



Fire on explosive charge vehicle while at a charged face

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What happened?

An explosives charge vehicle containing explosives, caught fire while at a charged face.

When trying to move a charge unit from a heading after charging the face, the charge crew found the machine unserviceable. An injector unit pump was found protruding about 1cm from the engine block of the vehicle as a result of broken clamp down bolts. Maintenance personnel re-installed the injector unit pump with new bolts and cleaned up the fuel which had spilt in the engine bay.

Upon restarting the machine, the engine went into an uncontrolled over speed. Several unsuccessful attempts were made to shut the engine down, including by using the ignition key; E Stop; AFFF and discharging a fire extinguisher into the air intake.

How did it happen?

The engine fuel system was a unit pump design with a common fuel rack connecting all unit pumps.

Each unit pump was timed with the fuel rack to ensure the fuel quantity control was uniform across all cylinders. The fuel rack was located within the engine block. During normal operation, when the engine stop solenoid is de-energized, the governor moves the fuel control rack into the no fuel position and the fuel rack defaults to the full fuel position when the engine is not running but ready to start. The governor controls the engine speed with the fuel rack position once the engine starts.

Incorrect bolts had been used to secure the injector pumps, which subsequently failed. When maintenance personnel replaced the broken bolts and reinstalled the injector unit pump into the engine block, the fuel rack and clevis on the injector unit pump were not in the correct position for installation. This caused the clevis to be misaligned, jamming the fuel rack in the full fuel position.

On starting the engine, the speed governor, stop solenoid, E-stop and throttle control did not have any impact on the engine speed or stop the engine due to the fuel rack being jammed in the full fuel position.

Recommendations

1. With assistance from the OEM, consider installing engineering solutions to mobile equipment which work in conjunction with the E-stop to stop the engine in an emergency, such as:

- Stopping fuel to the engine with a fuel shut off valve on the fuel supply, or
- Stopping air supply to the engine with an air shutdown flap installed to the air intake system.



2. OEM or OEM equivalent parts (including bolts and fasteners) should be used when conducting repairs and maintenance on critical or safety systems.
3. The OEM instructions should be followed when conducting repairs that are unfamiliar, complex or to critical systems (such as the fuel system).
4. Audit fuel systems on mobile plant for damage, fuel leaks or residual fire hazards.



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