ABSTRACT

PT XYZ is a company runs in the paint industry and chemical construction, which has been expanding their product distribution and implementing the multi-echelon distribution system in the coverage area of East Java. The problem occurred in PT XYZ is the low order fulfillment in each retailer which is supplied from DC Surabaya and mostly caused by insufficient of inventory stock as an impact of the imbalance of demand and inventory. According to the inventory status data, more than 50% of customer demand cannot be fulfilled because of stock out problems in each retailer.

Based on this case, the demand distribution test is conducted to find the distribution pattern of customer demand in each retailer and the result stated that more than 50% of average demand follows the Poisson distribution. Thus, in order to minimize the potential phenomenon of stock imbalance occur both in retailer and Distribution Center and also increase the service level in facing the fluctuation of customer demands, this research will determine the optimal inventory policy for two-echelon inventory distribution system using method of continuous review (*R, Q*) policy under Guaranteed Service Approach for Poisson demand. In this method, the decision variables that will be determined are optimal order quantity and reorder point considering the inventory cost incurred with dynamic programming algorithm to obtain minimum total echelon inventory cost with high service level.

The optimal calculation results of the proposed inventory conditions using continuous review (*R, Q*) policy is able to improve the average service level in each retailer up to 74% higher and decrease the average total echelon inventory cost amounted to 53% lower than the total echelon inventory cost of existing conditions which decreases from Rp 3,630,050 to Rp 1,694,555.

Keywords: paint industry, stock out, inventory policy, Poisson demand, continuous review (*R, Q*) policy, Guaranteed Service Approach, dynamic programming