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## PROCESS IMPROVEMENT FOR TRADITIONAL MOULD MAKING PROCESS THROUGH GROUP TECHNOLOGY AND RANK-ORDER CLUSTERING ALGORITHM

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### ABSTRACT

The current environment of changing market trends that include mass customization, sustainability, environmental impact and localized production drives the manufacturing industry to strive for additive manufacturing because of the versatility of the technology. Injection Moulding Company (IMC) is using traditional manufacturing approaches which compromise its competitiveness resulting in decreased production rate and high operational costs due to lengthy changeover times. The aim of the study was to investigate the usage of group technology and rank-order clustering algorithm as mechanisms to aid the reduction of manufacturing lead time for the traditional mould making process. ABC mould demand classification analysis conducted for the top 16 moulds revealed that the moulds for the switch cover ranked highest in terms of the demand of moulds that were fabricated by IMC. The value stream map revealed that there was room for improvement in terms of push to pull and frequent lot transfer, standardising work, reducing cutting time and process scrap, as well as introducing poka yokes and cellular manufacturing, and it was proposed to reduce material movements and setup times. Through the deployment of group technology and rank clustering algorithm, three mould families and three machine cells were derived. As a result, the mould fabrication process was improved by reducing material movements and reducing setup times.

**Keywords:** Group technology, Rank-order clustering algorithm.