Fabrication Process for Large Diameter Thin Wall Vessels

Rick Shepherd
Ward Tank and Heat Exchanger Corp
Topics

- SS/Duplex/Ni. Alloy
- ASME code vs. API and non-code tanks
- Design
- Material
- Welding process review
- Integrity
- Hydro testing
- Shipping/handling
- Safety
SS/Duplex/Nickel Alloy

- Advanced use of stainless steel/duplex
- Used in place of carbon steel
- Used for reduction of chloride stress corrosion
- Newly developed corrosive processes
- Long term cost benefits (life cycle)
- Corrosion allowance
- Higher allowables producing thinner material
ASME Code Vs. API & Non-code Tanks

- **ASME code**
  - Calc thickness per ASME Sect VIII, Div1
  - Calc nozzle thickness
  - Calc repads
  - Calc hydro pressure plus static head

- **API & non-code**
  - Thicknesses per App S & J (shop fab)
  - Suggested nozzle thicknesses
  - Calc repad thickness but typically not req’d
  - Air/soap test or water fill
  - Manway is standard plate flange design
Design to Assist in Deformation Reduction or Elimination in Horizontal Shop Fabrication

- Stiffening rings
- Spiders
- Large openings
- Supports (with or without pads)
- Vertical fabrication
Large Openings
Vertical Fabrication
Welding Process Review

- Procedures & processes
- Wire availability
- Customer specifications
- Heat input (hottest to coolest per inch of weld)
  - GTAW
  - SAW
  - SMAW
  - FCAW
  - GMAW
- Welder qualifications
Integrity During Fabrication

- Review
- Stiffening rings
- Internal rounding rings or spiders
- Rolling bands
- Width of turning rolls
Stiffening Rings
Stiffening Rings and Turning Roll Location
Spiders
Proper Turning Rolls
Hydro Testing

- Design
- Vertical or horizontal?
- Drain and vent locations are critical
- Temporary saddles for hydro test and shipping
Shipping & Handling

- Saddles - design
- Trucking
- Permits
- Blocking
- Plant entrances
- Offloading
Safety Handling

- Hydro-test
- Loading/shipping
- Off loading
Questions??