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Optimal parameters for MRP with POQ policy¹

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Abstract

This paper deals with component supply planning in assembly systems, i.e. where several types of components are needed to produce one finished product. The actual component lead times are random variables. MRP approach with Periodic Order Quantity (POQ) policy is used. The target of this study is to find the optimal values of the order periodicity and planned lead times at the offsetting step of the MRP procedure. The proposed model and algorithms minimise the sum of the average holding cost for the components, average backloging cost for the finished product and setup cost. These methods can be used for the optimization of time phasing and periodicity for such a MRP system.

Keywords: Assembly Systems, Supply Planning, Random Lead Times, Periodic Order Quantity, MRP Parameterization.

1. Introduction

The *Material Requirement Planning* (MRP) approach is widely used in industry for production planning and supply management. The large practical interest of MRP lies certainly in the fact that this concept provides a framework, which is clear and simple to understand, as well as a powerful information system to help decision makers. The advantages and limitations of this approach as well as the practical procedures that are necessary to implement MRP in a real life environment are largely discussed in the literature (Baker, 1993; Sipper and Bulfin, 1998; Zipkin, 2000; Axsater, 2006; Tempelmeier, 2006).

In MRP for a deterministic environment without constraints and with a lot for lot policy, the items are delivered just-in time (JIT). Nevertheless, in actual situations there are random factors, thus, stockouts are possible. In addition, some costs and constraints (transport, supplier rules, etc.) are the obstacles for the lot for lot policy. Therefore, it is necessary to find the methods to adapt the MRP technique to these situations. Fortunately, MRP has several parameters. An adequate choice of these parameters fine tunes their performances regarding the above factors. Thus, one of crucial issues of MRP utilization is its parameterization for real life enterprises and situations.

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