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FLEXIBILITY FOR THE CUSTOMER AND...

ECONOMIC LOT SIZES FOR PRODUCTION!

Producing and delivering a maximum of different items in short lead time to satisfy a broad variety of customer demand, while respecting the economic constraints of production equipment, has always been the problem faced by the Economic Lot Size or Economic Order Quantity (EOQ).

The classical formula tries to balance ordering and setup cost with inventory cost to find the most economical quantity to produce from Manufacturing's point of view. But it requires knowing several costs more or less difficult to ascertain. Who would bet his money on the validity of an « Ordering Cost»? Who would put his head on the billet for an "Inventory Cost" of 8.75%?



Confronted with this problem, and without calculating the costs in the classical EOQ formula, one company in the mechanical industry has drastically reduced its economic lot sizes, thanks to a technique from Lean thinking.

The lot sizes of machined parts in one of their manufacturing cells went from 2 weeks down to 5 days, then 4 days, then 2 days. Today this cell can produce all of its items every day. So long, shortages; hello, empty floor space that used to hold safety stocks to combat the shortages.

The « magic » technique which generated this leap in flexibility, is called EPE I, meaning « Every Part Every...Interval ». Its objective is to find the minimum economic ordering interval between two production runs of the same item. If the old EOQ formula needed one more nail in its coffin, the EPE I is more like a giant stake !

Here's how EPE I is calculated:

1. For each item in the technological family, express its demand in pieces per day and calculate for each item how many minutes of production will be necessary to cover one month of demand, and total up the times for all the items in the family.
2. Subtract this result from the total number of minutes worked in the month. The remainder will be the time available for changing over from one item to another.
3. Add up the minutes required to make a changeover for each item in the family and divide this total into the remainder from Step 2 above. This reveals the number of times that all of the items in the family can cycle through production during the month.
4. Convert this result to days or hours or minutes: it's the EPE Interval. Every Part can be produced Every 30 minutes or 2.4 days or whatever the Interval turns out to be. Calculate the quantity that this represents.

Typically, **this new lot size is 5 to 10 times smaller** than the actual so-called « economic » order quantities, based on dubious cost calculations. The factory becomes much more flexible in the face of variable customer demand, **without increasing actual costs**, because EPE I takes into account existing production and changeover times. The number of changeovers may rise, requiring training more people to do them. This should not be an impossible task with Standard Work Sheets from Lean to guide them.

For products with weak and irregular demand, this new flexibility allows planning them according to customer need, in the next EPE Interval. For example, a packaging line that has 17 product slots to plan on Thursday for the following week, could have 12 slots for regularly demanded products and 5 for rarely ordered ones. When a customer order comes in for one of these slow-movers, it is put into one of the 5 slots. For assembly operation, which usually have quicker response times, the slow-mover requested can be produced one day for delivery the next.

Try it ! Calculate the EPE I on one of your product families, meaning items going through the same production process: integrated circuit assembly, tube turning and milling, plastic injection molding, etc. See whether the new minimum lot sizes are not much smaller than existing ones. You can only gain in flexibility.

