Marine Safety Forum – Safety Flash 11-32

Issued: 23rd August 2011

Subject: FIRE IN ENGINE ROOM OF OFFSHORE SUPPORT VESSEL

An Offshore Support Vessel was being towed astern of a rig during a rig move transit operation when a fire was reported from the main engine room of the vessel. The engine room fire suppression system (Hi-Fog Water Mist) was automatically activated, emergency fuel shut-off valves closed to shut off fuel supply to the affected engine and vessel emergency response procedures initiated. The fire was effectively extinguished within 10 minutes by the vessel's Emergency Response Team (ERT) personnel using portable extinguishers. Following checks on the main engine(s) and safety equipment, vessel was able to continue operations safely with remaining 3 engines.
The source of the fire was subsequently identified as due to fuel oil leaking from the flange on a Fuel Injector Pump on main engine No.2. The fuel return line had come loose at the flange due to one of two securing bolts shearing and the other working loose. Fuel sprayed from the leaking flange and impinged upon the adjacent hot lagging of the main engine exhaust and turbo charger resulting in ignition and subsequent fire.

• Return Fuel line on the injector pump for main engine No.2 had come loose at the connection flange resulting in fuel spray to leak and impinge hot lagging on adjacent exhaust and turbocharger lagging. This subsequently resulted in ignition and fire
• The flange for the Fuel Injector Pump had only 2 securing bolts. One of which had sheared off and the other had worked loose which led to the fuel leak
• The Fuel Injector Pump was serviced every 15,000 running hours as per PMS. However no guidelines were available from the main engine manufacturer-MAK-on specific checks, torqueing requirements and replacement programme for the securing bolts

LESSONS LEARNED

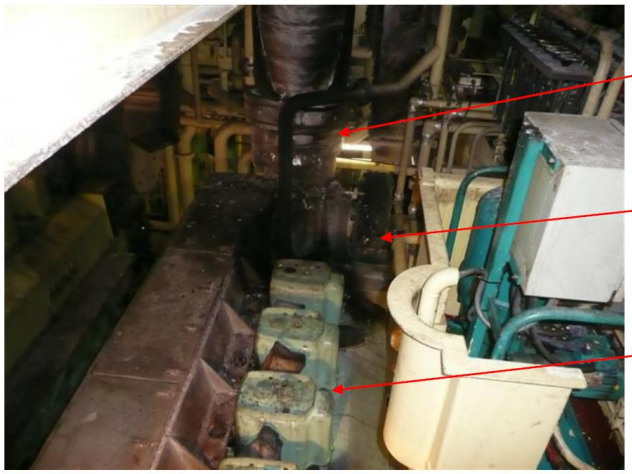
• Upon checking on other vessels in the fleet following the incident, vessel operator discovered loose flange securing bolts on similar main engine configuration and fuel lines with a potential for failure and loss of containment
• Current design of the flange securing bolts (2 bolts instead of 4) was not ideal in ensuring that the integrity of the flange connection was maintained
• For safety critical connections bolt torqueing guidelines should be communicated by the manufacturer and enforced / monitored as part of the periodic preventative maintenance system for the asset
• Importance of maintaining and testing emergency fire fighting systems and ERT training through regular emergency drills on board vessels

RECOMMENDATIONS

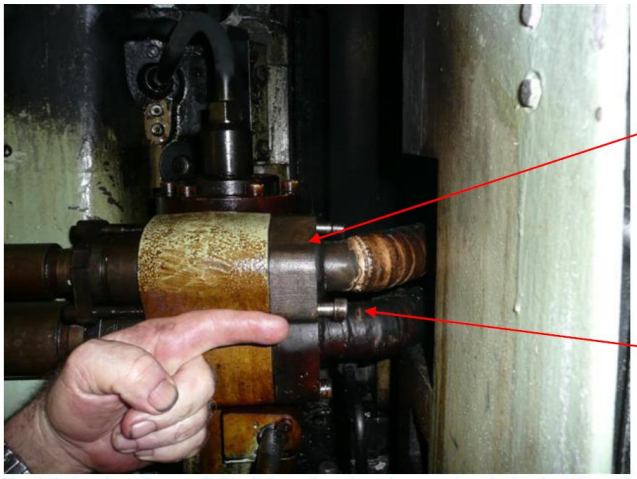
• Include 3 monthly checks on fuel line flange bolts into contractor's Planned Maintenance System (PMS). This to include physical checks on the torque and condition of the fuel flange bolts as per Original Equipment Manufacturer (OEM) guidelines.
• Request information from engine manufacturer (MAK) on bolt composition and torqueing requirements on securing bolts for the Fuel Injector Pump. Information to be disseminated to vessel operators and marine community via subsequent Information/Safety Flash

• Vessel operators to initiate checks on similar fittings on Fuel Injector Pumps and other high pressure pumps to check on condition and integrity of securing bolts. Checks and monitoring are especially critical after maintenance and reinstatement of high pressure lines to check for steady state operation

Photographs:



Overall View of Main Engine No.2 showing location of Fuel Pump and seat of Fire



Fuel Injection Pump Inlet Line showing 2 securing bolts holding flange face of Fuel Injector Pump

Close View of Securing Bolts that failed holding flange face of Fuel Injector Pump