ABSTRACT

The basic objectives of inventory control is to reduce investment in inventories and ensuring that production process does not suffer at the same time. The different types of costs like purchasing cost, setup cost, holding cost, etc., involved in inventory problems affect the efficiency of an inventory control problem.

Today most of the real world decision-making problems in economic, technical and environmental ones are multidimensional and multi objective. It is significant to realize that multiple objectives are often non commensurable and conflict with each other in optimization problem. An objective within exact target value is termed as fuzzy goal. So a multi objective model with fuzzy objectives is more realistic than deterministic of it.

Lead time is an important element in any inventory management system. Traditionally, most of the literature dealing with inventory problems treated lead time as a prescribed constant or a stochastic variable which therefore is not subject to control. However, in many practical situations, lead time can be reduced by an additional crashing cost, and hence is controllable. By shortening the lead time, a company can lower the safety stock, reduce the loss caused by stock-out, improve customer service level and thus increase the
competitive edge in business. The reduction of lead time mainly consists of the following components: order preparation, order transit, supplier lead time and delivery time. Variations in lead time can occur for purchased items and for those that are manufactured in house. A major factor related to these variations is quality problems.

A multi-item inventory model with shortages along with three constraints such as limited storage space, number of orders and production cost has been formulated. A demand dependent unit cost is assumed to minimize the total annual cost and the model is solved by using Karush Kuhn-Tucker conditions. A model with lead time is also solved in which the lead time crashing cost is considered as a function of lead time. In each model the unit price is considered under fuzzy environment and the minimum total cost is calculated. The nature of the parameter is considered as fuzzy to make the inventory model more realistic.

The methodology used to solve the proposed model in the present research is Karush Kuhn-Tucker technique. The implementation of the model is demonstrated using numerical example and the results are compared. Finally conclusion remarks are given at the end to summarize the contributions. A sensitivity analysis is performed by changing the values of the parameter.