

Meeting customers Product & Tooling Design Needs

Rosti's Design and Analysis resource have now been in place for a number of years with many high profile achievements in the development of customer new products and improved product revisions. The key objective of this resource is to aid customers in reducing the risks associated with NPIs (New Product Introductions) while providing continuous involvement and upfront collaboration in part and tooling design.

During the first 18 months there have been further recruitment and so Rosti have now developed a competent team offering Product Design and Design Validation Services to all Rosti customers.

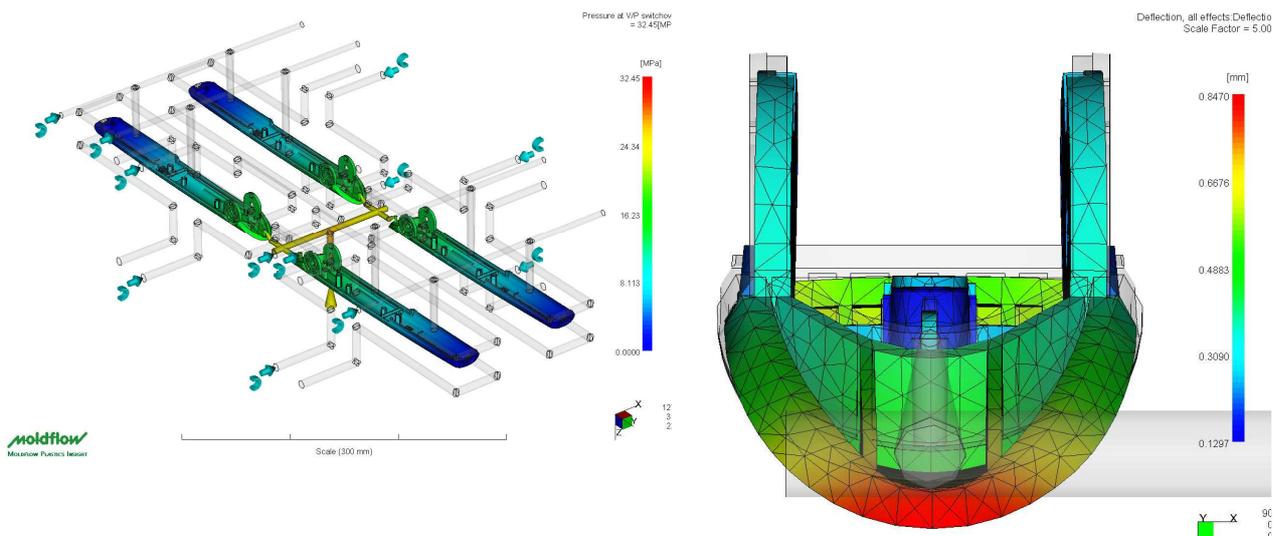
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Case Study 1

This project involved a premium personal care product with a strong and a global consumer brand. The customer stressed the need for a seamless transfer of production from the current moulding location in Asia to China, without compromising existing aesthetics or product quality. Much of the product know-how remained with the current supplier and so no 2D or 3D part data were available. It was necessary to accurately match current texture and gloss levels in the new tooling, accurately replicate the current printing and achieve all of the desired fits and functionality in the final assembly.

At the feasibility stage, the initiative was taken to create a number of tooling concepts, whilst addressing some of the concerns that had been identified during the initial review process. In the absence of any data, the main body parts were measured and manually re-created in 3D using our in-house Unigraphics software. This allowed Rosti to immediately proceed with Moldflow analysis to verify that the proposed tooling layout would be suitable in terms of pressure requirement, acceptable part distortion taking account of the glass fibre content and orientation. Rosti proposed a different gating method and position compared to the current production samples to ensure consistent gate trimming, and following the deflection predictions, created a number of options to compensate for the distortion by adjusting the tool steel dimensions.



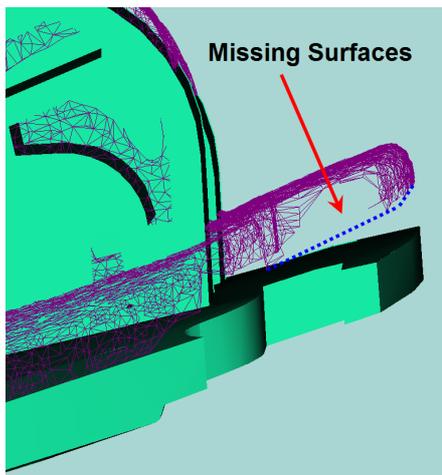
Moldflow Result examples

Rosti's Tooling Team, working through the customer's product designer, have achieved a superior parts-fit, whilst at the same time made some improvements to the existing product with substantial customer and consumer benefits, including some anti-counterfeiting features

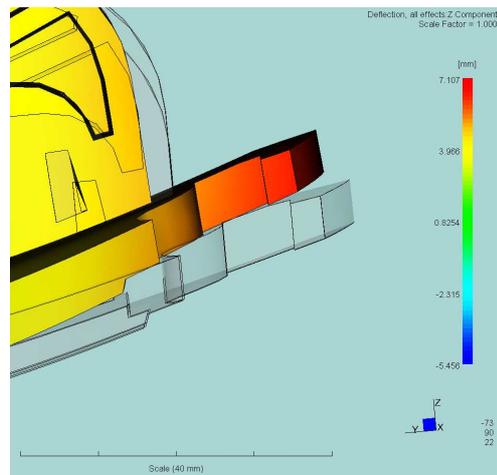
Case Study 2

The Design and Analysis team has been working on a number of programmes that have recently been awarded from a new customer who has experienced severe problems associated with distortion in large plastic parts. The customer approached Rosti in order to access the company's extensive experience in high level moldflow analysis and tooling design.

All plastic part were digitally scanned to provide 3D data which is truly representative of the distorted mouldings. Rosti carried out a flow and warp analysis to demonstrate the deflection that should have been predicted at the original tooling design, and identified modifications to the CAD data which should have produced moulded parts that are in line with the desired nominal dimensions. Additionally, critical areas that are likely to cause warp in the new tool construction were identified.



(a) – Overlaid models $\approx 7.3\text{mm max}$



(b) Predicted Deflection $\approx 7.1\text{mm max}$

Comparison between actual scanned data and simulated deflection

An Ansys model of the large and main plastic part was created to assess structural integrity of the design. The customer have specified tough tensile test criteria to meet the product high performance expectations in the field.



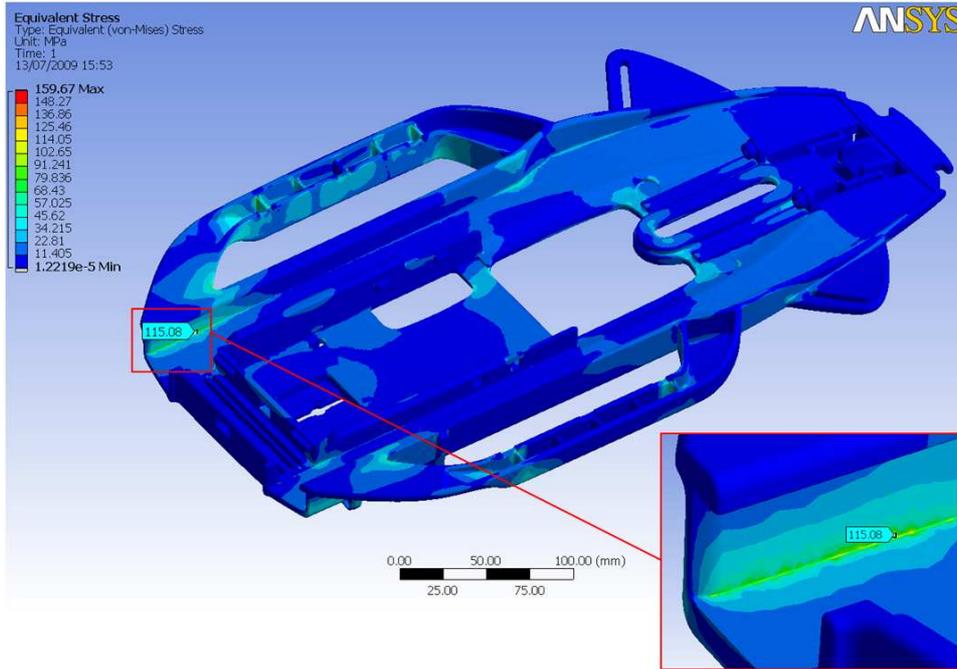
(a) Before application of force



(b) After failure (ultimate tensile strength reached)

Tensile Test Images

By simulating this tensile test Rosti were able to determine the point of failure under tensile loading, which is the same as the result experienced in the field.

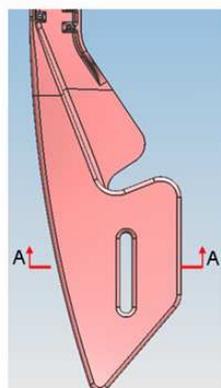
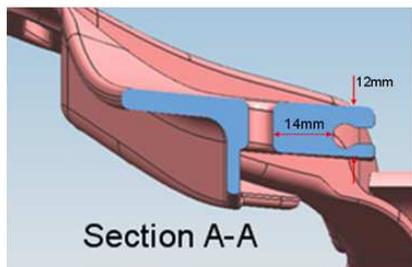


Anslys Stress Analysis

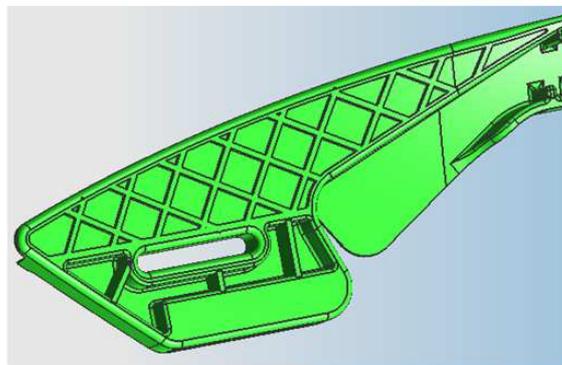
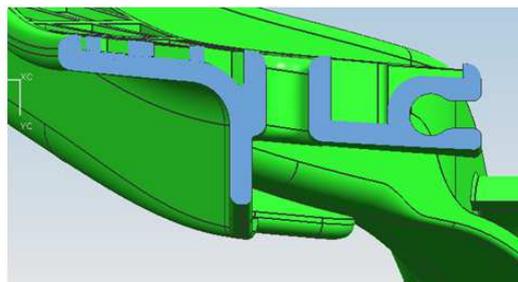
The Ansys software was used to establish superior new design concepts and allowed various 'what if' scenarios to be evaluated in determining an optimum design in terms of performance versus reduced thickness, or when thick sections were replaced with coring and rib detail.

Since completing this project, the Design and Analysis team have worked with the customer in re-designing their upcoming new programme parts.

Current Design



Proposal



Rosti Design Proposals

This programme of work proved to be vital to our customers in meeting their part and tooling design and that we will continue to offer such assistance to all our customers in the future.