Propositions

attached to the thesis

Spare Parts Demand Forecasting and Inventory Management: Contributions to Intermittent Demand Forecasting, Installed Base Information and Shutdown Maintenance

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I

In the situation of intermittent demand, empirical-extreme value theory (empirical-EVT) forecasting method is more stable in performance than the bootstrapping WSS (Willemain et al. 2004), Croston's method (1972) and the Syntetos-Boylan approximation (2005) in different situations, especially with the introduction of demand from preventive maintenance.

(Chapter 2)

II

The application of extreme value theory in intermittent demand forecasting might lead to an extreme high ordering point when a fill rate target is considered. This behavior does not happen under the cycle service level criterion.

(Chapter 2)

III

Optimizing inventory using the maintenance plan in on-condition maintenance yields a very substantial cost reduction with low investment.

(Chapter 3)

IV

If a repair shop is prepared with information on upcoming work, then spare part shortages should be rare, which highlights the economical value of information sharing in the supply chain.

(Chapter 3)

V

The widely used standard method with normal distributed project time assumption is not applicable in the ordering problem of spare parts in a shutdown maintenance with bimodal activity duration.

(Chapter 4)

VI

Installed base information looks good for spare parts demand forecasting and inventory management. Yet, it takes a lot of administrative effort. Installed base information is therefore more therefore valuable when the size and location of the installed base changes over time.

VII

Tracking historical machine discards through customer end-of-usage helps to reduce spare part inventories. However, tracking this data is difficult without service contracts. OEMs should either offer so-called availability contracts or invest in better communication with customers.

VIII

Knowing the part age is more valuable than knowing the machine age to predict future part demand, especially when the part lifetime is much shorter than the machine lifetime under increasing failure rate.

IX

When information on the part age is lacking, a logistic regression model is more valuable than a complex failure-based prediction model.

X

Considering potential future machine discards in the forecast results in insignificant cost savings when the lead time is short.

XI

One may set an upperbound and lowerbound in optimization problems. It prevents endlessly looking for improvements and makes one happy with the situation. However, never set an upperbound in your life.