EVO COMPLEMENTARY NR10 – SEP/MHV

HUMAN SAFETY SOLUTIONS

NR-10 COMPLEMENTARY COURSE –SAFETY IN THE ELECTRIC POWER SYSTEM AND IN ITS VICINITY - EPS/ MARINE HIGH VOLTAGE

SCOPE AND APPLICABILITY:

Establish the minimum requirements and conditions aimed for the implementation of control measures and preventive systems, in order to ensure the safety and health of workers who directly or indirectly interact in electrical power system and Marine High Voltage. Applies to the stages of generation, transmission, distribution and consumption, including the stages of design, construction, installation, operation, maintenance of electrical installations and any work done in your vicinity, observing official technical standards established by the competent bodies, or omission in the absence of these, applicable international standards as COWSP E IMO. Understand the working of the various specialized components & equipment used in High Voltage installations. Learn through sharing of experience among participants.

REGULATIONS & STANDARDS:

- NR10;
- NR37;
- NBR 14039;
- NBR IEC 62271;
- NFPA 70E;
- NEC 70;
- COWSP, 2010 Ed,
- STCW/CONF.2/34;
- STCW Regulations II/1, II/2 and II/3;
- Ships Electrical Standards (2008) - TP 127 E.

COURSE CONTENT:

1. Organization of the electric power system – EPS.

2. Electricity Distribution:
   a) Three-phase systems;
   b) Isolated Neutral System - IT;
   c) Power.

2.1 Commutating Devices;

2.2 Converters, Rectifier, Inverters, Variable-Frequency Drives and Isolation Transformer;

2.3 Propulsion Motors:
a) Motor Drive;
b) Motor Starter;
c) Power Architecture;
d) High Voltage Electrical Propulsion;
e) Transmission Systems;
f) Synchronous motors;
g) Induction Motors.

2.4 Electrical Quality:
a) Ripple Effect;
b) Harmonics and VFD Special Cables;
c) EMI – Electromagnetic Interference;
a) Essential and Non-Essential Loads;
b) Protection Devices SF6;
c) Grounding Systems;
d) Equipotential;
e) Electrical Faults.

2.5 Emergency Systems;

2.6 Heat Dissipation and Cooling Equipment;

3. EPS Work Organization;
   a) Program and planning services;
   b) Teamwork;
   c) Records and registration of facilities;
   d) Working methods; and
   e) Communication.

4. Behavioural aspects;

5. Impeditive conditions of Work.

6. Typical risks in the SEP and its prevention
a) Proximity and contact with live parts;
b) Induction;
c) Atmospheric discharges;
d) Static;
e) Electric and magnetic fields;
f) Communication and identification;
g) Work at height, special machines and equipment.
h) Additional Risks
i) Electrical Risks on board – COSWP

7. Techniques and risk analysis in SEP;

8. Working procedures – analysis and discussion;

9. Technical working under tension;
a) Live line;
b) Potential;
c) Indoors;

d) Work at a distance;
e) Night work;
f) Underground environments.
g) Additional precautions - COSWP
h) De-energized Electrical Installations

10. Equipment and work tools (selection, use, maintenance, verification, testing);
11. Collective protection systems;
12. Personal protective equipment;
13. Postures and work clothing;
14. Safe vehicles and transportation of people, materials and equipment;
15. Signals and isolation of work areas;
16. Permit to perform services in installations and operations;
17. Techniques of removal, assistance, and transportation of injured personnel;
18. Typical accidents – Analysis, discussion, protective measures;
19. Legal Responsibilities.

COURSE DESIGN

TOTAL: 40 hours

PREREQUISITE:

Valid NR10-Basic Course
Professional evidence of Electrical Basic Training in accordance with the requirements of STCW / CONF.2 / 34 IMO

MINIMUM/MAXIMUM NUMBER OF DELEGATES

This course requires a minimum of 1, and a maximum number of 12 trainees.

To offshore trainings, the course number of trainees will comply with the vessels/rig necessity.

MAIN SAFETY ISSUES:

- Special cares with tools that are used in energized machinery;
- Selection, inspection and use of related tools and PPEs;
- Individual and Collective measures of protection against electricity;
- Risk evaluation in the workplace;
- Risk Control in the workplace;
- Distractions and fatalities;
- Electricity Detection.

REQUIRED EQUIPMENT:

- Access to a safe perimeter where it is possible to observe equipment, machinery or High Voltage facilities.
- Switchboards;
- Access to Generators room (recommended);
- Access to Transformers room (recommended);
- Electrical Rescue Hook.

PROCEDURES FOR PRACTICAL VISITS IF POSSIBLE:

- Demonstration on how to use the rescue hook;
- How to identify equipment Voltage and define safe distances according to NR-10 Annex I;
- Safety visit to electrical equipment areas to reinforce the importance to keep distance from all equipment and explain the importance of PPE use: Gloves, coveralls, insulated tools;
- Electricity accidents first aid techniques demonstration.

CERTIFICATION:

Training certificate signed by responsible Engineer accredited by Brazilian CREA.

CERTIFICATE VALIDITY PERIOD:

2 years.