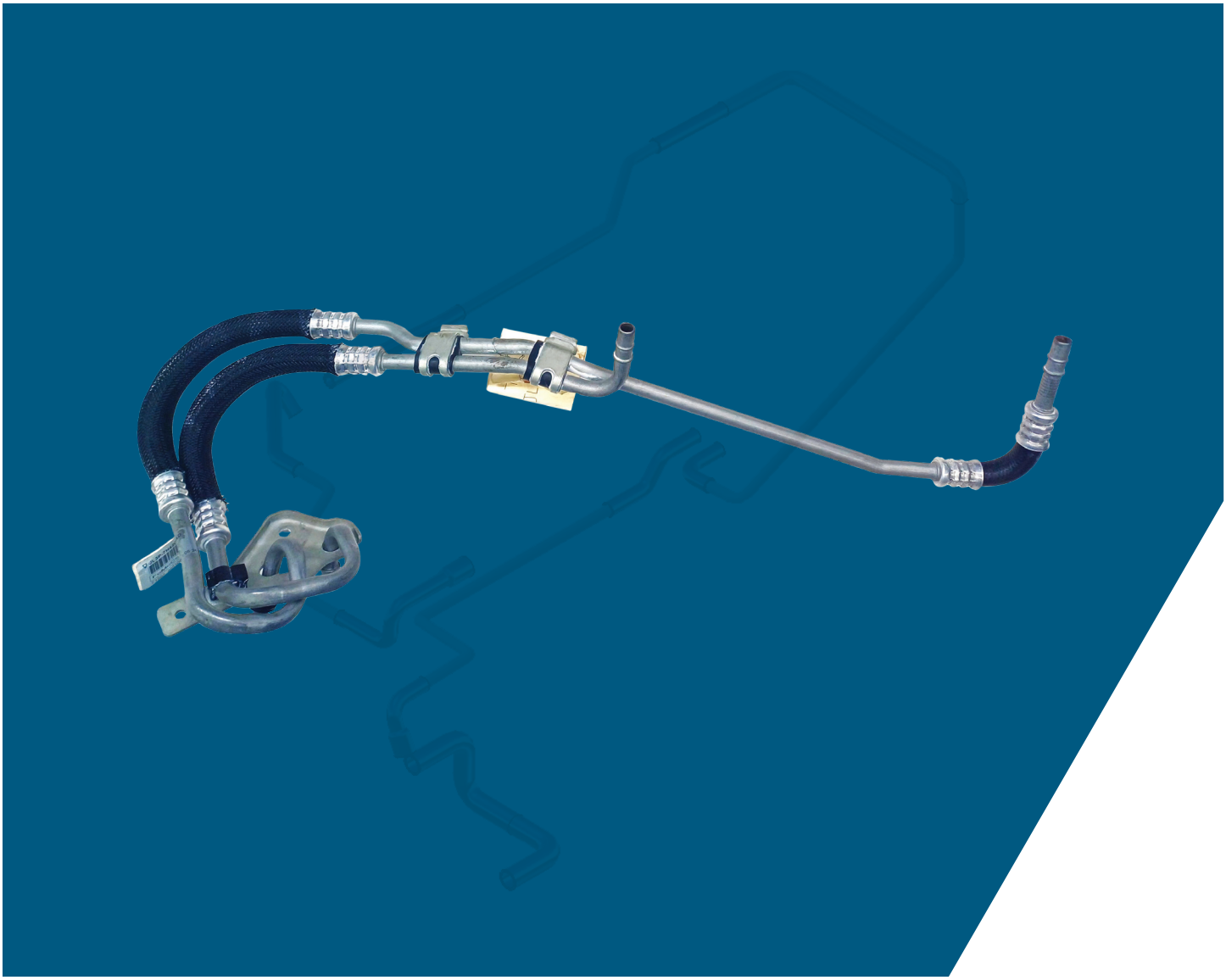
CUSTOMER STORY



PRECISE FLUID TRANSMISSION PRODUCTS

IMPERIAL AUTO USES ALTAIR® HYPERWORKS® TO ACHIEVE ALL-AROUND DESIGN PRECISION

About the Customer

Established in 1969 in Faridabad, India, Imperial Auto Industries Limited has transcended its humble beginnings to become a leading integrated manufacturer and assembler of fluid transmission products in India. With a global footprint comprising 20 manufacturing facilities in India and three abroad, the company specializes in diverse offerings, including flexible high-pressure assemblies, metal tubular assemblies, and low-pressure hose assemblies. As a preferred supplier to original equipment manufacturers (OEMs), Imperial Auto is dedicated to maintaining high-quality standards. The company boasts comprehensive in-house manufacturing capabilities for essential processes like electroplating, brazing, and rubber compound mixing, enabling the production of top-notch products. Imperial Auto's clientele includes renowned OEMs such as Mercedes-Benz, Porsche, Caterpillar, Cummins, BorgWarner, TATA Motors, and many others, showcasing its prominence in the global automotive landscape.

"Altair HyperWorks has proven to be an invaluable asset for the Imperial Auto team in the completion of our projects. We have greatly benefitted from the exceptional support provided by the Altair and DesignTech teams. The user-friendly interface of HyperWorks simplifies the process of creating and analyzing simulations, even for those who may not be simulation experts.

Sourav Kumar,
CAE and CAD Engineer,
Engineering Department
(R&D), Imperial Auto

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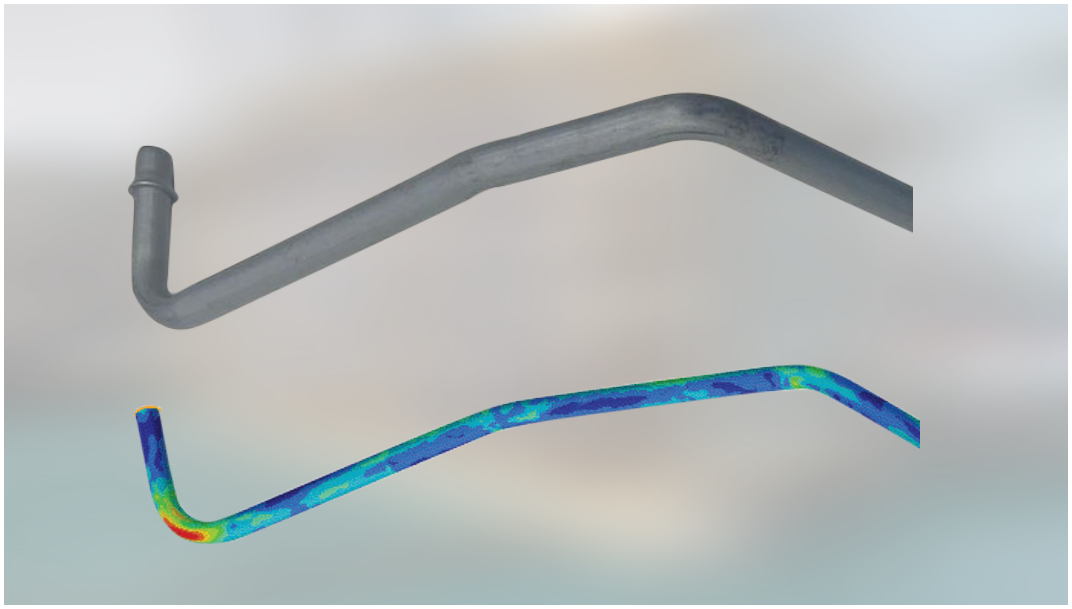

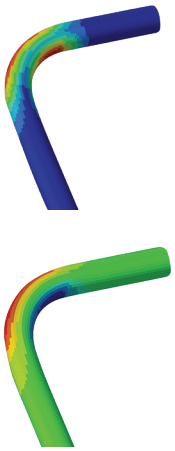

LEFT: Compare the actual part with the simulated model result

TOP RIGHT: Elemental stresses generated on the tube

BOTTOM RIGHT: Thinning % of the tube

Their Challenge

The product development team at Imperial Auto faced a series of challenges, encompassing issues such as the occurrence of wrinkle spots within the pipe of their fuel injector system, the spring-back effect witnessed during bending, angular spring-back, elevated thinning percentage, the emergence of high-stress points, and complications associated with the flattening of the tube's cross-section and radial expansion. Although these challenges are prevalent issues encountered in various fluid transmission systems, their resolution is key in the pursuit of high-performance fluid transmission products.

Our Solution

The integration of Altair® HyperWorks® into the design process at Imperial Auto proved instrumental in enhancing the design team's efficiency and productivity. The Altair HyperWorks platform, with its intuitive workflows that readily adapt to the domain expertise, facilitated a seamless development process for increasingly complex and interconnected products. With the implementation of Altair HyperWorks, particularly Altair® Inspire™ Form, the design team was able to address a variety of key challenges. Notably, the team realized substantial reductions in thinning percentages, mitigated high-stress concerns, and minimized the spring-back effect throughout their product line.
The adoption of Altair HyperWorks was pivotal in optimizing the design workflow, resulting in significant improvements and a more streamlined development process at Imperial Auto.

Results

Imperial Auto has been extremely pleased with the outcomes derived from the adoption of Altair HyperWorks. Through a comprehensive evaluation comparing results obtained via Inspire Form against manual methods, the company discerned a notable similarity between the two approaches. With a keen focus on factors including the wrinkle effect, bend radius, spring-back effect, and thinning percentage post-bending of pipes, a variance of 8–10% was observed between the results derived from physical tests and those from CAE simulations. These findings were superb, prompting Imperial Auto to concentrate efforts on minimizing this discrepancy, aiming to achieve a target range of 3–5%. This rigorous analysis also enabled precise, continuous improvement in their design and simulation processes.

Imperial Auto wants to utilize Altair tools for the development of products related to hydrogen vehicles, involving the conversion of chemical energy into mechanical energy. To achieve this, they'll conduct simulations encompassing structural, thermal, model, and leakage (CFD) analyses, among other aspects. The simulation of hydrogen vehicles necessitates the integration of tools for thermal management, mechanical structure performance, and other related areas, and Altair provides the technology needed to achieve this. This will further enable Imperial Auto to obtain real-time or virtual simulation performance data to stay at the forefront of innovation and address the evolving landscape of sustainable automotive solutions.

To learn more, please visit altair.com

> Since we started using Altair software, Imperial Auto has experienced commendable support from the DesignTech Team, spanning HyperWorks, Altair CFD™, Inspire™ Form, SimLab®, and SimSolid®.
> The Imperial Auto team will be engaging with the DesignTech team for system-level simulation and other Altair tools in our upcoming projects as well.
>
> Charan Singh,
> Manager,
> Engineering Department (R&D), Imperial Auto

DesignTech
Technology for designing the future

ALTAIR CHANNEL PARTNER

To learn more about Altair software solutions, please visit us at:
Imperial Auto