Paris, France – September 01, 2010

ESI is the pioneer and world-leading solution provider in virtual prototyping.

Market Data

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ISIN FR 0004110310

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Tata Motors chooses ESI's Sheet Metal Forming simulation software to reduce noise

A 3-ply steel/polymer sandwich oil sump fully reshaped with the help of PAM-STAMP 2G

Based on a Noise-Vibration-Harshness (NVH) study showing that maximum engine noise comes from the oil sump, Tata Motors, India's largest automotive company, selected PAM-STAMP 2G, ESI's Sheet Metal Forming Simulation Suite, to investigate and then completely redefine and optimize its oil sump concept.

The main objective was to reduce noise by implementing 'Silent Steel' in the new engine oil sumps for upcoming vehicle platforms. 'Silent Steel' is a three-ply sandwich material in which two sheets of steel are held together by a layer of polymer. The resulting material displays inherent advantages in Noise-Vibration- Harshness (NVH) characteristics, which are particularly significant in the immediate vicinity of the vehicle engine. Changing the material to the layered silent steep also meant completely redesigning the part; changing the shape of the oil sump and adopting new stamping tools

PAM-STAMP 2G virtual prototype and 1st physical prototype

Complex design due to multiple constraints

The initial sump design, as conceived by the Product Designer, needed to be prototyped for validation. Although the techniques used for prototyping, including heating and hammering blank sheets, provided fairly accurate product geometry, they were not nearly representative of the stamping process which would be implemented later on. Feasibility could not be assessed and tooling limitations could not be anticipated with the three-ply silent material. Due to the progress of vehicle development, additional constraints from interfaces and assembly accumulated.

Productivity boost with PAM-STAMP 2G

As constraints from the vehicle environment, from tooling, and from the material itself were building up, over 25 different geometry modifications were needed before reaching a satisfactory final design that was good enough to be tried out physically with silent material. PAM-STAMP 2G's, complete, integrated, scalable and streamlined stamping solution covering the entire tooling process including quotation and die design with formability and try-out validation, springback prediction and correction, was thus used to validate each design evolution until a defect-free feasible solution was reached.

The first physical prototypes in the stamping tool workshop matched very closely the modelled result.

"*With simulation solutions such as PAM-STAMP 2G, simple and easy-to-manufacture part design proves very cost-effective and without compromise in terms of quality,"* declared **Brian D' Cruz**, Program Manager, Tata Technologies. *"The constructive and positive team effort leads to unique cost-effective solutions that could have been discarded as unfeasible without the synergized effort of Tooling and Product Designers."*

PAM-STAMP 2G allowed Tata Motors to benefit from an early resolution of various manufacturing and vehicle-level constraints leading to a marked reduction in prototyping time and significant gains in time-to-market. These achievements kindled a very high faith in virtual prototyping abilities, opening the path for more daring designs much earlier in the product development phase. Indeed, Tata Motors developed such a confidence in virtual simulation that digital validation was subsequently considered sufficient to release physical manufacturing.

To read the full story about Tata Motors and ESI, go to: http://www.esi-group.com/corporate/news-media/success-stories/tata-motors

For more information on ESI's Sheet Metal Forming Simulation Suite, please visit: http://www.esi-group.com/products/metal-forming

For more ESI news, visit: http://www.esi-group.com/newsroom

About Tata Motors

Through subsidiaries and associate companies, Tata Motors has operations in the UK, South Korea, Thailand and Spain. Among them is Jaguar Land Rover, the business comprising the two iconic British brands. It also has an industrial joint venture with Fiat in India. With over 4 million Tata vehicles plying in India, Tata Motors is the country's market leader in commercial vehicles and among the top three in passenger vehicles. It is also the world's fourth largest truck manufacturer and the second largest bus manufacturer. For more information, visit www.tatamotors.com.

About ESI Group

ESI is a pioneer and world-leading solution provider in virtual prototyping that takes into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on performance. ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs over 750 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit www.esi-group.com.