Bills of Material an Often Overlooked Opportunity

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The ability to effectively plan, schedule, and create a high level of control continues to exist in every manufacturing company regardless of the product being produced. Even with the most advanced Enterprise Resource Planning (ERP) system a large number of companies still struggle with many of the following kinds of problems:

- Missed customer order deliveries,
- Not purchasing the correct items or materials at the right time,
- Excess as well as obsolete inventory,
- Low levels of productivity,
- Higher costs, and
- Lots of frustration as well as low levels of moral caused in many cases by poor accuracy in the database and ineffective operating practices.

Surprise! There are companies that don't endure those problems. Their inventory turns are double digit. Their productivity improves annually. Their business processes are in control and performance is predictable. Customer service has become customer delight. And, they are listed as one of the best places to work.

One of the major contributors to these exciting businesses has been the successful implementation of Enterprise Resource Planning. To successfully implement ERP, the following four basic things are required:

1. Everyone, yes everyone, understanding how business is to be conducted (defined processes);

2. Everyone understanding how the system works (education and training);

3. An accurate and complete company database (100% accurate and complete); and

4. Software that actually works.

In many ERP (Enterprise Requirements Planning) implementations, the Bills of Material are often over-looked as an area where there is tremendous benefit. The users of this information have many different requirements and use this information in a variety of different ways. In other words, each user puts a variety of demands on this data. Some of the most common uses for the bills of material include:

- product definition,
- manufacturing instructions,
- engineering change management,
- service parts support,
- liability/warranty protection,
- forecasting,
- planning bills of material,
- planning material purchase and shop scheduling,
- order entry facility,
- pick lists,
- scarce materials or resource analysis,
- costing,
- pricing, and
- back-flushing.

All of these uses must be clearly understood and defined before one bill of material can be constructed to satisfy all of these necessary user demands.

In the not so distant past, the bills of material were used as an engineering document to define the product from the design point of view. The bills of material were not intended to be utilized to plan materials or define schedules. As more and more companies started to use Material Requirements Planning (MRP) and move away from statistical inventory systems (order-point), the bills of material (as well as other engineering information) became much more important. To understand the importance of accurate bills of material, it is necessary to understand the difference between Statistical Inventory systems and Material Requirements Planning systems. A Statistical Inventory system is part based. This means that each inventory item is viewed independently of all of the other inventory items. This is done without regard to product relationships or future demand for the item. When an item reaches its statistical order point it is reordered. A MRP system is a product-oriented system. MRP looks at the product demand, normally from the Master Schedule, and the relationship of its components, as the bills of material define them. In an ERP system, the bills of material become the basis or the structure on which the production scheduling and material planning system depends.

In today’s ERP systems, the Bills of Material take on a much broader role -- they are much more than the bills of material -- they have become an extensive company database. Some people refer to this database as the “Engineering Information Database” (EID). It is not unusual

for this company database to include drawings, item masters, routings, resource centers, bills of material, quality specifications, engineering change control and also work instructions. Because of the extent of this database, accuracy is absolutely essential.

In most instances, companies planning to implement ERP would be wise to review their "Engineering Information Database" (EID) to determine whether certain changes in the structure of this data may need to be made. Many companies use the implementation of a new ERP system as an opportunity develop a "Product Architecture" that defines how the data in the EID is to be constructed and maintained. This "Product Architecture" is essential to defining a "standardized" approach for product and process development, planning and scheduling, order entry, and pricing as well as costing. Many companies form a team from the functional departments that are dependent on this data. They charge this team with the development of the "Product Architecture" and assigning responsibility for different aspects of the database.

In reviewing the EID, the following checklist will help to spot opportunities or deficiencies:

1. The EID should lend its self to developing a Demand Plan (including the ability to forecast), Operations Plan, Resource Requirements Plan, Master Schedule, Rough Cut Capacity Plan and Materials Planning. It should also support shop scheduling, the inventory transaction system along with service parts planning and field supply.

2. The EID should exist as one database. This avoids redundancy, avoids multiple designs, and eliminates conflicts between which database contains the correct information. Sadly, in many companies, as they start to implement ERP they discover that they have more than one "database". The two biggest problems with multiple databases is trying to determine which one is the correct one and trying to keep them the same.

3. The EID should be subject to a "Standardized" set of definitions and methods, forms, form instructions, policy statements, procedures and flow diagrams. The particular subjects that should be candidates for standardization might vary from business to business. However, the following areas should be considered at minimum:

    - The design process;
    - The product and document release process;
    - The change request process;
    - The change control process;
    - The item master creation process;
    - The bill of material creation process; and
    - The routing and work center creation process.

4. The EID must be 100% accurate. With one database, it becomes much easier to get it accurate and to keep it that way. The proven approach to achieving this level of accuracy is to assign responsibility for database accuracy to an EID administrator, have the users perform audits on a daily basis and provide feedback to the EID administrator. These errors should be corrected within 24 hours. Why 24 hours? With this audit process, the errors that you will uncover will virtually all be "matter of fact" errors. These errors were made during data entry or during corrections made over time. Two key reasons for the 24-hour time frame is to insure that you respond quickly and that the same job is not released with the same error again. Accuracy is defined as the number of areas audited versus the number of audited areas that are accurate. If the proper controls are in place, once an area has been audited it is not necessary to audit it again. An important note - the costs of an in accurate EID are numerous and primarily hidden. Some of these hidden costs are excess and obsolete inventory, missed schedules and deliveries, inaccurate costing and pricing, and lots of frustration with poor data.

5. The EID should contain ALL of the required information to support the defined "Product Architecture". This "Product Architecture" must reflect all of the needs of the users. Several years ago there was a movement to only put "significant" information into the database. This was because it slowed down processing and the computer response time. That resulted in lots of private databases, additional cost through redundancies and the need to try to keep more than one area accurate along with the resulting chaos. In today's systems, with their power and speed, this is not a problem.

6. The EID information fields should have an owner responsible for the population of the information. Once this initial information is input, the ongoing maintenance responsibility must be defined. In some companies this responsibility belongs to the EID administrator. In others, the owner responsible for the population of the information retains this responsibility.

7. The EID should be under date effectivity change control and a historical record should be retained of all additions and changes. This allows the users to review the status of the data of all EID areas over time. The Engineering Change Order (ECO) is a document normally controlled or managed by the Engineering Database Administrator who is responsible for notifying everyone to any changes to the EID. There are normally several different types of changes: Emergency, this must happen NOW,

Phase In - use up existing materials,
Phase In - start no later than,
Phase In - start with this serial number,
Phase In - when it's most cost effective,
Temporary Deviation – for a limited period of time.

8. The EID should be able to produce a variety of inquiries as well as reports on demand to support all of the different user requirements. The system response time should never be an issue.

The Engineering Information Database must provide a foundation for a valid, formal system. This need for a valid, formal system has become even more essential as more and more businesses move rapidly form being a mass producer of products to that of a mass customizing, customer problem solver. The work to evaluate your existing "EID" can be significant; hundreds of people years have been invested in the current state, resulting in what you have today. If what you have today allows you to be the mass customizing, customer problem solver, great! If it doesn't …