Chapter 3
Methodology for Storage Location Allocation Based on the Planning of Material Requirements

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ABSTRACT

The general goal of warehouse management is to ensure the correct supply of materials to the production line. In this context, this document presents a supposed instance for a general problem of a raw materials warehouse with poor control of inventories and poor internal traceability. An internal material requirement planning (MRP) and storage location-allocation problem (SLAP) for sixty materials was used to supply the restocking store that provides for the production line, to see the materials with the highest turnover and to reassign the materials in the general warehouse to minimize the internal long-term logistics costs. As a result of the methodology, the company determines the products with the highest turnover in a variable demand environment. Also, the company reallocates these products in the warehouse of raw materials reducing logistics costs and supply in 100% on-time the stock store that, in turn, supplies the production line.

INTRODUCTION

Some authors divide the logistics according to their dimension in internal and external logistics or their functions such as supply logistics, operations, and distribution. The logistics of operations, also known as production logistics or internal logistics, plays an essential role in the performance of organizations. Identifying the logistics of operations with activities such as the management of warehouses and inventories, transport and material handling, and production management (Cardenas & Urquiaga, 2007).

In Western culture and Japanese culture, warehouses and inventories lead to severe complications when there is not a management system that allows them adequate planning and control (Bustos-Flores & Chacón, 2007).

The warehouse and it is material handling capacity represent a mini system within the general logistics process (Bowersox, Closs, & Cooper, 2007). Even though warehouses can serve quite different ends, most share the same general pattern of material flow. Essentially, they receive bulk shipments, stage them for quick retrieval; then, in response to customer requests, retrieve and sort SKUs, and ship them out to customers. The reorganization of product takes place through inbound processes that include receiving ad put-away and outbound processes that includes activities such as order-picking, checking packing and shipping. Most of the expense in warehouse is in labor; most of that is in order-picking, and most of that is in travel (Bartholdi & Hackman, 2014).

Warehouse processes, unlike what happens in factories or workshops, usually do not add any value to the product from the customer's point of view, so it has to minimize the cost of the same through a proper rationalization of the resources employed (Anaya, 2011).

Thus, this work will focus on the area of raw materials warehouse; this warehouse has as its primary function the timely supply of raw materials, parts, and components to the production departments. Usually, it requires having three sections, such as reception, storage, and delivery (García, 1999).

Among the problems frequently faced by the raw materials warehouse with the production line, is the deficiency of control of the locations and internal traceability. These cause more time for collection and handling of materials and therefore a longer delivery time to the line; the obsolescence, consequence of the ignorance of the locations by the employees, the reliability of the information, and the lack of a First-In, First-Out (FIFO) treatment. Excess inventory of materials in storage due to lack of communication with other departments regarding scheduled production; Wastes due to unnecessary movements when having to request an input repeatedly for the same batch of production or the same run. Moreover, the biggest problem, a line stoppage due to the shortage of materials for production (Rajadell & Sánchez, 2010).

Given this situation, for some companies, there is a need to place pre-stocking warehouses between the central warehouse and the production line. The pre-assortment warehouses are those in which the raw materials from the central warehouse are protected before being processed or processed (Gonzalez, 2013). Faced with the urgent need to minimize costs and eliminate waste, the activities that consume resources of the organization, but do not create any value, activities of time, money and physical effort (Casanovas & Cuatrecasas, 2011). Through a reduction of material handling costs and eliminate constant and frequent trips to the warehouse during each shift to feed the production lines (Richards, 2011).

In this way, the relationship of efficiency and productivity of the warehouses with the production has allowed the emergence of different management philosophies, some of the most representatives are Just in Time (JIT) and Material Requirements Planning (MRP) (Cardenas & Urquiaga, 2007). The JIT goal is to establish times for activities so that the materials and components purchased to reach the point of manufacture or assembly just at the time they are required for the transformation process. The key to

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