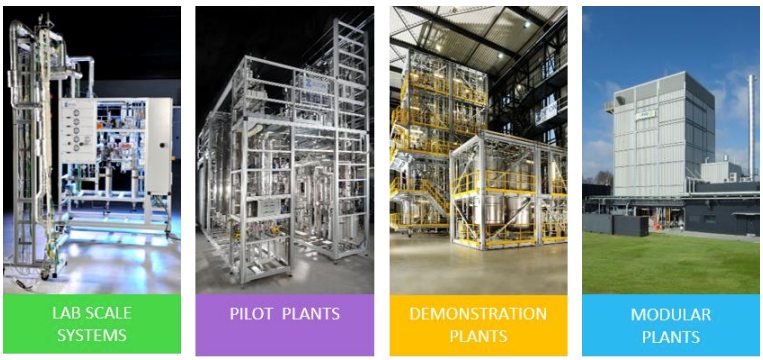
INTERNSHIP: PIPE SUPPORTS (HBO)

Zeton company profile

As the world's leading designer and builder of innovative lab scale systems, pilot plants, demonstration plants, and small modular commercial plants, Zeton helps its customers to bring their new technology and processes to market, faster, with less risk, and lower cost. The plants are modular/skid mounted so that installation and commission at the client's site takes minimum effort. Zeton projects include conceptual design, basic and detail engineering, manufacturing, factory testing, transport, re-assembly and testing at the client's site.

With operations in Burlington, Canada and Enschede, The Netherlands, Zeton has successfully completed over 800 projects in 35 countries across six continents. The location in Enschede has over 170 employees and serves mainly Europe, Africa and the Middle East. Zeton has three product groups: Zeton Lab and Pilot Systems Z(LP), Zeton Pharma (ZPH), and Zeton Demo and Production Plants (ZDP).



Piping systems used in Zeton built pilot plants need to be very versatile. They have to carry the fluids, in a safe and controlled manner, usually in confined spaces with little room for ideal routing. Instruments are attached to measure fluid properties. Valves are installed to handle flows. Quite often piping systems are insulated and heat-traced. Thermal loads, wind loads and other forces can also be present. All these, and many more, conditions make that supporting of these piping systems play an important role in the overall safe design.

For over a decade, Zeton uses its own in-house designed pipe supporting system. This standard is designed to our specific needs. After years of extensive design, a lot of ideas and needs for improvement have arisen. One crucial aspect is that the supporting system requires a validation of mechanical strength, forces and moments in different directions and verification of how fabrication aspects (like welding imperfections) affect the overall mechanical strength and performance. By using one type of support that's versatile in multiple situations limits the amount of models at engineering phase and also possible installation flaws during manufacturing.

Websites: Zeton | The World Leader in Pilot Plant Design and Fabrication | Werken bij Zeton | REALIZE THE FUTURE

Duration

The duration of the internship is foreseen to be in the range of 4-5 mo.

Education

Studies related to mechanical engineering, HBO-level

Assignment

In this assignment you will undertake amongst others the following steps…

1. Determine where and how current design requires further improvement
    a. Gather user feedback
    b. Which factors play an important role, and which ones minor? Like economical aspects, fabrication issues and challenges, etc.
2. Are there codes and/or standards that describe the use and requirements of pipe supports.Validate the design of the supporting systems
    a. Which (simple) methods are there to validate the design of 100+ supports?
    b. Is the current design sufficiently strong for the typical scope of work, or does the design requires an iteration?
    c. What it the max limit of the current design? Is that weak spot something we can accept, or is it critical?
    d. Does the design require further improvement based on such outcome?

Activities

The assignment will be composed of the following:

1. Gather current users feedback of the current support by interviews among engineers and mechanics.
2. Gather data on (potential) design improvements
3. Determine an approximate maximum loading capacity of the current design using Design-By-Rule to their respective degrees of freedom.
4. Validate these outcomes using a Design-By-Analysis approach
5. Recommendations and possibly developing a concept with the results found from the research.