



2022



## Exchanger World 2022 Field Removal of Sample Tubes

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#### **Pulling tube samples**

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•Why do we pull sample tubes in the field?

- For metallurgical study
- For corrosion analysis

CUST-O-FAE

 Failure Mechanism root cause analysis





**Tube Fretting** 

Chloride Stress Cracking/ Corrosion



Inlet Erosion



Sediment/ Fouling External Tube Corrosion





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### **Pulling tube samples**

**Considerations before starting** 



#### Where is the exchanger and tubes to be extracted?

- Access to the bundles
  - Is the channel head still in place?
  - Is there an obstruction in front of the bundle that will be an issue
- $\,\circ\,$  Room available to work in
  - If the channel head is in place will it be large enough to work in?
  - Is the tube to be puled at the periphery, is there room for equipment if the channel head is in place?

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TEADIT VANTERUS

G Chimstede SR SUPERIOR



#### Weld Removal Preparing tubes to be pulled



 $\circ$  Are there drawings available?

Important to identify if the weld is a seal weld or strength weld.

1.5mm RADIUS

SHELL SIDE





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## Weld Removal



Preparing tubes to be pulled

- If welded, remove weld.
  - Whether tubes are seal welded or strength welded removing all the weld is necessary to pull the tube.
    - When using a mill make sure you have the correct head and remove all weld.
    - Inspect weld area with DPT if necessary













## **Tube Pulling Methods**



Pulling approach

- There are several ways to remove a tube from a bundle.
  - Small manual puller
  - o Pine Jenny
  - Super Pine Jenny
- Ensure whatever method you choose has sufficient tonnage to extract the tube in question.
  - How much tonnage do you need? 12T/ 30T/60Ton







#### **Pulling tube samples**

Super Jenny/ ACTP system









# Tube Rolling Considerations



# You have two options once the tube is pulled.

- Roll tube stub or new tube
  - Using an expander and roll motor roll in tube stub and plug.
- Plug the tube sheet hole where tube was removed
  - Plug directly into tube sheet with a mechanical plug.











# Tube Rolling – Replacement/ Stay Tubes









#### Tube Plugging Plug Installation



- Plug the tube sheet hole where tube was removed
  - $\circ~$  Plug directly into tube sheet with a mechanical plug.
  - Many modern mechanical plugs use an annealed ring to allow for compression. These plugs can be used without damaging valuable tube sheets.















Joey Brock & Eric Tinnerman - Equipment Group International

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