TVVD1003
Visual Vessel Design

Course Agenda
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Day 1

Introduction to VVD Interface

Options and Process Data

Material Libraries

Visual vs. Normal Mode and individual component design

Design of a Semi-Elliptical Head in VVD (‘Normal’ Mode)

Horizontal Vessel with Multiple Nozzles to EN 13445-3
- Liquid Content input
- Weight Contingency
- Simple Vessel (Drum) modelling, including Heads
- External Pressure and unsupported lengths of shells
- Analysis and Results, including Component Utilization and Review
- Copying Components
- Nozzle Input, including Radial, Hillside & Tangential and Nozzle on Nozzle
- Sump/boot modelling, including adding nozzles to ends
- Groups of Nozzles/Openings calculation
- Stiffener Rings for External Pressure
- Support Saddles, including Integrated Rings
- Loads & Load Cases, including Live and Wind & Seismic Loads
- Lifting Lugs

Vertical tower with Platforms and Ladders to EN 13445-3
- Conical Sections
- Skirt Support, with openings, and Base (/ring…) analysis
- Editing Components, including multiple at once - Quick Design
- Nozzles/Openings continued, including Manways
- Nozzles with attached piping (drain)
- Multiple Nozzles in heads
- Flanges (on Pipe/Nozzles) and Analysis
- Domes (Instrument) on Nozzles
- Modelling Pipe/Pipe Bends
- Platforms and Ladders
- Loads & Load Cases continued
- Tall Tower Analysis

Day 2

Comparison of code criteria EU EN 13445, US ASME VIII Div. 1 and UK PD 5500
- Allowable stress
- Joint Factors
- Design of cylindrical shells
- Design of heads
- Nozzle (reinforcement) Calculations
- Differences and similarities between ASME VIII Div. 1 and Div. 2
- Nozzle reinforcement interference

Vertical tower to ASME VIII Div. 1
- Cone to cylindrical shell Junction Rings (Stiffener Ring at Transition)
- Nozzle/Nozzle Flange - Mating Input
- Pipe/Bend modelling continued
- User-specified Components, including Trays, Packing and Insulation
- Loads & Load Cases, including Wind & Seismic Loads
- Lifting (Tailing) Lug analysis, including Horizontal to Vertical rotational lift

Convert an existing EN 13445 design to ASME VIII Div. 1
- File Templates
- New Design Code
- Importing Materials from another vessel design file
- Change Component and Nozzle, etc., Materials
- Analyze & Review results and edit vessel to pass

Analysis of external loads on Nozzles and Lifting Trunnion analysis

Fatigue analysis

Legs, Lugs and Half Pipe Jacket

Other models;

- Jacketed Vessel
- Rectangular Vessel
- (ASME VIII) Div. 1 App. 14 Large Opening and (Welded) Flat End calculations
- EN 13445 Standalone Nozzle Calculation

Day 3

Heat exchanger with fixed tubesheet to EN 13445-3, Sect. 13.5

- Technical discussion
- Fixed tubesheet exchanger modelling and analysis
- Body Flange input and analysis
- Tube Layout and Bundle design
- Expansion Bellows / Joint

(Alternative Tubesheet design method to EN 13445-3, Annex J, is available)

Heat exchanger with submerged floating head to EN 13445-3, Sect. 13.6

- Floating Head / Bolted Dome End design

Heat exchanger with U-tube bundle to EN 13445-3, Sect. 13.4

Limit Analysis and external loads on nozzles discussion