TechTalk Onsite Services

Wilco Landkroon & Aletta Keijzer

09-02-2023

Introduction Swagelok

Wilco Landkroon
Field Engineer / Trainer

Aletta Keijzer
Communication

Agenda

- Fluid System Inspection
- Identifying Common Issues
- Our Onsite Services
  - Fluid System Evaluation & Advisory
  - Sampling System Evaluation & Advisory
  - Compressed Gas Leak Detection
  - Hose Advisory
  - Survey Report
- Training

Fluid System Inspection

Fluid System Inspection

Leak study results at 10 surveyed areas / applications

- Installation failures at fittings: 12.12%
- Total annual loss: 176.184m3 gas

Reducing install failures.

Reducing leakage.

Minimize leaks.

Maximize efficiency.

Installation Issues

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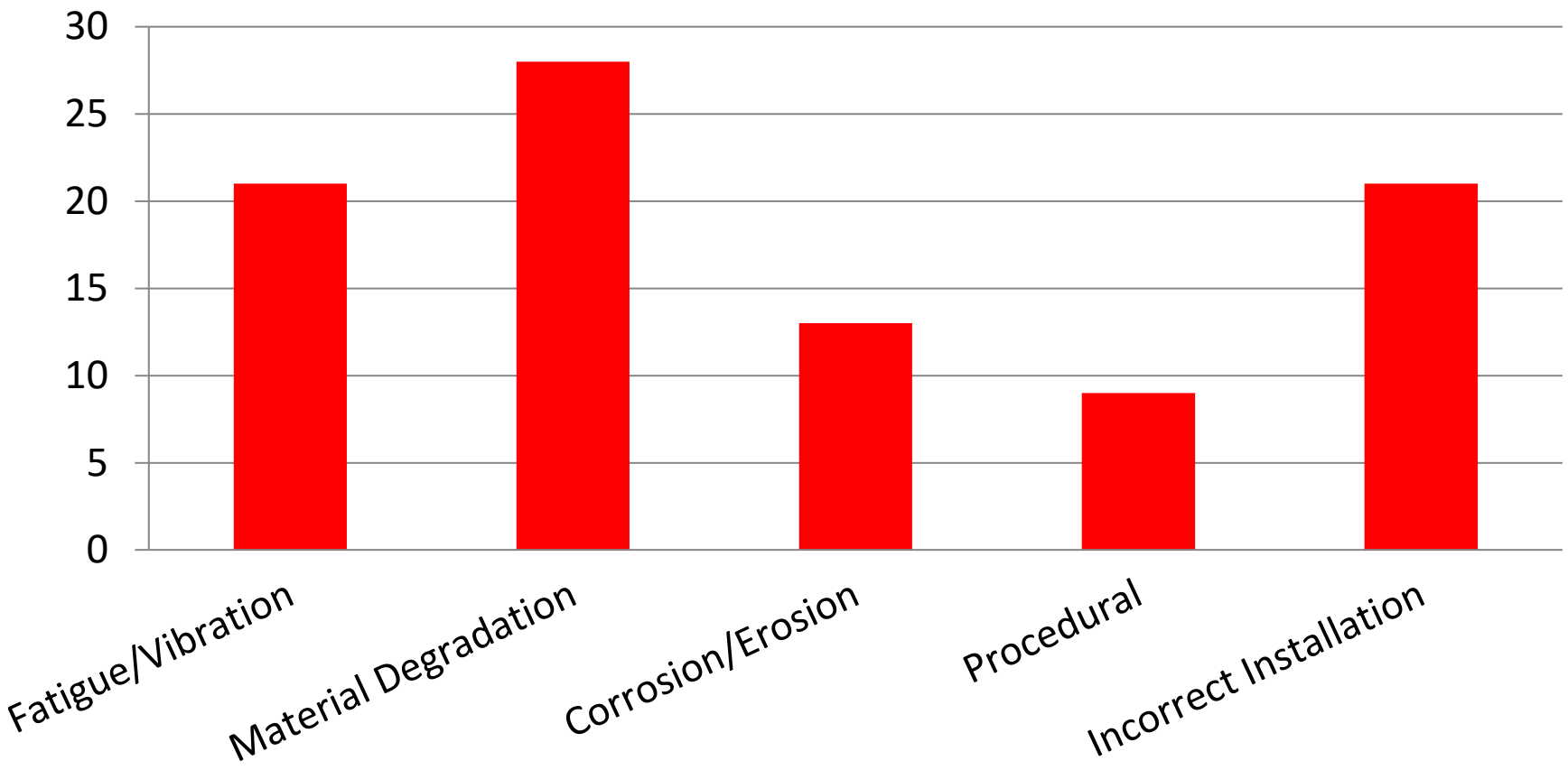
- Purposeful inspection is the key to success
  - Spotting issues can be challenging
  - Being aware of best practices at installation can make your life easier in future
  - Not just looking for leaks

Installation Issues



Ref HSE's "Analysis of investigated offshore hydrocarbon releases."
Ref DNV Industry Experience-"Causes of Pipework Failure"

Question

Are you absolutely certain that your system does not have issues?

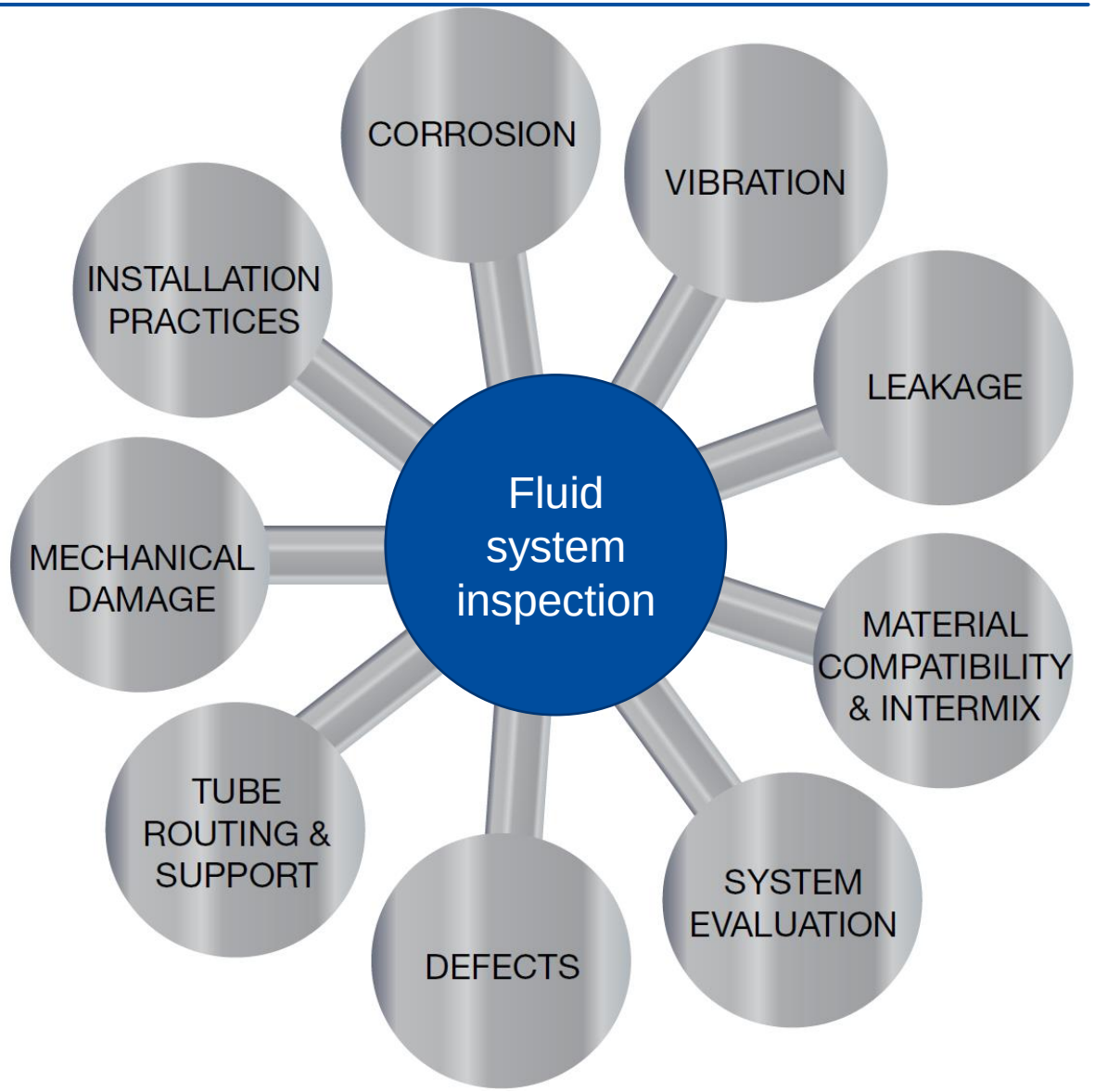
A. Yes

B. No

C. Not sure

Fluid System Inspection

- Over/under tightening of tube fittings
- Tube supports – intervals and installation
- Vibration, static and dynamic loading
- Material compatibility
- Correct installation
- Routing & repair recommendations
- Bend defects
- Open ports
- Tube fretting/abrasion
- Thread reduction
- Component reduction
- System optimization
- Hose installation and suitability



Root cause analysis, not just issue identification
Why, Why, Why

Equipment

Leak detector

Fitting gap gauge

Weather resistant tagging

Technology to record issues with camera

Ultrasonic leak detection

Thread identification

Inspection mirror

Cloth

Vernier for sizing

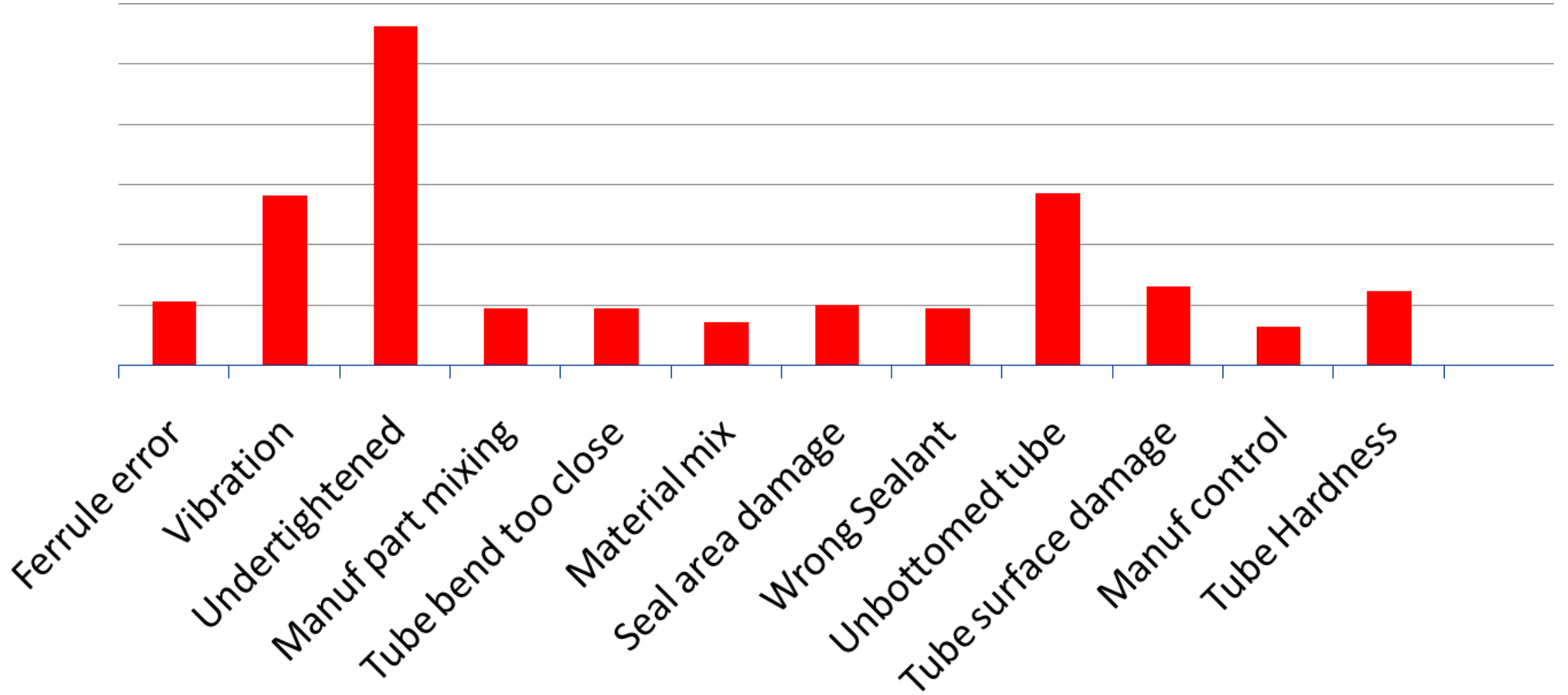
Tape measure

Thermal camera / probe

Applications

- Chemical refinery
- Laboratory
- Gas bottles
- Hydrogen systems
- Semiconductor

Weak Installation

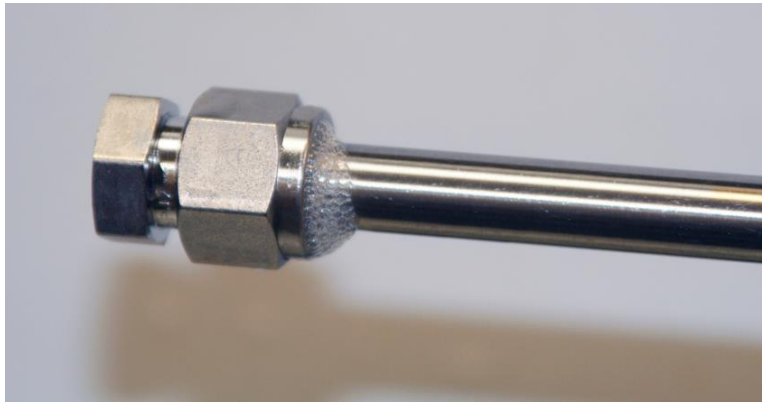


Categorization of Issues

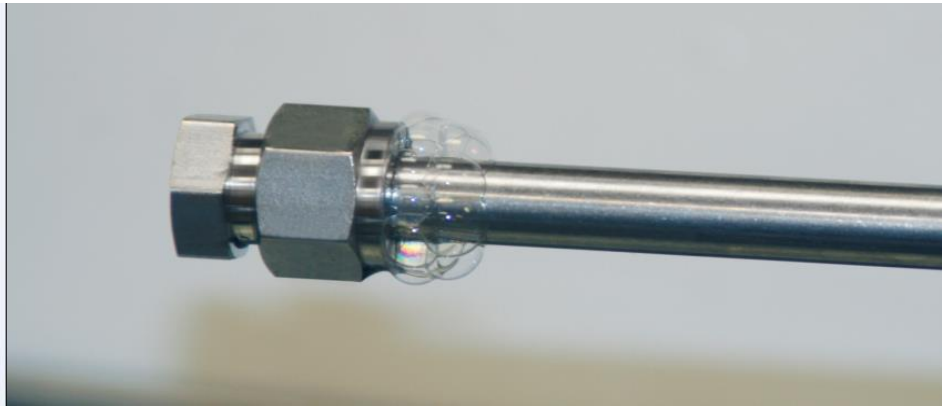
INTEGRITY ASSESSMENT	RISK RANKING	
	RATING	PRIORITY
Potential for impact on Production, Personnel and Environment posing urgent risk or effect that will lead to major leakage and LOPC. Action should be completed immediately or as soon as safely possible.	1	Urgent
Potential for impact on Production, Personnel and Environment posing a high risk or effect that could lead to LOPC. Action to be taken for immediate closure and corrective action within 6 months.	2	High Risk
Potential for impact on Production, Personnel and Environment posing a medium risk. Action to be taken in less than 12 month.	3	Medium Risk
Potential for impact on Production, Personnel and Environment posing low risk. For improvement in coming project scope or future modification. Action to be taken in less than 24 months.	4	Low Risk

Identifying Common Issues

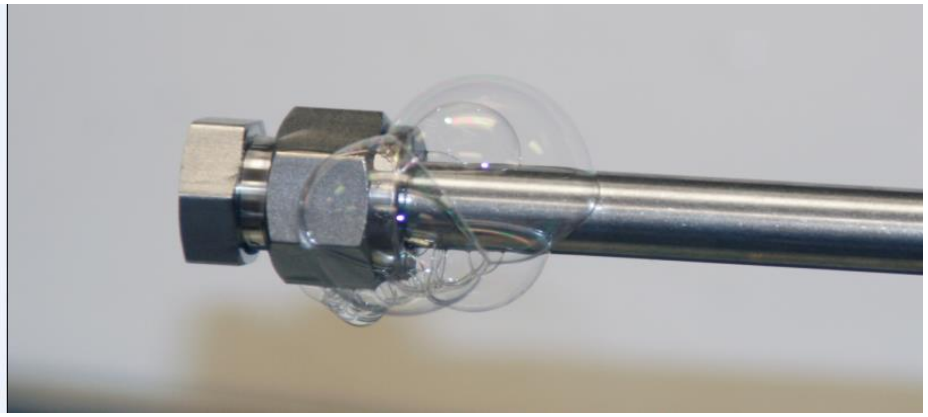
Small Leak – Gas (±0.5 std L/min)



Medium Leak – Gas (>1 std L/min)



Large Leak – Gas (>50 std L/min)

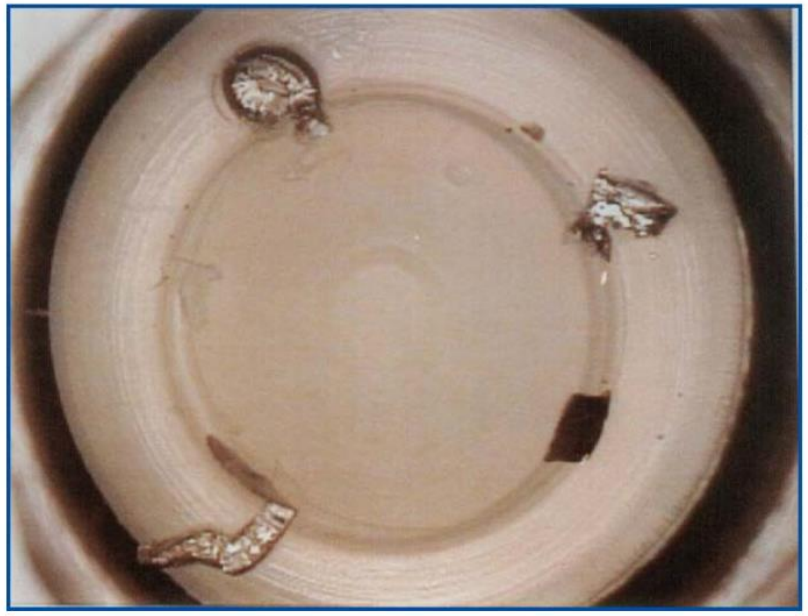


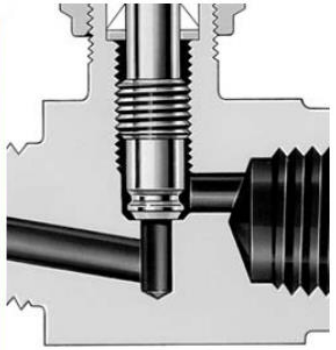
Identifying Common Issues

Poor tubing placement

Identifying Common Issues

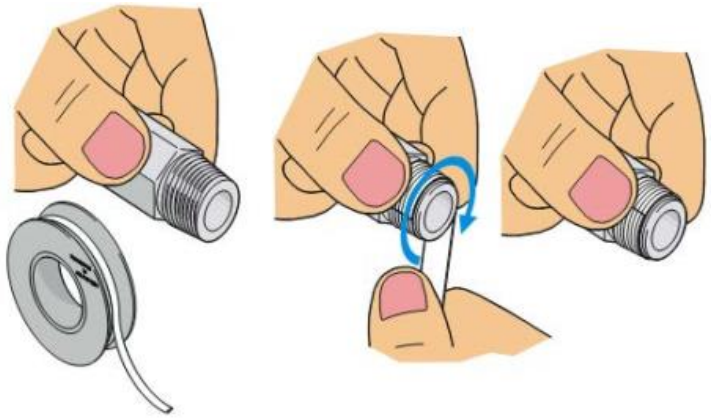
Heavy scratches and dents causes leaks

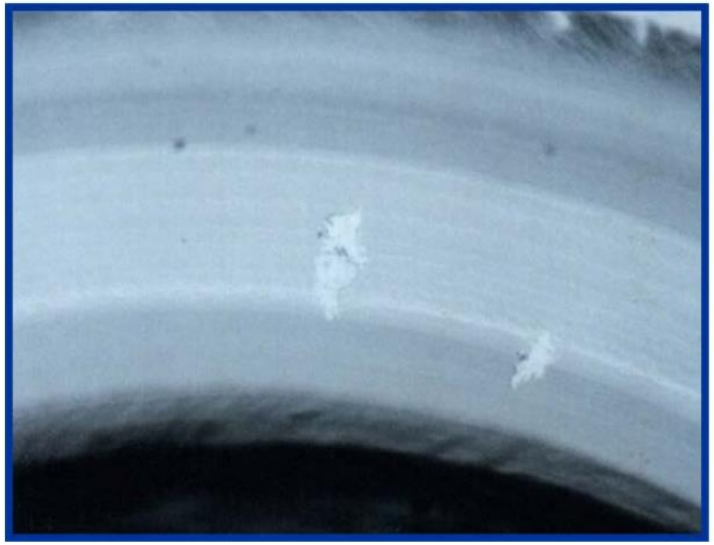


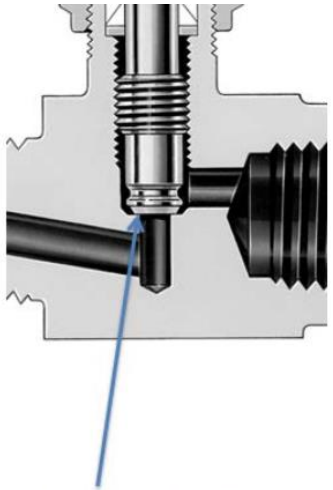


Identifying Common Issues

Sealant for Tapered Threads

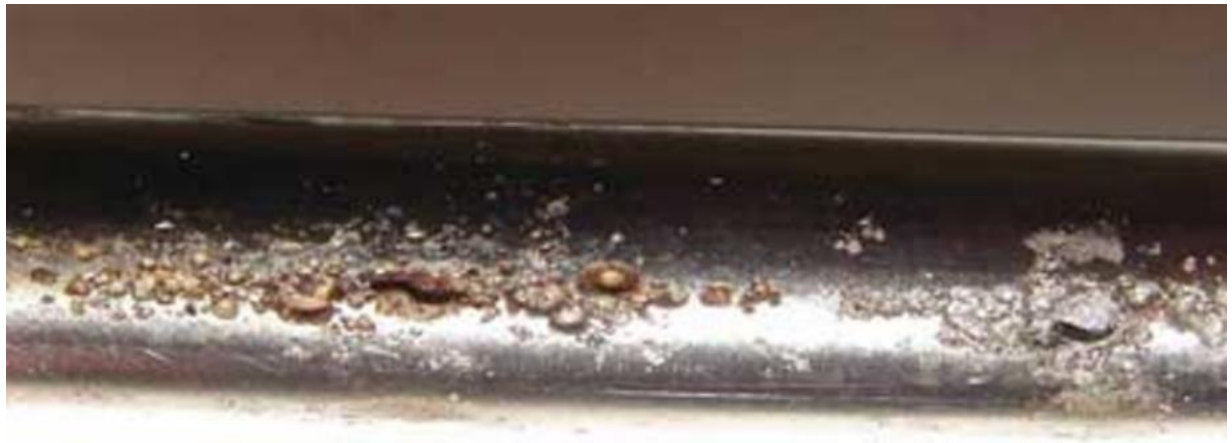






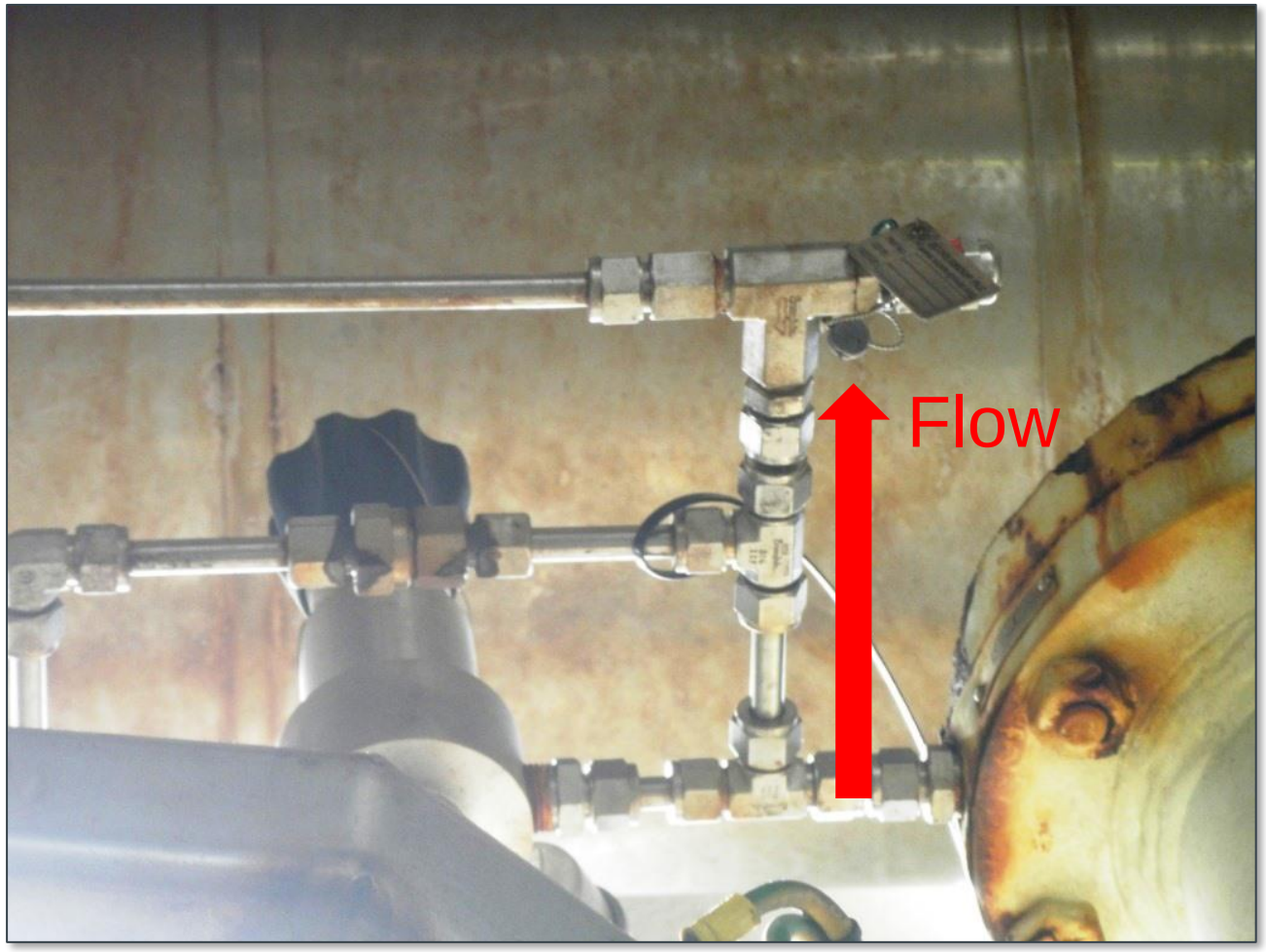
Identifying Common Issues

Corrosion



Identifying Common Issues

Installation error



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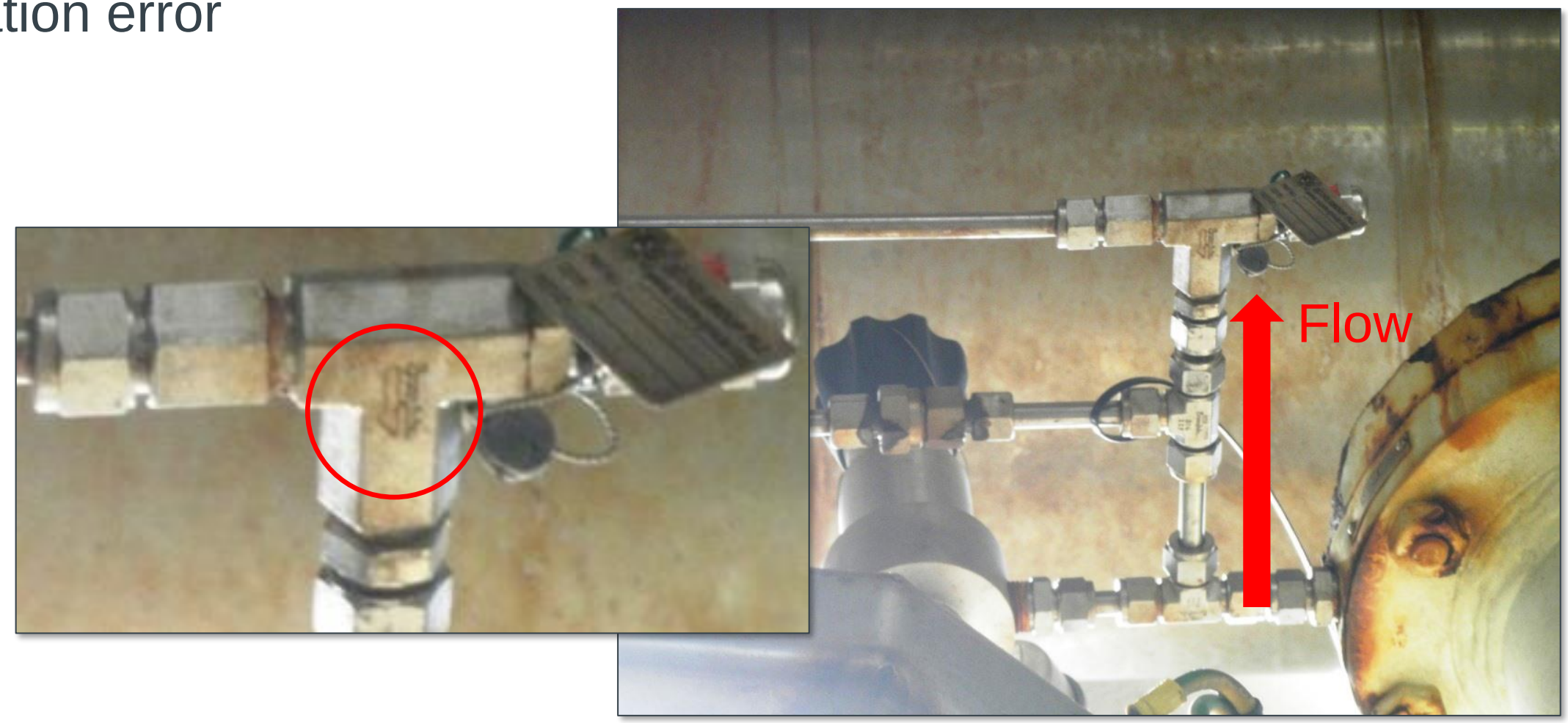
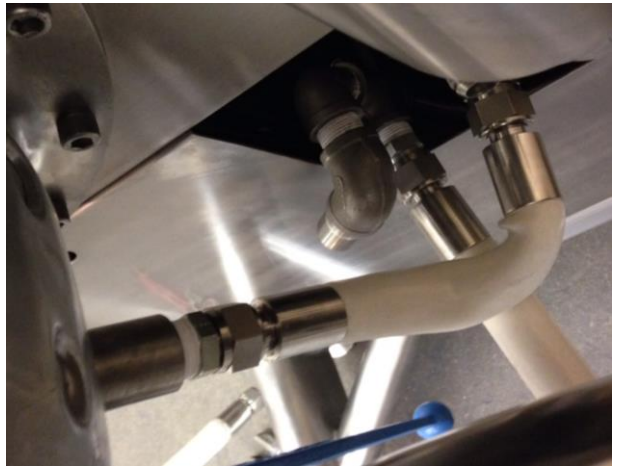


Hose installation

- Points of attention for proper Hose installation:
  - → Respect minimal bend radius (both static- and dynamic) to avoid kinking
  - → Avoid mechanical load on end connections
  - → Avoid damage due to rubbing and sharp edges
  - → Avoid Hose twisting (torsion)



Surveys

Fluid System Evaluation & Advisory Services

Site evaluation of your installation

- Improve performance and reliability
- Enhance safety
- Reduce costs
- Reduce emissions

Sampling System Evaluation & Advisory Services

Detailed report tap to analyzer / grab sample panel:

- Time delays
- Representative samples
- Reduce maintenance and downtime
- Resolve issues

Compressed Gas Leak Detection

Leak detection:

- Mitigate safety risks
- System efficiency
- Increase reliability
- Reduce energy consumption
- Reduce costs associated with gas leaks
- Reduce emissions

Hose Advisory Services

Hose installation improvements and recommendations.

- Installation and maintenance
- Hose selection
- Preventive maintenance schedules
- Documenting hose installation and wear concerns

Reports

Sample Systems Evaluation and Advisory Services Report

1.2. Sample pre-conditioning system SSS SSS

❖ **Subsystem Observation – Evaluation – Recommendation**

Figure 4 - Pre-conditioning system, SSS SSS

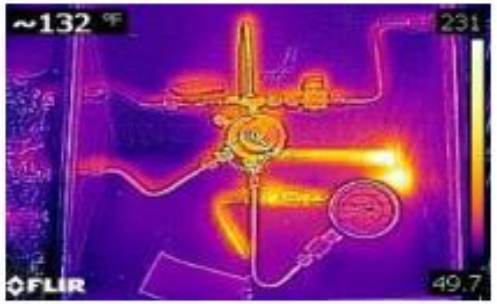


Figure 5 - FLIR Camera: Pre-conditioning system, SSS SSS

Observation	Evaluation	Recommendation
▪ All tubing running in and out the PCS are ¼"x 0.035" diameter.	▪ No issue in general. But it could be considered to use 1/8" tubing to improve the response time. With ¼" tubing the volume would be about 492 ml which gives a time delay in the STS of approximately 28 seconds. $T = \frac{V}{v}; T = \frac{492\ ml}{1{,}070\ ml/min} = 27.6\ seconds$	▪ If the system gets renewed you might consider 1/8" tubing for the transport line. This would reduce the line volume of the STS to 72 ml and reduce the time delay to 4 seconds. $T = \frac{V}{v}; T = \frac{72\ ml}{1{,}070\ ml/min} = 4\ seconds$
▪ The PCS is installed in a closed cabinet using a steam heated	▪ The hot temperature of the regulator is causing issues on the	▪ Use an electrical heated regulator to allow appropriate heat transfer

Reports

Sample Systems Evaluation and Advisory Services Report

3.2 Sample transport lines

REF 3.2.1 Sample transport line

REF 3.2.2 Sample pump

Ref	OBSERVATION	EVALUATION	RECOMMENDATION
3.2.1	Sample line is kinked	This kink in a 6mm tube with a wall thickness of 1mm can creates a very small orifice which create a pressure drop in the line.	Replace this kink for an elbow fitting or use a tube bender to renew this 180° bend.
3.2.2	Because of a pressure drop in the sample transport line there is a pump before the conditioning system. The back-pressure regulator after the pump keeps the line pressure at	Pressure drop calculation over the sample transport line indicates that this pump should not be needed.	Based on earlier recommendations the pressure drop may create by an orifice in the kinked tubing and/or condensation of the gas.

Training

Tube Fitting Installation Training

Tube Fitting Installation

- Foundational tube fitting knowledge
- Minimize risk of leakage and ensure system integrity

You will learn

Upon course completion, you will:

- properly select, cut and deburr tubing
- correctly assemble a Swagelok® tube fitting
- gauge a tube fitting assembly
- gain an understanding of the differences in tube fitting designs, tube fitting components and their importance to proper assembly
- be able to identify thread types and installation practices, and properly prepare threaded installations.

Bending Training

How do you eliminate leak points in your system?

More connections mean greater potential for leaks.

The Swagelok Tube Bending course offers foundational knowledge needed to introduce tube bending to your system to eliminate connections and leak points found in traditional welded pipe systems.

Inspection Training

- **How do you avoid cost?**
  Avoid leakage and plant stops by proper installation of tubes and fittings.

- The Tube Fitting Installation Inspection course is designed to teach you how to mitigate and minimize risk of leakage through proper inspection.

Sampling Training

- Sampling System Problem Solving and Maintenance Training
  SSM - 2-days training

- Process Analyzer Sampling System Training
  PASS - 5-days training

Summary

- Importance of fluid system inspection
- Many installation issues
- Onsite survey can help identify challenges
- Customized survey
- Importance of training

Questions

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