Curran international
Tubular Heat Transfer Services.

December, 2017

With renewed hope,
we turn our eyes toward the New Year.

Dear Friends:

Driving past thousands of flood-damaged cars lined-up, bumper-to-bumper at a local race track serves as a vivid reminder of devastation and disruption hurricane Harvey brought to the Greater Houston area. Along with tens of thousands of people, we all have relatives or friends who were affected by Harvey.

More than 3 million cubic yards (a mass the size of the Great Pyramid of Giza) of storm debris, wasted furniture, appliances and personal items has been collected from the area. It's estimated that about 300,000 cars and trucks were damaged in Harvey-related flooding.

It has been more than three months since this hurricane delivered record rainfall leading to widespread flooding. While many people can make livable-shelter in homes still being renovated, many others are displaced from their homes for months to come.

We end 2017 with many in our community rebuilding their lives and their homes. For too many, holiday shopping lists for have become an exercise in practical replacement of necessities – instead of gifts. Many residents will continue to balance work and home-rebuilding tasks for months to come.

The Astros' playoff run and World Series victory was an exciting and much-needed diversion from the daily grind of hurricane clean-up and restoration.

Now, with renewed hope, we turn our eyes toward the New Year.

Gratefully,

Ed Curran

Protect, Prolong Exchanger Service-Life

Hydraulically Expanded Liners Restore Corroded Exchangers

Tube Failure Starts on Day One

From the time a heat exchanger is placed into active service external factors such as erosion, corrosion and mechanical issues immediately begin to directly affect the longevity of the heat exchanger components, especially the tubes.

As issues manifest themselves and tubes begin to fail, the standard maintenance practice is to simply plug the failing tubes. As the tubes continue to deteriorate and fail, tube after tube is plugged until the percentage of plugged tubes necessitates either a retubing or complete replacement of the heat exchanger.

One Can Only Plug So Many Tubes

Although plugging failed tubes would appear to be the easiest and most cost effective approach, when dealing with damaged or defective tubes, plugging of tubes also creates other detrimental issues within the heat exchanger. These issues include poor performance and decreased longevity. For instance, as the plugged-percentage increases the heat exchanger thermal performance suffers proportionally. Additionally, as the plugged-percentage increases tube inlet velocities also increase. This increase in inlet velocities can lead to premature tube failures due to inlet erosion issues.

Curran has exchanger tube restoration covered!

As a full-service, forward-thinking company, Curran International offers services designed to help enhance the longevity of your heat exchanger tubes. Curran's services are specifically designed to maximize the value of your heat exchangers by providing increased reliability while maintaining thermal performance.

For more than 25 years Curran has applied thin film tube ID coatings to restore in-service exchanger tubes suffering from under deposit corrosion. Coating to mitigate cooling water deposits and corrosion in cooling water has a well-documented service history, and provides an economic alternative to re-tubing where asset has limited remaining service life.

Alloy tube liners are another repair option for restoring corroded exchanger tubing, resulting in a tube-in-tube repair using a corrosion resistant light wall tubing. The alloy liner is hydraulically expanded the full length of the existing, or "parent" tube, with enough residual pressure to achieve an intimate contact between the inner and parent tubes. See the animation demonstrating hydraulic tube installation at www.curranintl.com.

Hydraulic expansion closes the air gap between the liners/sleeve OD and the parent tube ID. This eliminates any possibly insulator affect by facilitating 100% metal to metal contact. This process can repair tubes with excessive wall loss, tubes with cracking or pitting, as well as tubes with through-the-wall defects.

Once the liners or sleeves have been installed, the tube ends are mechanically rolled to seal the ends. Excess liner is trimmed to the end of existing tube, or can be flared to enhance flow.

Curran has installed a range of alloy liners, stainless steel, AL-6XN®, C276, alloy 825 and Admiralty Brass; most materials are available in a range of wall thicknesses to 0.022" wall. For instance, a more erosion-resistant material such as stainless steel can be installed in tubes that that are prone to erosion such as mild carbon steel or brass alloys. Further, Curran typically uses thin wall tubing (.028" or less) in order to minimize any issues with velocities or thermal heat transfer.

Stainless steel liner shown at tube end after hydraulic expansion, providing a tube in tube repair to corroded exchanger tube.

A well cleaned tube makes for better hydraulic installation

Curran dry grit tube ID cleaning achieves superior tube cleanliness; removes all contaminants and corrosion, and can yield "white metal" cleanliness if needed. This thorough cleaning method promotes better heat transfer by facilitating metal to metal contact between the sleeve OD and the parent tube ID.

There are other methods to clean tube ID prior to installing alloy liners, but remaining scale impacts heat transfer performance and could lead to parent tube ID and alloy sleeve OD. Incomplete tube cleaning can also lead to premature failure of the alloy sleeves by creating "hot spots" or from by trapping any remaining active corrosion cell(s) in the annulus between the parent tube ID and alloy sleeve OD.

Clean, inspect, install

After the tubes are prepared, they are inspected for cleanliness before the liners are installed. Once the tubes pass all QA/QC inspections, the liners or sleeves are installed into the parent tube and expanded.

Contact Curran before deciding to plug tubes and remove from operating service to hear about exchanger tube restoration. Curran's objective is to help clients maximize the performance and reliability of their tubular heat transfer equipment; it offers a unique advantage for turnkey project management.

For more information all of Curran International services call (281) 339-9993 or edeely@curranintl.com.

Dry Grit Tube ID Cleaning for Air Cooled Exchangers
Yields Higher Integrity NDE, Reduces Maintenance Tasks

Curran's Dry Grit Blast Method

Predictable cleaning results and vacuum containment of blast waste are two advantages that make Curran's method of dry grit blast tube ID cleaning of air cooled exchanger the preferred practice.

Air cooled exchangers provide cooling and condensing of hydrocarbon products and process fluids at temperatures that exceed the effective limits of cooling water exchangers. Condensed hydrocarbon products and process fluids at high temperatures subject tube IDs to product scale, oxidized deposits, fouling and under-deposit corrosion

Air cooled exchangers are located at an elevated level, it is not uncommon for some exchangers to be higher than 40' above grade. Access to tubes is from a catwalk in front of the headers at both sides of the exchanger. Constructing containments on catwalks for traditional methods of hydro-blast cleaning is imperfect, often requiring that the areas below the fans be barricaded to protect other workers from potential containment leaks. Rendering tubes clean for IRIS inspection using 10K and 20K hydro-blasting rigs has met with mixed success.

A Fully-Contained Blast System

Curran's dry grit blast method scours tube IDs to "near white metal" clean for all forms of NDE inspection. The fully contained tube-end-to-tube-end blast system eliminates the need for cumbersome containment installations on narrow catwalks.

Tubes cleaning times range unit to unit, but cleanliness and QC are verified using a borescope before tubes are signed off as complete and ready for NDE inspection.

Here are a Few of the Significant Benefits of Grit Blast Tube Cleaning:

- Dry grit blasting is predictable, eliminating rework and costly remobilization of NDE resources.
- Cleaner tubes yield higher integrity NDE and restore exchanger thermal performance.
- Curran's method eliminates catwalk containment wraps, and clean-up tasks.

Curran specialized nozzles "bridge" and capture waste-grit and tube debris tube-end to tube-end.

The Curran method eliminates containment setup on catwalks, thus keeping headers unencumbered and accessible.

Proprietary Nozzles

Curran's method uses proprietary nozzles that are fitted to tube ID and "bridging" the headers. Dry grit is propelled down tube at high volume and velocity creating a turbulent flow that scours away deposits and scale.

The Curran air cooler tube cleaning method does not require tube lancing, so all work can be performed from existing catwalks. Blast waste is contained through the "exiting header" and collected in a containment bin situated at grade below the fin fan.

20-Years' Experience

Curran originated this field service nearly 20 years ago and by now has safely performed millions of manhours of work at refinery locations across the globe.

To learn more contact Ed Deely, edeely@curranintl.com, (281) 339-9993.

Expect More
from a Curran Coating

Greatly-Improved Service Life

Too often plant operators are frustrated with the short service life of immersion coating; this discovery during maintenance events results in extra cost and effort to repair failed coatings to protect fixed assets.

Typical findings of coating failure root cause – not caused by a mechanical impact – is a result selected coating not meeting equipment operating parameters, and poor surface prep.

Curran has high functionality 100% solids coatings that are currently being used to protect fixed equipment in immersion services across the globe. These resin and catalyst components combine to offer superior adhesive strength, excellent cathodic disbondment resistance and resistance in hot immersion services.

Surface Preparation is Vital

Protective coating applications requires discipline to surface prep, starting with a clean, contaminant free surface is required for immersion coatings. NACE and Society of Protective Coatings provide recommendations and standards for surface prep, application evaluation and coating coverage.

The combination of a coating specified to meet the extremes of operating parameters and applicator discipline to acceptable practices will lead to better results when inspecting coated components 5 or more years after application.

Channel in cooing water, pitted surface blasted clean exposing many pits deeper than 0.0625”

Curran 1500 was applied in 2-3 coats, total DFT averaged 0.100” creating a homogenous corrosion resistant film.

To ensure coating meets specified parameters, the manufacturer should have test data documenting performance in a range of tests according to ASTM. Common tests offer tensile adhesion, cathodic disbondment, abrasion, and atlas cell regimens.

A coating’s resistance in hot “dry” exposure has no relationship to the limits of its performance in hot “immersion” service.

The modifications blended into Curran 1500 offer built-in protection from cold wall and heat excursions. Coated coupons have passed Atlas Cell testing to 185°C for 30 days. The coating has been cycle tested in immersion to 400°F with no failures. It has passed adhesion pull tests to 3800 PSI.

Curran 1500 offers immersion performance equal to 1000T. Curran 1500 has been optimized for protection in hot fluids where “cold wall” exposure is an operating condition.

So, should an upset condition occur, chances are, Curran 1500 will not fail.

“Cold Wall” is a Hot Issue!

Few epoxy coatings are built to survive in “cold wall” conditions. The temperature difference, when a coating is used in a hot immersion condition and the opposite side of the steel equipment is at a significantly lower temperature, is very hard on the coating.

Steel tanks and vessels in hot water service are commonly insulated. It’s the equipment which is not insulated. When an upset condition creates a heat excursion, an internal coating is at high risk of failure.

Simply stated, the delta T of the inner hot wall and outer cool wall create enough energy to blister an internal coating that is not formulated for “cold wall” exposure.

Curran 1500

Curran 1500 is recommended for all exchanger components in cooling water service. Curran 1500 is suitable for in-service equipment and can be used across heavily pitted surfaces to provide a conformal film to protect steel from new corrosion.

Curran 1500 is a workable paste grade material, suitable for wetting in crevices at tube and tube sheet joints, and applied across wide surfaces using a plastic coating blade. When fully cured, 1500 application at flanged mating surfaces can be machined.

New fabrication heat exchanger channel, ID coated with Curran 1500, applied to 0.040” in a single coat.

The coating can be applied to new fabrication in a single coat to 0.040” DFT (Dry Film Thickness).

Contact Curran International for more information about the 100% solids Curran International protective coatings and Curran’s vast application experience.

Please contact Curran International at (281) 339-9993 or edeely@curranintl.com.

Catch Curran

NACE Corrosion Conference and Expo 2018

April 15 – 20

Phoenix Convention Center, Phoenix, AZ.

CORROSION 2018 Conference & Expo

AFPM Reliability and Maintenance Conference 2018

May 22 – 25

Henry B. Gonzalez Convention Center, San Antonio, TX.

AFPM
American Fuel & Petrochemical Manufacturers