

Magnetec Monthly Chronicle

Issue No.9 " FROM THE FIELD " September 2005

www.magnetec-inspection.com

Magnetec Inspection, Inc.

Excellence in Eddy Current Inspection Technology & Failure Analysis

Phone# 847-488-1958 Cell# 847-542-2810 ew@magnetec-inspection.com

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The Finfan Exchanger is Found in a Major Mid-western Refinery

Subject: Corrosion Protection by Sleeve Installation

The finfan was inspected to determine active corrosion mechanism and to aid in life expectancy and service reliability for an expected 5 year operating time frame.

The exchanger operates as a 20 bank unit with crude overhead process. The tubing consists of 364 straight tubes – 1" X .109 min wall X SA-214 X 32 Foot long. The exchanger was reported with failures prior to shutdown. The finfan banks had been previously inspected many times prior to current inspection and sleeves were installed in 2001 due to control the active corrosion mechanism. The tubing was documented with severe thinning from the inlet tube end & 1' foot sleeves were installed by Magnetec Inspection,

Inc. with their hydro-expansion technique to protect the tube end/roll area from continued corrosion and failures. The inspection scheme was performed on 100% of the tubing across the entire bundle matrix with the previously installed sleeve also being inspected with a secondary technique. The previously documented corrosion had spread past the installed sleeve with wall loss depths of 60% in the form of general thinning and localized pitting to a length of 8 feet into the tube length. A review of operating conditions

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found the crude slates to be considerably more sour and corrosion additive (filming agents) rates at about ½ normal rates due to clogged injection quills. The corrosion rate and extension down the tube length would be somewhat normal based on the significant changes in the operating conditions. During the inspection process 2 tubes in the most severely corroded areas were pulled to document the corrosion mechanism, extent of attack, and to determine if re-sleeving to an extended length was possible. The attached photos are representative of the pulled tube sample and show the parent tube material protected by the sleeve and the corrosion extent in the unprotected tube length. It was determined that the finfan could be re-sleeved with 10' foot sleeves to protect the tubing beyond the new corrosion zone. On average, the finfan banks had an expected life of 5 years prior to the first failure which was extended to 7 years prior to the first failure with the addition of protective sleeves. The changes in the operating conditions were a prime mitigating factor in the advancement of the corrosion down the tube length.

**Original thickness tube in outlet pass
(non-corrosion zone)**



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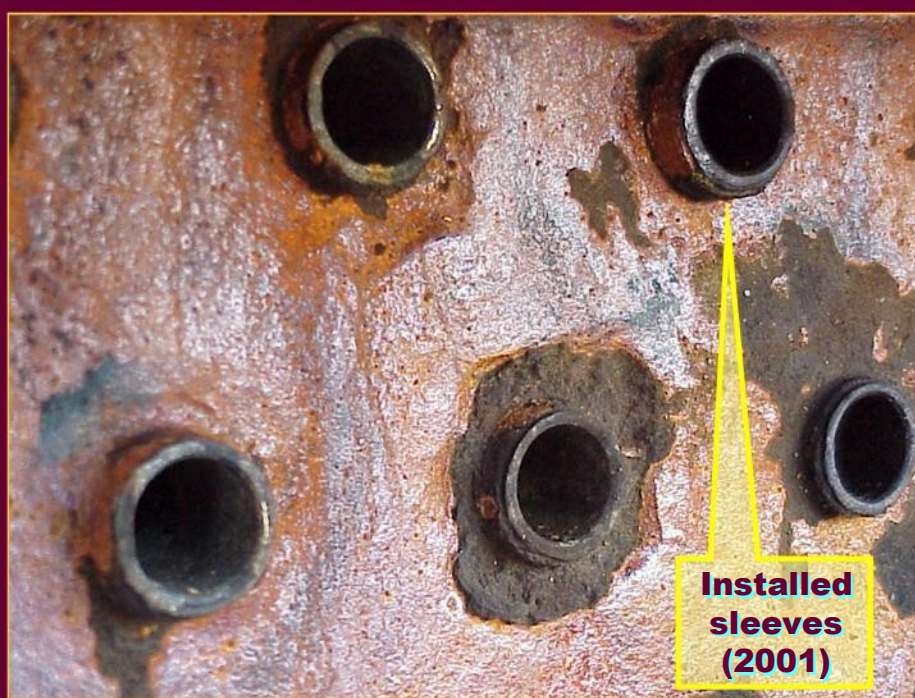
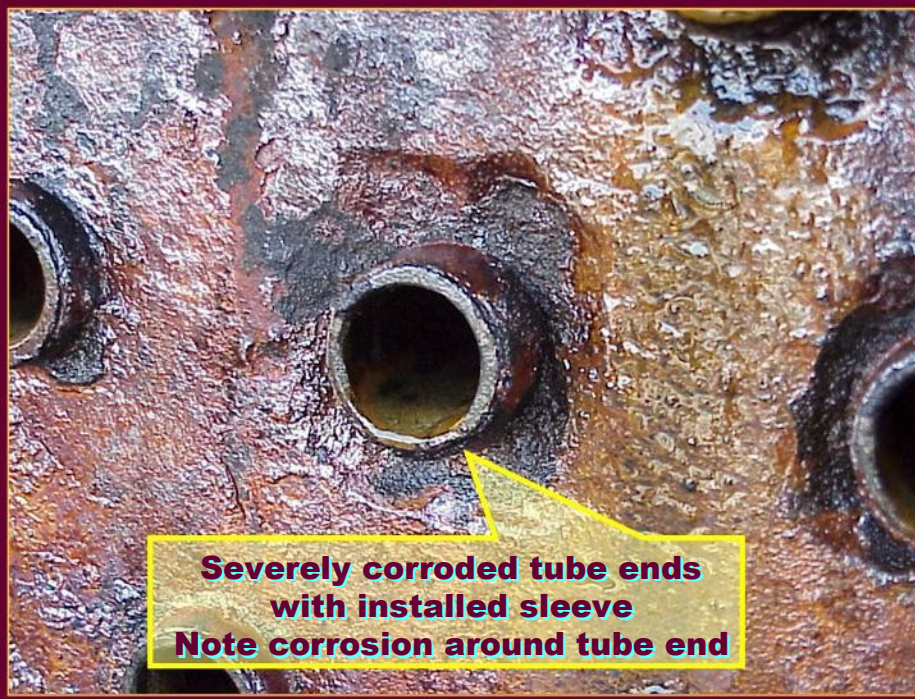
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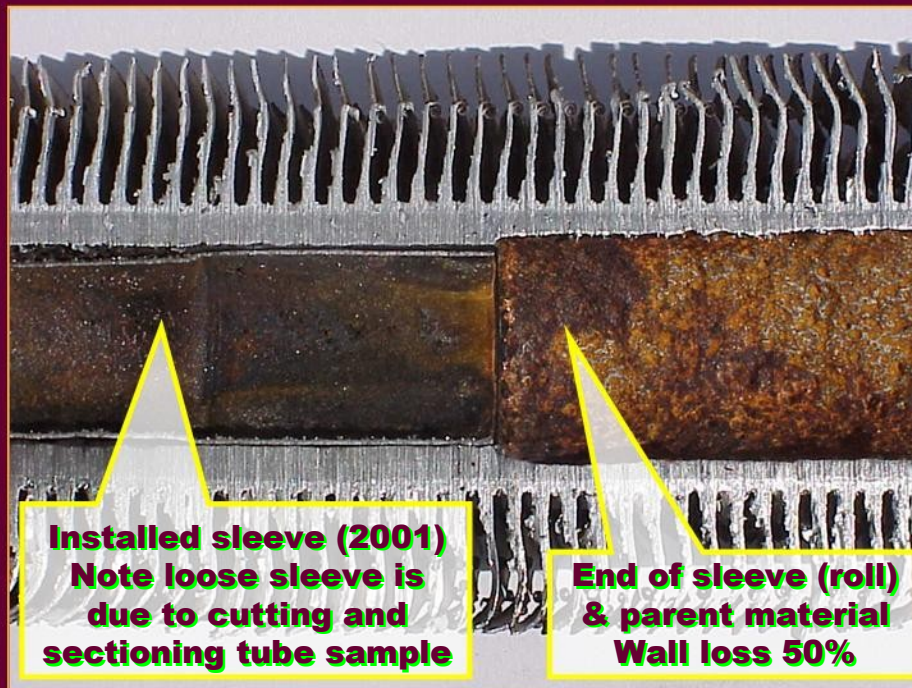
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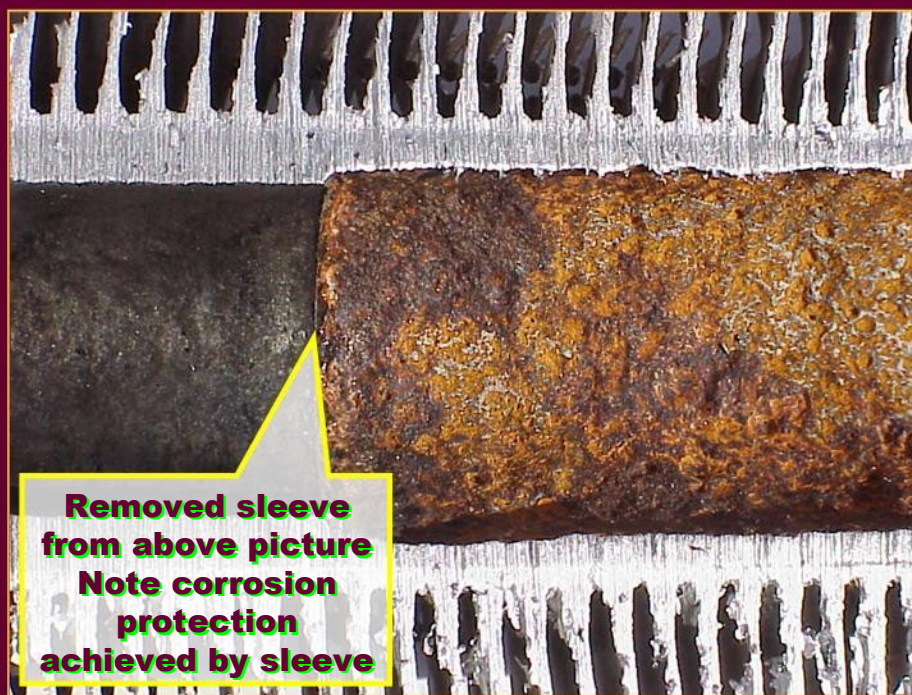
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Pulled tube sample – Location at Sleeve/tube interface



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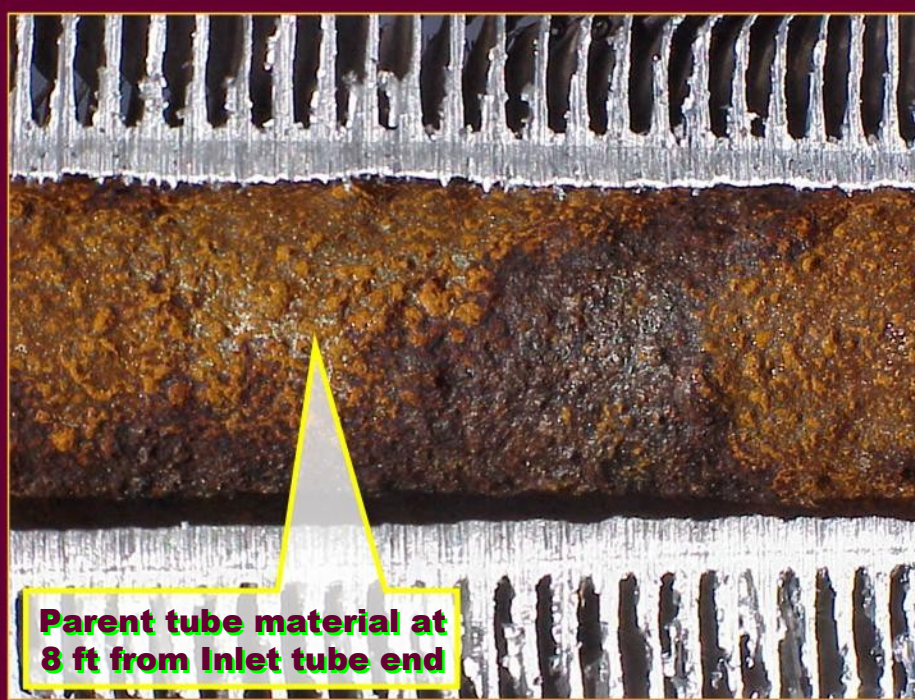
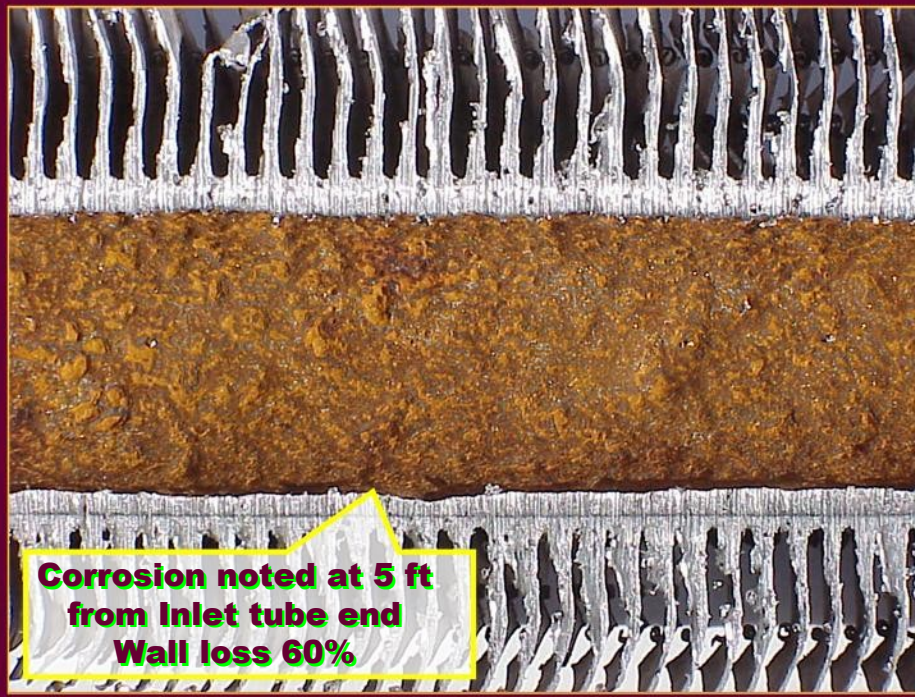
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For more info on sleeving, go to:

<http://www.magnetec-inspection.com/2Sleeving.html>

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