A Methodology to Release the Inventory Shortage Impact for Prolonged Replenishment Frequency for TOC Supply Chain Replenishment Systems

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Abstract

The TOC (Theory Of Constraint) Supply Chain Replenishment System (TOC-SCRS) is a replenishment method of the TOC supply chain solution and now being implemented by a growing number of companies. The performance reported by the implemented companies includes reduction of inventory level, lead-time and transportation costs and increasing forecast accuracy and customer service levels. In application of the TOC-SCRS in a node of a supply chain, the replenishment frequency and replenishment lead time are the two required parameters. Generally, the replenishment frequency of a node depends on the public transportation schedule such as ship schedules or its private conveyor schedule. If this node is a plant, the replenishment frequency depends on the set up frequency in this plant. However, when the frequency in a plant is determined to be prolonged from higher frequency to lower frequency, in the set up frequency migration process, some goods will be confronted with inventory shortage for their production priority are postponed. A methodology is therefore proposed in this paper to release the inventory shortage impact for prolonged replenishment frequency in a plant. A numeric case and a sensitivity analysis are also utilized to evaluate the application of the proposed method. Employing this proposed methodology will facilitate a plant or a central warehouse to successfully implement an effective TOC-SCRS.

Keyword：Supply Chain Management, Inventory Replenishment, Theory of Constraints (TOC), TOC Supply Chain Replenishment System, Inventory Replenishment Frequency