

An Original



Article

Bill of Material Restructuring

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Dave Garwood, author of the seminal works "*Bills of Material, Structured for Excellence*" and "*Bills of Material for a Lean Enterprise*" claims that the best way to start a fight amongst engineers is to bring up the subject of Bill of Material (BOM) structuring.

Disagreement amongst engineers aside, BOM structuring is a subject worth exploration because a correctly structured BOM will add real value to a company's marketing and sales activities as well as accuracy to its ERP system and will lead to increased customer satisfaction.

If a company's product line consists of a finite, limited number of end products, modularizing the BOM may not be necessary. For example, to a manufacturer of a limited range of fruit preserves, for example, the BOM may not be an issue since there are only a few variants and relatively large quantities of each.

Further, the product may be relatively simple in terms of the different components used per unit of end product. With a product line of this nature it is feasible to maintain complete BOMs for each product model and to forecast and plan accurately by model.

However, most manufacturing is not that straightforward. Customers may want a virtually infinite number of end products due to the complexity of design and the wide choice of optional features – customers can be like that!

A **CONFIGURATOR** will allow relatively inexperienced sales order takers to enter a complex customer order correctly – if the BOM is structured correctly so that inconsistent components cannot be grouped together.

This takes decision making out of the hands of order takers and puts it into the hands of the manufacturing professionals, where they really belong!

For the sales department to effectively use a **CONFIGURATOR**, the BOM is modularized, to create a non-buildable product at the top level. Instead of maintaining a BOM for each individual end product, the BOM is restated in terms of the building blocks, or modules, from which the final customer product is created.

A good example is a hoist used to handle material in a factory. The hoist manufacturer offers the customer a number of optional features:

- 10 different motors;
- 30 different drum sizes;
- 4 different gear boxes;
- 2 different control pendants; and
- 1 hook

These optional features can be assembled in various combinations, which makes it is possible to build 2,400 unique combinations. If a second hook option is added, the number of possible combinations doubles to 4,800! From a parts inventory and forecasting perspective, dealing with these options is a very challenging task, but it can get even more complicated.

Assume the company sells 100 hoists per month. Which 100 out of the 4,800 possibilities would they select to forecast for a particular month?

One solution is to have a BOM with everything in it and force the sales department to “add and delete to every order” as necessary. This process is quite prone to human error, but many organizations choose it. Apart from the high possibility of human error, this method virtually requires that the sales personnel be real experts in the hoist field.

By modularizing the structure, each option having their own BOM, the numbers go down considerably:

- 10 Motor BOM;
- 30 Drum BOM;

- 4 Gear Box BOM;
- 2 Pendant BOM; and
- 1 Hook BOM

This gives a total of 47 rather than 2,400. If it becomes necessary to add a second hook option, the number of BOMs to maintain becomes 48 not 4,800.

All the BOMs could be simplified by identifying any common parts, adding a Common Part BOM. This increases the BOMs to 49, but simplifies all of the modules, which makes both order taking and engineering change easier.

This approach also makes Master Planning easier, as it allows two-level master production scheduling.

In multi-level master scheduling, we have, in essence, 'promoted' pendants from level 1 items to level 0, inventory needs can be forecast based on historical use, thus enabling the company to institute a sensible approach to calculating Safety Stock.

So, let the engineers fight. A thorough and thoughtful Bill of Material system will help keep the products flowing smoothly out of the plant and keep customers coming back.