

Engine Coolant Systems

Incident Description:

Incident #1: The engineer arrived on site and was presented with a truck with the bonnet up which they were told had been overheating. The engineer, who was wearing gloves with latex coated palm areas, assumed that the truck had been static for a while and had cooled, so decided to take off the radiator cap. Hot coolant erupted under pressure, soaking and entering the glove, causing burns to the hand and forearm.

Incident #2: The engineer was presented with a truck with an overheating light on the dash. Upon opening the bonnet, it was noticed that the fan belt had snapped. The engineer reached in and removed the fan belt, and then checked the pulleys by hand in case they had seized. In the process of doing this, the radiator hose was knocked, whereupon it broke away from the radiator causing boiling water and steam to spray out from the radiator, seriously scalding the engineer requiring hospital treatment.

Incident #3: An LPG counterbalance forklift was brought into the workshop due to overheating. The truck had been parked up for a couple of hours to allow it to cool. The engineer wanted to check the electrical connection to the cooling system temperature sensor which is located at the front of the engine bay. When the plug was unclipped and pulled off the sensor, the whole temperature sensor came out of its housing causing hot coolant to be released from the system. The engineer's upper body was sprayed with coolant. Later in the evening blisters started to appear on engineer's forearms which required hospital attention.

Contributory Factors and Root Cause:



- **Assessment of risk:**
Typically, a coolant system works at around 95° C and 7 psi. Parts such as hoses and plastic elbows may deteriorate over time.
- **Inappropriate equipment:**
Different styles of glove protect against different hazards. Overalls only protect when worn correctly.
- **Taking a moment to assess risks:**
A common theme among all three incidents was that the engineer felt pressure to make a quick repair. When we start to rush - this is when accidents will happen.

Conclusions:

- Plastic pipe elbows may become brittle with age and can fracture unexpectedly, causing a sudden release of hot coolant under pressure.
- Hot steam may escape when the coolant system is opened, causing serious scalding.
- Simple nitrile and latex gloves do not provide any protection against heat; cloth gloves with a coated palm, or with a loose cuff, can capture fluid and increase the severity of an injury.



Actions:

- Assess the risk for the whole working area, not just the component being worked on.
- Check that coolant systems are at below 50° C before starting **any** work around the engine.
- Ensure that PPE is appropriate for the task. The wrong PPE can increase accident severity.
- Depressurise the coolant system by covering the filler cap with a cloth and opening the reservoir gradually before starting **any** work around the engine.

