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# CASE STUDY

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# FEA OF PUMPS

## CASE STUDY HIGHLIGHTS

### Client Profile

Renowned Pump Manufacturer, India

### Introduction

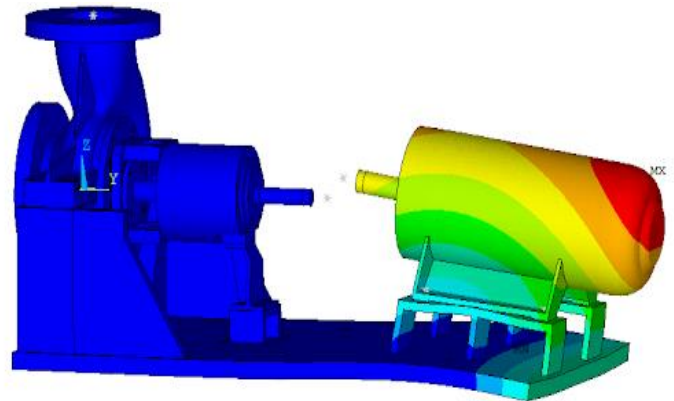
The pump assemblies used in nuclear power plant applications need to be evaluated for design parameters as well as seismic qualifications to ensure their reliability considering the criticality of their applications. The design guidelines for this component are provided in sub sections NB, NC, ND & NF of ASME BPVC Sec. III. These sections are described based on the criticality of the components with NB subsection having guidelines for most critical components as likewise the other subsections with reduced criticality. The design is evaluated for various loading combinations described as Level-A through Level-D. This loading also includes seismic loading which corresponds to the seismic response at the pump installation site. Renowned Pump Manufacturer from India approached ANALYZER to seek assistance in evaluating the design of their newly developed pump assembly for its reliability being a nuclear power plant product.

### Workflow

- Creation of 3D CAD model
- Creation of FEA model
- The FEA model is analysed
- The assembly is also evaluated for close gap clearances in severe operation conditions.
- Report the results for client's reference.

### Challenges

- Capturing the Mass of various components of pump assembly in foundation load calculations
- Bearing modelling in FEA
- Coupling modelling in FEA
- Bolt load extraction from FEA
- Seismic analyses of pump assembly



Torsional Vibrational Analysis of Pump

## THE SOLUTION

The FEA model is prepared for the complete pump assembly. To avoid complexities, bearings & coupling are modelled in a much simpler way in FEA. The first model is solved to extract the foundation loading & the complete assembly is solved for various load combinations.

The results showed that the foundation loads are much below the allowable limits. The stresses for various load combinations are within the allowable limit. The assembly is also evaluated for close clearances between mating parts & is predicted to be working fine under severe operating conditions also. Thus, the pump design was predicted to be safe even in severe operating conditions during its service life.

## BENEFITS

- Pump assemblies are evaluated in a more accurate way than the conventional analytical methods.
- The pump assemblies from an idle plant can be used for a working plant by evaluating it for site seismic conditions.
- Evaluation against close clearances would ensure the severe condition operational reliability of the pump assembly.

## ABOUT ANALYZER CAE SOLUTION PVT. LTD

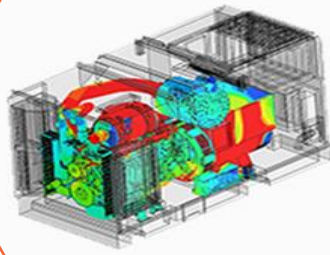
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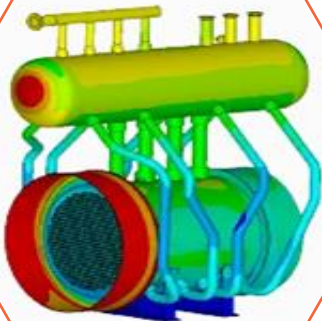
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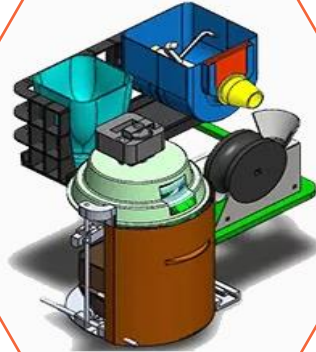
CFD



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## CONTACT DETAILS



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