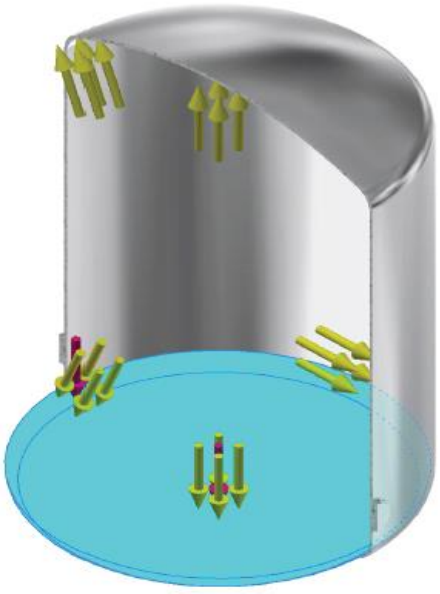
تحضير، تعبئة و تغليف، حلول هندسية
Process, Packaging, Engineering

Finite element analysis (FEA)

Finite element analysis (FEA) is a numerical method for calculating stress and strain (and other quantities) in structures that cannot be easily analyzed any other way. FEA analysts use complex software to create a mathematic representation of the physical structure being studied, apply loads to the structure and then solve for the resulting displacements and stresses. In years past, FEA was performed by highly trained analysts with master's level engineering degrees or higher. Today, the combination of competitive market pressures, powerful computer hardware and well-designed software has resulted in CAD designers being asked to perform FEA early in the design process. To enable these designers to perform FEA analysis, solid modeling software vendors have incorporated FEA into their solid modeling and design drafting packages.

In AFAQ, each steps of the FEA procedure is examined; define the geometry and material, apply constraints, apply loads, solve and then interpret the results. Lastly is a description of the assessment and evaluation.

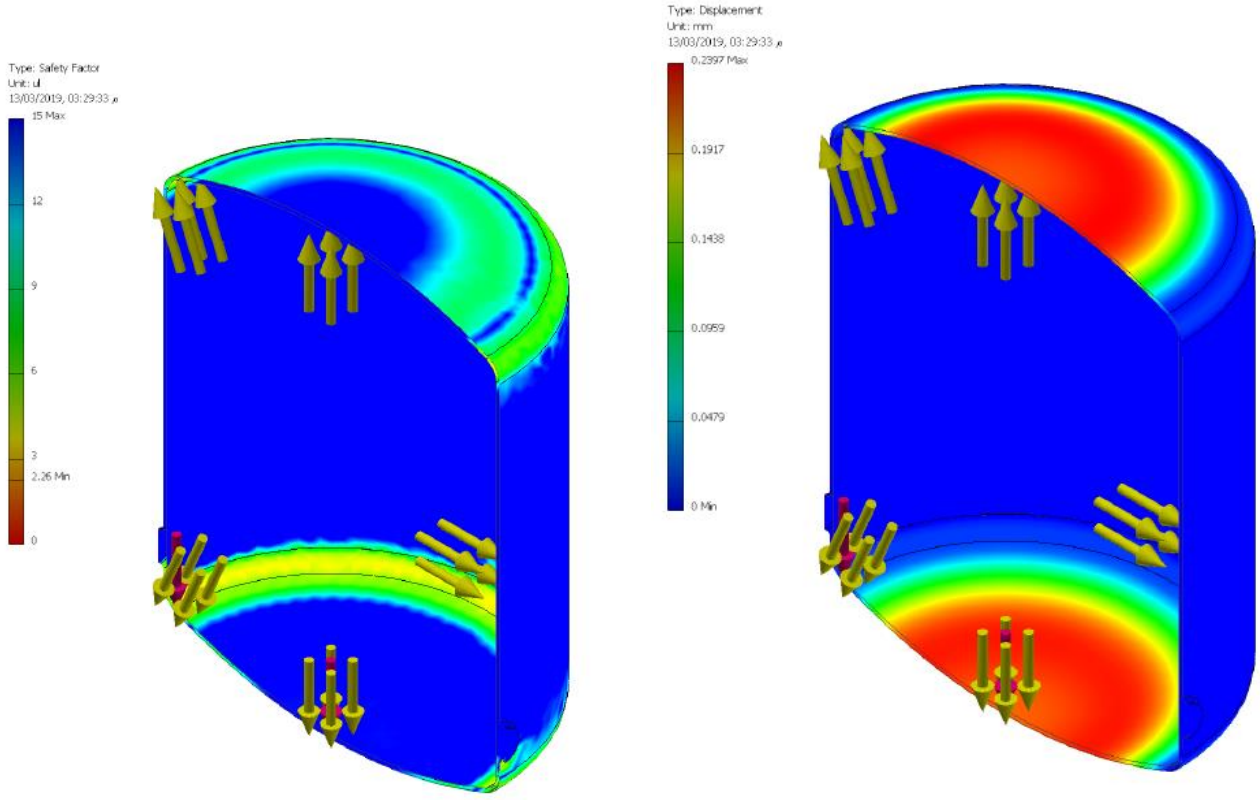
For example, this is a FEA report for stainless steel 316L tank (200 Liters).



- Metal properties:
  - Material: Stainless Steel 316L
  - Density: 8.08 g/cm^3
  - Mass: 90 Kg
  - Thickness: 4 mm
- Operating conditions: (see figure)
  - inside pressure 0.300 MPa (yellow arrows)
  - material weight 2000 N (pink arrows)
- Result summary:
  - Displacement:
    as the displacement figure, we realize that:
    the minimum value is 0 mm which is in the side faces, colored with blue.

The maximum value is 0.2397 mm which is in the top and the bottom of the tank, colored with red.

- Safety factor:
  as the safety factor figure, we realize that:
  the minimum value is 2.26 which is in the bottom side faces, colored with yellow.
  The maximum value is 15 which is in the top, bottom and side faces of the tank, colored with blue.



Eng. Mouhammad Al malla
AFAQ01
Design Dept. - Mechanical Design Engineer