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A Mathematical Programming Model for Lot Sizing and Production Planning in Multi-Product Companies: A Case Study of Azar Battery Company

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Abstract : Production planning is one of the complex tasks in multi-product firms that produce a wide range of products. Since resources in mass production companies are limited and different products use common resources, there must be a careful plan so that firms can respond to customer needs efficiently. Azar-battery Company is a firm that provides twenty types of products for its customers. Therefore, careful planning must be performed in this company. In this research, the current conditions of Azar-battery Company were investigated to provide a mathematical programming model to determine the optimum production rate of the products in this company. The production system of this company is multi-stage, multi-product and multi-period. This system is studied in terms of a one-year planning horizon regarding the capacity of machines and warehouse space limitation. The problem has been modeled as a linear programming model with deterministic demand in which shortage is not allowed. The objective function of this model is to minimize costs (including raw materials, assembly stage, energy costs, packaging, and holding). Finally, this model has been solved by Lingo software using the branch and bound approach. Since the computation time was very long, the solver interrupted, and the obtained feasible solution was used for comparison. The proposed model's solution costs have been compared to the company’s real data. This non-optimal solution reduces the total production costs of the company by about %35.

Keywords : multi-period, multi-product production, multi-stage, production planning
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