

## **Vendor-Buyer Integrated Inventory Model with Quality Improvement and Negative Exponential Lead Time Crashing Cost**

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### **Abstract**

In this paper, we consider the vendor buyer integrated inventory model with lead time reduction for non defective and defective items under investment for quality improvement. This paper presents an integrated inventory quality improvement investment and crashing cost by simultaneously optimizing the optimal order quantity, lead time, process quality and number of deliveries for non defective and defective items. Negative exponential lead time crashing cost is considered in the proposed model. Lead time is an important element in any inventory management system. In many practical situations, lead time can be reduced by an additional crashing cost, that is, lead time is controllable. Here, the buyer lead time can be shortened by paying an additional crashing cost which is negative exponential function of lead time. The objective is to minimize the total cost incurred by the vendor and the buyer. In this study first, we developed mathematical model and procedure of finding the optimal solution is developed. An iterative procedure is developed to find the optimal solution and numerical examples are presented to illustrate the result of the proposed model. The result are illustrate with the help of numerical example. Graphical representation is also presented to illustrate the proposed model.

*Keywords:* Integrated inventory model, vendor buyer coordination, controllable lead time crashing cost, supply chain management.