

Two-Warehouse Inventory Model for Deteriorating Items with Inventory-Level-Dependent Demand under Two Dispatching Policies

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Abstract : This paper studies two-warehouse inventory models for a deteriorating item considering that the demand is influenced by inventory levels. The problem mainly focuses on the optimal order policy and the optimal order cycle with inventory-level-dependent demand in two-warehouse system for retailers. It considers the different deterioration rates and the inventory holding costs in owned warehouse (OW) and rented warehouse (RW), and the conditions of transportation cost, allowed shortage and partial backlogging. Two inventory models are formulated: last-in first-out (LIFO) model and first-in-first-out (FIFO) model based on the policy choices of LIFO and FIFO, and a comparative analysis of LIFO model and FIFO model is made. The study finds that the FIFO policy is more in line with realistic operating conditions. Especially when the inventory holding cost of OW is high, and there is no difference or big difference between deterioration rates of OW and RW, the FIFO policy has better applicability. Meanwhile, this paper considers the differences between the effects of warehouse and shelf inventory levels on demand, and then builds retailers' inventory decision model and studies the factors of the optimal order quantity, the optimal order cycle and the average inventory cost per unit time. To minimize the average total cost, the optimal dispatching policies are provided for retailers' decisions.

Keywords : FIFO model, inventory-level-dependent, LIFO model, two-warehouse inventory

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