

## Specialized Engineering Studies

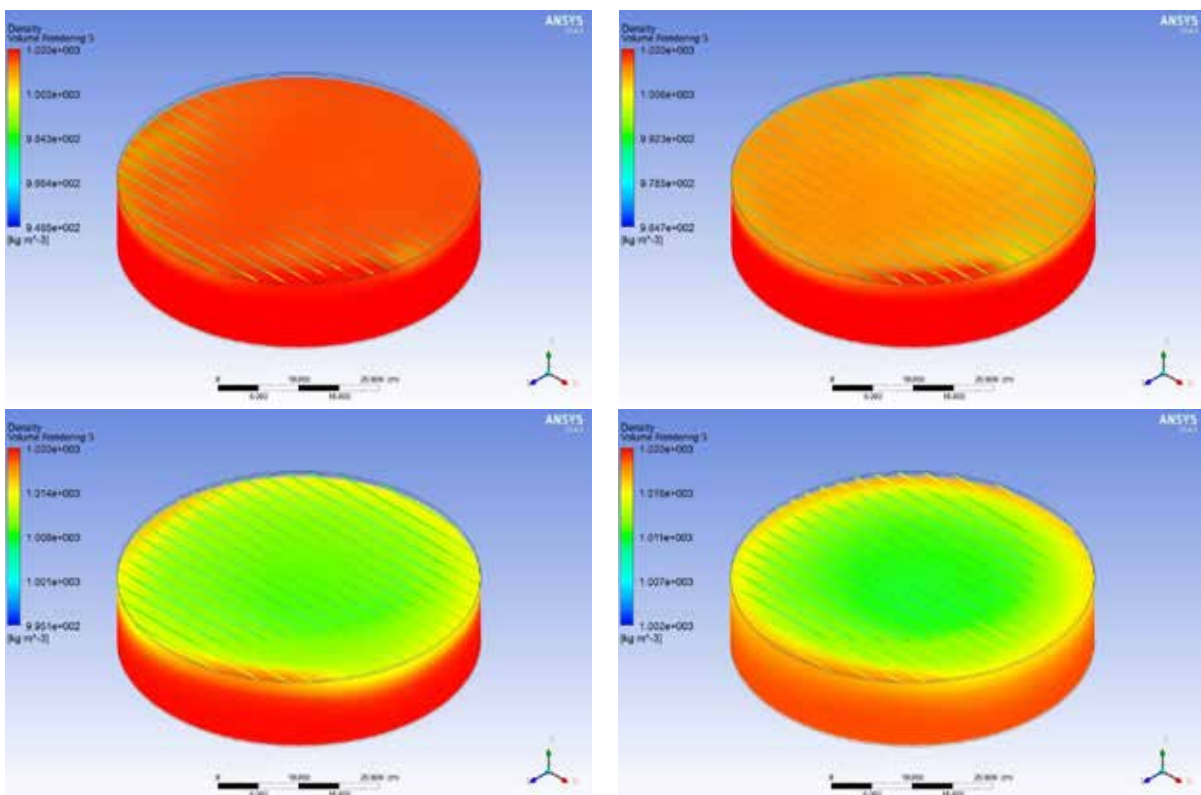
A team of specialized engineers has been dedicated to provide Specialized Engineering Studies that may be required at any stage of the project life cycle, or can be offered as a separate package.

The scope of our Specialized Engineering Studies covers the following :

### Computational Fluid Dynamics (CFD)

Our team of engineers possesses hands on experience, skill and thorough understanding of engineering dynamics and fluid physics. For

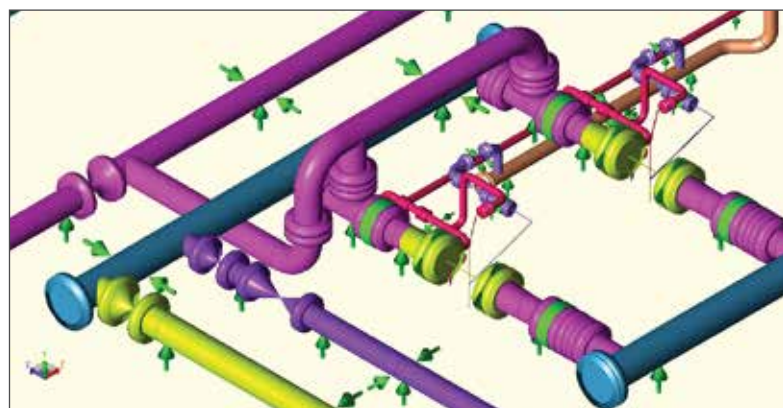
any CFD analysis, understanding of meshing requirement and quality are very instrumental in determining its success. Our CFD team use fluid simulation strategies, techniques and dedicated software that are best suited for your industrial applications. At MUC we offer an array of engineering solutions such as performance calculation, design validation, evaluating operating conditions and more with the advantage of optimum solutions at reduced downtime.



CFD for tank mixing

### Stress Analysis

Pipe stress analysis evaluates the effect of pressure, static and dynamic loads on piping. At MUC we model the piping systems, connected equipment and other process equipment connected to the system. To this model, various static and dynamic loads are applied. The results of

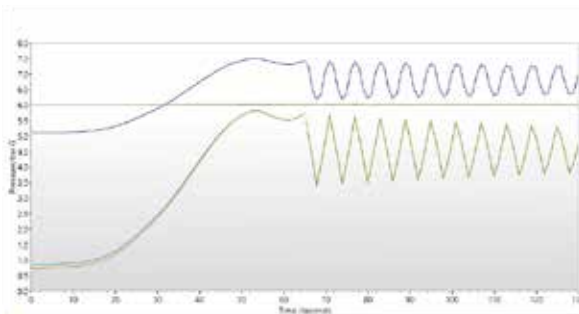


Stress Analysis of pumping system

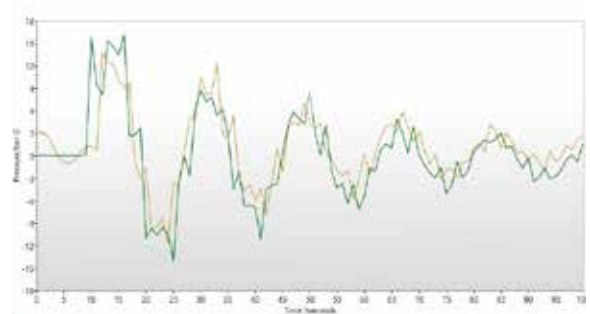
all such effects are then assessed and checked against industry standards to ensure they are within the acceptable limits set forth by such standards. Once again at MUC we have hands on experience and the right tools to perform Stress Analysis.

## Surge Analysis

The extent of surge should be evaluated for all hydraulic systems so that system failures and leakage can be avoided. Our team of hydraulic engineers is highly experienced in surge analysis and modeling. Surge pressures are produced in a pipeline whenever there is a sudden change in flow which can cause a variety of problems such as high / low pressure, damage to equipment/pipeline, line bursting. A typical surge analysis would evaluate the system, identify the primary reason behind surge and select the preferred mitigation recommendation. At MUC our team of experienced hydraulic engineers is equipped with dedicated software; so that we ensure our customer's requirements are fulfilled to the highest standards.



- Pressure 0 metres along pipe 17
- Pressure 0 metres along pipe 41
- Inlet pressure of valve 1
- Pressure 0 metres along pipe 1
- Pressure 2 metres along pipe 1

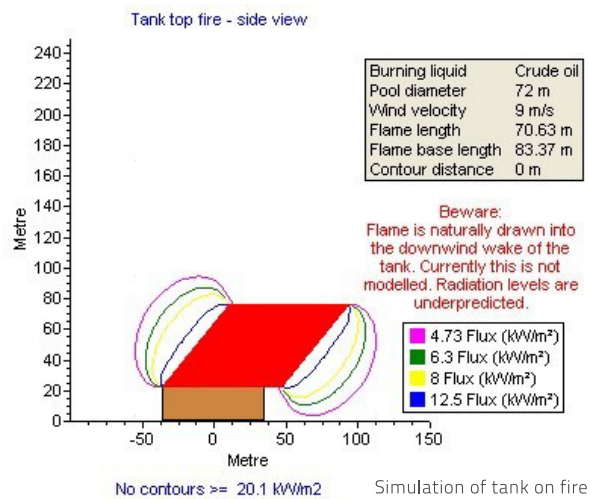
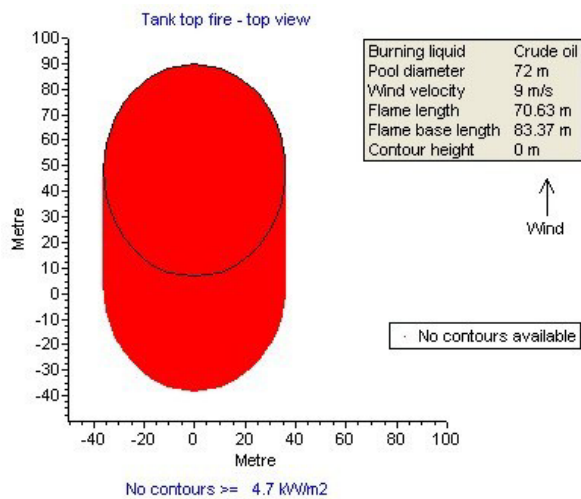


Surge waves in Jettylines

- Pressure 0 metres along pipe 41
- Pressure 0 metres along pipe 1
- Inlet pressure of valve 1

## Heat Radiation Calculations

It is sometimes necessary to analyze whether thermal radiation will cause fire to spread from one area to another or the extent of protection required for nearby facilities. MUC has the engineering capability to study heat radiations, validate fire scenarios and offer recommendations and sufficient measures to mitigate the risk of an unlikely far spread consequence. Our engineering staff is complemented with dedicated software for such studies which are proven to offer accurate solutions in a cost effective and economical manner.



## Finite Element Analysis (FEA)

Finite Element Analysis is a unique method to evaluate and analyse complex structural problems. May your requirement be analysing various designs, optimizing designs, determining whether the designs meet with the standards or even to analyse failure of components, our team of experts can offer you with the right solutions.

## Design Integrity Studies and Residual Engineering

We carry out design review and appraisal in line with applicable codes, specifications and standards. At MUC, our team is capable of carrying out Design Integrity Studies and Residual Engineering to ensure the design criteria across all major disciplines are addressed.