



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 9, Issue 11, November 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.542

 9940 572 462

 6381 907 438

 ijircce@gmail.com

 www.ijircce.com

Web Based Spare Parts Purchase Using Forecasting and Optimization Techniques

Prof.Pratik Chopade Sir¹, Abhishek dixit²

Lecturer, Department of Computer Engineering, JSPM's Rajarshi Shahu College of Engineering, Polytechnic.,
Tathawade, India¹

Student, Department of Computer Engineering, JSPM's Rajarshi Shahu College of Engineering, Polytechnic.,
Tathawade, India²

ABSTRACT: In this paper the objective is to determine the optimal allocation of spares for replacement of defective parts on-board of a usage. The minimization of the total supply chain cost can only be achieved when optimization of the base stock level is carried out at each member of the supply chain. A serious issue in the implementation of the same is that the excess stock level and shortage level is not static for every period. This has been achieved by using some forecasting and optimization techniques. Optimal inventory control is one of the significant tasks in supply chain management. The optimal inventory control methodologies intend to reduce the supply chain cost by controlling the inventory in an effective manner, such that, the supply chain members will not be affected by surplus as well as shortage of inventory. We focus specifically on determining the most probable excess stock level and shortage level required for inventory optimization in the supply chain so that the total supply chain cost is minimized. So, the overall aim of this paper is to find out the healthy stock level by means of that safety stock is maintained throughout the service period

I. INTRODUCTION

The design and operation of spare part management systems is very important for automobile sector, Prior relevant system could be grouped in two categories. It is aimed to find optimal demand for a given spare parts management system; that is, how to determine optimal inventory level in order to reduce cost. This paper attempts to solve a comprehensive design problem for a spare part management system. Every automobile sector should proceed systematically and establish an effective Spare parts management system. Inventory encompasses all raw materials, work in process, and finished goods within the supply chain. Changing Inventory policies can dramatically alter the supply chain's efficiency and responsiveness. Inventory is an important cross functional driver of supply chain performance. An important role that can be satisfied by having the product ready and available when the customer wants it to reduce the customer waiting time in the service sector. Inventory is held throughout the supply chain in the form of raw materials, work in progress, and finished goods.

II. LITERATURE SURVEY

(Diaz and Fu, 1997). Repairables are generally more expensive, so the share of repairables in total service part investment is probably considerably higher. In this work, the focus will be on repairable items. Inventory costs have been a major research area to determine the most effective costs. The models are generally formulated as a cost minimization problem, with a cost function comprising holding costs, ordering setup costs, and either explicit penalty costs or a specified service level constraint. Singh and Vrat (1984) explored a two-echelon repair-inventory system, developing a model for determining the location of a repair and storage facility, together with the allocation of serviceable spares to minimize the total expected system cost, defined as the sum of shortage, holding, and transportation costs. Previous studies regarding the spare part inventory management typically focused on local inventory of a single facility and little on the entire supply chain; see Huiskonen (2001). Mabini and Christer (2002) considered four cost factors in the total expected annual inventory cost; the cost of holding serviceable and non-serviceable modules and components, the purchase cost of replenishment modules and components, the repair cost of modules and components, and the aircraft delay cost due to module shortages. Vaughan (2005) presented a model where demand for the spare parts arises due to regularly scheduled preventive maintenance and random failure of units in service with constant failure rate. Through literature, the costs incurred due to shortage or backorders are higher than the cost for inventory and the regular order, because that the failure has already occurred. The METRIC approach is concerned with setting the initial levels of repairable spare part inventories and their distribution among various



locations in a distribution network The goal is to minimize the sum of the expected backorders of all service parts at all local bases. Other literature that emphasized the significance of backorders cost include Nahmias (1981), Erlebacher and Meller (2000), Huiskonen (2001), Daskin et al. (2002), Rustenburg et al. (2003), Ozsen et al. (2003), Shwarz et al. (2004), Vaughan (2005), and the books of Sherbrooke (2004) and Ghiani et al. (2004).

III. PROBLEM DEFINITION

Buying spare parts for car anytime & anywhere using webpage and mobile application , user can search or browse the part it shows some of parts with information with it if its original or first class or second class parts.

IV. OBJECTIVE

Time Saving. -Money Saving.

The online market works for 24x7x365 days a year.

This means you don't have to worry about the time and can shop anytime from anywhere. All you need is working internet connection.

Online buying of car parts gives bigger reach and without worrying about the distances

V. CONCLUSION

All the works that carried out here in this paper aims to keep up optimal inventory level in an automobile sector. This is the case for all problem sizes, for various part types and spare type. By doing so far the shortages in the spare parts.

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