

## Insight on deformation of polymeric extrudate during shaping through extrusion dies using finite element method

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### Abstract

Extrusion is one of the most versatile and economical process for making long rubber profile for automotive, doors, windows, medical tubing and also some tire component etc. Die swell is one of inherent phenomena in rubber industry especially during manufacturing of long rubber profiles. For geometries of the profiles which are non-symmetrical or complexly shaped, the extrudate changes in terms of the dimension as well as shape, leading towards complexity in the study of die swell behavior of the rubber compound. The rheology depends on the various parameters such as the geometry of the die, processing parameter, rheological properties, and the thermal parameter of the material. It also relies heavily on the thermal and rheological boundary conditions. Consequently, a large instability occurs during processing. The aim of the present study is to visualize the fluid flow behavior of the compound during processing using finite element analysis. The various challenging complex profile shapes which are used to manufacture automotive parts can be studied easily by using the proper material parameters as it quickly generates an indicated set of results. This will help to increase the production efficiency of the extrudate profile by reducing the traditional prototype trial, and error method of manufacturing extrusion die for getting a desired shape of the product.

### Biography

Sujit Sharma is a research scholar at the prestigious Indian Institute of Technology, Kharagpur, India. He completed his Bachelor of Technology degree in Chemical Engineering from the National Institute of Technology, Durgapur, India, in 2015. He acquired a Master of Technology in Rubber Technology from the Indian Institute of Technology, Kharagpur, India, in 2018. He has received the best paper award at 23rd Rubber Conference, IRMRA, Mumbai, India, December 2018, best poster award in National Rubber Conference, Kolkata 2019 organized by AIRIA. Awarded Diamond Grade (greater than 90%) in National level online Quiz on Polymer Science and Engineering during 31st August to 07th September 2020, and best oral presentations award in 12th chapter of International Conference on Advancements in Polymeric Materials, APM 2021, organized by Laboratory for Advanced Research in Polymeric Materials (LARPM), R&D wing of CIPET through the virtual platform during 9th to 13th March 2021.



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