An approach to study and avoid failure of plastic assembled parts using Autodesk® Simulation Moldflow®

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SM5610-P In the highly competitive automotive domain, flawless functionality coupled with aesthetic and ergonomic appeal of a component play key roles in the success of a vehicle program. All these aspects are required to be provided at an effective cost, which makes the task challenging. It has become necessary to come up with innovative solutions which are cost effective and at the same time which will meet the performance requirements without last minute rush.

The basic design rules designers generally apply during plastic part design but design rules which apply to secondary joining & assembly processes (welding, mechanical fastening) need to be carefully evaluated too.

It is a practical necessity to understand why plastics fail in order to minimize the failure scenario. Failure is a practical problem with a product & implies that the component no longer fulfills its function. Failure may also be attributed to loss of attractive appearance or shrinkage.

In this study we will be investigating the influence of design to control the part warpage and ultimately the better parts assembly warpage. The parts considered here is a vibration welded injection molded assembly part. The individual part moldflow analysis was giving overall good results but assembly failures observed during actual usage / testing.

The scope of this paper is to explain the new approach which helps to avoid plastic part assembly failures which are joined to each other by various plastic joining techniques.

Learning Objectives

At the end of this class, you will be able to:

- Explain how part design influence deflections
- Explain how use of Moldflow in early part of design phase is beneficial.
- Understand how best we can apply Moldflow to evaluate problems
- Explain the one of the better approach of controlling the assembly failures of plastic parts

About the Speaker

Nitin Deoram Hadpe, Team Lead Process CAE Engineer, Tata Technologies Ltd. has his engineering degree in Polymer engineering. He is also pursuing his Masters in Automotive Engineering. His around 11 years of industrial experience includes work at major engineering service provider and Major auto OEM in India. Prior to his tenure at Tata Technologies, he worked as Simulation Lead engineer and Project engineer in Neilsoft Ltd and Taco-Faurecia design center in India respectively where he provided moldflow simulation support to various customers and worked on very critical projects. He also worked as Assistant Manager-R&D, Polymer technology department at Mahindra and Mahindra (Major SUV manufacturer in India), Nashik India, where he was responsible for the material selection, failure analysis of plastic parts, materials advanced and Nano-technology-projects, developing material standards, simulation-supports-etc.

Nitin is an associate certified user for Autodesk Moldflow products. This class presentation is part of Nitin's one of the project where he worked along with customer to set up a process to avoid the on field / test phase failure of welded plastic parts. This process has given better benefits to customer.

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