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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"

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CASE STUDY

ENGINEERING DESIGN & ANALYSIS SERVICES

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

Service Verticals

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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.

FEA OF HEAT EXCHANGER

(ASME Sec. VIII Div. 2 (Table 5.3) Approach)

CASE STUDY HIGHLIGHTS

Client Profile:

Process equipment manufacturer, India & Abroad

Introduction

Tube & Shell types of heat exchangers have their design procedure defined in ASME & TEMA Standards. But in some cases, the equipment is designed as per ASME Standards alone (e.g., Heat Exchanger for Air cooled processing fluid). So, such a design needs FEA assistance to decide whether the design is safe or not??

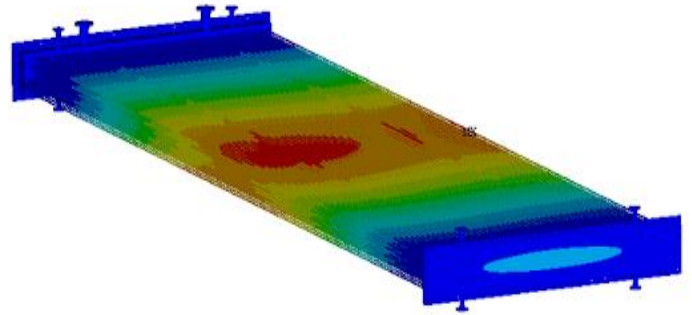
Process equipment manufacturer from India & Abroad approached ANALYZER to seek assistance in evaluating the design of their newly developed heat exchangers for a particular application to multiple loading conditions using simulation techniques & provide the solution in case of any observed failure either stress failure or tube to tube sheet weld failure.

Workflow

- Design parameters & material properties extraction for Heat exchanger geometry
- Preparing FEA Model for Heat Exchanger with complete structured Hexahedral Mesh.
- Solving the FEA Model & Result extraction
- Performing the weld qualification calculations for tube-to-tube sheet welds.
- Preparing an easy-to-understand report for the performed FEA.

Challenges

- Preparing complete structural hexahedral mesh without losing small geometrical details.
- Optimizing the mesh count in case of bigger heat exchangers
- Modelling the weld between tube & tube sheet



Air Cooled Heat Exchanger (15 Length)

THE SOLUTION

The heat exchanger was analysed for different loading conditions as per Table 5.3 of ASME BPVC Sec. VIII Div. 2 using Finite Element Analysis in ANSYS APDL Solver. Stress Linearization has been carried out at various locations. The tube-to-tube sheet weld qualifications were performed for the weld. The results showed that the induced stresses were well within the acceptable limits as per guidelines. Also, the load at the weld junction is found to be much below the allowable limit. Hence, the structure's design was predicted to behave safe during operation without premature failure.

BENEFITS

- Actual behaviour of heat exchanger for the different load conditions is evaluated.
- Reduced manufacturing time
- The most critical component of heat exchanger-tube sheet is also evaluated for its strength.

ABOUT ANALYZER CAE SOLUTION PVT. LTD

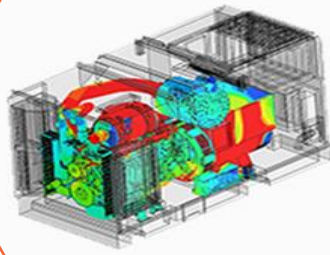
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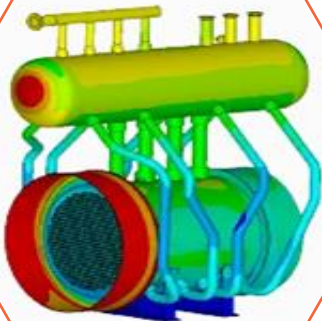
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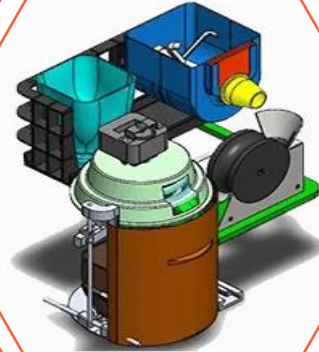
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