Applying Emergency Order Policy to Two-Echelon (R, S) Inventory System

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ABSTRACT

As one of the most important aspects of supply-chain management, delivering goods promptly and accurately to customers has always been the most essential study for every company. Managers often raise a company's service level at every inventory cite in order to reduce the chance of inventory shortage, and to further reduce the system's total cost. This research applies emergency order policy as a strategy into Two-echelon periodic-review (R, S) inventory system, and by introducing this strategy, aims to achieve reduction of the system's total cost.

The two-echelon inventory system considered in this study contains one warehouse and multiple retailers. Managers need to determine whether to execute the emergency order process according to the current inventory at the review point. If the current inventory at a retailer can not satisfy the expected demand during the lead time of the regular orders, an emergency order will then be placed, and goods will arrive in a shorter lead time to avoid major shortage of inventory.

This research introduces two models of the system — one with emergency order policy and one without — to analyze and compare all the different aspects from both systems by constructing their correlation cost equations and model simulations. Both systems generate holding costs and shortage costs, and emergency order costs are also introduced into the systems when emergency order policies are implemented. Simulations of the two models are also conducted and sensitivity analysis is performed with respect to customer service levels, demands, correlation costs and lead times. The results are studied and discussed. This research shows that emergency order policy is capable of reducing the original system's total cost, and should be taken as a serious strategy in supply-chain management to improve a system's model.

Keyword: service level　periodic-reveiew (R　S) inventory system　emergency order policy　two-echelon inventory system