



The Risk of Scalding and Serious Injury when Working on Steam Systems

Loss Prevention

Crewmembers can be badly scalded while working on steam systems. The following examples illustrate how personnel have been injured as a result of either not following the correct procedures or abiding by best practice, or where they were unaware of the work activities of other crewmembers, with disastrous consequences

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Incident One – Not following correct procedures:

Two engineers were injured while carrying out routine maintenance on a boiler. The engineers opened an inspection door and were scalded, one of them severely, by a violent escape of steam. Initial investigations revealed that the incident was due to human error rather than equipment failure as neither officer had followed the applicable procedures nor checked that the boiler had been de-pressurised prior to commencing the inspection.

Incident Two – Assumptions can lead to accidents:

An engineer officer and a rating were engaged in routine maintenance on a leaking steam valve while the vessel was at anchor. They intended to replace the packing and believed that the part of the system they were working on was safe. After removing the gate assembly bolts the engineer tapped the valve stem in order to loosen the valve. However, the system was still pressurised and this action caused the gate assembly to blow out.

Both men were badly scalded by the released steam and were hospitalised. One of them also sustained serious leg injuries after being struck by the valve bonnet and handwheel assembly.

It was later found that the steam line had not been isolated, de-pressurised or SA 008 drained. No checks were carried out as it was wrongly assumed that the engineer on the preceding watch had carried out this task. Furthermore, rather than slackening the nuts holding down the valve bonnet as a precaution, they were removed completely before the valve was loosened.

Incident Three – Poor interdepartmental communication:

A Class survey of a boiler was being undertaken in port. The vessel's engineers were unaware that the Bosun and a deck rating were painting the exhaust pipes on top of the funnel casing. During the Class survey the attending surveyor asked for the boiler over-pressure safety vent valves to be tested.

The steam pressure in the boiler was increased until the safety vent valves tripped. The steam vented through an open ended pipe situated on top of the funnel casing which directed the flow towards the centre of the funnel top, scalding the rating severely.

The Bosun, standing on a small raised platform by the side of the vent, was blown onto the top deck of the funnel by the force of the blast, but escaped injury.

Subsequent investigations found that there was little communication between the deck and engine departments with regard to their respective work programmes. Moreover, the vent pipe was unmarked and crewmembers did not know that pressurised steam might escape at any time.

Conclusion

These incidents clearly demonstrate the risk of serious injury if procedures are not followed correctly or if adequate precautions are not taken. Given the devastating effects of being hit by a sudden and unexpected release of steam, Members may wish to review their maintenance procedures regarding boilers and steam systems to ensure all eventualities are covered. Inspections and maintenance involving steam plant should be subject to the vessel's "Permit to Work" process, and no work should be carried out without the knowledge and approval of the Chief Engineer.

All involved in the operation should be refamiliarised with the applicable procedures and it may also be prudent to carry out a risk assessment beforehand. As a minimum the system should be de-pressurised, drained, cooled and isolated, and warning signs posted. Isolation valves should be locked or tied shut to prevent any backflow of steam or condensate, and blanking plates may also need to be inserted.

After emptying a boiler, care should be taken to check that the vacuum has been broken before the manhole doors are removed. Although an air cock may have been opened to break the vacuum, the manhole door nuts should be loosened and the joint broken before the dogs are released. The top manhole doors should be removed first, and personnel should stand well clear when the doors are opened in case of hot vapour. All departments should be kept informed throughout.



Members requiring further guidance on this topic should contact the Loss Prevention department.



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