Abstract Title: Optimization of Injection Moulding Process Parameters for Minimal Shrinkage Using Taguchi, GA-SA Method

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Abstract

The main objective of this research work is to produce the object and determining the parametric effect to the warpage and shrinkage of the head light of the motor vehicle. In recent times, research has been concentrated on optimization of these design parameters ranging from heat level required to melt the material, the required consistency, the cooling process, cooling time required for solidification in addition to fine dimension markings of the injection mould cavity. Pressure also plays an essential role in the moulding process as the material to be converted into the product needs to be injected at specific levels of pressure to achieve the desired quality. Basic shrinkage and warpage tendencies are influenced in each manufacturing process based on the mould temperature, packing time, packing pressure, cooling time. These parameters are used to increase the temperature and based on the cooling time the shrinkage decreases and it increases the packing pressure. To employ the optimization process genetic algorithm is used to predict the temperature effects throughout the mould. This method is used to compare the analytical procedure which is extremely accurate to the analytical solutions. An efficient moulding technique optimized with respect to temperature has been investigated and experimented using data clustering method. In this research work deals with an ANFIS model characterized with a five stage network in combination with Taguchi's method to analyze the effects of temperature, pressure, holding time on the proposed mould model. The final part of the thesis utilizes a Genetic algorithm – Simulated annealing optimization model to fine tune the parameters for optimal moulding.

Keywords— *Genetic algorithm, Injection moulding, Process parameters, Simulated annealing.*

Professional Biography

Dr.M.Rajendran received the B.E degree in mechanical engineering and M.E degree in Production Engineering from Engineering & Technology Faculty, Annamalai University and Government College of Technology, Coimbatore, Bharathiar University, India, respectively. He received Ph.D degree from Anna University, India. He has published more than 30 scientific papers in the field of composite materials, non-traditional machining process for mechanical engineering. His research interests include aging mechanisms of Thermal, design of automobile and aerospace components, polymers. where he is currently the professor in Department of Mechanical Engineering, karunya institute of technology and science, Coimbatore, TamilNadu, India..



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