

# Design a Torque measuring/testing station for valve carts/norbars

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## Aim of the Project

Design a Torque measuring/testing station for valve carts/norbars

## Background

This project was run in conjunction with Aughinish Alumina. The task was going to be to meet and supply a design for a required device on-site at their plant in Foynes.

This required device was a purely mechanically driven Torque Testing Station. It had to be corrosive resistant due to the diverse conditions it would be subjected too at the plant.

The torque tools being tested on this bench would have a maximum torque ability of up to 4500N/m but with the addition of an air valve regulator the bench was only required to take 50% of that torsion.

The main difficulties of this project was that there was no previous tools like it and so the whole testing station was designed right up from the whiteboard.

## Design Overview



Figure 1: Completed Bench & Test Rig

Above can be seen the final test rig. The bench is made up of box section steel and is painted as to resist the corrosive elements on-site. It is also fitted with fork brackets for ease of mobility.

The test rig can be seen seated on top of the bench and uses a hydraulic cylinder & ball screw to achieve the goal of measuring

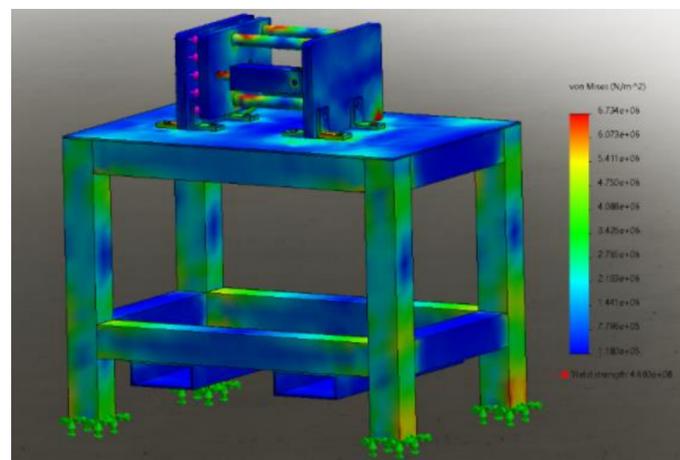


Photo of: FEA Simulation

## Design Detailed

The test rig consists of 3 separate plates which are joined by 4 guide rails. These plates are designed from mild steel and coated in anti corrosive paint. When the pneumatic torque tools are applied to the unit the plates will compress with the aide of a centrally placed ball screw. This ball screw allows the cylinder to open the plates back up after the test is complete.

The cylinder is hydraulic and has a limited movement of 5mm. This approach was the only one suited to the parameters laid out by Aughinish as they needed it to be completely mechanically driven.

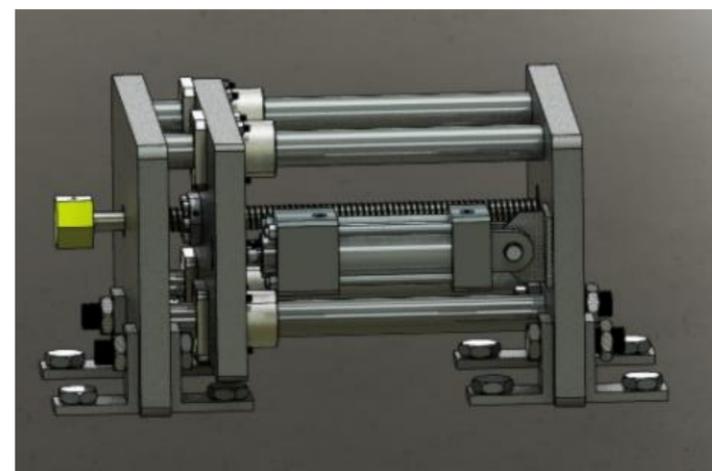


Photo of: Hydraulic Test Unit

## Conclusion

Through lots of research this project was completed successfully. With the tools and accuracy of Solidworks and its simulation function the team are confident that when or if this build proceeds that the outcome will be that which was initially desired by the end customer Aughinish Alumina.

Although this project was complex the final design is something that the team can stand over and be proud of. All feed back from Aughinish has shared the same sentiment towards our design.

## Acknowledgements

- Aughinish Alumina
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