

A New Concept of Virtual Cellular Manufacturing

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Abstract

The research in virtual cellular manufacturing (VCM) systems area gains momentum as markets have become more globalised. This is due to turbulent customer demands, characterised by frequent changes in product mix and volume. Therefore, if companies are interested in implementing manufacturing systems that can be quickly restructured with minimal cost and time, the approach of virtual cellular manufacturing gives considerable benefits. VCM systems physically resemble the traditional functional layout. Within this setting, group technology (GT) philosophy is used to gain the advantages accompanying with traditional cellular manufacturing (CM) systems. VCM is being used with broad applicability in manufacturing sector to reduce job set-up and flow times. Decisions for pooling of jobs into families, release of part families to the shop, and temporary machine dedication will lead to improvement in shop performance i.e. in terms of job flow time and system utilisation. The goal of this paper is to develop a new concept of VCM and address its operational issues through a numerical illustration. Based on the numerical results, we also outline a factorial design of simulation experiments for future research.

Keywords: Group technology, cellular manufacturing, virtual cell formation, simulation experiments.