

## Course Fee: US\$650

A must for anyone who evaluates the vibration potential of shell-and-tube heat exchangers! In this course, you learn about vibration mechanisms in shell-and-tube heat exchangers and *Xist* methods to analyze vibration severity. Most importantly, you discover corrective measures to mitigate damage.

## Key Topics

- Introduction to vibration phenomena
- Flow-induced vibration (fluidelastic instability, vortex shedding, turbulent buffeting, acoustic vibration)
- Design options to mitigate vibration
- Field fixes
- *Xist* Vibration Report
- Example application and case studies

## Suggested Participants

Design and plant engineers responsible for the mechanical condition of shell-and-tube heat exchangers

## HTRI Software

This course will make use of the following HTRI software: *Xchanger Suite*® components *Xist*® and *Xvib*®. All training materials are based on the current software version.

**Course Credits:** 6 hours (PDH/CEU)

## Outline

### I. Tube Vibration

- Introduction to vibration
- Fluidelastic instability
- Vortex shedding
- Exchanger designs free of vibration problems

### II. *Xist* Vibration Report

- Analyze tube spans
- Interpret results
- *Xist* criteria for “flags”

### III. Acoustic Vibration

- Fundamentals of acoustic vibration
- HTRI methods
- Corrective action

### IV. Introduction to *Xvib*

- Reasons to use *Xvib*
- Calculation methods
- Creation of an *Xvib* case from *Xist*