Design of a facility layout model in hybrid cellular manufacturing systems under variable demand

ABSTRACT

Changes in demand, as one of the issues of volatile manufacturing systems, decline the performance of manufacturing systems over the time; especially, it degrades the effectiveness of layout in manufacturing systems. Although the layout of the arrangement of facilities on the shop floor play a significant role in the effectiveness of manufacturing systems, it has not absorbed the attention of researchers in hybrid manufacturing systems. In this paper, a new mathematical model for facility layout in a hybrid cellular manufacturing system has been proposed, which considers demand varying over the planning horizon. The model minimises the material handling cost. To solve the model, a simulated annealing algorithm from literature has been improved. The comparison of results between two algorithms shows the superiority of the improved algorithm in both the quality of solutions and computational time.

Keyword: Facility layout; Hybrid cellular manufacturing system; Mathematical model; Simulated annealing algorithm; Systems engineering; Variable demand