

Thonemann, Ulrich W.; Brown, Alex O.; Hausman, Warren H.

Easy quantification of improved spare parts inventory policies. (English) Zbl 1232.90097
Manage. Sci. 48, No. 9, 1213-1225 (2002).

Summary: We present approximate analytical models to quantify the expected improvement in inventory investment when using a system approach to control inventory as opposed to a simpler item approach. A system approach ensures that a demand-weighted average fill rate is achieved at low inventory investment by assigning low fill rates to parts with high costs and high fill rates to parts with low costs. An item approach does not vary fill rates by parts but assigns identical fill rates to all parts. Using single-parameter functional representations of the skewness of unit costs and average demand across all parts in the system, simple approximate analytical expressions for the required inventory investment are derived for both approaches. The accuracy of the approximations is validated using data from a distribution center for computer spare parts. For these data, the solutions obtained by the approximations are very close to the exact values. The results show that inventory investments can be well approximated as a function of only a few cost and demand parameters. These expressions can be used to determine the percentage reduction in inventory investment for a particular target demand-weighted average fill rate when the superior system approach is used instead of the item approach. For increased ease of use, the percentage reduction in inventory when using a system as opposed to an item approach is computed over a range of realistic values for the key parameters of the model and a quadratic expression is fitted to the data. This fitted expression provides rough guidelines for the anticipated improvement with very limited data needed, prior to detailed modeling or implementation.

MSC:

[90B05](#) Inventory, storage, reservoirs

Cited in **6** Documents

Keywords:

[inventory policy](#); [system approach](#); [item approach](#); [approximation](#)

Full Text: [DOI](#)