

# Technical Bulletin (Safety Alert)



ENGINEERING

## HSE issues safety alert over the phenomenon of condensate induced water hammer in steam systems

Bulletin No. 002

August 2019

### Introduction

An on-going case, currently under investigation by the Office for Nuclear Regulation, has prompted the HSE to issue a reminder to duty-holders about their responsibilities in terms of the maintenance and operation of steam systems.

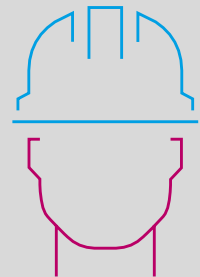
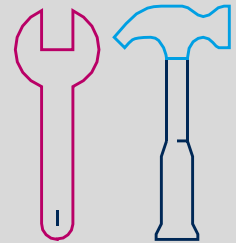
The incident in question saw three people injured following the release of steam from a non-nuclear heating system. The Office for Nuclear Regulation (ONR) is in the process of investigating the incident, but early reports suggest that there was a failure in the pressure boundary of the steam system, potentially caused by a water hammer event.

Water hammer sometimes referred to as 'Condensate Induced Water Hammer', is a known vulnerability in steam systems. It most commonly occurs when steam is introduced into cold pipework that has not been sufficiently drained. As the steam cools, it turns into condensate which takes up less volume in the pipework than the steam. This produces a vacuum or pocket into which the water rapidly flows, creating an impact against the pipework.

The [HSE](#) is reminding all duty holders of this phenomenon in steam systems and advising them to ensure suitable measures are taken to prevent the occurrence of such events, including the appropriate operation and maintenance of such systems on their sites.

HSE recommend that the five-point action plan detailed in the Safety Assessment Federation (SAFed) factsheet is considered;

['potential hazards created by water hammer in steam systems'](#).



### Key message

The above is a reminder that we must ensure that everybody operating, installing, maintaining, repairing, inspecting and testing pressure equipment should have the necessary skills and knowledge to carry out their job safely – so we need to provide suitable training. This includes all new employees, who should have initial training, be supervised, be assessed and authorised to work on pressure systems and equipment.

Examples of pressure systems and equipment are:

- boilers and steam heating systems;
- pressurised process plant and piping;
- compressed air systems (fixed and portable);
- pressure cookers, autoclaves and retorts;
- heat exchangers and refrigeration plant; valves, steam traps and filters;
- pressure/expansion vessels;
- pipework, hoses, pressure gauges and level indicators.

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