



Views from a surveyor

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Topics

- Lithium ion batteries and EV's
- HSFO and LSFO contamination
- Engine room fires



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Lithium ion batteries and EV's



- IUMI Working Group
- Best practice & recommendations for the safe carriage of electric vehicles <https://iumi.com/opinions/position-papers>
- Probability of fire in EVs, lower than that of petrol/diesel cars
- CO₂ fire extinguishing is it effective or not?
- New types of battery rapidly being developed

- Yacht battery clause released on 15 September - JH2023-011



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HFO and LSFO contamination a persistent and evolving problem



- Low sulphur blending – instability, sludging, deposits
- HFO – dumping ground for chemical contaminants
- Bio fuels – not regulated and finding there way into HFO and LSFO stocks
 - FAME linked to 100+ cases in 2018
 - Organic Chlorides in 2021
 - CNSL – Cashew nutshell liquid in 2022/23



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Incompatibility – Sludge formation



Sludging caused by unstable fuels is one of the most serious operational concerns

Each new batch can be materially different and hence incompatible with other fuels onboard





Incompatibility – Sludge formation

Not limited to engine damage but also includes

- **Disposal of contaminated bunkers**
- **Cleaning of fuel tanks**
- **Disposal of sludge**

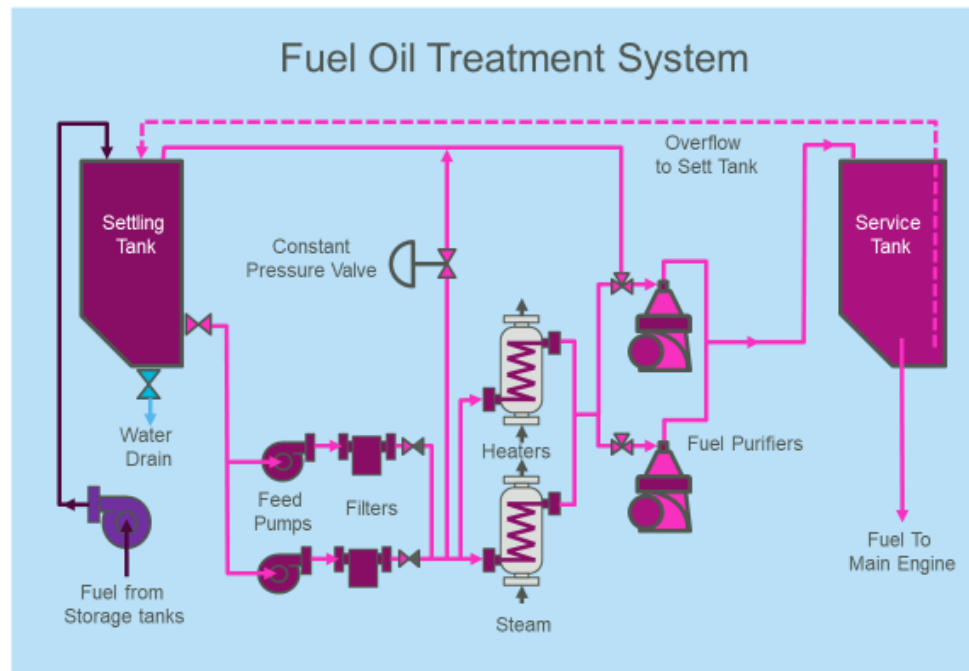




Incompatibility – Sludge formation

Speed limitation due to lack of supply of fuel to the service tanks

- **Grounding**
- **Collisions**
- **Salvage**





Cashew nutshell liquid - CNSL



- Promising as a marine biofuel
- Good combustion qualities
- Relatively cheap as a byproduct



- Maybe susceptible to polymerisation
- Highly acidic
- More testing is required

However.....CNSL has been found in current HFO stock and has resulted in severe sludging.

According to ISO8217 specification it should not be there and is therefore a contaminant under Clause 5 of the standard



Engine room fires - update

More than 50% of ship fires start in the engine room

Most cases involve fuel leaks and hot surfaces

Since 2003 high pressure (HP) fuel lines subject to new rules

The rules do not apply to low pressure (LP) piping

LP fuel pipework is an item on the IUMI Policy Agenda and is currently being addressed with IACS



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Problems that surveyors see

- We carry out numerous Joint Hull and P&I condition surveys
- A significant amount recommend improvements in leak prevention of fuel pipes and insulation of exhaust pipework
- Several are noted as severe defects requiring immediate attention.
- These defects are not always identified by Flag inspectors

- Some examples of what we see.....



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Engine room fires - fuel

HIGH PRESSURE FUEL INJECTION PUMP – FUEL PIPES





Engine room fires - fuel

HIGH PRESSURE FUEL INJECTION PUMP – FUEL LEAKS





Engine room fires - fuel

HIGH PRESSURE FUEL INJECTION PIPE BRACKETS



with



without





Engine room fires - fuel

HIGH PRESSURE FUEL INJECTION PIPE – WITH “SOLAS” TAPE



with



without

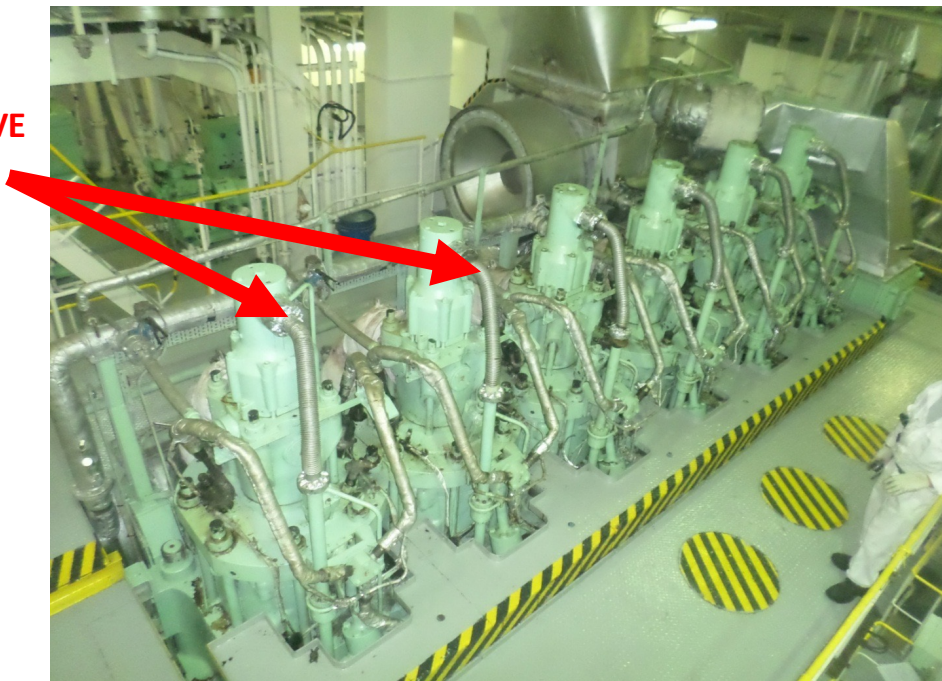




Engine room fires - fuel

HYDRAULIC EXHAUST VALVE ACTUATORS

**EXHAUST VALVE
ACTUATORS**



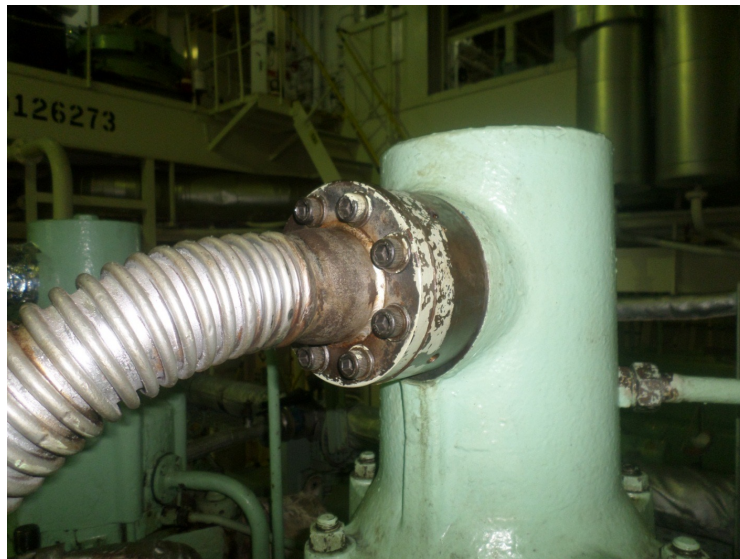


Engine room fires - fuel

EXHAUST ACTUATOR – PROTECTED WITH “SOLAS” TAPE



with



without





Engine room fires - fuel

“SOLAS” TAPE





Engine room fires - fuel

LOW PRESSURE (L.P) FUEL & LUBRICATING OIL PIPES



**Bolts missing and
no splash tape**





Engine room fires - fuel

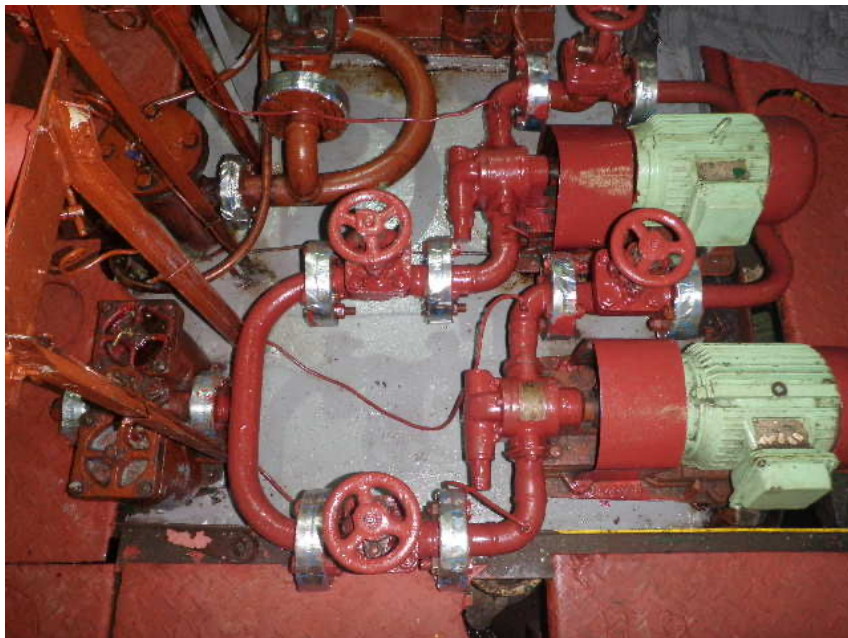
L.P FUEL PIPES





Engine room fires - fuel

L.P FUEL PUMPING SYSTEM – WELL SHIELDED





Engine room fires - Heat



INSULATION OF HOT SURFACES

According to IACS rules and after 1998, and as also stated in SOLAS Ch II-2 Reg.15.2.10, all surfaces above 220°C must be insulated or protected in order to prevent ignition of flammable fluids.

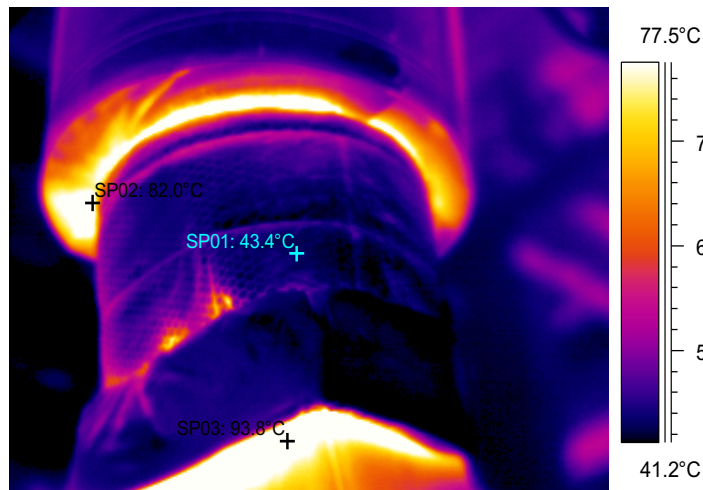


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Engine room fires - Heat

A VIEW OF A TYPICAL DIESEL ENGINE EXHAUST UPTAKE CORRECTLY LAGGED



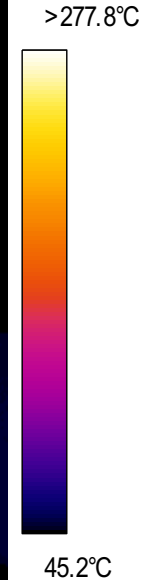
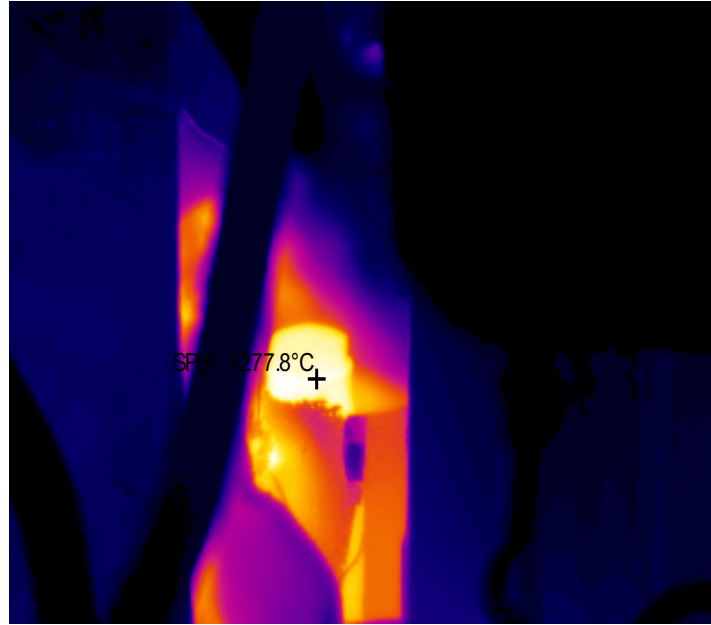
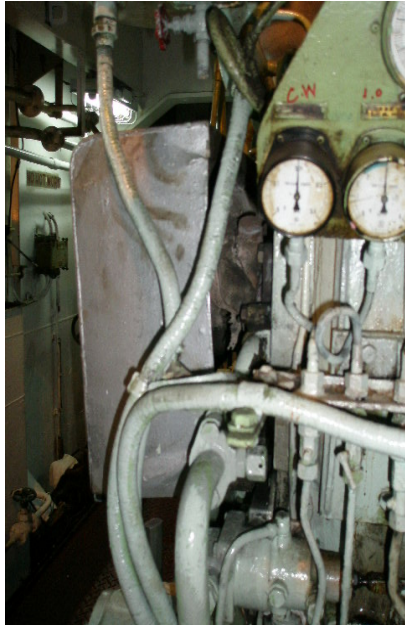
TEMPERATURES ARE WELL WITHIN THE SOLAS LIMITS





Engine room fires - Heat

TYPICAL DIESEL ENGINE EXHAUST UPTAKE INCORRECTLY LAGGED



A THERMOMETER POCKET IS EXPOSED



Engine room fires - conclusions

Improvements needed with,

- Crew training and diligence
- Onboard audits
- Superintendent inspections

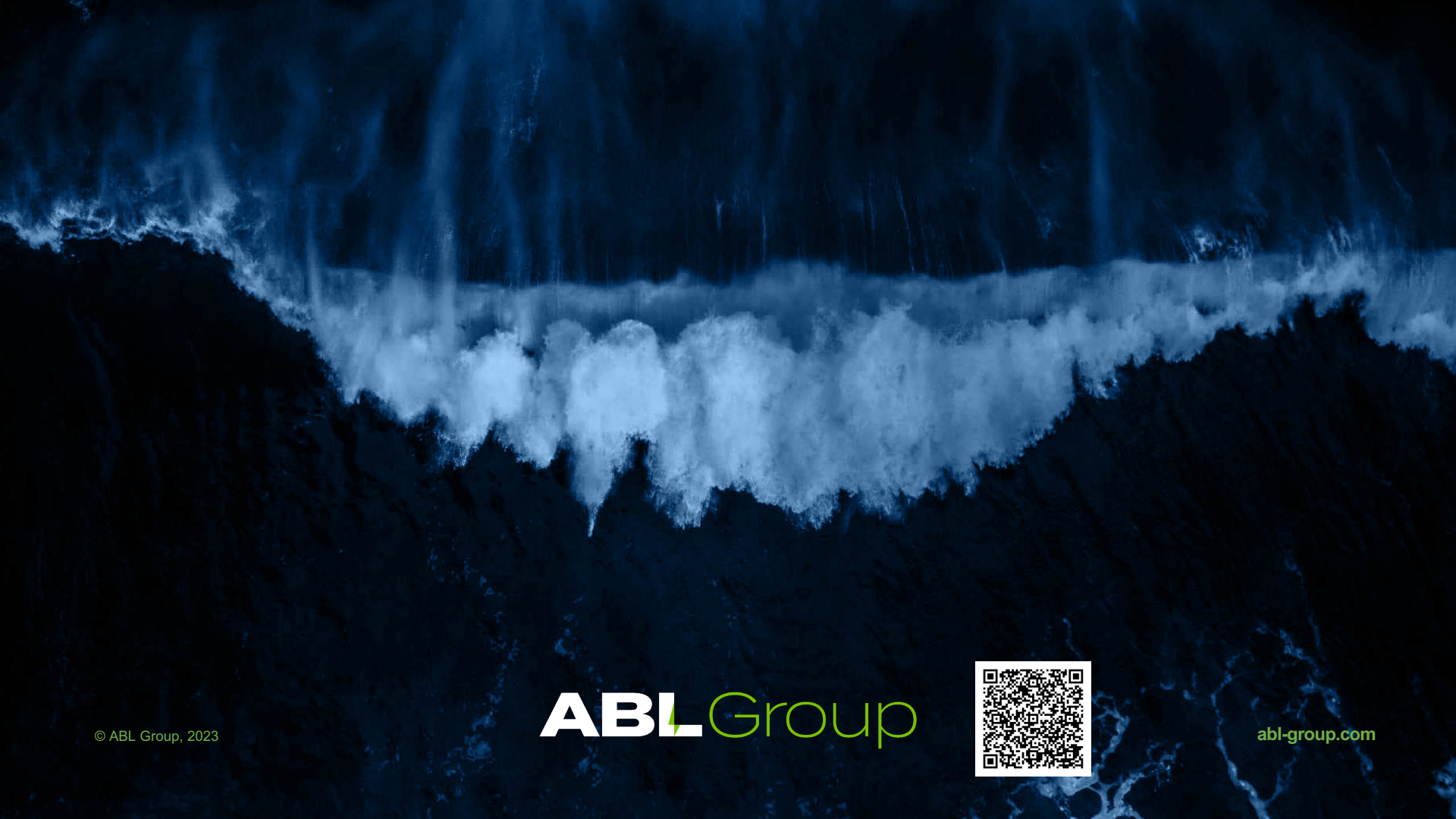
- Flag state inspector competence

- SOLAS Regulations to include LP Pipework

- Condition surveys for insurers verification



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