I.M.A.
ASSESSMENT AND TRAINING CENTER INC

MAN B&W (ME-C) FAMILIARIZATION TRAINING

REVISION 1,
ISSUED: AUGUST 3, 2021

TRAINEES' MANUAL

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USERS GUIDE
ALLOCATION OF TOPICS / ASSESSMENT COVERAGE

Topic 1 for All Engineers and Electrician (ETO)
Topic 3 for Chief Engr., 2nd Engr., 3rd Engr. and Electrician (ETO)
Topic 2, 4, 5 & 6 for Chief Engr., 2nd Engr., and Electrician (ETO)

Course Topic	Chief Engr.	2nd Engr.	3rd Engr.	4th Engr. / Jr. 4th Engr.	Electrician
1. Introduction to the ME-C Engine					
2. ME-C Concept Engine Control System					
3. Engine Operation					
4. Hydraulic Cylinder Unit (HCU)					
5. Hydraulic Power Supply (HPS)					
6. EMS and PMI System – PMI Pressure Analyzers					

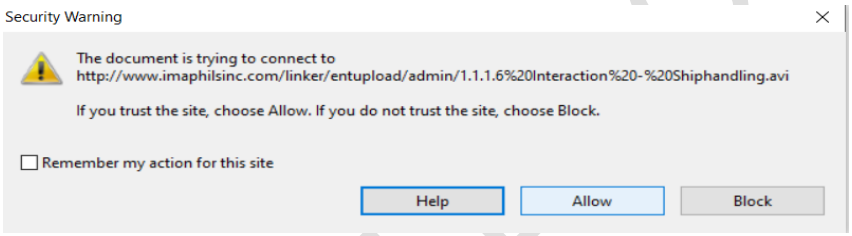
INSTRUCTIONS IN DOWNLOADING FILES
(PowerPoint Presentation, PDF Files and Video Clips)

IMPORTANT: Internet Connection is required.

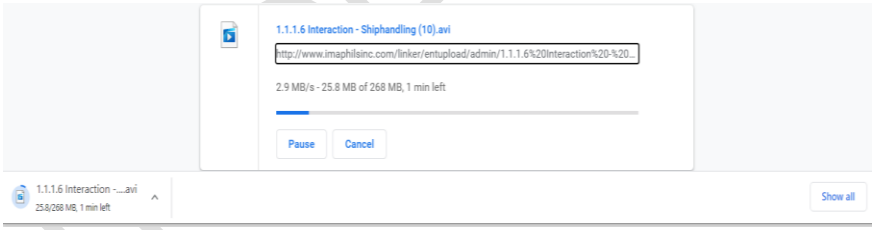
FOR LAPTOP USERS:

Step 1: Click the "LINK" to View & Download the file.

Step 2: On the Screen, below will appear, *click "ALLOW"*



Step 3: After clicking *"ALLOW".* File will be downloaded automatically.



Step 4: When downloading is complete, go to "*DOWNLOAD*" to view the File.

FOR MOBILE PHONE USERS:

Step 1: Click the "LINK" to download the file.

Step 2: On the Screen, you will be asked "Do you allow to download the file"?

Step 3: Click *"DOWNLOAD".* File will be downloaded automatically.

Step 4: When downloading is complete, go to "*DOWNLOAD*" to view the File.

SCOPE

This Course is designed and developed for all Marine Engineers and Electro-technical Officers (ETO) who will be working on board the ship with installed Electronically Controlled Marine Engine Propulsion made by MAN B&W. Understanding the principles of operation of modern two stroke diesel engines is the first step in being able to successfully operate and maintain them.

The Course meets the requirements of STCW Code:

1) Section A-III/1 and Table A-III/1 - Function: Marine Engineering at the Operational Level; Competence: Operate main and auxiliary machinery and associated control systems
2) Section A-III/2 and Table A-III/2 Function: Marine Engineering at the Management Level; Competence: Manage the operation of propulsion plant machinery and Manage operation of electrical and electronic control equipment
3) Section A-III/6 and Table A-III/6 – Specification of minimum standards of competence for Electro-technical Officers – Function: Electrical, electronic and control engineering at the Operational Level; Competence: Monitor the operation of electrical, electronic and control systems.

INTENDED LEARNING OUTCOME

On the successful completion of the Training Program, the Trainees should be able to have adequate knowledge and awareness with a practical understanding of the principles and design in tuning and balancing of the engine parameters which will improve specific fuel oil and the difference between MC Conventional Type Engines and ME Electronic Engines.

1. INTRODUCTION TO THE ME-C ENGINE*

Note: To Download the file, refer to page 4 of this Manual.

Link 1:
www.imaphilsinc.com/linker/entupload/admin/Topic1IntroductiontotheMEEngine(10Pages).pdf

Link 2:
www.imaphilsinc.com/linker/entupload/admin/Topic1IntroductiontotheMEengine(13Slides).pdf

1.1 Various Information (Abbreviation)*

Note: To Download the file, refer to page 4 of this Manual.

Link: www.imaphilsinc.com/linker/entupload/admin/Topic1.1VariousInformation-Abbrevations(2pages).pdf

1.2 List of ME Shut Down and Slow Down*

Note: To Download the file, refer to page 4 of this Manual.

Link:
www.imaphilsinc.com/linker/entupload/admin/Topic1.2ListofMEShutDownandSlowDown(1page).pdf

1.3 Description of Engine Control System*

Note: To Download the file, refer to page 4 of this Manual.
Link:www.imaphilsinc.com/linker/entupload/admin/Topic1.3DescriptionofEngineControlSystem(3pages).pdf

1.4 Checking and Maintenance Schedule, ME Engines*

Note: To Download the file, refer to page 4 of this Manual.
Link:www.imaphilsinc.com/linker/entupload/admin/Topic1.4CheckingandMaint.Schedule(7pages).pdf

Video Clips:

V1 Difference in ME & MC Engine (6:17) The Engine Room / MAN B&W Electronically Controlled Engine*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/V1-DifferenceinME&MCEngine(6m17secs).mp4
This video deals with the design evolution of MAN B&W engine.

V2 Design Difference Between MC and ME Engine of Exhaust Valve ME Engine Exhaust Valve (4:48)*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/V2-DesignDifferencebetweenMC&MEEngineofExhaustValve(4m48secs).mp4

Contents:
1) How Exhaust valve in ME series of MAN engine
2) Exhaust valve arrangement in MC series of MAN engine
3) How FIVA valve is controlling Exhaust valve actuation in ME engine
4) Why Exhaust cam arrangement is removed in ME engine
5) How Exhaust valve of MC and ME differ in design
6) Why Damper are provided in Exhaust valve

V3 Difference Between MC and ME Engine in Designing of Fuel Oil System Arrangement ME Engine|) (5:56)*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/V3-DifferenceBetweenMC&MEengineindesigningoffueloilsystem(5m56secs).mp4

Contents:
1) How fuel is injected in ME series of MAN engine
2) Fuel Pump arrangement in MC series of MAN engine
3) How FIVA valve is controlling fuel actuation in ME engine
4) Why fuel pump is removed in ME engine
5) How Arrangement is made

2. ME-C CONCEPT ENGINE CONTROL SYSTEM*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/Topic2MEConceptEngineControlSystem.pdf

Discuss the following ME-C Concept:

2.1 Control System
- 2.1.1 Multi - Purpose Controller
- 2.1.2 Control Network
- 2.1.3 Main Operating Panel
- 2.1.4 Local Operating Panel

2.2 Tacho System
2.3 Performance
2.4 Pneumatic Maneuvering System

Video Clip:

V4 Electronically Controlled Engines (ME Engines from MAN B&W) (2:50)*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/V4-ElectronicallyControlledEngines(MEEnginesfromMANB&W)(2m50secs).mp4
Animation Only – Illustration with text explanation

3. ENGINE OPERATION*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/Topic3EngineOperation.pdf

4. HYDRAULIC CYLINDER UNIT (HCU)*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/Topic4HydraulicCylinderUnit.pdf

4.1 Distribution Block
4.2 Components
- **4.2.1 FIVA**
- **4.2.2 Accumulators**
- **4.2.3 Cylinder Lubricator**

4.3 High Pressure Pipes
4.4 Troubleshooting using HCU Events – Examples of HCU Events from ME-ECS*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/4.4ExamplesofHCUEventsfromME-ECSver0.pdf

Video Clips:

V5 FIVA Valve ME Engine Basics (16:20)*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/V5-FIVAVALVEMEENGINEBASICS(16m20secs).mp4***

Contents:

1) *Compare Cam & Cam-less engines*
2) *FIVA Valve Operation*
3) *Internal Parts of FIVA*
4) *Hydraulic Diagram Explanation*
5) *MOP monitor CCU FIVA valve indication*
6) *Test*

V6 ME Engine FIVA Valve Operation (1:22)*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/V6-MEEngineFIVAValveOperation(1m22secs).mp4***

This animation was designed in MS Office Excel to explain the FIVA valve operation of ME Engines.

V7 Main Engine: FIVA VALVE: Trouble Shooting (7:43) Marine Tech Hub*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/V7-MainEngineFIVAVALVETroubleShooting(7m43secs).mp4***

V8 How to test FIVA and Calibrate Fuel Plunger (MAN B&W ME-C) 12:59)*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/V8-HowToTestFIVAandCalibrateFuelPlunger(MANB&WME-C)(12m59secs).mp4***

Contents:

1) Test FIVA Valve & Calibrate Fuel Plunger
2) How to reset Alarms after Calibration
3) How to change Inductive Sensor Fuel Plunger

5. HYDRAULIC POWER SUPPLY (HPS)*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/Topic5HydraulicPowerSupply.pdf***

5.1 System
5.2 Filter Unit
5.3 Startup Pumps
5.4 Engine Driven Pumps / Drive System / Pump Principle
5.5 Valve Block

6. EMS AND PMI SYSTEMS – PMI PRESSURE ANALYZERS –

(Computerized tool that replaces the indicator, used for performance evaluation)

6.1 On-line PMI System Pressure Analyzers*

Note: To Download the file, refer to page 4 of this Manual.

Link: ***www.imaphilsinc.com/linker/entupload/admin/Topic6.1OnlinePMIPressureSystemAnalyzer.pdf***

Video Clip:

V9 PMI Online Sensor Calibration Procedures (7:49)*

Note: To Download the file, refer to page 4 of this Manual.
Link: www.imaphilsinc.com/linker/entupload/admin/V9-PMIOnlineSensorCalibrationProcedures(SeaLegend)(7m49secs).mp4

7. CASE STUDY – MV STAR KARLIE

7.1 Continuous problem on ME Components*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.1CaseStudyContinuousProblemonMEComponents.pdf

7.2 5Y Service Report – ME Hydraulic & Control System*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.25YServiceReportMEHydraulic&ControlSystem.pdf

7.3 Final Service Report – FIVA Valve & Proportional Valve Repairing*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.3FinalServiceReportFIVAValveandProportionalValveRepairing.pdf

7.4 Final Service Report – FIVA Valve Overhauling & Testing*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.4FinalServiceReport-FIVAValveOverhaulingandTesting.pdf

7.5 Performance Audit Report – ME Fuel Oil Filter*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.5PerformanceAuditReportMEFuelOilFilterNov52020.pdf

7.6 Service Report – Cylinder #4 Malfunctioning Exhaust Valve closing too slow*

Note: To Download the file, refer to page 4 of this Manual.
Link:
www.imaphilsinc.com/linker/entupload/admin/7.6ServiceReportCylinder4MalfunctioningExhaustvalveclosingtooslow.pdf

7.7 Service Report – FIVA Valves Failure*

Note: To Download the file, refer to page 4 of this Manual.

Link:

www.imaphilsinc.com/linker/entupload/admin/7.7ServiceReportFIVAValvesFailureOct.22020.pdf

7.8 MV Star Jeanette - Trouble Shooting on loss of control HPS & low hydraulic pressure and Tacho Failure

Note: To Download the file, refer to page 4 of this Manual.

Link: www.imaphilsinc.com/linker/entupload/admin/7.8StarJeanette-PreliminaryReport3.pdf