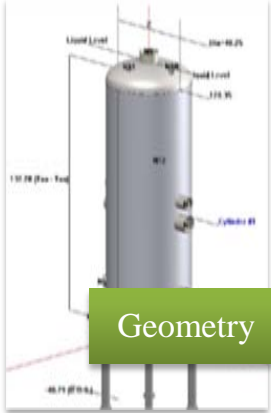


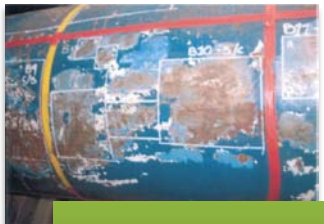
INPUT DATA



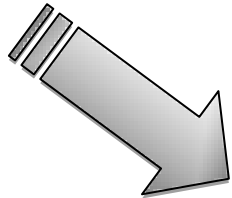
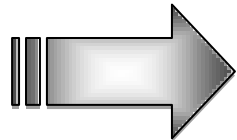
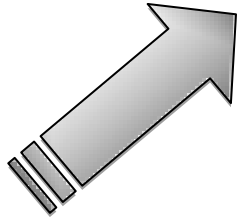
Geometry



Working, Survival & Test Conditions



Gauge Thickness



LEVEL 1 - COMPONENT CODE CHECK

ASME B31.3 Ch. II and IX

ASME BPVC Sec. VIII Div. 1

DNV Accepted von Mises Stress Theory

LEVEL 2 - CORRODED COMPONENT EMPIRICAL EVALUATION

DNV-RP-F101

API 579-1/ASME FFS-1

ASME B31G

LEVEL 3 - SYSTEM EVALUATION (FEA ASSESSMENT METHOD)

Algor PipePak
(Autodesk Simulation)

Autodesk Robot
Structural Analysis

Key word: Rig Engineering, Pressure Piping & Vessels, ASME B31.3, ASME BPVC Sec. VIII Div. 1, ASME B31G, DNV RP-F101, API 579-1/ASME FFS-1, Corroded Pipelines & Vessels Evaluation, Fitness For Service, Algor PipePak (Autodesk Simulation), Codware Compress, Autodesk Robot Structural Analysis



RIG ENGINEERING ASSESSMENT

LEVEL 1 - COMPONENT CODE CHECK

- A. ASME B31.3 Process Piping
 - Chapter II Design (*for ordinary service piping*)
 - Chapter IX High Pressure Piping
 - Straight pipe and pipe bends design check
 - Software: *Mathcad calculators prepared by RE*
- B. ASME Boiler & Pressure Vessel Code, Section VIII Division 1
 - Air Pressure Vessel (APV) and Mud Gas Separator (MGS) vessel types and Bulk Tanks
 - Software: *Codeware Compress www.codeware.com*
- C. DNV Accepted Equivalent von Mises Stress Theory
 - Design reference: DNV-OS-E101 Drilling Plant, DNV-RP-D101 Structural Analysis of Piping System
 - Equivalent von Mises Stress Theory
 - Software: *Mathcad calculators prepared by RE*

LEVEL 2 - CORRODED COMPONENT EVALUATION

- A. Recommended Practice DNV-RP-F101 Corroded Pipelines (*for cylinders*)
 - Part A - Load Resistance Factor Design (LRFD). *Advanced analysis reflecting probabilistic approach (partial safety factors): safety class level, inspection method, confidence level, standard deviation calculation*
 - Part B - Allowable Stress Design (ASD). *Simple analysis with a global usage factor*
 - Assessment scope: *carbon steel not exceeding API X80 grade, no cyclic loads and sharp defects (cracks), thickness not more than 40 mm, not recommended when fracture is likely to occur*
 - Software: *Mathcad calculators prepared by RE*
- B. Recommended Practice API 579-1/ASME Fitness-For-Service-1 (*for heads and cylinders*)
 - Part 4 - Assessment of General Metal Loss

- Assessment scope: *pipelines and vessels designed in accordance with ASME B31 and BPVC Sec. VIII Div. 1, corrosion loss only*
- Software: *Mathcad calculators prepared by RE*
- C. Manual for Determining the Remaining Strength of Corroded Pipelines ASME B31G
 - Supplement to ASME B31 Pressure Piping
 - Assessment for corroded thickness between 10 to 80% of original thickness

LEVEL 3 - SYSTEM EVALUATION

Finite Element Analysis (FEA) of entire piping system

- Piping resistance and flexibility analysis in accordance with ASME B31.3
- Software: *Algor PipePak www.neonindia.com/algorPipePak (nowadays Autodesk Simulation autodesk.com/simulation-software)*
- Structural analysis of pressure vessels
- Structural software: *Autodesk Robot Structural Analysis autodesk.com/robot-structural-analysis-professional*

BENEFITS:

- Fitness for Service (FFS) approach for Maintenance/Shut down
- Remaining strength assessment
- Acceptance criteria determining minimum safe wall thickness or Maximum Allowable Operating Pressure (MAOP) (also known as Maximum Allowable Working Pressure - MAWP)
- Components (straight pipe and pipe bends, vessel cylinder, dome ends, nozzles and supports) or entire system evaluation (pressure piping and vessels)
- Thorough assessment of piping and vessels – Finite Element Analysis (FEA) including offshore specific load conditions