

The logo for the Electrical Trades Union (ETU) features the letters 'ETU' in a bold, white, sans-serif font. Three yellow lightning bolts are positioned behind the letters: one behind the 'E', one behind the 'T', and one behind the 'U'. The entire logo is set against a dark blue rectangular background.

ETU

Electrical Trades Union

**IndustriALL Global Union
Shipbuilding-
Shipbreaking Action
Group Meeting**

**31 OCT-01 NOV 17
Rotterdam, Netherlands**

**Presentation by the Electrical Trades
Union of Australia**

The logo for the Electrical Trades Union (ETU) features the letters 'ETU' in a bold, white, sans-serif font. Three yellow lightning bolts are integrated into the design, striking the 'E', 'T', and 'U' respectively. The logo is set against a dark blue background within a white-bordered rounded rectangle.

ETU

Electrical Trades Union

AUSTRALIAN SHIP BUILDING AND SHIP REPAIRING

SECTION 3: OHS, ORGANIZING, AND
FIGHTING AGAINST PRECARIOUS WORK.

PRESENTATION OF THE CURRENT
ISSUES/CHALLENGES ON OHS IN
SHIPBUILDING AND SHIP REPAIRING AS
ELECTRICIANS

SITUATION



- Primarily naval ship building and repairing, and some domestic merchant, civilian, fishing and public transport work.
- Highly regulated training, qualifications, and health and safety systems, but increasingly the subject of attacks by conservative governments and employers.

ACTIVITIES

- Construction
- Commissioning
- Major maintenance (> 24 hours in dock)
- Minor maintenance (< 24 hours in dock)



CURRENT ISSUES



- Most ships operate on 440V, 60Hz, 3 phase power (AC)
- Some on board generators produce 3.3kV and employ step-down transformers
- Large scale DC used for motive and electrical power on conventional submarines

CURRENT ISSUES (CONT)

- Some DC supplied by battery banks for LV applications (control and energising supplies)
- Inverters DC-AC
- Rectifiers AC-DC
- Shore power based on 415V, 50Hz, 3 phase power (AC)

PARTICULAR ELECTRICAL OHS CONCERNS



- **Electrical considerations**

- Major maintenance (> 24 hours) 415V 50 Hz shore power used
- Minor maintenance (< 24 hours) 440V 60hz on board power used

PARTICULAR ELECTRICAL OHS CONCERNS



- Major maintenance temporary supplies
 - Isolation transformers
 - Earth (ground) imported with shore power, especially if two or more ships docked and possible influence on another ship's earth
 - Ability to provide greater level of isolation and safety

PARTICULAR ELECTRICAL OHS CONCERNS



- Minor maintenance
 - Restricted access to apparatus due to live conductors and only local isolation available

THREATS, DANGERS AND RISKS



- ***NO SWITCHING OF EARTH UNDER ANY CIRCUMSTANCES***
- ***DO NOT WORK LIVE OR ENERGISED***
- ***DO NOT WORK ALONE***

DANGERS FROM



- Electrical hazards (Darwin's principles made electricians smart and something will always bite the unwary)
- More than one Authorised Person in Charge
- Absence of safe procedures
- Reclosers and other automatic systems such as loss of supply (switch "auto" to "non-auto" or "manual")

DANGERS FROM (CONTINUED)



- Transformer backfeeds
 - 100kVA transformer ($P = E I \cos \Phi$)
 - Ratio $6600V/440V = 15$
 - Primary: 6.6kV, 15A
 - Secondary: 440V, 225A

DANGERS FROM (CONTINUED)

- HV systems
- LV systems
- Rectifiers
- Inverters
- Leakage current (especially due to water)
- Insulation breakdown or absence
- Electrical apparatus
- Mechanical apparatus



DANGERS FROM (CONTINUED)



- Confined spaces (entry, occupation, egress and rescue)
- Battery hazards
 - DC
 - Acid
 - Lithium
 - Burns

DANGERS FROM (CONTINUED)



- Battery hazards continued
 - Fire
 - Explosion
 - short circuit
 - breathing and air quality

DANGERS FROM (CONTINUED)

- Battery hazards continued
 - Batteries may not be able to be isolated in some circumstances
 - Mitigate the risk
 - Engineer the solution (use fibre glass crawl boards)
 - Isolate the worker with PPE (wear acid resistant clothing, arm length gloves and goggles)

SYSTEMS AND APPARATUS HAZARDS



- Systems such as radar, sonar, sensor masts must be isolated and placed in non-auto (manual operation) if persons working on or near, or inside sub casing
- Radar exposure on naval vessels

SYSTEMS FOR REDUCING HAZARDS



- Isolation procedures

SYSTEMS FOR REDUCING HAZARDS

(Generic isolation procedure)

- Authorised Person in Charge or Delegated Authority
- Auto to manual (reclose or other auto energising systems)
- Disconnect
- Double isolation
- Remove all possibility of energising

SYSTEMS FOR REDUCING HAZARDS



(Generic isolation procedure cont)

- HV (AC)
- LV (AC)
- ELV (AC)
- LV (DC) control, energising and lighting

SYSTEMS FOR REDUCING HAZARDS



(Generic isolation procedure cont)

- Auxiliary supplies to and from transformers
- Energising supplies (generators)
- Prove dead

SYSTEMS FOR REDUCING HAZARDS



(Generic isolation procedure cont)

- Lock out
 - authorised person
 - danger tag and lock out
 - person who applies lock/tag, removes it

SYSTEMS FOR REDUCING HAZARDS

(Generic isolation procedure cont)

- Earthing
- Mechanical isolation (diesel generator sets)
- Physical barriers to inadvertent contact

SYSTEMS FOR REDUCING HAZARDS



Other considerations

- Drawings current as work as executed (alternative supplies recorded)
- Never work alone
- PPE
- Insulated gloves
- Cardio pulmonary resuscitation and first aid
- Rescue
- Avenues of escape

SYSTEMS FOR REDUCING HAZARDS



- Isolation transformers (temporary supplies for major maintenance)
 - 415V AC 3 phase or 240V AC 1 phase primary
 - 32V AC secondary
 - 32V DC rectified
 - Low voltage DC (32V DC) used for lighting

SYSTEMS FOR REDUCING HAZARDS



- Isolation transformers (temporary supplies for major maintenance) cont
 - Avoids electric shock hazards encountered in bilges and other areas with water present
 - Festoon lighting
 - Electrically unreliable environment (Changes to fuses and luminaires every morning)

REGULATION



- Licensing, education and training
 - ETU insistence on qualified, licenced and authorised workers
- OHS
- Safety is union business, especially in the absence of effective regulators (which is always)

MAINTENANCE OF SAFE SYSTEMS

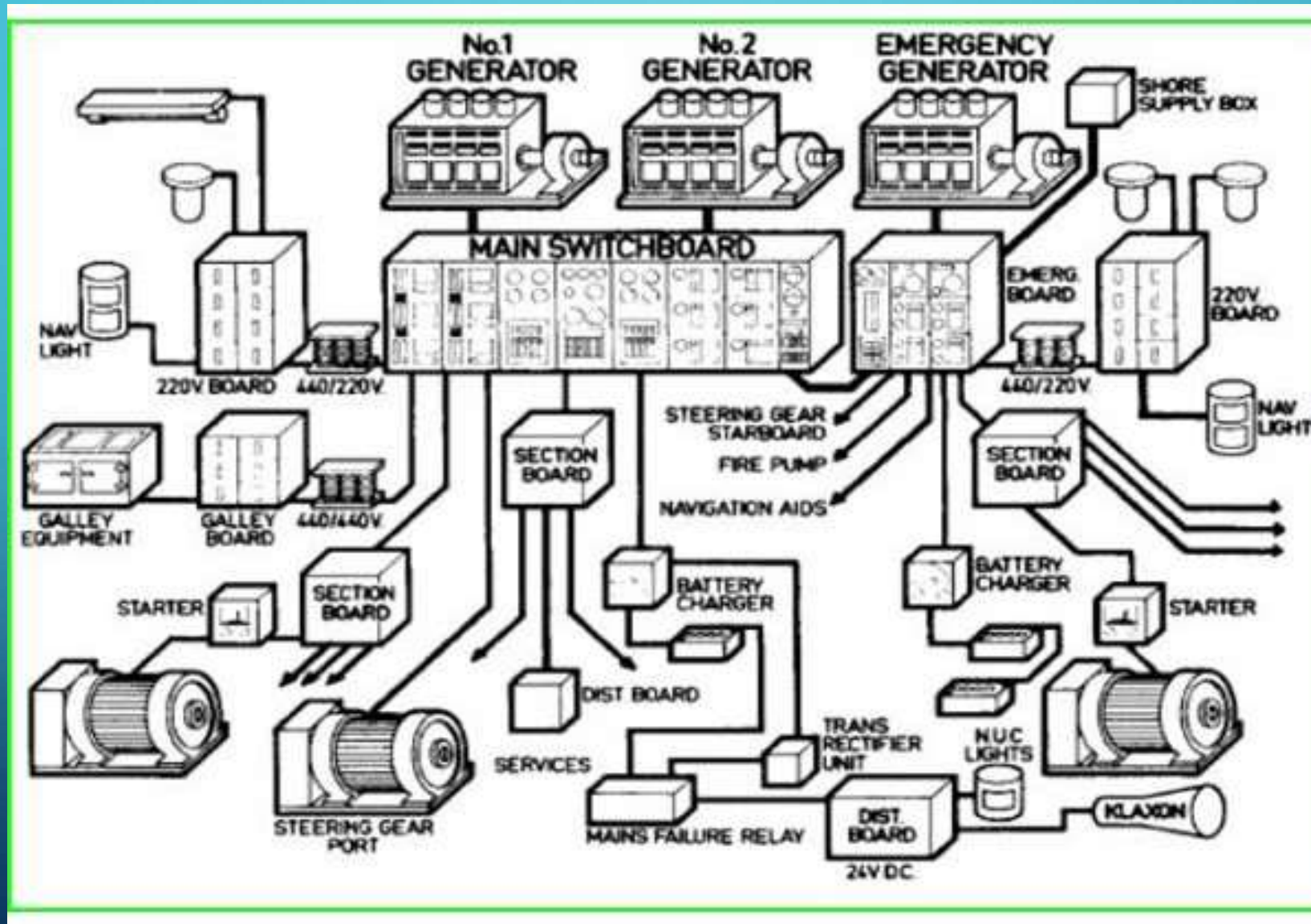


- Integrity of qualifications and training system
- Demand union input
- Vigilance
- Activate and support members, regardless

FUTURE INTENTIONS AND ACTIVITIES

- Organise, organise, organise at all levels, including around safety
- Monitor
- Regulate
- Inspect
- Advocate
- Vigilance
- Activate
- Agitate
- Lessons learnt

MARINE ELECTRICAL SYSTEMS



Power Distribution Diagram

