Two-shot moulding feasibility study

The cost/weight advantages of substituting a polymer in a steel and rubber component

White Horse Plastics specialises in the production of tight tolerance technical injection mouldings. With over 20 years experience in the business, one of their objectives is to help optimise customer designs to provide the right solution at the right price. Many customers have benefited from WHP's ability to take prototypes or parts that are already in production and recommend design alternatives or materials, resulting in cost savings and improved performance.

This case study describes how WHP exploited their proven expertise and existing in-house technology to investigate the potential of producing a lighter, more cost effective component with other added advantages.

The Challenge

White Horse Plastics examined a firewall grommet which was the standard for a number of vehicle manufacturers. This part, made of steel and rubber, was produced using a labour intensive process but had the potential of being automated to speed up production and so lower cost.

However, in order to do this, the steel element of the component would need to be replaced with a glass reinforced polymer, so allowing 2 shot technology to be utilised. If this could be done then an added advantage would be that the weight of the component would be reduced significantly, potentially enhancing performance. The challenge was to find suitable polymers which were well priced, moulded well and met all of the original equipment manufacturer's specifications.

The Solution

Firstly, component costs were estimated as a two shot moulding to establish initial viability against the existing component. These indicated that 4 impression tooling would be needed in order to be competitive. Next, after reviewing the component design in line with existing performance requirements, WHP looked at the design implications to ensure that the material selected had the necessary characteristics to replace the current material and that there were no other limitations affecting the performance of the finished part.

Because this component could potentially be used on a number of vehicles it was also extremely important to make certain that all of the requirements applicable to these were met.

To ensure that the project could be examined in sufficient detail by everyone concerned WHP then commissioned the development of a model. As well as component design, this allowed more realistic tooling and costing information to be generated.

To date, two iterations of the design have been necessary. The challenge has been in working with the concept that only the fixed half of the moulding cavity will change (with 180° platform rotation of the moving platen) to allow the 4 impression tooling needed, not only for the model produced but potentially as the basis for more detailed feasibility into grommets which include bellows at a later date.

The result

This study has indicated that the firewall grommet can be produced utilising a less manual process, resulting in a leaner supply chain which will help increase speed to market and so lower cost.

Added advantages are:

- improved acoustics
- lower component weight, potentially enhancing vehicle performance
- typical cost saving of 8 pence per unit based on current pricing information.

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