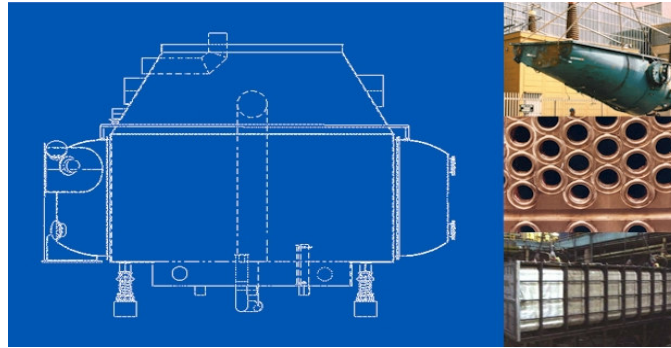




Water-Cooled Surface Condenser Training Course



Day One

Introduction to condensers

- Role of the condenser
- Types of condenser
- Water vs air-cooling
- Identification of major components
 - Shell
 - Tube bundle
 - Channel / waterbox
 - Hotwell
 - Vacuum systems

Condenser Construction

- Shellside construction
 - Shell / hotwell
 - Support baffles
 - Steam inlet / impingement
 - Venting / Air cooler
- Tubeside construction
 - Tubes / tubesheets
 - Tube-to-tubesheet attachment
 - Waterboxes
 - Linings / coatings

Codes and Standards

- HEI Standards
- Other standards

Day Two

Thermal Design

- Heat balances
- Temperature profiles
- Heat transfer
- Pressure drop
- Drains / flashing
- Venting

Datasheets and Performance Testing

- Using datasheets
- Performance Testing

Fouling and Fouling Control

- Fouling mechanisms
- Fouling control
- Cleaning
- Scheduling cleaning

Instrumentation and Control

- Condenser ancillaries
 - Vacuum systems
 - Condensate pumps
- Instrumentation
- Level control

Day Three

Designing for Reliability

- Causes of condenser failure
- Erosion
- Corrosion
- Vibration
- Abnormal operation
- Solutions to common reliability problems

Maintenance and Inspection

- Access for inspection and maintenance
- Regular maintenance requirements
- Inspection techniques
- Data recording
- On-line monitoring

Condenser Repair

- Repair procedures
- Tube re-expansion
- Tube plugging
 - Types of tube plugs
 - Plug selection
 - Plugging procedures
- Re-tubing
- Weld repair