

Warpage Optimisation on the Moulded Part with Conformal Cooling Channels using Response Surface Methodology (RSM) and Glowworm Swarm Optimisation (GSO)

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Abstract. Today, there are many of optimisation method have been explored by previous researchers to find the appropriate processing parameters setting for the injection moulding process. From the previous researches, it has been proven that the optimisation work improved the quality of the moulded part. However, the application of optimisation work in conformal cooling channels still lacks. Therefore, in this study, the application of optimisation work to improve warpage of front panel housing with conformal cooling channels moulds have been explored. By choosing cooling time, coolant temperature, packing pressure and melt temperature as the variable parameters, design of experiment (DOE) has been defined by using the rotatable central composite design (CCD) approach. Response Surface Methodology (RSM) was performed to determine the mathematical model. The mathematical model then will be used in Glowworm Swarm Optimisation (GSO) method in order to obtain the optimal processing parameters setting which will optimise the warpage condition. Based on the results, cooling time is the most significant factor contributes to the warpage condition and warpage have optimised by 38.7% after optimisation using the proposed approach. This finding shows that the application of conformal cooling channels with optimisation work will produce better quality of the moulded part.

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