



# 4C HSE Conference 2018

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## Forge Bonding™ for Valve Repair

An Improved Method for In-Service Valve Packing Restoration



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# This presentation discusses;

- Typical valve leakage scenario
- Forge Bonding™ process
- Forge Bonding™ vs. drill & tap
- Technology advantages



# Typical Valve Leakage Scenario

- Previously injected valve is found leaking at same leak points including drill & tap fitting.
- The valve is placed back on the “leaker list” requiring re-injection and monitoring.



**As before, the same two repair recommendations are made.**



### **1<sup>st</sup> & 2<sup>nd</sup> attempt**

- **Re-tighten follower bolts and the injection fitting.**
- **Re-inject the valve.**

### **Successive attempts fail**

- **Take valve out of service and repair or replace.**



**Senior management says, “Must stay in service until next scheduled outage”.**



- **Environmental releases add to facility annual emissions.**
- **Creates hazardous conditions to human health and safety.**

# Back to the Practice of 1<sup>st</sup> & 2<sup>nd</sup> Attempts



**...with all it's problems;**

- Over tightening of packing
- Twist off or strip injection fitting
- Temporary repair at best
- Increased risks of ;
  - Environmental release
  - Human health and safety

***...it can also become a repetitive budget buster...***

**Fact: Temporary repairs cost thousands of dollars and frequently requires shut-down and valve replacement.**

# Does this sound familiar?

**There is a better method:**

- **Forge Bonding™**
- **Permanent, in-service maintenance platform.**
- **Strength & reliability of hot work, but requires only “cold work” permitting.**
- **Safer than drill & tap.**

**It's safe, fast, economical and  
enhances the valve asset!**

# Forge Bonding™ Process

## Step #1



**Evaluate valve condition and formulate a repair strategy.**



# Step #2



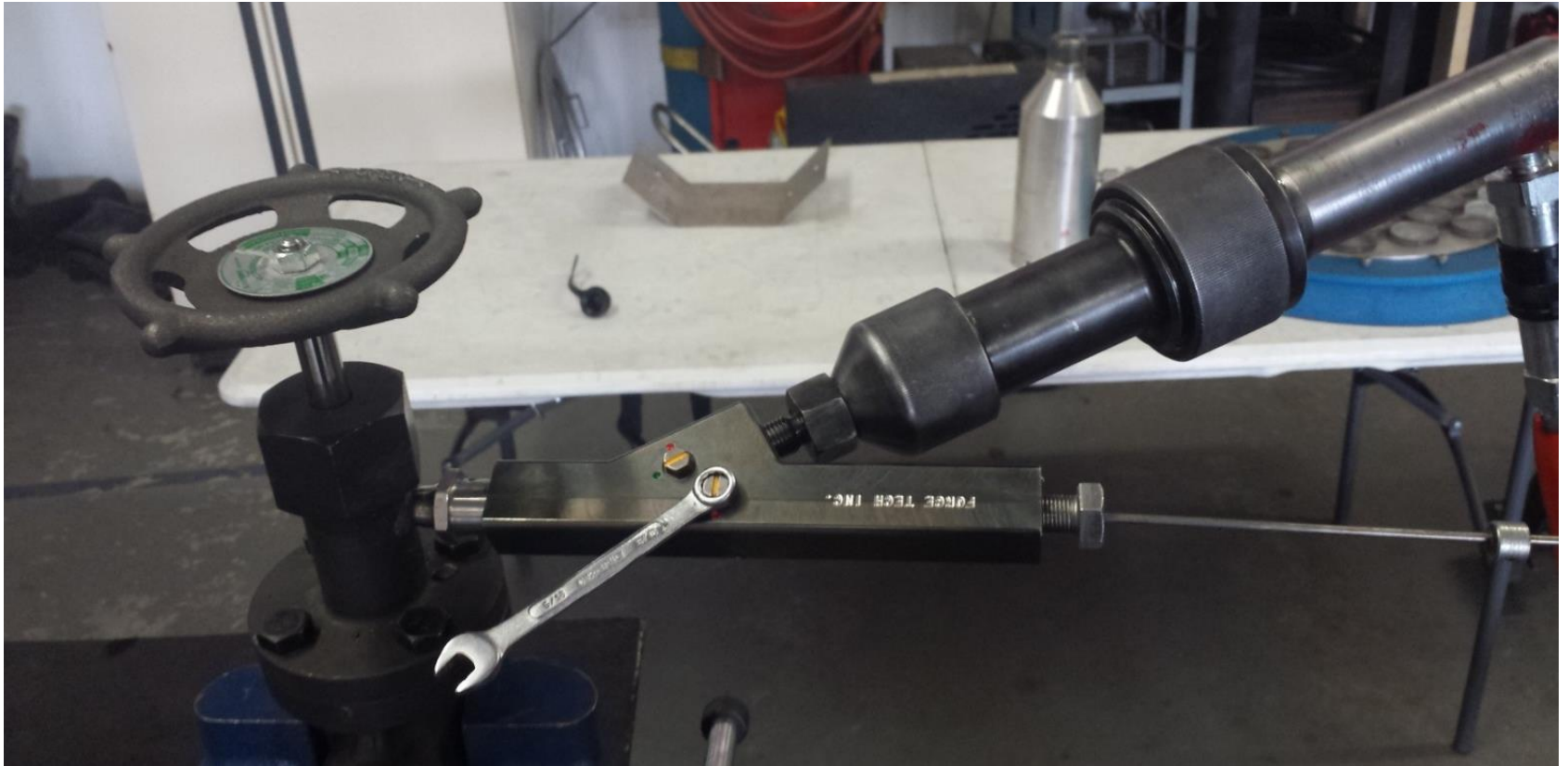
**Mark injection location  
and prepare surface.**

# Step #3



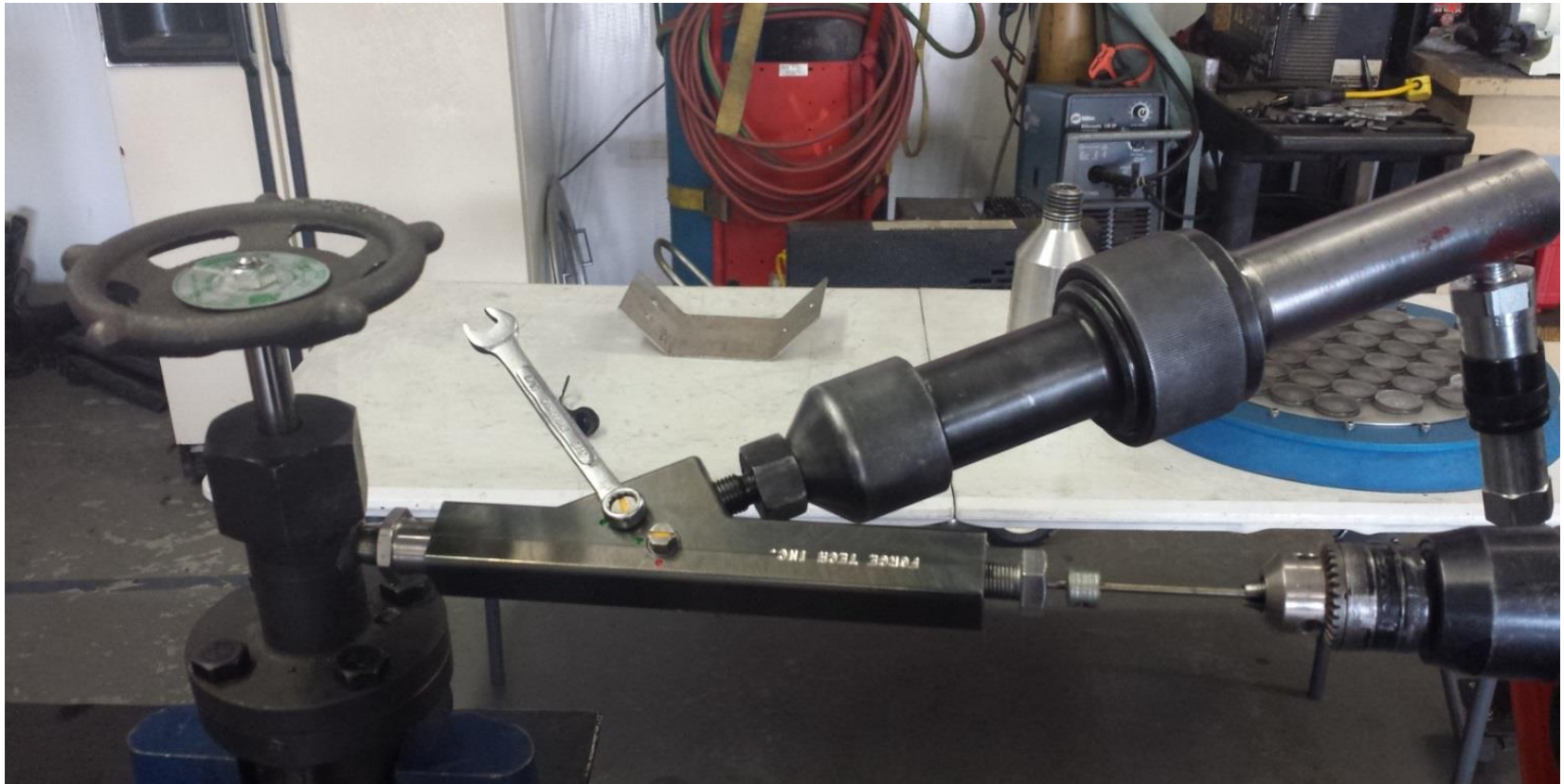
**Install Forge Bonding™ equipment and bond the fitting to valve.**

# Step #4



**Install Extreme Pressure Injection Kit (EPIK™) and pressurize with sealant.**

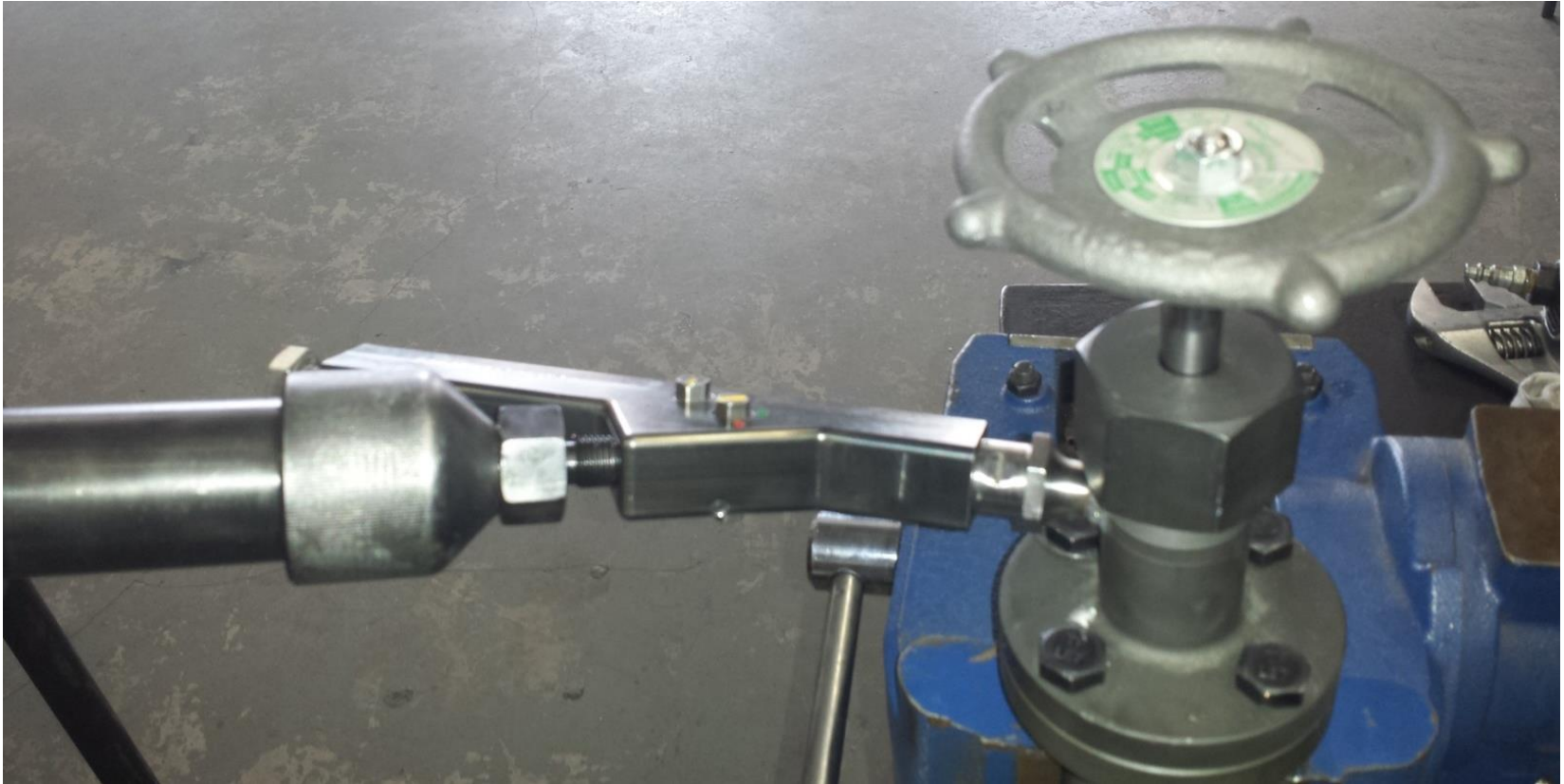
# Step #5



**Drill into packing gland. Inject sealant while withdrawing drill bit.**



## Step #6



**The leak is stopped, injection fitting is closed and the EPIK™ is removed.**

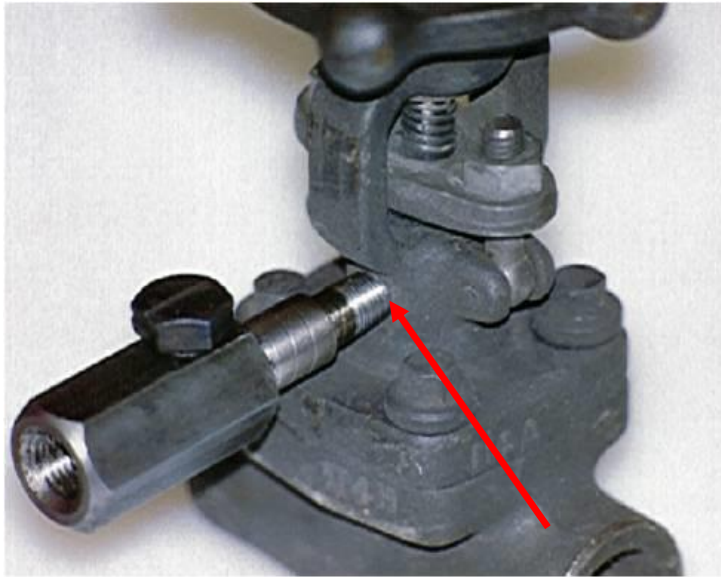


## Step #7

**Install cap to complete the valve repair. Valve is now leak-free.**



# Forge Bonded™ Injection Fitting Quality



## Drill & Tap

- < 35 ft-lbs of torque to failure.
- Leak point at threads.



## Forge Bonding™

- > 140 ft-lbs of torque to failure.
- No threaded leak point.

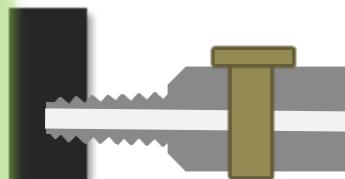
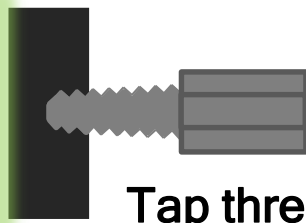
# **Safety of Forge Bonding™ vs. Drill & Tap**

## Drill & Tap



**Partial drilling (most hazardous steps).**

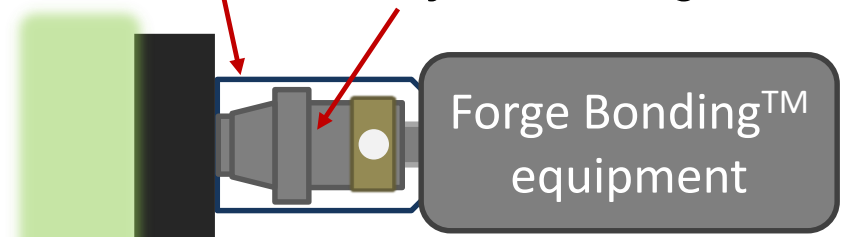
- Wall thickness calculated incorrectly.
- Drill-stops set incorrectly.



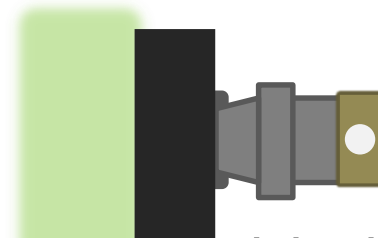
## Forge Bonding™

Argon purged shroud

Injection fitting



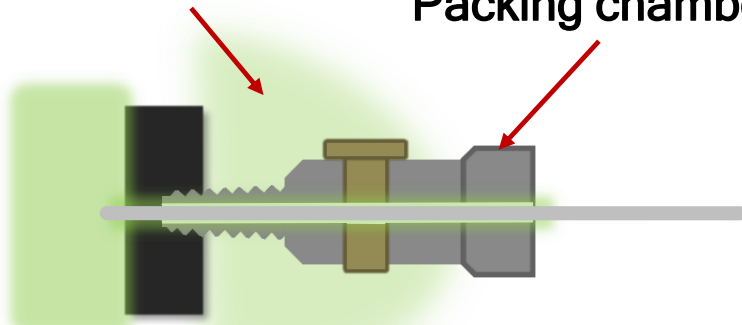
Attach Forge Bonding™ equipment and bond injection fitting to valve.  
**NO DRILLING REQUIRED.**



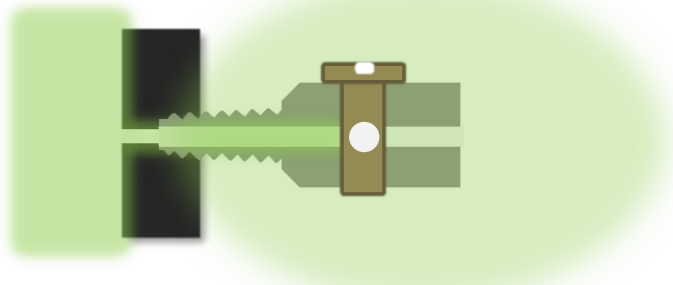
# Drill & Tap

Emissions

Packing chamber

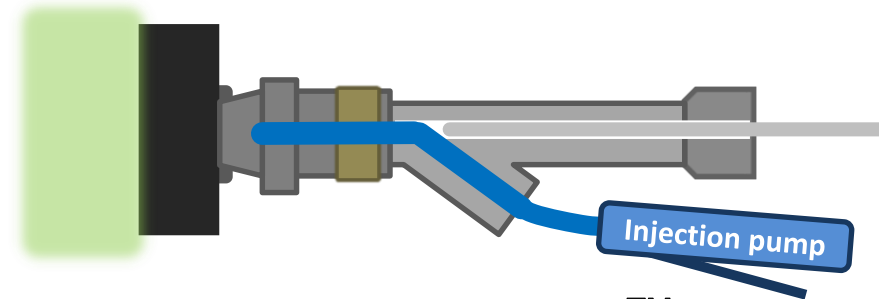


Drill into packing gland.  
**Potential emissions.**

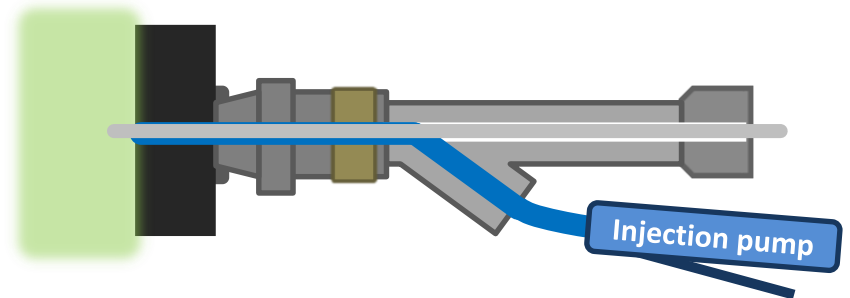


Drilling is complete. **Emissions present until sealant is injected. Increased potential leak sources.**

# Forge Bonding™



Inject fitting using EPIK™ system.



Drill into packing gland and inject valve. Forge Bonded™ fitting has no leak sources.



# Forge Bonding™ Summary

- Engineered permanent maintenance platform.
- Achieves regulatory compliance.
- Safer repair process.
- In-service process, reduces overall costs.

**THANK YOU**

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