



Tata Motors Adopts DELMIA Solutions for Digital Manufacturing

Tata Motors is the most famous automotive brand in India. The company plays a central role in being a part of the Tata group - the largest conglomerate in India with total revenue of approximately \$22 billion.

The Decision to Go Digital

Tata Motors decided to adopt digital tools not only for product design, but also for production engineering planning. The move to embrace this technology was aimed at linking new model development with plant optimization. *"Finding and solving design or manufacturing issues earlier, affects not only product quality but also company profitability in a significant manner. Delay in finding problems has a huge impact on cost and development time. We saw that digital manufacturing would be useful to solve those issues,"* explained Mr. Nitin Rajurkar, general manager, Passenger Car Business Unit.

What Dassault Systèmes Solutions Are Deployed

Tata Motors uses CATIA for product design and DELMIA for simulating production activities. The company has used CATIA for a long time – V4 for six years and V5 for two years. DELMIA V5, DELMIA QUEST and DELMIA IGRIP are used in simulating the production processes. Tata Motors recently added DELMIA Process Engineer, which works to integrate the design and manufacturing processes.

How DELMIA is Used

Equipment study – Body-in-White

DELMIA IGRIP features a standard library of welding robots and guns, so the user can select the most suitable gun and there are similar libraries are jigs, fixtures and conveyers. IGRIP simulates robot motion, as well as enabling off-line programming. Further evaluation features, such as testing weld gun accessibility, clash analysis and



Body-in-White Workcell with Weldgun Library

automatic collision detection between robots, have contributed to reduce process planning time dramatically.

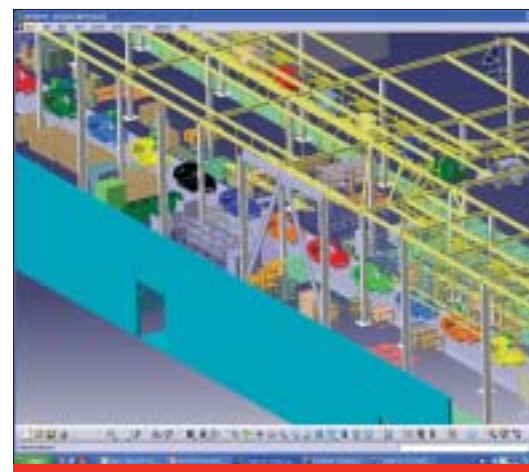
Plant Layout

With DELMIA QUEST, various plant layout alternatives have been created virtually and put through a thorough review. The best layout design was then chosen. The plant planner is able to perform a layout study in the 3D environment, taking feedback from various departments and disciplines, such as manufacturing engineers, maintenance personnel, equipment suppliers, and management in order to optimize the layout. In addition, putting 3D images in documents has made communication across departments smoother. Facilitating communication is an often overlooked advantage of working in a digital environment.

Operator simulation

DELMIA V5 Human Task Simulation is used for the simulation of operations performed by shop floor staff. This enables the analysis of both workability and workload to be studied from an ergonomic point of view

at the very beginning of process planning. In this way, two goals are reached: efficiently achieving the targeted cycle time, and creating operator-friendly working processes.



3D Plant Layout of Indica Trim Line



Gear shift lever cable access validation

Often, assembly lines are shared among multiple models of vehicles. Introducing another model into an existing assembly line invariably introduces problems as the complexity level increases. At Tata Motors, these issues are quickly identified and solved by performing a virtual line balancing operation that takes all the variables into consideration. Through the 3D simulation of assembly processes and tests, such as clash, interference or tool accessibility, the finer details can also be ironed out in advance.

DELmia Solutions Facilitate Design-for-Manufacturing

"It is very difficult to quantify benefits of digital manufacturing into concrete numbers," said Mr. Nitin Rajurkar. "This is because we are still in the implementation phase for our new model projects. However, there are a few projects up and running and in these we have achieved cycle time reduction of about 10-15% thanks to the optimization effects of DELmia. Improvements in manufacturability or tool accessibility have been made, contributing to quality improvement of manufacturing processes. The workload of process planners and manufacturing engineers has also been reduced."

Asked about time-to-market, he added, *"There are multiple parameters that affect the time-to-market, so it is just our estimation, but I think we can cut time-to-market by at least six months thanks to DELmia implementation, when compared with previous models. This is mainly because of digital process simulation, enabling us to give 'tool go-ahead' much in advance of product development. We used to wait for the physical prototype prior to designing the tooling."*

DELmia QUEST enables the user to select the best line layout or conveyor design out of multiple design alternatives, avoiding unnecessary investment on equipment. Its implementation at Tata Motors has allowed off-line snag detection at earlier stages, contributing to a reduction in the cost of equipment redesign – a bugbear in the past. Rework had been wasting time and money.

DELmia solutions at Tata Motors have enabled the assessment of equipment and logistics planning in a virtual world. Assembly process issues, such as interference, tool accessibility and working posture have been detected earlier, thanks to simulation. From there it has been straightforward to implement the necessary improvements at the initial stages of product design, ensuring that the manufacturing requirements are met.

Tata Motors is the first Indian company that has implemented DELmia solutions from end-to-end. *"We are delighted at, and feel proud of, the great benefits we gained through DELmia solutions during our recent design and manufacturing engineering projects,"* commented Mr. Nitin Rajurkar. *"It has been only 18 months since digital manufacturing started at Tata Motors. We had previously implemented DELmia solutions such as QUEST or IGRIP individually, but not in an integrated way. We have now succeeded in implementing the integrated DELmia project with very good results."*

About Tata Motors

Tata Motors Limited is India's largest automobile company, with revenues of Rs. 24,000 crores (USD 5.5 billion) in 2005-06. It is the leader by far in commercial vehicles in each segment, and the second largest in the passenger vehicles market with winning products in the compact, midsize car and utility vehicle segments. The company is the world's fifth largest medium and heavy commercial vehicle manufacturer. Established in 1945, Tata Motors' presence indeed cuts across the length and breadth of India. Close to 4 million Tata vehicles ply on Indian roads, since they first rolled out in 1954. The company's manufacturing base is spread across Jamshedpur, Pune and Lucknow, supported by a nation-wide dealership, sales, services and spare parts network comprising over 2,000 touchpoints.

Information about Tata Motors at:
www.tatamotors.com