

# Steam Release

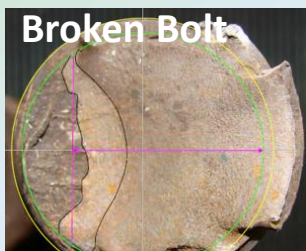
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## What Happened:

During reinjection of a clamp on a flange of 70 barg 290 °C water line, the 20 bolts failed and steam was violently released. Two contractors died.



## Aspects:

- High pressure steam release is dangerous: besides the high pressure and heat, steam also eliminates visibility and oxygen
- Stress Corrosion Cracking phenomenon in bolts or studs should always be considered even when bolt material has been selected as SCC resistant (e.g. threaded rolled ASTM A193 Grade B7 bolts and studs)
- During injection of a clamp the tension on the studs can be increased with 10 to 20% (from experiment)
- Caustic is used for pH control in steam systems. High caustic can weaken the carbon steel piping and bolts after leakage: attention for white deposit 
- A Clamp is a temporary solution, plan removal at installation

**Clamp reinjection brings hazards and needs special attention**