

Saving cost and reducing turnaround time with simulation

Imperial Auto has successfully validated the contact pressure for O-Ring by Contact Analysis using Altair OptiStruct Solution.

Established in the year 1969, Imperial Auto is one of the biggest integrated manufacturers of 'Fluid Transmission Products (FTP)' in the world. The company has eight dedicated manufacturing and assembly plants in India. Imperial's multi-location state-of-the-art manufacturing facilities have diversified product portfolio and serve the niche clientele of the company. The grand vision of the company's top management can be easily gauged from the strategic and technical alliances that Imperial has formed with major international players in their industry. The company operates on a global scale and has a strong worldwide presence in their market. Imperial is a major and important supplier of parts to leading engine, automotive, off highway and farm equipment OEMs worldwide and also boasts of multiple overseas warehousing facilities to serve their clients seamlessly.

Imperial believes in manufacturing only world-class quality products and considers its high level of commitment towards continuous improvement as the

Implementing
Altair Solutions in our R&D division has brought a considerable change. The Token Based licensing model is easy to adopt and execute which offers complete flexibility to users.

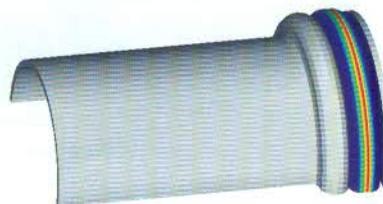
- Kushal Bir,
Vice President,
Imperial Auto Industries



O-Ring Application



Displacement



Contact Traction / Normal (pressure)

most important prerequisite of serving clients on a global scale. The company has made significant investment in its R&D initiatives.

Imperial has a robust headcount of 3000 employees and has some of the most coveted and respected quality and environmental certifications such as ISO/TS 16949:2009 and ISO 14001:2004. Some of the most prestigious global OEMs such as Caterpillar, Cummins, FIAT Powertrain, Navistar, General Motors, JCB, and John Deere find place in the company's client list.

REDUCING PROTOTYPE ITERATIONS AND TURNAROUND TIME

Being a very important supplier to some of the world's most reputed engine, automotive, and off highway and farm equipment OEMs, the company considers it imperative on its part to be very innovative in the product design and development processes. This becomes more important for Imperial in the automotive industry vertical because they manufacture fluid transmission pipes in which controlled and sustained flow of fluids - petrol, diesel, break oil, and coolant - is crucial. In this critical and highly dynamic environment, the company found it challenging to optimise fluid flow and minimise fluid loss. The Imperial team also understood the importance of having a secured, predictable, and confirmed process that will generate accurate results in its innovation efforts.

To add to this, because the team comprehended even the finer nuances of their processes, they wanted their R&D solutions to be robust enough to handle all platform variations and be scalability compliant. Through this, the team wanted to make sure that the complete design of a product is handled in one common environment.

Amidst this backdrop, the Imperial team faced a set of challenges in one of their important projects. In their pursuit of designing and building a flawless assembly component, the team had to check the “O” ring leakage that could withstand required air pressure of 3 kg/cm². In this endeavor, the team had to struggle with an iterative process because they had to build several prototypes to confirm the “O” ring leakage. This method of trial and error to check the “O” ring leakage and build a flawless product was unreliable and took considerable amount of time to finalize the product design.

ANALYSE AND INTERPRET RESULTS USING HYPERWORKS

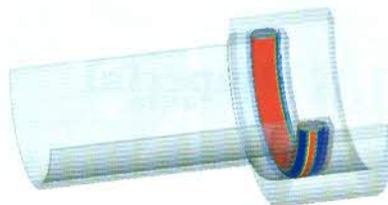
When faced with this challenge, the team wanted a solution that could help them cut the turnaround time, reduce prototype iterations, and also improve design and product quality. After examining a few simulation products which met the requirements, the Imperial team finalised Altair’s HyperWorks as its features were an exact fit that promised to deliver.

Altair HyperWorks

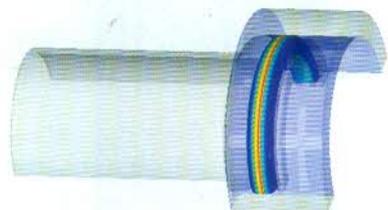
helped us cut down on the number of prototype iterations, final turnaround time and also saved on the project cost. We are now keen on exploring other capabilities of the Altair CAE Suite in our product development cycle. Also, both DesignTech and Altair Technical teams provided excellent support and training. With their help, we were able to realise newer applications of tools that we could use in our product line.

- Nikhil Srivastava,
Sr. CAE Engineer (R&D
Department), Imperial Auto
Industries

The team started with utilizing the meshing capabilities of Altair HyperMesh to mesh the model. The team had a ready rubber model that had the required material properties. Simulation in HyperWorks made it easy for the team to establish contact between the



Contact Status / Normal



Contact Forces / Normal



O-Ring

“O” ring and the pipe and the cylinder bore. The team then analysed the result by using the non-linear Quasi Static analysis method and effortlessly simulated the physical behavior of the product. In the final stage, the team used Altair HyperView to objectively interpret the analysis results when it came to contact requirements.

REDUCED TURNAROUND TIME WITH COST SAVINGS

The Imperial team found an excellent and dependable solution in Altair HyperWorks. The team was ecstatic that Altair HyperWorks enabled them to interpret the results with regards to contacts for various parameters and scenarios such as Contact Status, Contact Forces, and Contact Pressure. Altair HyperWorks made it possible for Imperial team to confirm the requirement of the “O” ring to prevent leakages. The team also interpreted that the required air pressure were within the allowable specifications.

With the team delivering excellent results with the Altair HyperWorks suite on similar projects, they are excited to explore more capabilities of the solution. With the deployment of Altair HyperWorks, the company saved an incredible 70% of the overall product development time. This translated in a significant reduction in the number of prototypes that were earlier built to reach the target quality of the product. With time and prototype iterations taking the downward curve, the team achieved an impressive saving of almost 40-50% of the product development cost too. This has gained customer confidence and resulted in customer satisfaction.

Propelled by the results of the project, the team implemented Altair OptiStruct for design optimization activities and managed to reduce design weight easily. The team is happy that the Altair HyperWorks suite acts as a one-stop-shop for their requirements and reduces their prototype count, shortens the iterative process, and hence reduces the final turnaround time.

Courtesy: Altair Engineering India Pvt Ltd and DesignTech Systems Ltd. For details, contact Chitra Sapkal on 020 4131 1241, Mob: 098234 42065, or email: chitra.sapkal@designtechsys.com