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Mechanical Property Predictions in Fibre Reinforced Polyamide Injection Moulded Parts Using Measured and Predicted Fibre Orientation Within ABAQUS

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In this paper we discuss the use of ABAQUS finite element software for the prediction of short fibre reinforced polyamide injection moulded parts subjected to bending loads. The analysis uses a shell mesh with composite material data provided by two distinct routes. Firstly, using fibre orientation predictions from a Moldflow MPI 5.0 midplane analysis and a proprietary translator provided by ABAQUS Ltd. The second route uses measured fibre orientation data from the University of Leeds image analysis system and translated into composite material data using the Tandon-Weng model. Using these two routes it is possible to assess the errors incurred during Moldflow analysis stages in terms of both predicted fibre orientation errors and the final mechanical properties of the composite material. The initial investigation was limited to the mechanical response of two strips either side of a transverse rib on a flat plate and is currently being extended to a commercial automotive part.