

NEWEA 2019

Condition Assessment Of FRP Assets Case Histories: Where and How to Look

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Ensuring Good FRP Asset Decisions Means Knowing Where and How to Look in Condition Assessment



Case History “A”

- Odor control ductwork & equipment – 21 years in service
- Look for construction related deficiencies
- Look for solids carry-over airflow related damage
- Examine the laminate performance with coupon removal



View of round ductwork on Grit Level – note leakage



Abrasion damage to corrosion barrier



Shows the core hole in the duct – sample area



Shows preparation for the core hole repair and shows repair plug with flange – this can be done with the system on-line



Depicts preparation of the vinyl ester resin repair compound



Demonstrates the flanged core hole repairs in progress



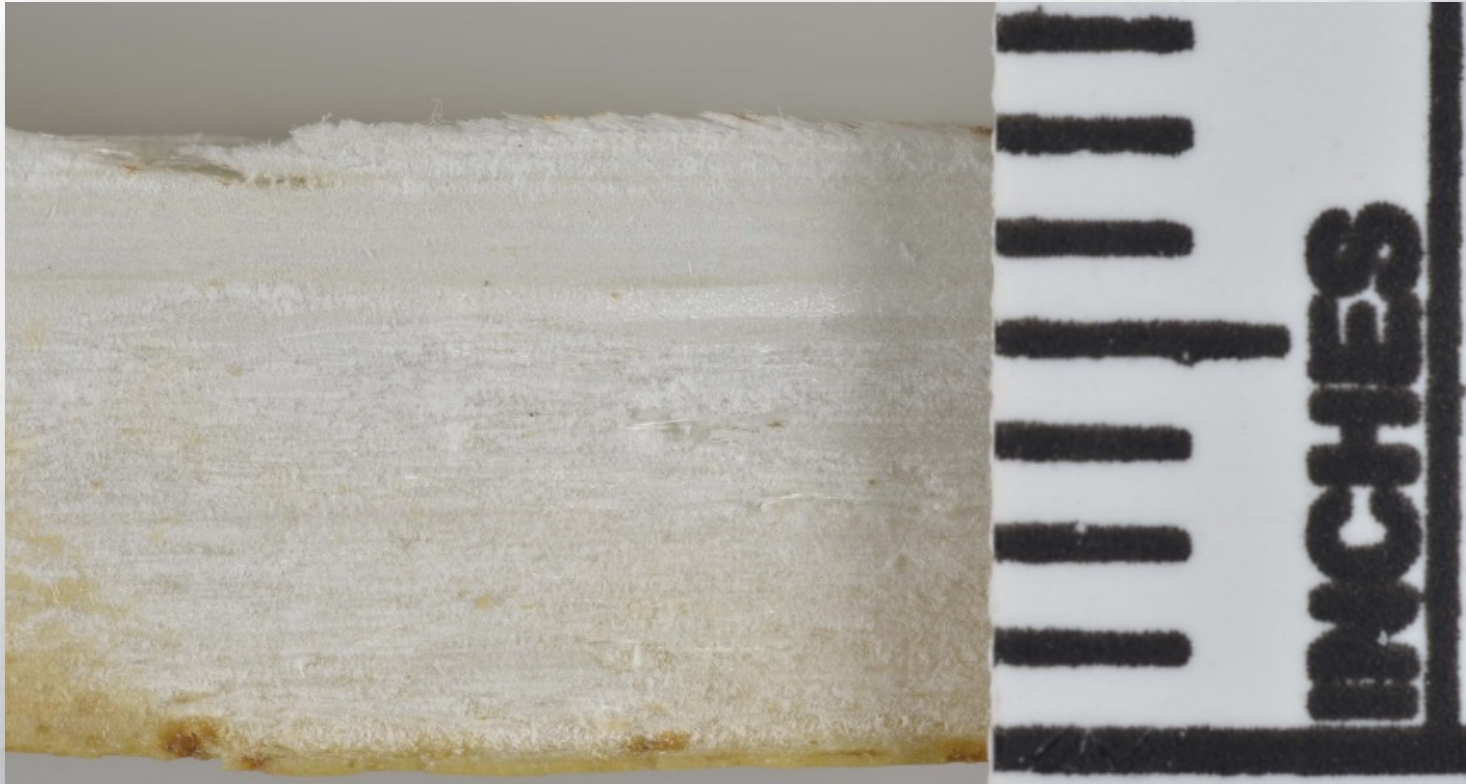
Shows the repair being completed prior to gel coating at Area A.



Shows the RFP repair prior to white resin gel coating – Sample Area

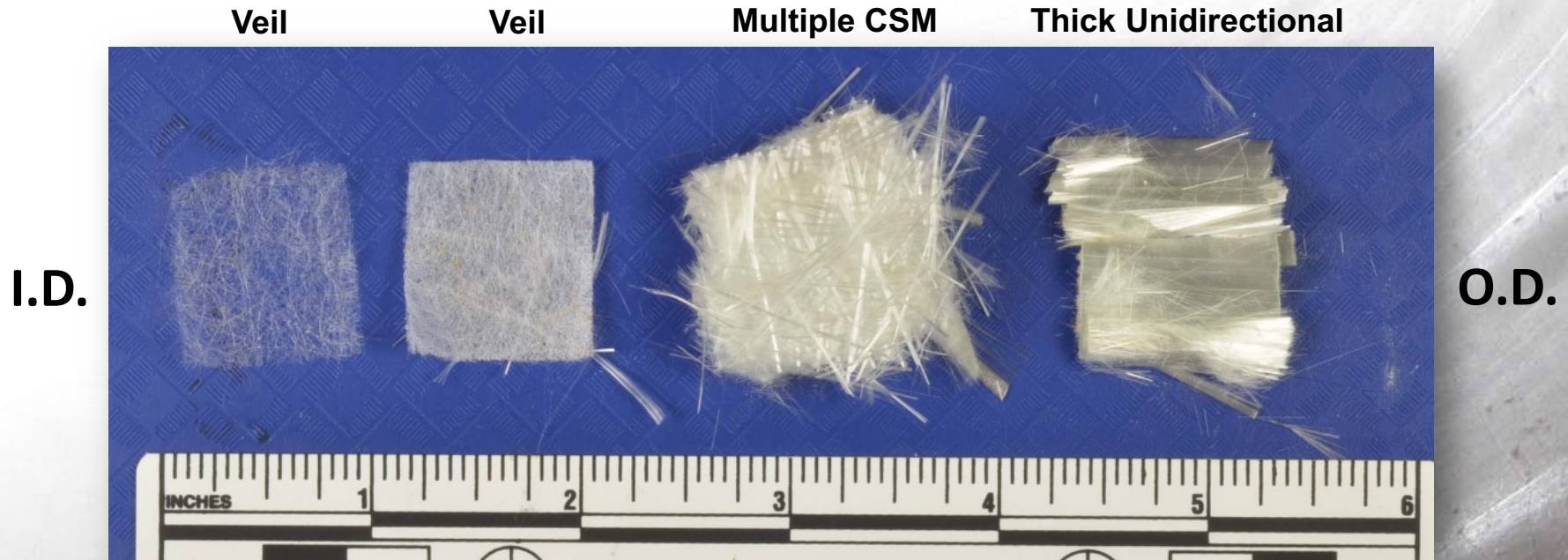
O.D.

I.D.



Area "A" FRP core sample: typical appearance of cross-section showing no apparent degradation

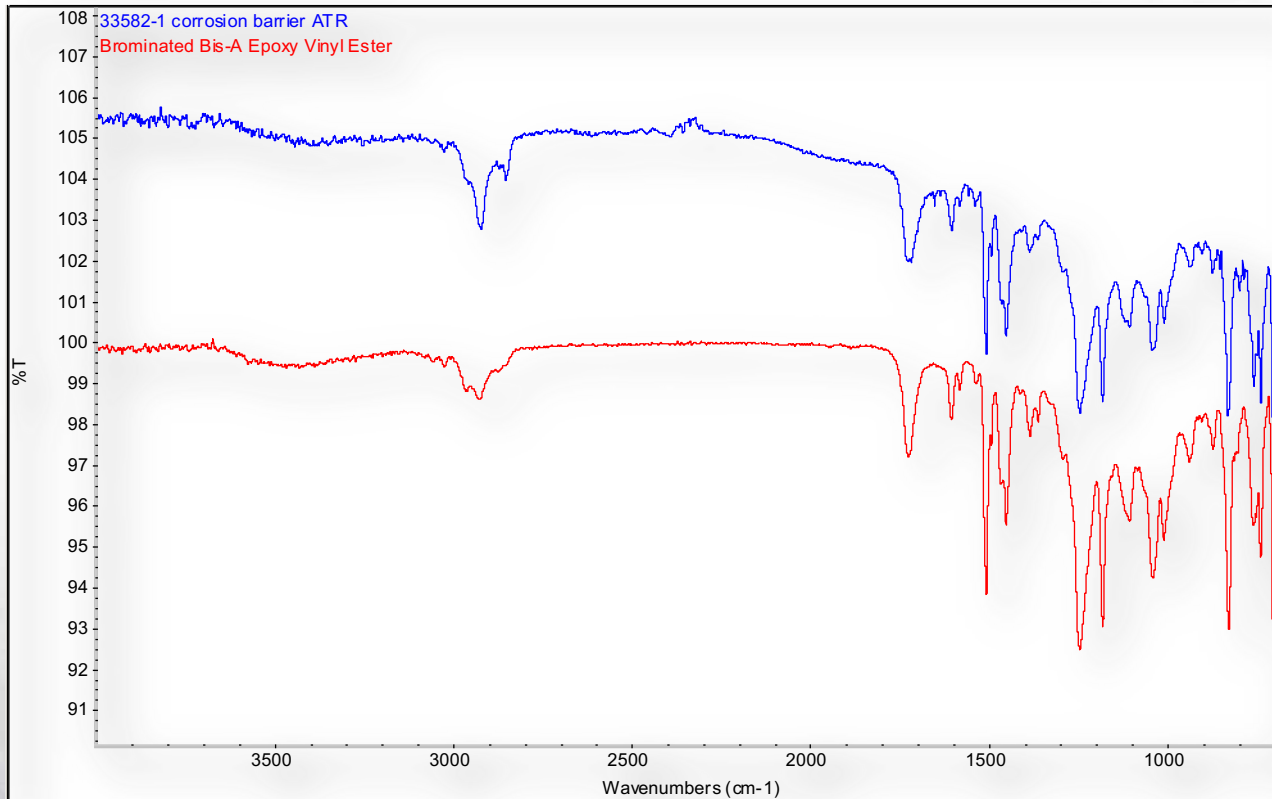
Laminate Sequence: Compare to Design



Laminate sequence from Area “A” FRP core (Test specification #1)

This laminate sequence analyses reveals double resin rich veils which exceeded the 20 mil minimum thickness requested by the MWRA performance specifications (Section 15680, 2.07 D.)

Resin I.D.



← Field Sample

← Reference

FTIR-ATR spectra of Area A FRP core inside surface (blue) and for reference sample of brominated bisphenol A epoxy vinyl ester resin (red).

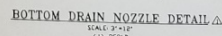
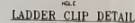
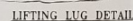
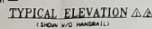
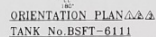
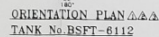
Conclusions

- Ductwork problems were identified as localized, joint leaks - localized. Overall ductwork was well constructed and met design specifications
- Localized replacement and repair work needed

Case History “B”

Sodium Hypochlorite Storage Tank – 14 years old:

- Look for corrosion barrier damage
- Look for latent construction defects
- Look for in-service damage from construction activities or operation



LAMINATES

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TELEX 250000
CIRCLE 10 ON READER SERVICE CARD

AN-COR INDUSTRIAL PLASTICS, INC.

DATE OF MANUFACTURE: 2004
DESIGN DATA

MAX. AWP: +0 PSIG AT 125°F MAX
MIN. AWP: -0.00 PSIG AT 125°F MAX
SPEC GRAVITY: 1.33
INTERIOR RESIN: HETRON 922
STRUCTURAL RESIN: HETRON 992SB

NOTES: Δ

- [illegible]

[illegible]

DIMENSIONAL TOLERANCES

THE TRACER (COMPANY) (NAME) (ADDRESS) (CITY) (STATE) (ZIP) (PHONE) (FAX)		CITY STATE ZIP COUNTRY TEL. NO.		WALSH CONSTRUCTION (FIRM) (ADDRESS) (CITY) (STATE) (ZIP) (PHONE) (FAX)	
SEALING PLASTICS (TYPE) (SIZE) (COLOR) (QUANTITY) (UNIT) (DATE) (TIME)				AN-COR INDUSTRIAL PLASTICS Inc 100 MELLOYD LANE, NORTH TIRANARA, N.Y. 14180	
ALL OTHERS: (TYPE) (SIZE) (COLOR) (QUANTITY) (UNIT) (DATE) (TIME)		(TYPE) (SIZE) (COLOR) (QUANTITY) (UNIT) (DATE) (TIME)		(TYPE) (SIZE) (COLOR) (QUANTITY) (UNIT) (DATE) (TIME)	
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**Concrete tank base, containment
area and protective coatings**



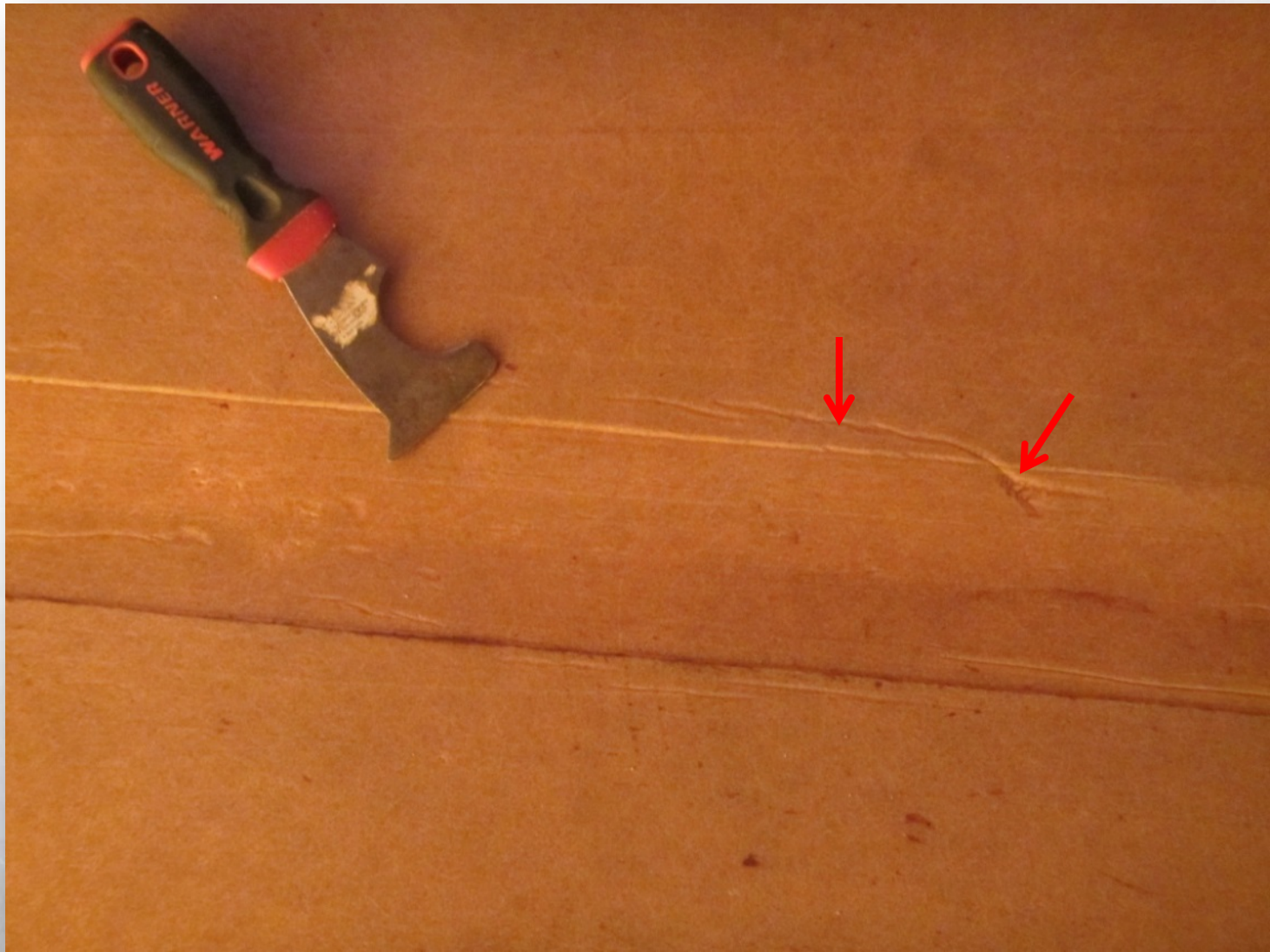
Gussets at tank drain pipe in the southwestern quadrant



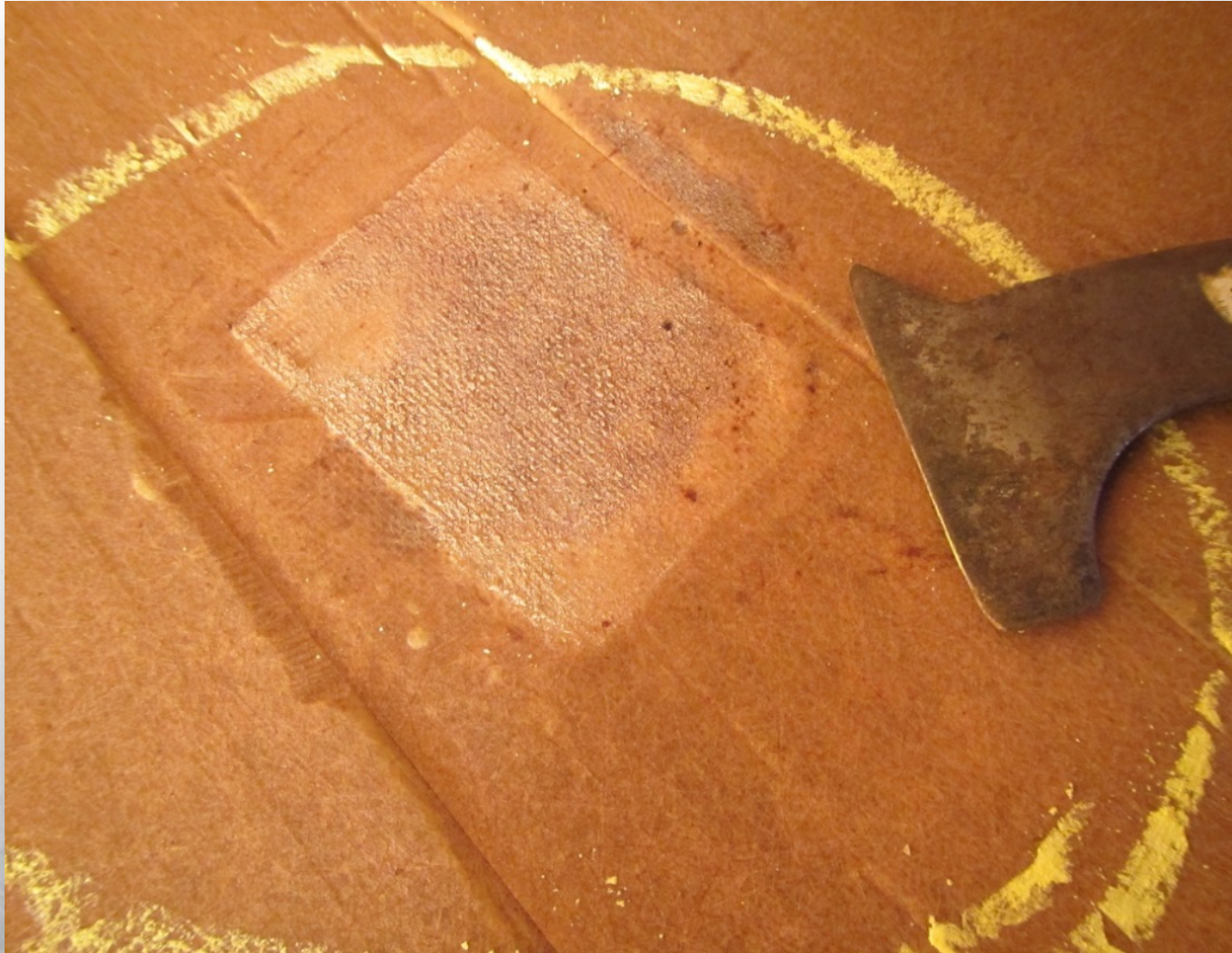
Detail of stain/burn marks in the northern quadrant of the tank interior

Detail of stain/burn marks in the northern quadrant of the tank interior





Detail of floor mold mark – note minor mechanical damage



**Floor patch in the northwestern quadrant
with thinned gel coat/ corrosion barrier**



Staining in the eastern quadrant with scraped off gel coat - corrosion barrier intact



Exposed chopped mat at the top of the secondary lamination in the northeast knuckle area – no corrosion barrier damage

Conclusions

- No construction defects
- Some in-service deterioration to monitor – no damage into structural laminate
- Tank to be re-inspected in 5 years

Case History “C”

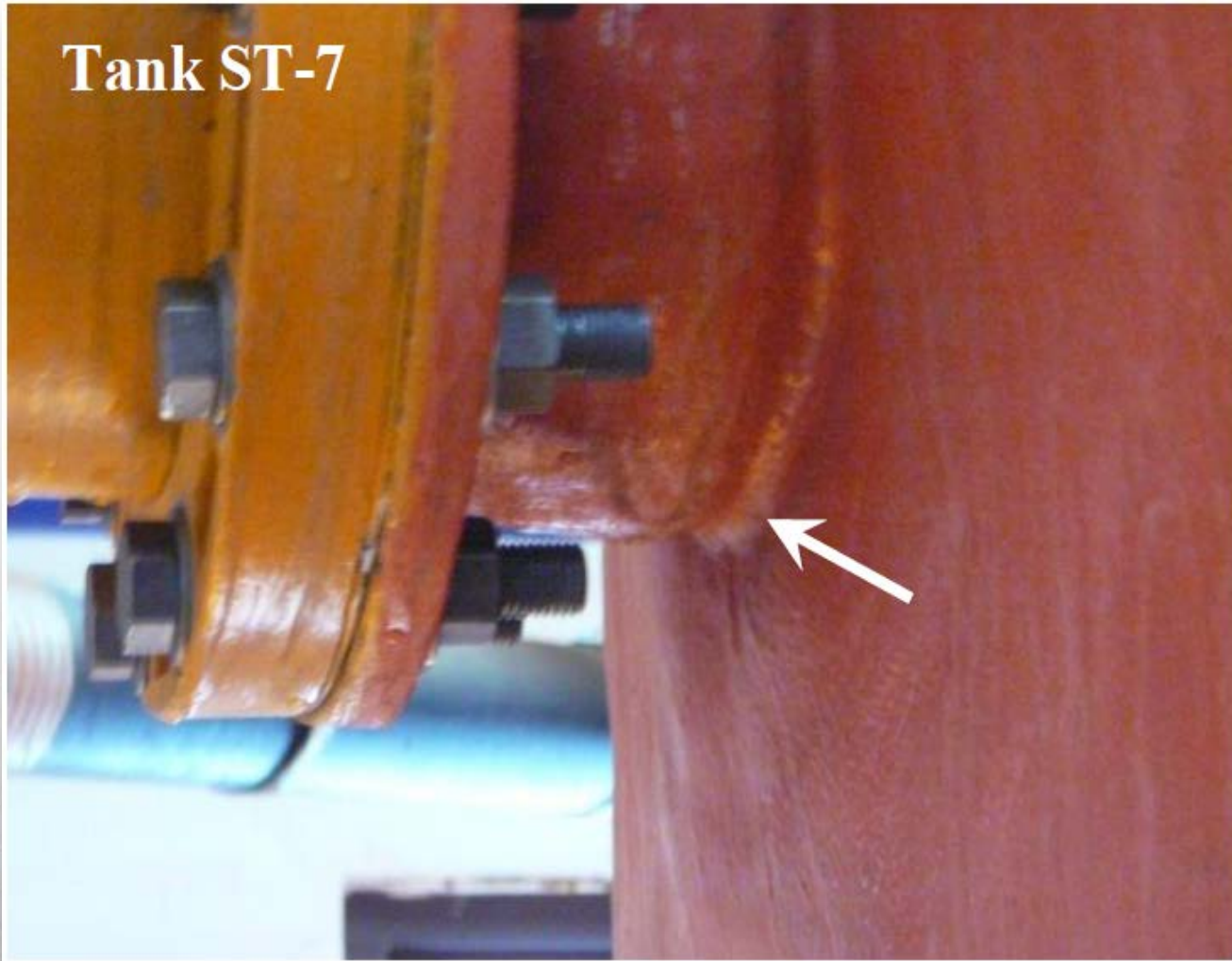
Ferric chloride storage tanks – 21 years old

- Look for evidence of external distress
- Look for internal condition of the corrosion barrier and carefully inspect critical areas – i.e. tank knuckle, nozzles, welds, or secondary laminations, etc.
- Compare external findings to internal findings
- Acoustic emission examination performed to identify defects

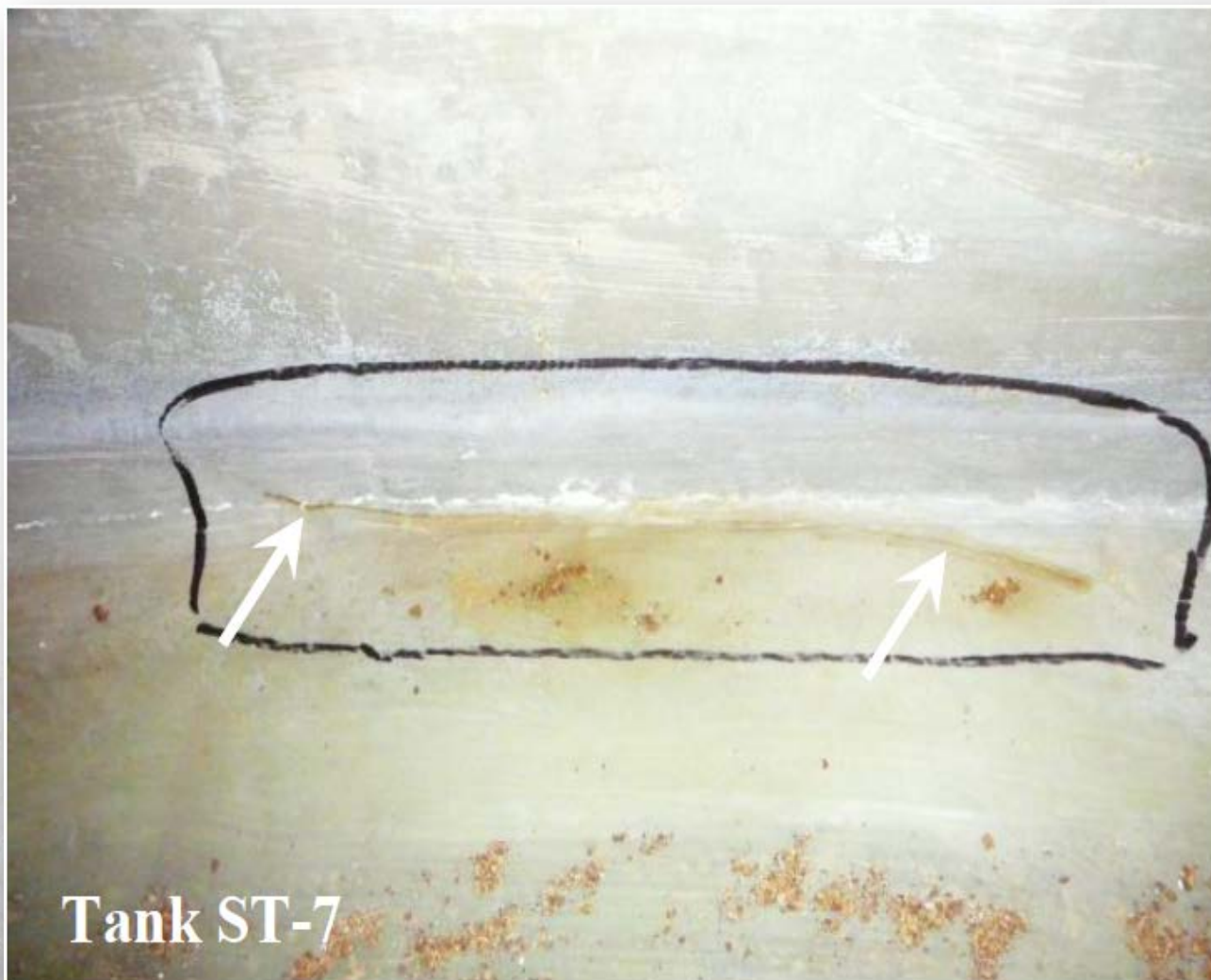
External Evidence of Leakage



Tank ST-7



Cracking at nozzle lamination



Internal cracking at knuckle



Cracking of corrosion barrier where floor laminate was applied over balsa core

Conclusions

- Tanks with damage were taken out of service immediately
- Extensive tank repairs were designed and scheduled
- Tanks are safely back in service

Part 2: Inspection Practices for Owners

Panel Discussion
Questions and Comments

