A Study on Replenishment Policies for Two-echelon Inventory Systems with Inventory Record Inaccuracy

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Abstract

This study considers a two-echelon inventory system where inaccuracy of records on inventory exists. The inventory system is composed of one distributor and one retailer. The objective is to evaluate the effect of system related costs when improve inventory record accuracy of the system. Four models are constructed: the system where both echelons exhibit inventory inaccuracy, the systems where either the first echelon or the second echelon has inaccuracy inventory information and the system with perfect inventory record at both echelons.

Two decision strategies (sequential strategy and coordinated strategy) are discussed when searching for the best inventory policy based on the minimum total cost of the two-echelon inventory system. System-related cost functions for the four models are derived and a search algorithm for optimal replenishment policies is proposed. An intensive numerical study is conducted and the performance of the four models is compared and analyzed. It can be shown that system costs can be reduced significantly by improving inventory accuracy.

Keywords: Two-echelon Inventory System Inventory Inaccuracy (s, S) Inventory Policy   Automatic Identification Technologies