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Inventory management of spare parts is one of the most critical issues in the aeronautical industry, given the required level of system availability related to the strategic importance and high stocking costs of the components. Even if a large number of spare parts increases warehousing costs, every single shortage have a greater impact: the adoption of best-in-class inventory management techniques becomes crucial. On these considerations, the paper presents an innovative model of spare parts allocation for the Italian Air Force with the aim of minimizing backorders and, at the same time, ensuring an availability of 99% depending on the actual flight plan. The model, solved by a marginal analysis, considers an original configuration of features combining different skills of maintenance centres in a hierarchical multi-echelon, multi-item, multi-indenture structure. A real case is provided in order to analyse the solving method and the results.

Keywords: spare parts allocation, multi-echelon, multi-indenture, aircraft maintenance, VARI-METRIC, marginal analysis method

Introduction

Spare parts inventory management is usually based on data provided by different sources, as for suppliers, that need to be analysed in accordance to the target of the organization. Commonly used models can follow two different approaches:

- the item approach tries to define an economic order quantity and period for each item, without considering possible interactions among different items and availability constraints. These methodologies of inventory control aims at reducing inventory and ordering costs of spare parts while progressively checking the resulting availability. Many examples can be found in [1];

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