



# Non-Linear Analysis of ‘Wellhead Assembly’ to check physical condition of Metal cap sealing

## CHALLENGE

- Wellhead metal seal in oil field faced deformation in shape due to extreme pressure coming on the seal leading to metal plasticity and frictional contact
- Damage of metal sealing had led to health hazard and increased operating expenses

The client is a leading full stream Oil & Gas company based out of USA

**10-15%**  
faster delivery of projects

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## SOLUTION

- Nonlinear analysis was performed on the assembly for bolt loading conditions and check was done for seal crushing
- The nonlinear analysis was subjected to varying operating and testing loads. The effect of various loads were quantified and collected for detailed data analysis
- Internal pressure to check Leakage [Contact pressure], strength and rigidity of assembly were analyzed to provide detailed specs sheet
- Combined hex/ tetra mesh was used for the complex geometry using Hypermesh tool
- Conducted in-depth Finite element analysis and provided complete report of all quantified mechanical responses

## RESULTS

- Reduced the Physical testing by 33% of multiple metal seal to reach optimum performance
- Built “pressure sealing data” with different seal types for ~10-15% faster delivery of projects