



# ALARMS AND AUTOMATIC SHUT DOWNS



**Dublin 27 September 2017**





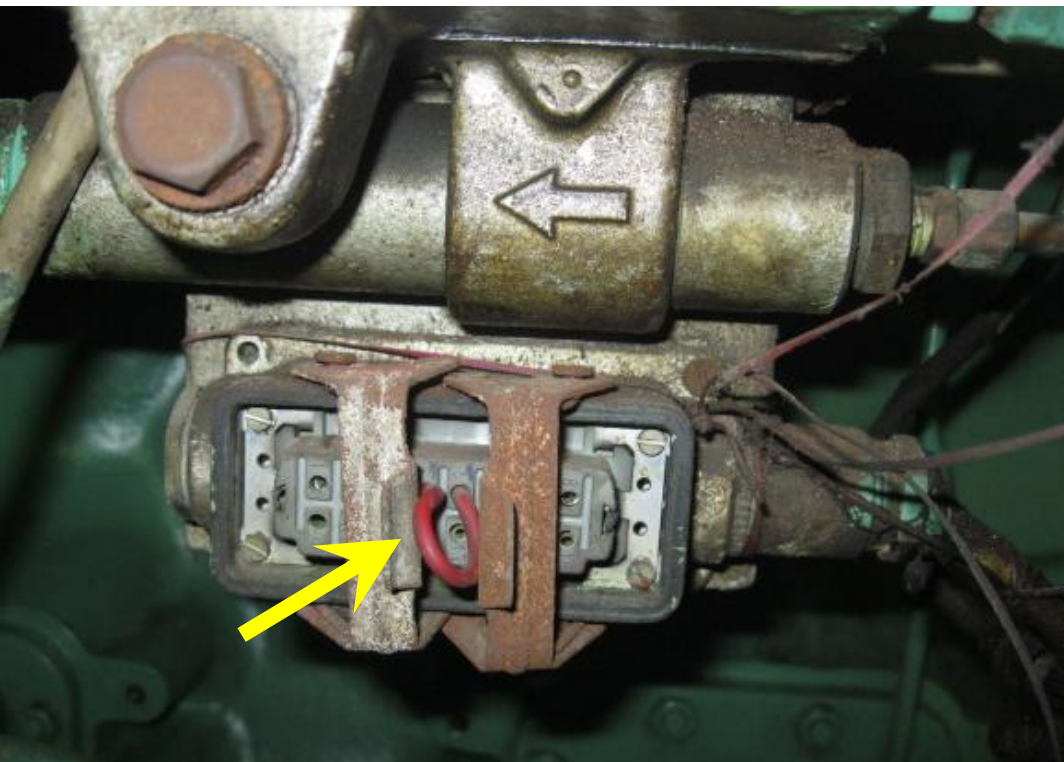
- **LOC**

- 30 locations, 400 Staff, 300 Technical, 36 Nationalities and 29 Languages
- Broad Range of Disciplines:
  - Marine Engineers
  - Naval Architects
  - Master Mariners
  - Marine Civil Engineers
  - Offshore Engineers
  - Structural Engineers
  - Subsea & Pipeline Engineers

- **Richard A. Bailey**

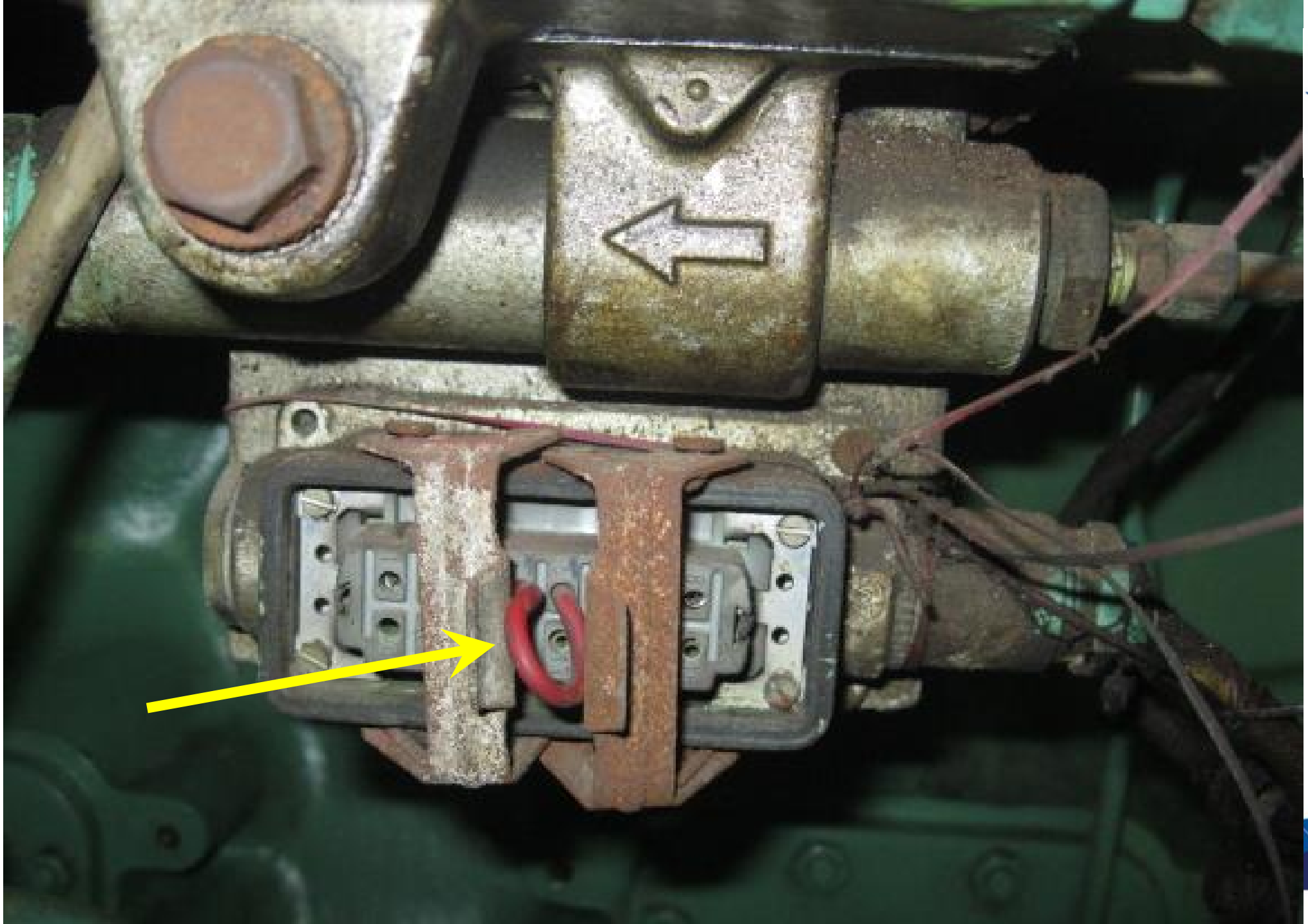
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- Alarms
  - Systems
  - Why, what, how
- Three systems
  - Control, Safety and Monitoring
  - Shut downs, Slow downs and overrides
- Testing
- Records
  - Analysis, fraud
- Unmanned Machinery spaces







- Sensors
  - Temperature
  - Pressure
  - Level
- Processor(s)
  - Control
  - Display
  - Record
- Alarm indicators
  - Engine Control Room
  - Engine room
  - Bridge

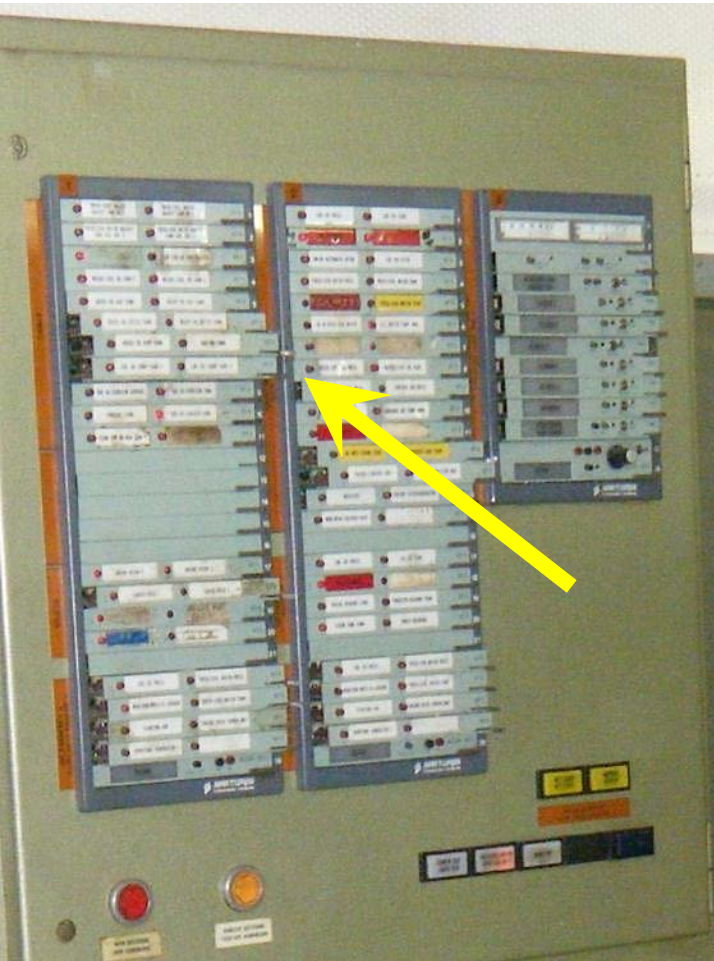
# WHY



- Prevent damage
- Protect machinery, and the ship
- Often intertwined with monitoring systems
- Flag / Classification requirement
- Client / Charterer requirement

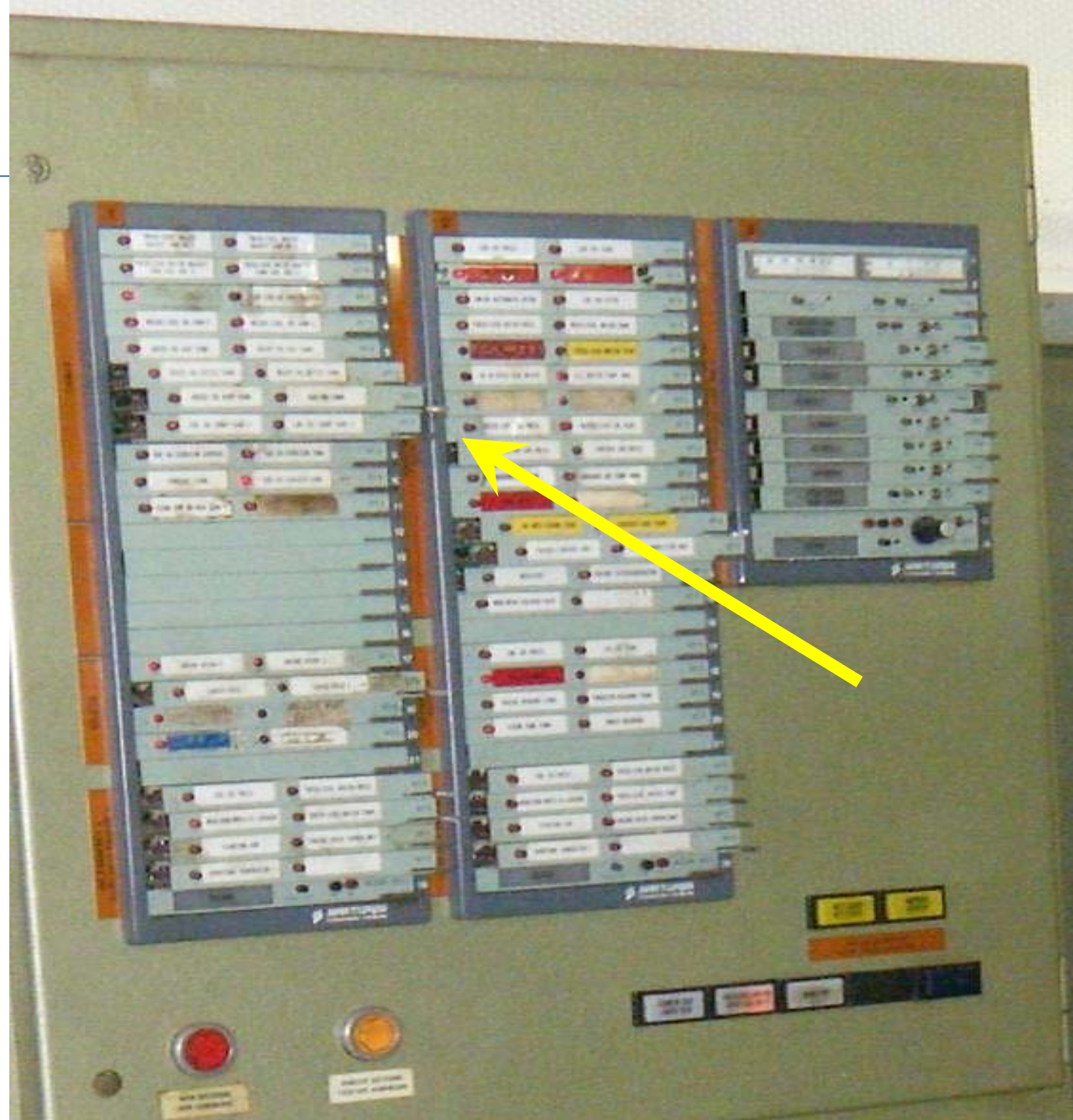


# WHAT



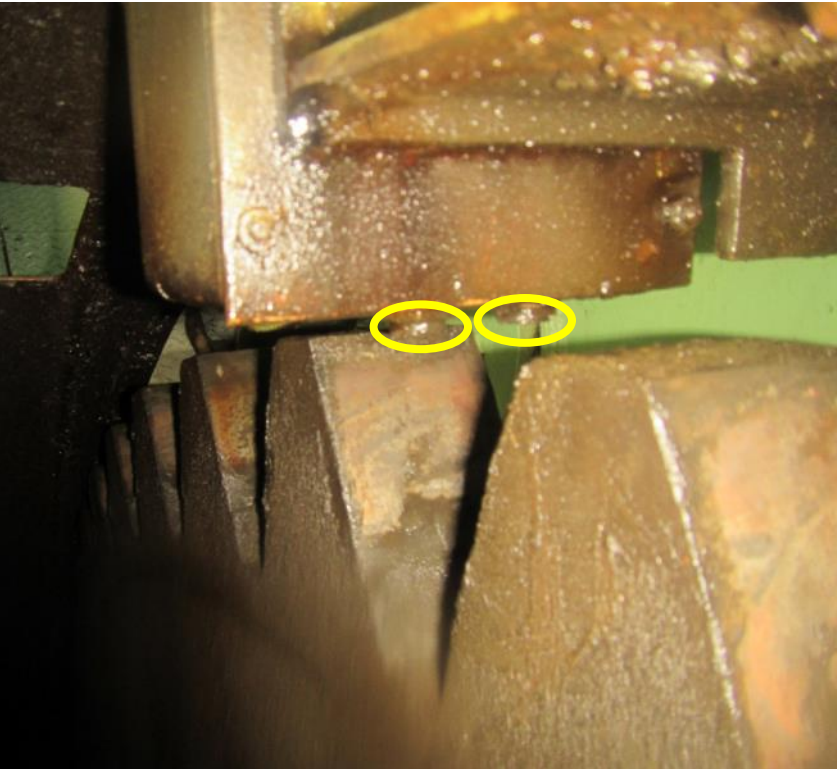
- Primary machinery
  - Main engines
  - Generator engines
  - Steering gear
- Secondary systems
  - Boilers
  - Cargo systems
  - Hotel services





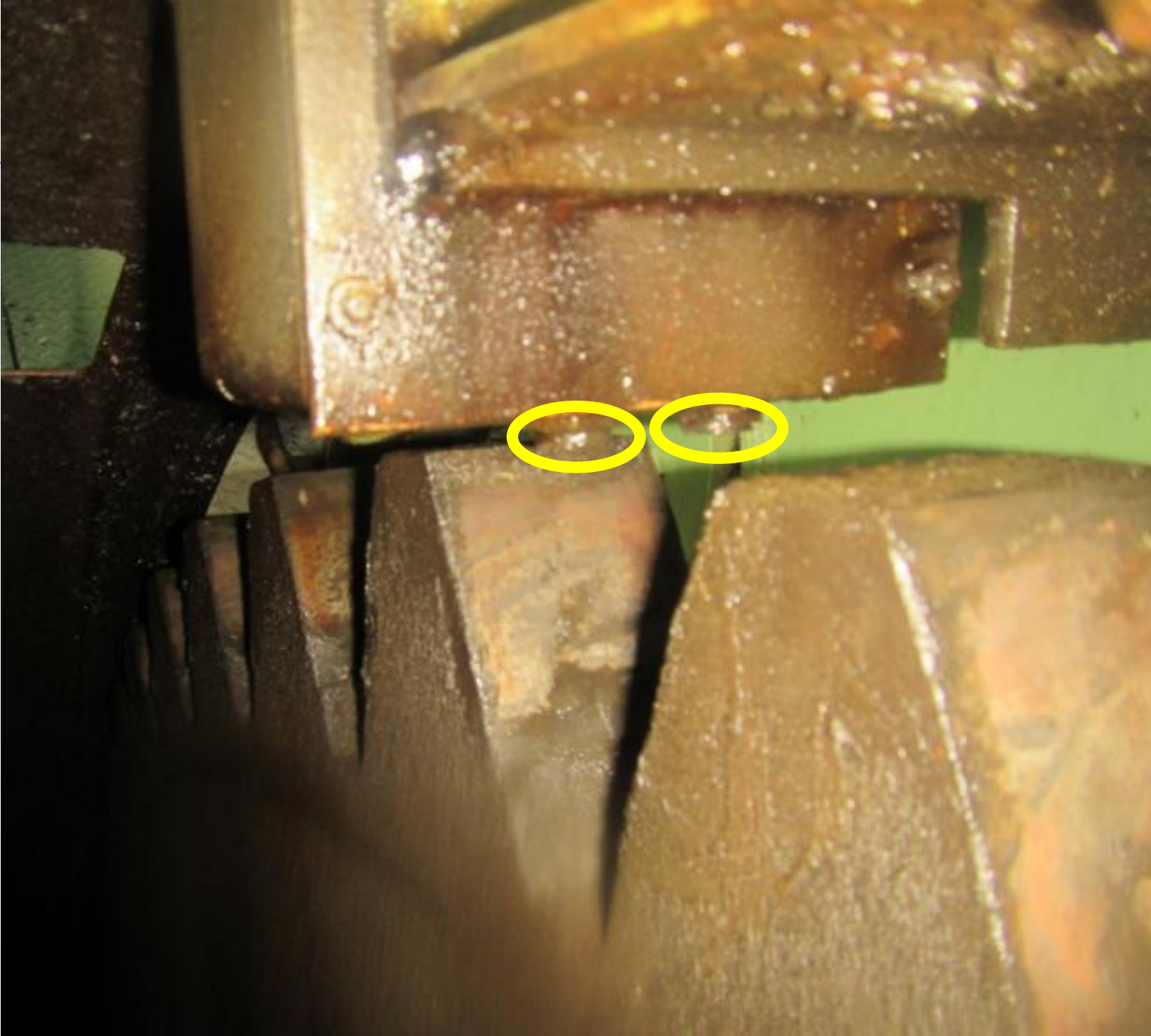


# HOW



- Measure distinct values
- Sensors
  - Temperature sensors, PT100 etc.
  - Pressure transducers
  - Level / float switches
  - Limits / proximity switches
- Processor converts the signals
- Processor controls the alarms.





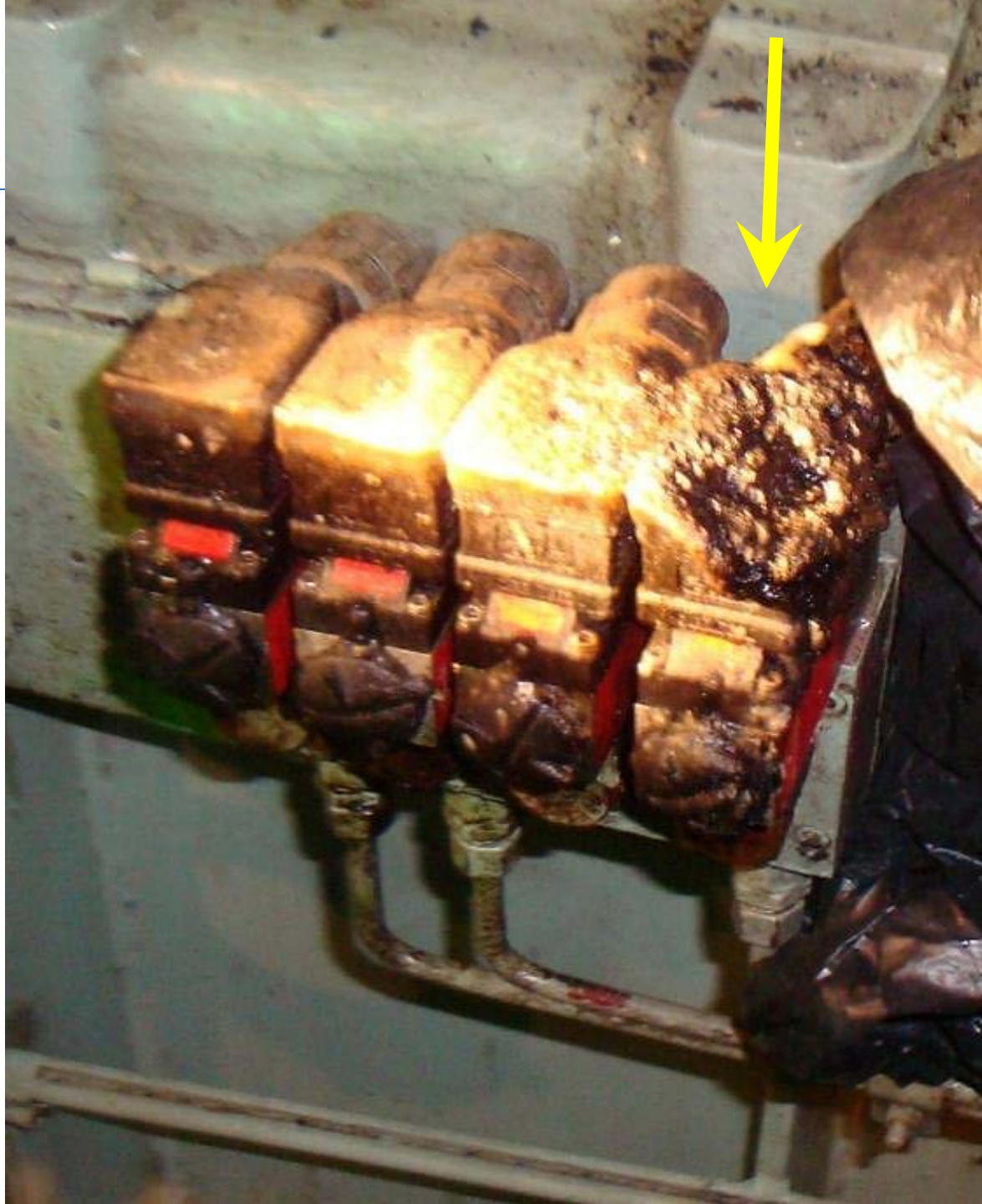
# THREE SYSTEMS

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- Control
- Safety (shut downs / slow downs)
- Monitoring (UMS) and recording
- Independent from each other



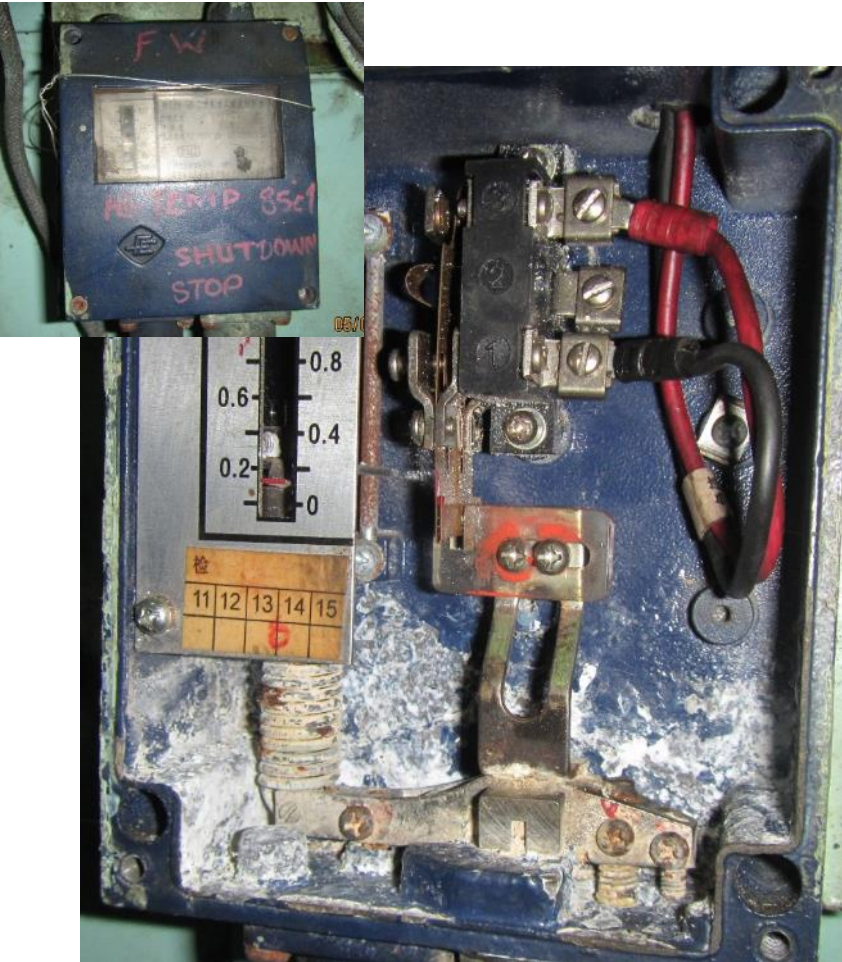




- Bridge control
  - Direct control from conning position
- Engine control room
  - Control in engine room
  - More control over engine load
  - Better awareness of engine systems
- Local
  - Mechanical at engine side
  - Not as simple with modern engines



# SHUT DOWNS



- Alarms that cause automatic engine shut down
- Main engine Low lubricating oil pressure
- Engine over speed
- Exhaust valve failure
- Sometimes emergency overrides fitted
- Extent required determined by class







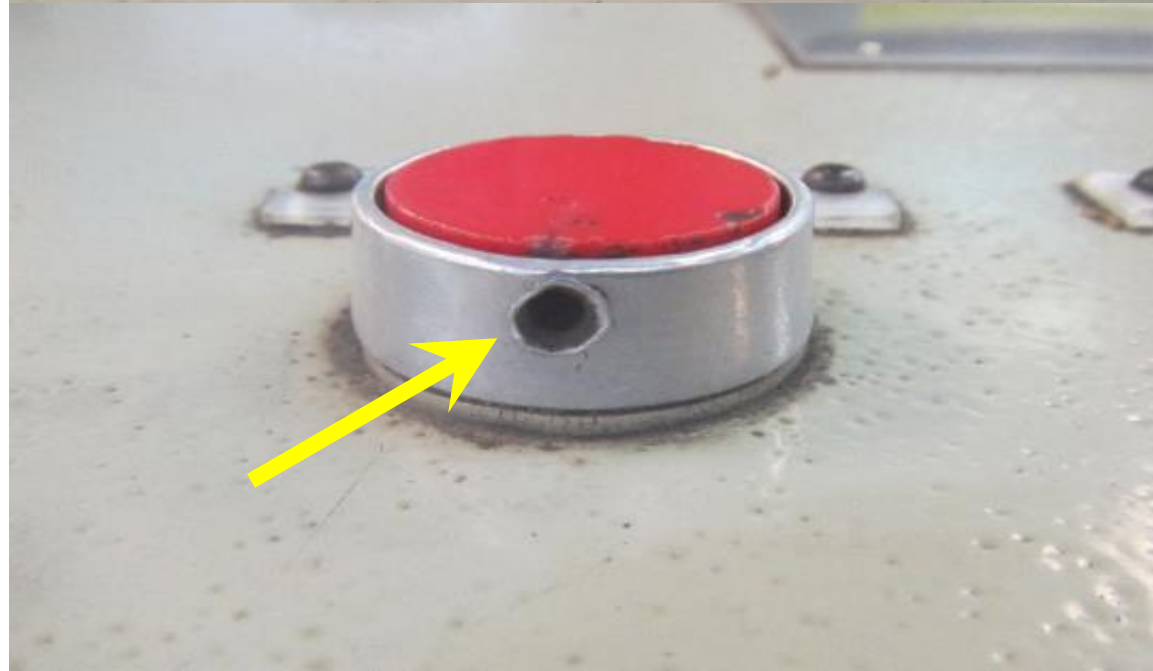
- Alarms that cause automatic engine slow downs
  - Crankcase oil mist
  - Scavenge fire
  - Exhaust gas temperature deviation
  - Cylinder lubricating oil failure
  - Cooling water jacket temperature
- Sometimes emergency overrides fitted
- Extent required determined by class



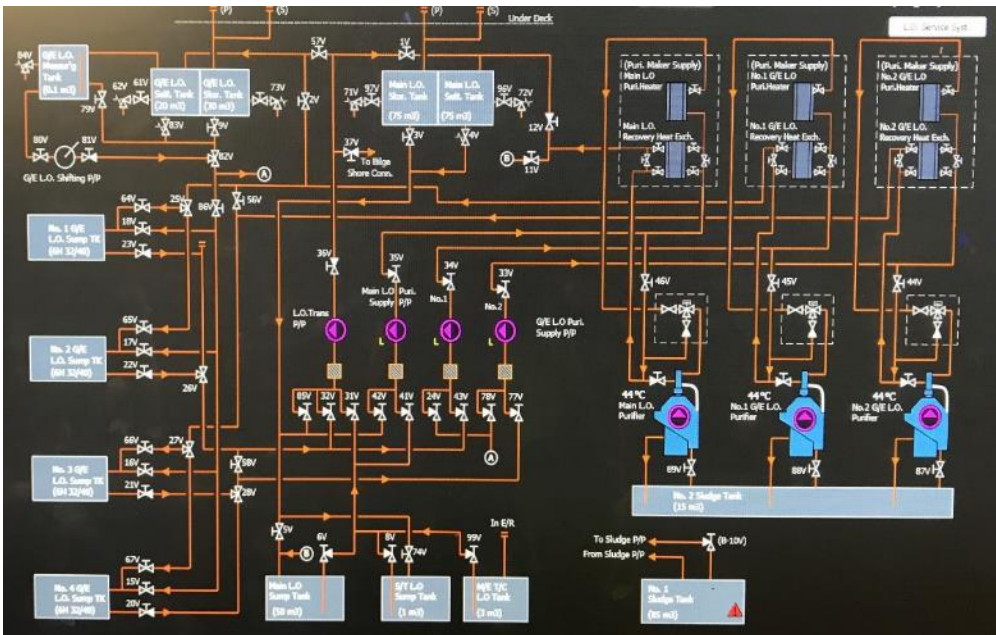


- Overrides
  - Dependent on system
  - Fitted to prevent greater loss.
- Auto starts
  - Standby generators
  - Pumps





- Displays live data
- Mimic diagram
- Connected to the record system
- Often connected to the secondary equipment controls

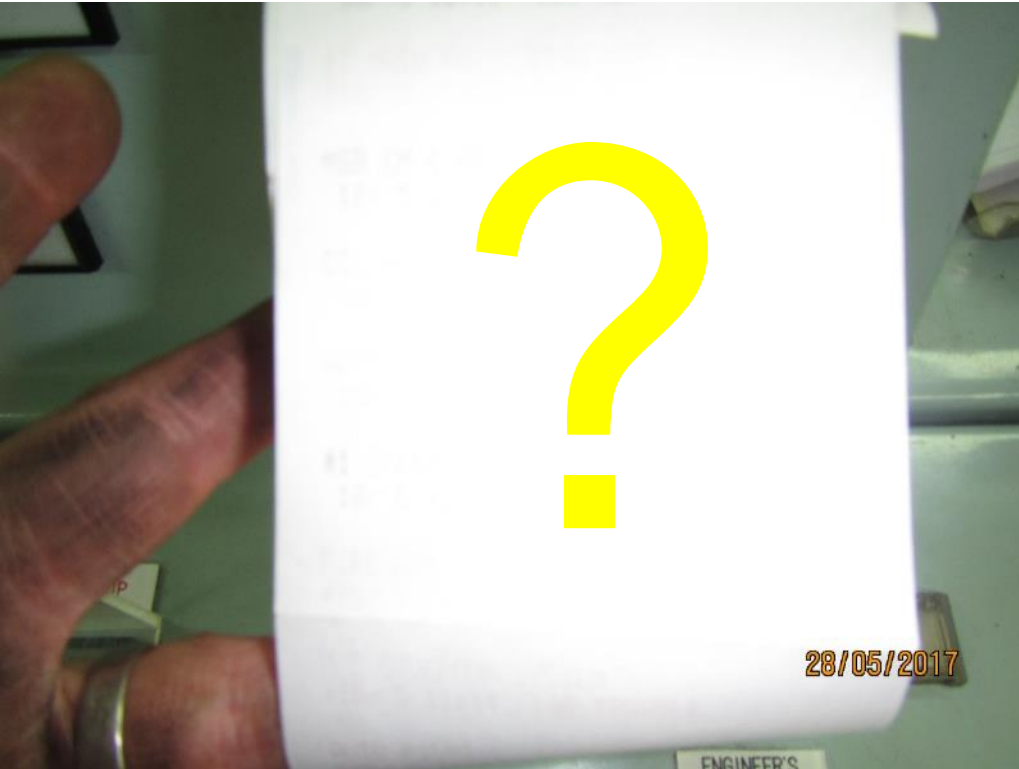


# TESTING



- All sensors and system require regular testing
- Test tools
  - Calibrated heater
  - Pressure test
    - Hand pumps
    - Deadweight tester
- Class requirement
  - Testing of alarms
  - Calibration of test equipment





- Alarm printers
- Records history
  - Time / date
  - Value
  - Alarm state
- UMS Alarm record book
- Engine room log



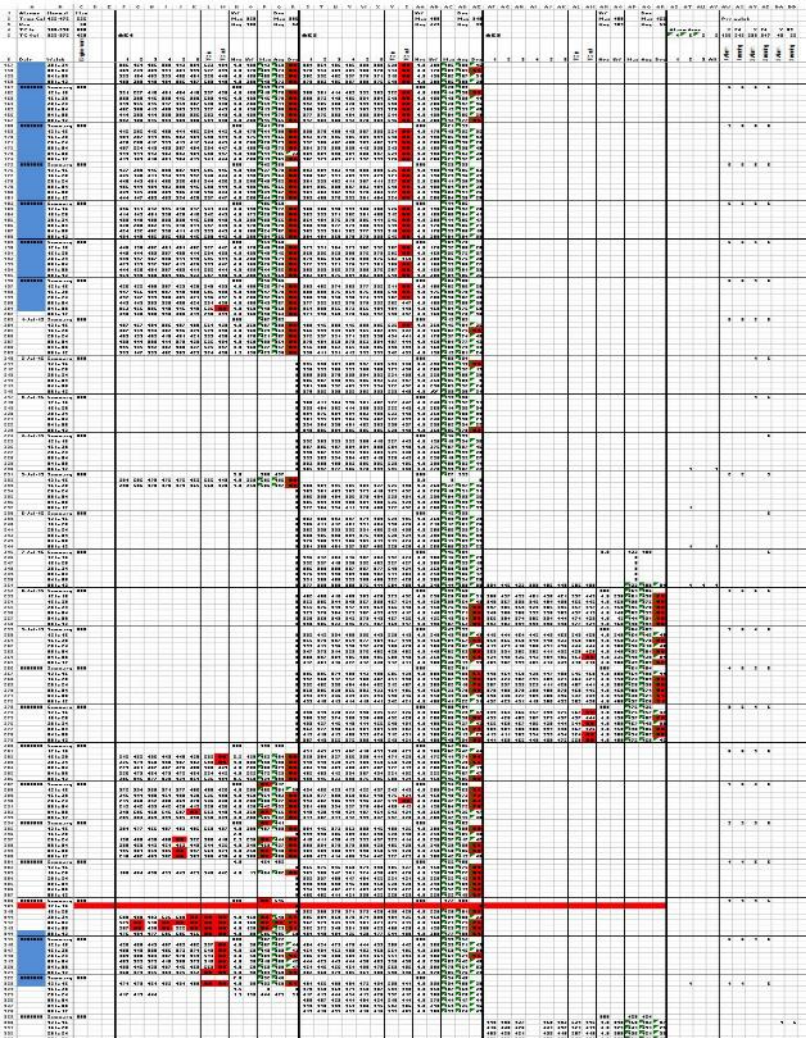


28/05/2017

ENGINEER'S



# ALARM ANALYSIS



The table displays a detailed alarm analysis with columns for various parameters and rows for individual alarm events. The data is organized into several sections, with some rows highlighted in blue and others in red, indicating different levels of severity or status. The columns include identifiers, timestamps, and numerical values, providing a comprehensive overview of the alarm system's performance and any anomalies.

- Shows trends
- Onboard review
- Post incident review
- Identify start date / time
- Forensic study of records





Table with columns: Party, Coverage, Insured, Loss, Amount, and various numerical columns (1-13). Rows are grouped by date ranges such as 10-Jul-15, 11-Jul-15, 12-Jul-15, 13-Jul-15, 14-Jul-15, 15-Jul-15, 16-Jul-15, 17-Jul-15, 18-Jul-15, 19-Jul-15, 20-Jul-15, 21-Jul-15, 22-Jul-15, 23-Jul-15, 24-Jul-15, 25-Jul-15, 26-Jul-15, 27-Jul-15, 28-Jul-15, 29-Jul-15, 30-Jul-15, 31-Jul-15.





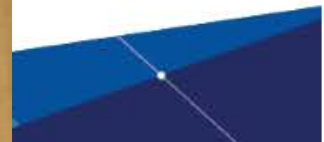


- Alarm records
- Errors and omissions
- DC MERWESTONE
  - Bilge alarm
  - Fraudulent device
  - Claim rejected
  - Overturned at Supreme court



- Unmanned Machinery spaces
- Class notation, E0, UMS, AUT, ACCU
- Engine room not manned
  - Non duty hours
  - Suitable / safe location
  - Not during critical operations
- Option to reduce manning
- Systems need to be operating correctly







- Increased automation ie.
  - Shut downs / slow downs
  - Preferential trips
  - Auto starts
- Alarm repeated in duty cabins and common spaces
  - Alarm cascades
- Final watch keeping round
- Deadman alarm for single man entry



# SUMMARY



- Alarms
  - Systems
  - Why, what, how
- Three systems
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- Testing
- Records
- Unmanned Machinery spaces





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