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Abstract
Cover-Time Planning, or Takt Planning, is presented. It is a system for calculating material requirements and start of purchases and production. Requested production rates of sales items, or alternative prefabricated modules in stock, are "broken down", exploded, to create the need for components, for all underlying items (articles) in the Bill of Material. Inventory and already ordered replenishments are compared with the item's desired production rate. How long already made actions are expected to cover the desired expected sales and production rates is compared with the item's lead time; if a forward future shortage is likely the article is signalled for a refill. With examples is described how make-to-order production is done easily. The method is a type of reorder point system, but with time instead of quantity as decision variable. Unlike a traditional reorder point system increases and decreases of production can be planned. Future work load in various production sections can be estimated. It is described how an "Available-to-promise"-system should be designed and used. Cover-Time Planning (CTP) is a complete alternative to Materials Requirements Planning (MRP). CTP responds faster than MRP, since MRP for each structural level uses a batch size to "break down" and to magnify the need at the underlying level. In the end a large material acquisition needs to be ordered maybe just to build a single end item. CTP uses the end item requirement rates on all structural levels shifted with the lead times, when customer demand changes, the entire production chain react simultaneously.

Keywords: Multi-level inventory and production control, Cover-Time Planning, Takt Planning, Materials Requirements Planning, Make-to order, Modules

1. Introduction and background

Companies want to deliver to their customers with short delivery times, it is a competitive tool. Companies do not want to have huge inventories and capital tied up in unsold material that suppliers have already been paid for. In order to achieve a short and competitive delivery time purchase, production and preparation must have started before the final customer order arrives; sometimes long before. - What should we start, and after what decision rules should we start? It is a question that a lot of companies struggle with.

What can we store? What production will start before the final customer orders come in? Just those items/products that we can appreciate a demand for; a demand rate at which it is desired to satisfy customer demand. If we do not know exactly the pace customers will ask for we must decide the rate we want to accomplish if customers would like to have the product.

A way to keep down the amount of capital tied up in inventory and work-in-process (WIP) as well as to establish short delivery times is to create modular products. When the customer order arrives, the sales and end item is assembled from modules. The same module will be used in several end items; thereby the modules help to create a variety of end items. Modules are kept in store and a large stock of different end items is avoided. Many manufacturing companies have this option or opportunity but they must also have an administrative tool and control system that makes this possible and efficient. For some companies, if there is no final product finished, there is nothing to sell. The market demands that the product is available the instant the customer wants the product; sausages, cultured spices, chainsaws, some type of electric motors etc. – This article presents a technique to start production before the final