GM(1,1) Model for Forecasting the Intermittent Demand of Spare Parts in Navy of Taiwan

Hua-Kai Chiou[a,b], Gwo-Hshiung Tzeng[a], Gia-Shie Liu[c] and Chih-Kang Cheng[c]

[a] Institute of Management of Technology, National Chiao Tung University, 1001, Ta-Hsueh Rd., Hsinchu 300, Taiwan.
[b] Department of Statistics, National Defense University, P.O. Box 90046-15, Chungho 235, Taiwan.
[c] Graduate School of Logistics Management, National Defense University, P.O. Box 90046-31, Chungho, 235, Taiwan.

Abstract

The inventory management of maintenance spare parts plays an important role on their logistic policy. In addition, due to the intermittent nature of demand for aircraft repair parts, the ground personnel perceive difficulties in forecasting and are still looking for superior forecasting methods. For the reasons of insufficient data or uncertain demand of maintenance requirement that we have, the traditional prediction method is generally hard to predict the optimal quantity of spare parts fitting the required quantity. In this study, we introduce Grey Prediction Model (GPM) to coping with such problem. After taking three types weapon system periodic items of planning material from 1999 to 2002, we then apply GM(1,1) model to predict the planning requirement of intermittent spare parts of 2003. In order to verify the performance of our forecasting model, we also compare the results with the observed data which are calculated by the rule of technical manual of equipments. Through this study, we demonstrate the GPM can conduct accurate prediction of spare parts especially in situations of insufficient data or resources within highly uncertain, that accurate prediction should reduce the operation cost and improve the reliability of maintenance equipment.

Key Words : Planning Material, Grey Prediction Model, Reliability, Spare Parts