including final disc-to-seat blue checks). Seat repair techniques taught in the course use the direct-seated carbide cutter seat repair tool kit.

**Target Audience:** Any Fleet Maintenance Activity with the capability of repairing primary plant valves.

**Class size:** 6

**NOTE:** This training may be customized to provide “just-in-time” training for a specified job.

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**AUDITS: (2 Hours)**

Content: The Local Audit Program, Root Requirements, Preparations, Audit Execution Techniques, Documentation, Examine Trend Analyses.

**Target Audience:** Quality Assurance Supervisors, Quality Assurance Officers, Leading Chief Petty Officers and Division Officers.

**Class size:** Limited to the size of the classroom.

FMSB request copies of recent audit findings two weeks prior to the training.

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**NUCLEAR/NON-NUCLEAR INTERFACE: (2 Hours)**

Content: Nuclear/Non-Nuclear Interface Responsibilities, Non-Nuclear Controlled Material Requirements, Non-Nuclear Testing Requirements (NSTM 505 Hydrostatic Test Requirements), Departure From Specifications (DFS)

**Target Audience:** Anyone who prepares or reviews Technical Work Documents, Quality Assurance Supervisors, Quality Assurance Officers, Leading Chief Petty Offices and Division Officers.

**Class size:** Limited to the size of the classroom.

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**PRIMARY VALVE REPLACEMENT REFRESHER (REVERSE SEATED) (32 Hours)**

Content: Typical valve replacement of a 1” reverse seated globe valve from start to finish. This course incorporates all quality assurance and radiological controls work practices normally encountered during this type of work. Topics covered are: piping penetration using a three wheel roller cutter, pipe end preparation, manufacture and installation of in/out purge rigs, and piping fitup using consumable inserts.

**Target Audience:** Any Fleet Maintenance Activity with capability of replacing a reverse seated primary valve.

**Class size:** 4

**NOTE:** Primary valve replacement is available as a stand-alone module or may be included in this by adding 16 hours.
**FLEET MAINTENANCE SUPPORT BRANCH TRAINING TOPICS**

### PRECISION MEASURING: (8 Hours)
**Content:** Three hours lecture on precision measuring devices including basic measuring tools (steel rule, thickness gauge, telescoping gauge, and surface finish comparator), micrometers, calipers, and protractors. Includes supervised workshops where attendees use various FMSB provided measuring devices on a mockup. Immediate feedback is provided to enhance skills of the craftsman.
**Target Audience:** Junior Craftsman, Junior Inspectors, and Division Officers.
**Class size:** Limited to the number of provided measuring devices. If required, multiple workshops can be scheduled.

### CUTTING TOOLS REFRESHER (32 Hours)
**Content:** Operation and periodic maintenance on the machines used in S9211-66-MMA-000, Cutting Tools for IMAs and CVNs. These tools are used for cutting valve and valve cap canopies, performing weld preparations following canopy penetration/bonnet removal, cutting and weld prepping piping, and miscellaneous other uses. Topics include Cutting Tool Maintenance, Installation/operation of canopy cutting machine, Installation/operation of #2 universal machine, Hand Operated cutting tools; 3-wheel roller cutter, pipe cutoff, end-prep machine. This class is mostly hands-on type of training where the students disassemble/inspect and reassemble all tools prior to use. Both air and hand driven tools are used in this class.
**Target Audience:** Any Fleet Maintenance Activity with capability of replacing/repairing primary valves.
**Class size:** 4
**NOTE:** This module may be customized to provide "just-in-time" training for a specified job.

### PRIMARY VALVE OPERATOR TRAIN THE TRAINER (Approximately 72 Hours)
**Content:** FMSB will conduct the entire PVO course with the Trainer Candidates (TC). After FMSB has conducted the entire course, each TC will be required to present a portion of the lecture phase of the course using the FMSB provided PowerPoint presentation and the commands computer equipment. Each TC will be required to conduct both a familiarization cycle and a graded practical using command provided material and mock-ups. Immediate feedback will be provided to the TC and a summary will be provided to the command. The command qualifying officer (Reactor Mechanical Officer, Staff Training Officer, and Division Officer) is encouraged to attend when practical. The command has the final authority in determining each candidate’s fitness to present the course.
**Target Audience:** Senior E-5, E-6 and CPOs that will be conducting the PVO training.
**Class size:** 8
**NOTE:** FMSB will provide a materials list and copies of all training materials four weeks prior to the training. Each command is encouraged to provide the TC time to review the material to prepare for the course. The host command should have on hand all material identified in the provided materials list and a computer with PowerPoint. FMSB should be notified of any tools or materials not available prior to the course convening.