# CMEO for Engineers

## 1. Course Content

The following courses comprise the MSC CMEO for Engineers:

- AVCERT (Aviation Certification)
- Chemicals & Commodities Contract/ Chemical Testing & Treatment
- Condition Monitoring System (CMS)
  - Reciprocating Analysis (Diesel Doctor)
  - Vibration Analysis
  - Special Tests
  - Lube Oil Analysis
- SAMM Corrective Maintenance
  - Work Requests
  - Ship's Force Work List (SFWL)
  - Voyage Repair Request (VRR)
- Energy Conservation (ENCON)
- Fuel/Lube Oil & Paint Contracts, Theory, Analysis, Sampling & Testing
- SAMM Virtual Technical Library (VTL)
- Intro to Shipboard Automated Maintenance Management (SAMM)
- Logbook
- LogiQuest
- Machinery Alignment
- SAMM Planned Maintenance
  - Workbook
  - PM Module in SAMM
- ESR/VSA
- Root Cause Analysis (RCA)
- Reliability Centered Maintenance (RCM)
- SAMM User Utilities
- ShipClip

## 2. Prerequisites

No Prerequisites: This course is designed for all MSC and Contract Engineers.

## 3. Administration

Course registration is online at http://mscn7training.com. The course is required every 5 years for all contract shipboard engineers. Completion of the course requires 100% attendance as well as passing an assessment to prove competence in the following areas:

- Logbook
- SAMM
- VMS
- Diesel Doctor

## 4. Schedule

The courses are conducted over a period of <u>5 days</u>, starting at 8:00 on Monday and ending at 5:00 on Friday. The maximum course size is 18 students on a first come first served basis. The courses are taught by Emprise, MSC, and Contract personnel. Junior Officers (3rd & 2nd AE) and Senior Officers (1st AE and CE) may choose to attend different sections in the afternoon of Day 2: Junior officers should take Vibration and RA labs, while Senior officers take SAMM Utilities.

The schedule is as follows:

| CMEO AFLOAT TRAINING – ENGINEERS | | | | | |
|---|---|---|---|---|---|
| **Location: EMPRISE, Chesapeake, VA** | | | | | |
| | **MONDAY** | **TUESDAY** | **WEDNESDAY** | **THURSDAY** | **FRIDAY** |
| **08:00-0900** | MSC Maintenance Philosophy & Reliability Centered Maintenance (RCM) | SAMM Workbook | SAMM Corrective Maintenance | ESR/VSA | ShipClip |
| **0900-10:00** | | | | AVCERT | |
| **10:00-11:00** | Root Cause Analysis (RCA) | SAMM Vibration Analysis (VMS) | SAMM Machinery History | ENCON | |
| **11:00-12:00** | | | | | LogiQuest |
| *12:00 - 1:00* | ***Lunch*** | ***Lunch*** | ***Lunch*** | ***Lunch*** | ***Lunch*** |
| **1:00- 2:00** | Intro to SAMM | SAMM Reciprocating Analysis (RA) | Logbook | FO/LO & Paint Contracts & Analysis Lube Oil Theory, Sampling & Testing | Chemical & Commodities Contracts Chemical Testing & Treatment |
| **2:00-3:00** | SAMM VTL/Training | | | | |
| **3:00-4:00** | SAMM Planned Maintenance (PM) | SAMM Vibration Lab / SAMM RA Lab | SAMM Utilities | Machinery Alignment | |
| **4:00 -5:00** | | | | SAMM Assessments | |

## 5. Course Descriptions:

AVCERT: This module covers Aviation re-Certification requirements and the necessary preparations required to ensure the vessel is ready for its recertification inspection. This particular module is tailored for the preparations required by the ship's engineers.

CMS – Condition Monitoring System: This module provides instruction on the different Condition Monitoring System items contained in the SAMM program. Each course will cover interpretation of data and the required action for any alert generated by one of the technologies in the CMS module.

- Reciprocating Analysis – How to use the Diesel Doctor software in SAMM to review reciprocating analysis data for validity and repair recommendations. Brief instruction on the junior engineer process to collect combustion data, including possible sources of incorrect data and actions if invalid data is collected.
- Vibration Analysis – How to use the VMS software in SAMM to review vibration data for validity and repair recommendations. Brief instruction on the junior engineer process to collect vibration data, including possible sources of incorrect data and actions if invalid data is collected
- Special Tests – How to review special test data in the CMS module in SAMM.
- Lube Oil Analysis – How to review Lube Oil Analysis results in the CMS module and actions to take for LO Analysis alerts.

Chemical & Commodities Contracts / Chemical Testing & Treatment: This module introduces users to the MSC Chemical contract – purchasing requirements, other information required for purchasing and tracking chemicals for engineering use. MSC policies and procedures for chemicals will be provided. This module also introduces users to the Chemical products on the MSC Contract and how to access the Material Safety Data Sheets (MSDS) for proper stowage and handling instructions. The student will also be shown best practices for testing and applying treatment.

Corrective Maintenance: This module provides instructions on the process to initiate and complete a Corrective Maintenance action in the MSC SAMM Program. Instruction will include generating and managing departmental Work Requests (WR) and upgrading all work requests to Ship's Force Work List (SFWL) items or Voyage Repair Requests (VRR). Instructions and guidance on MSC required actions for each of the different repair types (WR, SFWL and VRR) will be provided during this instruction.

ENCON: This module provides information on the Energy Conservation Program, the regulations behind the program, and the various shipboard systems that can benefit from the application of operational and technological improvements designed to reduce energy consumption and improve reliability.

Engineering Status Report (ESR) / VSA: This module covers the report originally generated under MSC's RITEMOV initiative to move towards Vessel Self Assessments between SMART inspections, and the additional metrics involved.

FO/LO & Paint Contracts & Analysis / Lube Oil Theory, Sampling & Testing: This module covers fuel oil and lube oil types, the ordering procedure under SEACARD or NAVSUP, the Paint Contract details, sampling procedures, testing and analysis, regulatory requirements, shipboard records (e.g. NEURS), and sample shipping procedures.

Logbook: This module provides instruction on the use of an electronic log keeping system for the Engine Department, employed throughout MSC's fleet. This section includes instruction on generating the monthly NEURS report.

LogiQuest: This module instructs the user on how to identify replacement parts by National Stock Number, commercial part number, or by equipment information. This module builds upon the ShipClip module by showing how to access detailed parts information missing from other ship's databases, or when the need arises to cross reference between NSN and commercial part numbers, especially when those numbers have been changed by the OEM.

Machinery Alignment: This module covers issue associated with alignment methodology and issue associated with misalignment, how these issues can be corrected, and how they affect machinery wear and vibration.

Machinery History: This module covers how to review all history (Maintenance, Corrective, CMS, Other) and print reports for inspection and monitoring evolutions. The user will print several reports under instruction based on previous inspections and common reports requested by regulatory organizations.

Planned Maintenance: This module covers the MSC Planned Maintenance process. Students will be shown how to locate and complete any assigned maintenance item, whether scheduled in the Workbook or unscheduled. Included in the presentation is a discussion on the Planned Maintenance (PM) feedback process, showing students the flow-path of all feedback and a method to review status of any feedback item written.

Pump Alignment: This module covers basic alignment theory and a discussion on common alignment errors and corrections, such as soft-foot, bar sag, piping stress, and thermal growth. Students will also learn a procedure to perform alignment by dual indicator alignment procedure with only one indicator and a commercially available Microsoft spreadsheet (Excel). Other methods to align belt driven units and mechanical couplings are also discussed.

RCA: This module covers the need for Root Cause Analysis in sorting symptoms from causes as an effective way to address, reduce or prevent future failures. Techniques to reduce perceptual blindness and bias, with tools available to assist with determining root causes are discussed along with methods on how to gather reliable information from operators and repair contractors. Proper use of RCA techniques allow users to identify potential issues on other equipment across multiple systems, ships, and ship classes.

RCM: This module focuses on Reliability Centered Maintenance; the practice of doing the right maintenance at the right time to reduce costs and downtime while eliminating unnecessary or ineffective maintenance. This module, together with the one on RCA, explain how best to identify and justify the need for changes to PMs when submitting Feedback change requests.

SAMM Intro: This module covers the architecture, purpose, and use of MSC's Shipboard Automated Maintenance Management system. Common terminology, common features and the Navigation/Search features will be taught during this course. Included in this section is a description of each Tab in the SAMM Dashboard and how each tab applies to the overall management of the vessel's maintenance.

SAMM User Admin: This module will cover how to add or deactivate a user in the SAMM program, verify the user's individual module permissions and log on credentials for SAMM.

ShipClip: This module focuses on the ship's logistical supply program; parts identification, location, ordering, and equipment specifications.

VSA: This module covers MSC's initiative to move towards Vessel Self Assessments between SMART inspections.

VTL: This module focuses on MSC's Virtual Technical Library, what it contains, how to access its information, and how it is used by ship and shore personnel.