

The Analysis of Defects Prediction in Injection Molding

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Abstract : This paper presents an evaluation of a plastic defect in injection molding before it occurs in the process; it is known as the short shot defect. The evaluation of different parameters which affect the possibility of short shot defect is the aim of this paper. The analysis of short shot possibility is conducted via SolidWorks Plastics and Taguchi method to determine the most significant parameters. Finite Element Method (FEM) is employed to analyze two circular flat polypropylene plates of 1 mm thickness. Filling time, part cooling time, pressure holding time, melt temperature and gate type are chosen as process and geometric parameters, respectively. A methodology is presented herein to predict the possibility of the short-shot occurrence. The analysis determined melt temperature is the most influential parameter affecting the possibility of short shot defect with a contribution of 74.25%, and filling time with a contribution of 22%, followed by gate type with a contribution of 3.69%. It was also determined the optimum level of each parameter leading to a reduction in the possibility of short shot are gate type at level 1, filling time at level 3 and melt temperature at level 3. Finally, the most significant parameters affecting the possibility of short shot were determined to be melt temperature, filling time, and gate type.

Keywords : injection molding, plastic defects, short shot, Taguchi method

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