



Analyzer CAE Solutions Pvt. Ltd.

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✉ bd@analyzer-cae.com

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Our Team Motto

Design team "Transforming Ideas to Reality"

FEA Team "Don't be stressed, We are there"

CFD Team "Diverse requirement, Converged Solution"

☎ [+919561439442](tel:+919561439442)

📍 [224-226, Ashok Plaza,](#)
[Viman Nagar, Pune-411014](#)



CASE STUDY

ENGINEERING DESIGN & ANALYSIS SERVICES

(Client Presence - **12+ Countries**, Experience - **14+Years**)

Service Verticals

FEA, CFD, Design, Prototyping, Staffing and Mentoring

Industry Verticals

Automobile, Aerospace, Oil & Gas, Process, HVAC, Turbomachinery & Pumping Station, Nuclear Energy, Medical & Electronic Equipment's, Industrial M/C & Equipment's, Construction Equipment's, Etc.

MODAL ANALYSIS OF STRUCTURE

CASE STUDY HIGHLIGHTS

Client Profile:

Process equipment manufacturer, India & Abroad

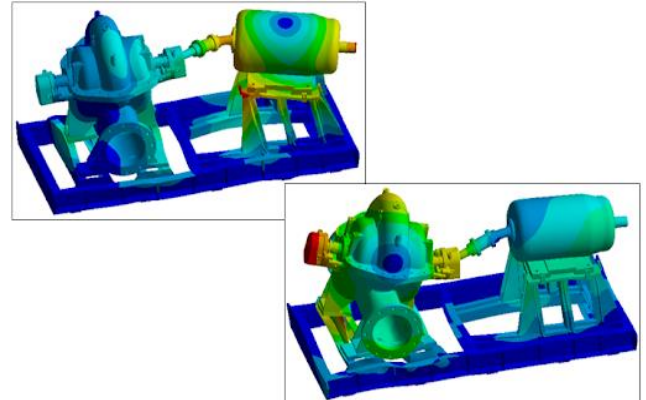
Introduction

As per the applications, industrial equipment is subjected to different types of loading. In some cases, the structures are subjected to vibrations. These forced vibrations may be sinusoidal or random in nature depending upon the functional requirements. If this external excitation frequency matches with one of the natural frequencies of the structure, then resonance will occur & structure vibrates with maximum amplitude. The condition of resonance should be avoided to avoid its harmful effects on the structure (In most of the cases this condition leads to structural failure). Modal analysis is performed to study different natural frequencies & their corresponding mode shapes.

Process equipment manufacturer from India & Abroad approached ANALYZER to seek assistance in evaluating the design of their newly developed equipment against forced vibrations & provide the solution in case of any observed resonance.

Workflow

- Determining the material properties for different MoCs of the structure, design parameters to be considered in FEA.
- Preparing FEA Model for modal analysis. In order to optimize the solution time, the meshing approach is of utmost importance in modal analysis.
- Solving the FEA model for modal analysis in ANSYS APDL Solver.
- From results of FEA, structure is either evaluated for its different modes or it is used as prerequisite of a dynamic analysis.
- Report the results for client's reference.



Model Analysis of Pump Assembly

CHALLENGES

- Meshing approach for Modal Analysis

THE SOLUTION

The structure was analysed using Finite Element Method for Modal Analysis. The modal analysis is performed for the structure without any loading as we are evaluating a characteristic property of the structure. While creating FEA model, care had been taken to keep the structural stiffness unaffected.

The results showed that the natural frequencies of the structure are away from external excitation frequency by sufficient margin. Hence the structure does not exhibit any resonance during its service life & may sustain the external excitation as a rigid body.

BENEFITS

- A design can be evaluated for its characteristic property – Natural frequencies.
- The resonance condition can be investigated for design modifications.
- With the help of mode shapes, a targeted design modification is made possible to avoid a particular mode.

ABOUT ANALYZER CAE SOLUTION PVT. LTD

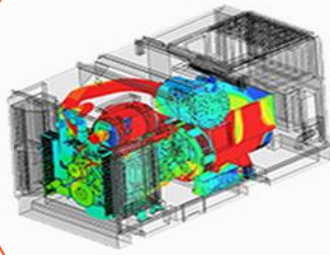
Author- [Mr. Dharani Madala](#)
(Director Engineering)

Analyzer is one of the leading Engineering Services company. We have a team of 140+ Engineers who work on various Design, CFD and FEA projects. We have been serving our customers for more than 14 years and have retained 97% of our clients from 12+ countries by providing best quality service at reasonable cost.

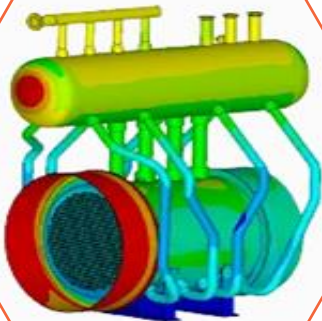
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CFD



FEA



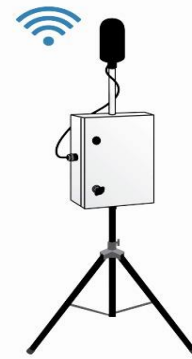
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STAFFING & MENTORING

CONTACT DETAILS



Mr. Dharani Madala



bd@analyzer-cae.com



<https://wa.me/+919890549442>



www.analyzer-cae.com



+919561439442, +919561739442



224-226, 2nd Floor, Ashoka Plaza, In-between Hyatt and Ibis Hotel, Nagar Road, Viman Nagar, Pune, Maharashtra-411014

ANALYZER HAS BEEN PROVIDING DESIGN AND CAE SERVICES ACROSS THE GLOBE



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