

COMPANY

Valeo

LOCATION

India

SOFTWARE

Autodesk® Simulation Moldflow®

Valeo

Rheology structural coupling with a Combination of CAE tools used along with the Autodesk Simulation Moldflow helps Valeo to predict material behavior accurately

Technology demands and development requirements in plastic parts have become very complex, because of a large number of materials available and new materials developed every day. Working with different material models without the availability of practical data is the real challenge

– Kulandaivel Palanisamy
Senior Engineer
Valeo India Private Limited

Valeo operates in 29 countries with 123 production sites, 16 R&D and 34 Development centers, and 78600 employees worldwide as on June 2014. In India, company has its head quarters, R&D center and production facility in Chennai, Pune and Sanand . Presently, company supplies clutch systems, starter/Alternator, lighting and HVAC systems to major vehicle manufacturers in India and looking forward to localize most of its product range in couple of years.

Challenges:

Engineers who design and manufacture plastic parts face the time-consuming and difficult process of selection of material, optimizing maximum weight reduction and performance, automating cutting-edge systems, while staying on budget and meeting all specifications and delivery dates.

“New materials are developed every day to cater

to the technology demands and development in the plastic parts. Working with different material models without the availability of practical data is the real challenge” said Kulandaivel Palanisamy, Senior Engineer - Valeo India Private Limited

Valeo engineers faced the challenging situation of reducing the gap between the simulation data and the test data. Assuming material properties as linear isometric or uniform throughout have significant impacts on product quality, and lead to variations in real part from the design model during processing, see the figure below.

“During the initial phase of designing a component, CAD model generated by design engineer does not carry any injection modeling history; they do not consider the gate locations, fiber orientation, etc. It leads to increasing of the gap between practical test data and simulation data” explains Kulandaivel Palanisamy

Variations in real part from design model during Processing

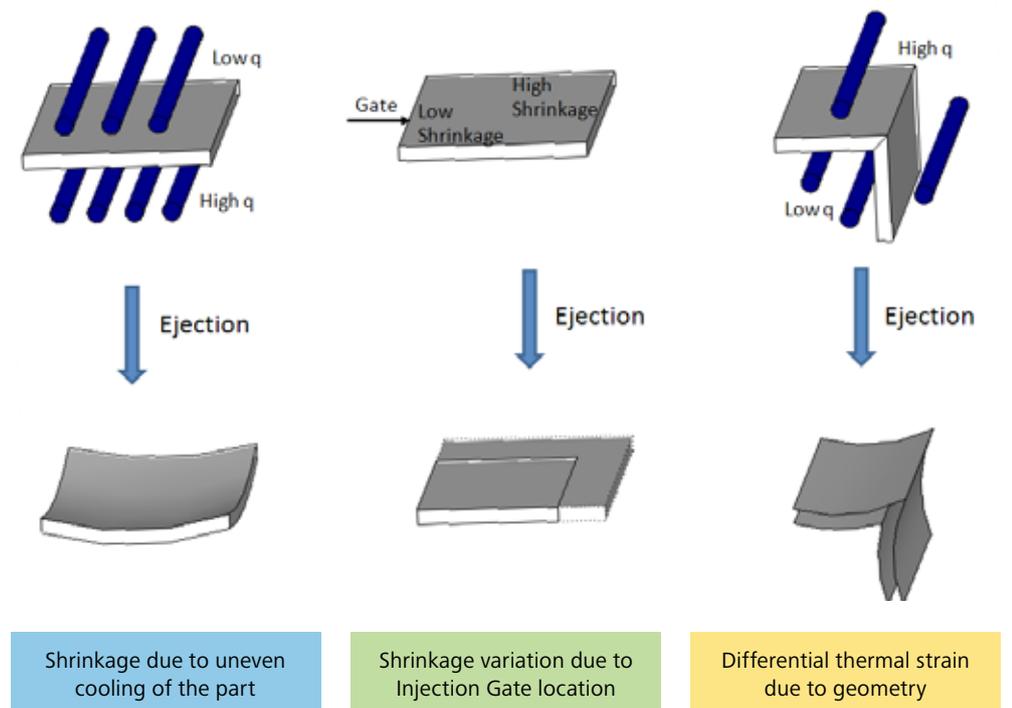


Image courtesy of Valeo

Rheology structural coupling enables us to design more robust products, eliminate guesswork and respect time- to-market. We're confident that our new products would be a success, bringing high value to our customers. Rheology structural coupling is the key to a successful prognostic model and Autodesk Simulation Moldflow would be one of the reasons for that success

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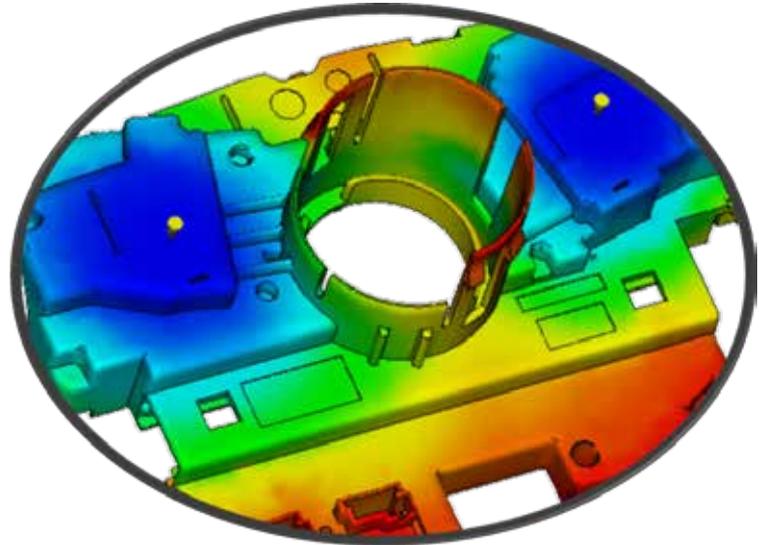


Image courtesy of Valeo

Key Benefits:

"Migrating from metals to plastics has become a global trend in the automotive industry; plastic materials have to deal with even more demanding mechanical, environmental specifications than their formerly metallic counterparts. Autodesk Simulation Moldflow enables a systematic approach for selecting an appropriate material from its up-to-date material database, where new materials are constantly added and existing ones are refined" said Kulandaivel Palanisamy

The Solutions:

In order to do realistic simulation and reduce the gap between the test data and simulation data, by selecting proper material model the Valeo engineers developed a methodology, where it is possible to get non-linear data, capture processing history starting from concept stage, predict fiber orientation, and generate practical data for correlation without any assumptions. Along with the Autodesk Simulation Moldflow various other FEA solutions were coupled together as shown in Figure 2 to get the final results.

Valeo engineers observed around 12% difference in the frequency while working on modal analysis of TCM back cover considering various scenarios using other FEA solutions and Rheology Structural Coupling methodology.

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Result:

Using Rheology structural coupling Valeo engineers now test the rheological properties of polymeric materials over a wide variety of temperatures and deformation rates. Understanding the rheological properties enables them to optimize products and process conditions, thereby saving costs and minimizing potential waste. It also provides engineers tremendous insight into the various materials available and reviews the selection of an application's appropriate plastic material.

"We see several positive aspects in our cooperation with Rheology structural coupling. Combination of tools used along with the Autodesk Simulation Moldflow helps us to capture fiber orientation, injection molding history and anisotropic behavior to improve prediction accuracy" concludes Kulandaivel Palanisamy.

Rheology Structural Coupling - Methodology

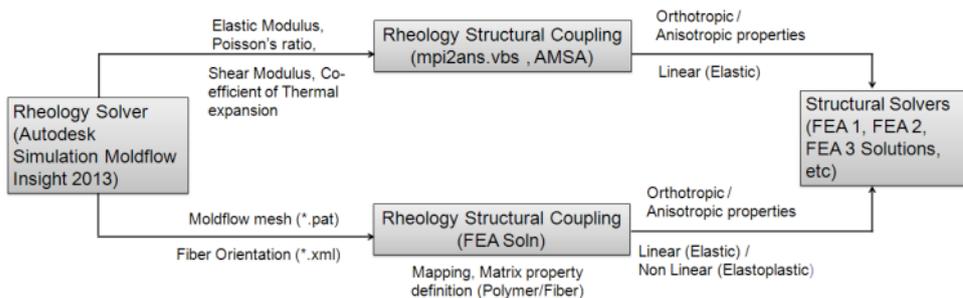


Image courtesy of Valeo - Figure 2