PHMC Lessons Learned/Operating Experience

Information Bulletin

Fluor Hanford

Hot Tap Failure Causes Breach of a Pipe

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Summary: Hot tapping tools are commonly used in many industrial applications. While failures associated with these tools are rare, they do occur. Additional precautions should be taken to ensure the tool functions as designed and an inadvertent pipe breach does not occur.

Discussion of Activities: On 04/08/2008, while performing a "hot tap" on a ½ inch chemical line, the drill bit passed through the chemical line and breached the outside section of the pipe.

The drill bit of the hot tapping tool contains a carbon steel retaining ring (Figure 1). The retaining ring is designed to both prevent the drill bit from penetrating too far into the pipe being hot tapped, and also prevent the extraction of the drill bit out of the stainless steel hot tap assembly. The retaining ring should have limited the drill bit penetration depth to 0.58 inches.

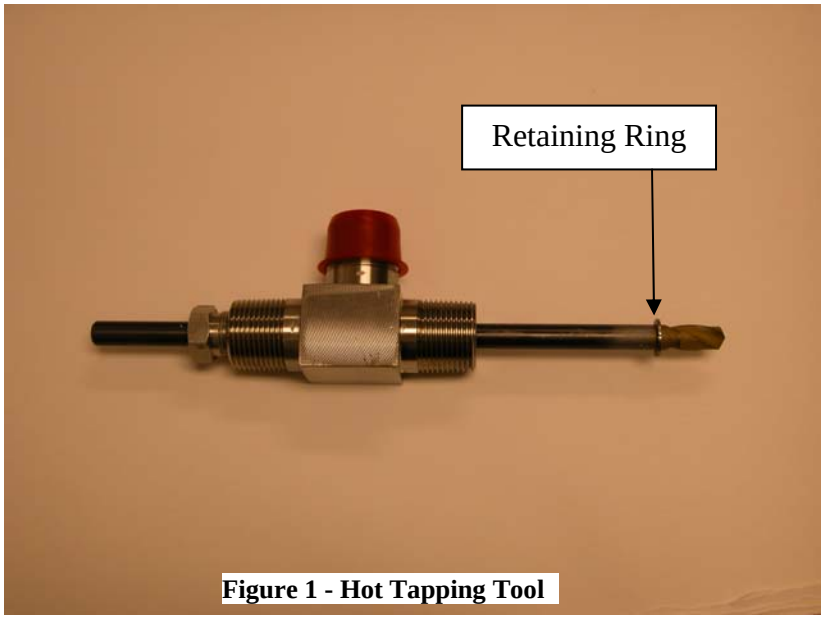

Figure 1 - Hot Tapping Tool

Analysis: The drill bit was removed and inspected. Indications are that the retaining ring failed during the hot tap operation. The drill bit showed signs of wear at the groove edge where the retaining ring affixes to the drill bit. The worker performing the hot tap did not detect any change in application pressure while drilling that would have provided an indication the pipe had been penetrated or resistance to further penetration indicating the retaining ring had contacted the inside of the stainless steel hot tap saddle. The facility was unable to determine the exact cause of the retaining ring failure; however, the most likely cause was contact with the hot tap saddle.

Recommended Actions: Ensure personnel understand the manufacturer's instructions and precautions associated with using the hot tapping tool. Additionally, enhanced instructions for assembly, installation and use of these tools should be considered.

- During hot tap assembly: Inspect the retaining ring to ensure it is in place prior to threading the Tapping Tool Body into the Saddle Block.
- After assembly: Test the retaining ring by pushing and pulling the drill bit shank until the retaining ring stops the movement of bit.

- After assembly but before installation: Push the drill bit shank all the way in until the retaining ring stops the bit, then mark the shank (tape or paint) or install a drill stop (Figure 2) on the shank to mark the point where the drill bit will be through the near (inner) pipe wall and the retaining ring will be against the inside of the saddle.
- During installation: Orient the tap to drain the line with consideration to allow easy access for the worker when drilling the line and to leave appropriate clearance for support personnel.
- During hot tap operations: Monitor the alternate indicator (mark or stop collar) as drilling progresses to ensure only desired pipe penetration is performed.

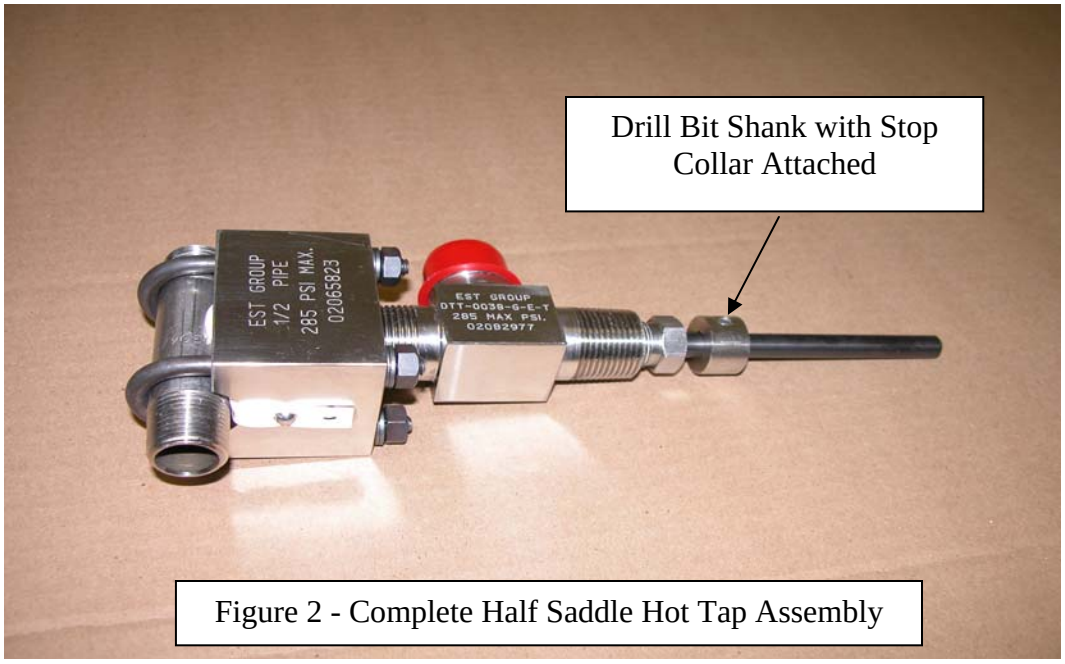

Figure 2 - Complete Half Saddle Hot Tap Assembly

Cost Savings/Avoidance: Not Evaluated

Work Function: Decommissioning and Demolition, Maintenance - Mechanical

Hazards: Personal Exposure - Contamination - Toxic Material, Pressurized Systems, Radiological Release

ISM Core Functions: Analyze Hazards, Develop/Implement Controls, Perform Work

Originator: Fluor Hanford, Inc., Submitted by M. D. Talbot and J. W. Smith

Contact: PHMC Lessons Learned; *(509) 372-2166; e-mail: PHMC_Lessons_Learned@rl.gov*

References: PFP-HPI-2008-003, *Inadvertent Pipe Penetration*
PFP-LL-08-004, *Inadvertent Pipe Penetration*