عنوان مقاله:

Integrated Dynamic Cellular Manufacturing Systems and Hierarchical Production Planning with Worker Assignment and Stochastic Demand

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خلاصه مقاله:

This study deals with the interaction of dynamic cellular manufacturing (DCM) and hierarchical production planning (HPP) problems with stochastic demands for the first time. Each of these alone does not consider the system factors such as stochastic demands and dynamic cellular formation separately. Accordingly, to fill this gap, this paper presents an integrated optimized model incorporating the most comprehensive design of DCM systems and HPP problems with stochastic demands. This model helps administrators get the optimal size and number of cells to decrease costs. Also, the model applies the principles of HPP to reduce the complexity of the integrated model. Since demands are uncertain, they need to be accurately predicted. Therefore, this study aims to combine the most precise decision variables with the most realistic conditions. A case study from an agriculture mechanization and industrial development company shows that an integrated model can provide managers with a feasible solution to meet demand, reconfigure cells in each period, provide new machinery to increase the required production capacity, and adjust production capacity to help them cope with demand fluctuations. A sensitivity analysis was performed and the results show that increase in forecast error and inter-cell move cost cause less significant changes in total cost but the total cost is sensitive to intra-cell move cost, available time capacities and cell quantity. It is also shown that the total cost was very sensitive to available regular time and available over time and the system should try to increase the .time capacity

کلمات کلیدی:

stochastic demand, Dynamic cellular manufacturing, Hierarchical production planning, mixed integer programming, Multi-period cellular manufacturing, worker assignment