

## **About The Course and the Objectives**

### **HIGH VOLTAGE TRAINING MANAGEMENT LEVEL**

Course duration is five working days. At the end of the course, assessments will be carried out as mentioned below.

#### **Assessment**

Continuous assessment for theory and overall assessment for practicals.

The learners will be continuously assessed on every day by oral questioning, practical tasks and multiple-choice assessments, each consisting of at least 10 questions with an allocated time of 15 minutes. The questions are drawn from the topics covered on the previous day.

70% is needed for a pass in theory.

#### **Practical assessment**

Practical assessment will be conducted on the fifth day of the course. (Duration variable as per student capability and differentiated learning strategy).

Pass marks 100%.

Successful candidates will be issued a certificate of training

Attendance required is 100%

### **OBJECTIVES OF THE COURSE:**

The prime objective of the course is to impart and create awareness in seafarers responsible for the safe control and management of high voltage power systems the essential education and training in high voltage installations to meet the **Knowledge, Understanding and Proficiency (KUP)** requirements set out in the specific part of the following:

**Table A-III/2** of STCW 1978 (as amended)

Function: Electrical, electronic and control engineering at the management level.

Competence: Manage high voltage (HV) installation, trouble shooting and restoration of electrical equipment to operating condition

On completion of the course, the participants will be able to demonstrate sufficient awareness and knowledge about the following;

- Understanding the safe management of HV systems on board including the HV power distribution system.
- Know the switching/isolation process to make working on HV equipment safe. Usage of safety forms related with HV
- Understand the fault tracing procedures and aim at restoring the system and maintain supply.
- Maintenance, testing and operations of various HV systems on board.

## **Outcomes**

There are three outcomes to the training:

Outcome 1: The learner can **manage** HV operations on board a ship.

Outcome 2: The learner **understands** the HV system and the maintenance of distribution capability.

Outcome 3: The learner can **identify** faults within a HV system and **reconfigure** the system to maintain supply.

## **Course Delivery Methods:**

Course is designed to be a blend of theoretical and practical learning.

Every participant will be encouraged to make use of engine room simulator to understand the course objectives well.

## **Max. Intake:**

12 students. No minimum requirement.

## **Prerequisites:**

None.

## **Instructors and Assessors qualification:**

Qualification/ Experience as per HV (MCA) Courses based on guidelines issued by MNTB - High Voltage Courses Criteria,

- Appropriate professional or academic qualification.
  - A minimum of two years' experience of operating HV equipment in an engineering environment
- or
- A recognized High Voltage training certificate.

- TOTA

### Course Contents:

Chapter	Description
1	<b>Introduction to high voltage and revision of basic electricity</b>
	What is high voltage (HV), Why HV is used, Risk of using HV safety design issues,
	Table of comparison of power requirements of Modern ships Table of comparison between 6.6 kV and 440 Vessel
	Revision of basic electricity
	Rules and procedures, electrical hazards, Electrical hazards, influencing factors, Effects of electrical energy on humans
	Table of nominal resistance offered by various parts of body shown in table below. Table below signifies the nominal resistance offered by various materials. Table showing effect of the magnitude of current on human body
2	<b>Legislation &amp; guidance in governing HV at sea</b>
	Legislation and guidance governing high voltage (hv) at sea, MCA Code Of Safe Working Practice (COSWP), Electricity at Work Regulation, 1989, 'Electricity at Work' HSG85, International Safety Management (ISM) Code, Maritime and Coastguard Agency (MCA), other agencies
	<b>Safe working practices, Procedures &amp; Safety documentation and records</b>
	Working procedures in HV, Procedures to be followed while working on HV - Isolation and Switching plan, proving dead, Lockout & tag out, earthing down,
	EPTW. HV Entry permit, Sanction for Test, Risk assessment, Circuit Main Earth, Assignment of suitably qualified person, Summarizing dangers of working on HV and precautions
	Definitions of terms used with HV
	<b>Personal protective equipment</b>
	Using appropriate and approved PPE, HV gloves, hats and shoes. Rubber matting
3	<b>Arrangement of a HV Switch Room and HV testing</b>

	Arrangement of a HV switch room
	HV testing, Insulation resistance, Factor influencing the insulation, Insulation resistance, Polarization index test, Infra-red imaging.
	<b>NER and Protections incorporated in HV Systems</b>
	Types of power distribution systems in ships Power-system protection, insulated neutral and earthed neutral system, advantages disadvantages,
	Neutral earth resistance (NER), High resistance neutral earthing, Low resistance neutral earthing
	Earth fault indication in HV systems, Core balance transformer, Zone fault detection, Zero phase sequence system, Differential current and Restricted earth fault protection
	What is circuit breaker, types of HV circuit breakers
Appendix: 1	Sample Electrical Permit – to - Work – HIGH VOLTAGE (As per COSWP MSCP01/Ch16/Rev1.01)
Appendix: 2	Sample Electrical Sanction-to-test – HIGH VOLTAGE (As per COSWP MSCP01/Ch16/Rev1.01)
Appendix: 3	Practical isolation exercise

## **HIGH VOLTAGE OPERATIONAL LEVEL**

Course duration is one training day as defined in MNTB guidelines. At the end of the course, assessments will be carried out as mentioned below.

### **Assessment**

Assessment based on practical to demonstrate ability to safely isolate HV circuit.

100% is needed for a pass.

### **Objectives of the course:**

To give seafarers the essential education and training in high voltage installations to meet the **Knowledge, Understanding and Proficiency (KUP)** requirements set out in the specific part of the following:

**Table A-III/1** of STCW 2012 (as amended)

Function: Electrical, electronic and control engineering at the operational level.

Competence: Operate electrical, electronic and control systems (part)

On completion of the course, the participants will be able to demonstrate sufficient awareness and knowledge about the following;

- Understanding the arrangement and protection of HV power distribution system on board.
- Know the safety requirements necessary for high voltage installations, usage of various forms etc.
- Maintenance, testing and operations of various HV systems on board.

### **Outcomes**

There are two outcomes to the training:

Outcome 1: The learner knows the arrangement and protection of high voltage installations on board a vessel.

Outcome 2: The learner knows the safety requirements necessary for high voltage installations.

### **Course Delivery Methods:**

Course is designed to be a good blend of theoretical, practical learning.

### **Max Intake:**

12 Student. No minimum requirement

## **Prerequisites:**

None.

## **Instructors and Assessors qualification:**

Qualification/ Experience as per HV (MCA) Courses based on guidelines issued by MNTB - High Voltage Courses Criteria,

- Appropriate professional or academic qualification.
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or
- A recognized High Voltage training certificate.
- TOTA

## **TABLE OF CONTENTS**

**Note:** Contents of HV Management level will be condensed to introduction level

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