WHITEPAPER

10 SECRETS EVERY SOFTWARE BUYER SHOULD KNOW

A Guide for Engineer-to-Order and Project-Based Manufacturers
INTRODUCTION

In today’s challenging business environment, midsize manufacturers are faced with increasing pressures from both domestic and overseas competition—pressures to reduce costs, improve and maintain quality and decrease lead times. Designers and builders of capital equipment face special challenges due to the complexity of the products they build and the unique requirements of this engineer-to-order (ETO) environment.

Today, companies look to information technology to help improve their processes and gain a competitive edge.

But most systems have their heritage in the Material Requirements Planning (MRP) philosophy developed in the 1960s. This concept utilized computer power to calculate time-phased material requirements. It later evolved into MRPII promoted by APICS and Ollie Wight during the 1980s, and further evolved to the Enterprise Resource Planning (ERP) systems available today.

The original premise of all of these systems is that material planning is the center of the universe. The typical manufacturing system was designed with an MRP process at the heart of the system. The emphasis of such systems is on standard bills and routings and standard costs.

Companies in the ETO world have different requirements. Designing and building complex products to exact customer specifications frequently involves long lead times and heavy engineering content. To win business, you must provide accurate estimates and quotations to a demanding customer base. Unlike the majority of manufacturers, capital equipment manufacturers typically purchase material to a specific project or job. You need to do progress billing and collect actual costs to projects. Often, you will not receive payment for a project until it is installed and operating at a customer’s site. So, cash management is of vital importance. And after the sale, you need to track warranty information and provide aftermarket services, including the sale of spare parts that may constitute a significant share of your company’s business.

If you are an ETO or project-based manufacturer, here are ten questions traditional manufacturing software vendors don’t want you to ask. Before you invest in new software to run your business, you should carefully consider the following questions.

Q1. Does the system demand that you develop a detailed bill of material (BOM) and routing?

Many ERP systems demand that you create a part number, bill of material and routing before you can begin any job or project. This works if you are making a standard product. But ETO companies build unique products to customers’ specifications. As a result, maintaining detailed BOM and routing data in the system is very cumbersome for ETO companies.

Ask:
- Does the system allow you to process an order from order entry to invoicing without first creating a part number?
- Does the system require a detailed BOM and routing before processing a work order?
- Does the system allow you to buy or make a part for one-time use, without creating an item master record?

Q2. Can you ship products directly from work-in-process?

In order to ship products using a typical ERP system you are required to close the job or project into finished goods inventory. This works well if you are building standard products to stock. However, it makes no sense if you are building large capital equipment. Most ETO companies ship products from work-in-process (WIP) directly to the customer’s site for installation. In addition, most ETO companies will continue to accumulate costs to the project after it is shipped. Most software vendors claim a system “work-around” by booking the product in and out of an inventory location. Beside the redundant transactions, this will force the part to be costed at inventory cost, not actual cost.

Ask:
- Does the system allow you to ship finished products directly from WIP without completing an inventory transaction?
Q3. Does the system allow you to create an estimate without a part number?
ETO companies have to submit quotes or estimates to compete for business. To submit a formal proposal and quotation, you need to construct an estimate. This can be constructed from a similar job or it may be a brand new item. In constructing this estimate most companies put “buckets” of time and money against the major elements of the project.

Unfortunately, with item-based manufacturing systems you are forced to create a part number, BOM and routing steps BEFORE you can even start to construct an estimate. This is a very time-consuming process for a one-off estimate, considering you may ultimately decide not to bid after all. It also results in the typical system becoming cluttered up with redundant and useless data that requires extra storage and maintenance. Because this is not practical for ETO companies, most resort to creating their estimates outside the main system with spreadsheet or small, custom-built applications. This will work for quick or simple estimates but eventually even those will need to be re-entered into the ERP system if you are successful and win the business. This creates duplication of effort and can easily lead to errors.

Ask:
- Can you create an estimate in the system without first creating an item master record?
- Can you create an estimate using “buckets” of time and money?

Q4. Does the system allow you purchase material directly to a job or project?
ETO companies purchase the majority of raw material directly for a specific job or project. Most MRP systems are designed to purchase material for stock. The MRP process looks at time-phased demand for material, aggregates the requirements based on a time horizon, order size and stocking policies, and suggests replenishment orders. This process is great if you are building products to stock and using standard costing, but does not support the operations of ETO companies, since material is purchased for individual jobs and requires the actual cost of the material assigned to the project. When material is purchased for a project it is important to create a time-phased plan by project for purchased items. Typical ERP systems aggregate demand for purchase items and do not plan material requirements by project.

Ask:
- Can you purchase material directly to a job or project?
- Is the planned and actual cost recorded against that project?
- Can you plan requirements for purchased items by project?

Q5. Are the Engineering functions integrated with Manufacturing Operations?
Because ETO companies design and build products to customer specifications, a significant amount of time and cost goes into the design stage of the project. Computer-Aided Design (CAD) packages like Autodesk Inventor and SolidWorks have greatly improved the speed and productivity of the design engineer. However the engineer’s view of the world is different from manufacturing operations. The engineer creates part and BOM information in the CAD system. Typically this information is then re-keyed manually in the ERP system. This leads to duplication of effort and the chance for errors. It is important not to have multiple versions of the same data in different systems.

Ask:
- Is the CAD system fully integrated with the rest of the system? Is the link two-way, or only one-way? Most have one-way, but a true ETO provider will have two-way.
- Can the engineer create a parts list in the CAD system and automatically create a BOM from the drawing without re-keying the data?
- Can the engineer create a purchase requisition or purchase order without having to re-key the part information into the ERP system?
- Can the drawing be viewed by all appropriate persons? Can they make notes on the drawing without changing the original drawing?
Q6. Does the system reflect the true actual cost?
Most of the traditional MRP-based systems are designed around standard costing. To address the needs of the make-to-order and engineer-to-order market they have tried to add actual costing capabilities. Unfortunately, the problem with many traditional systems is that the costing is based on the wrong things, such as:

- Establishing a standard cost for an item by defining detailed BOM and routings, and rolling up the cost using standard material cost, labor hours and overhead.
- Inventory valuation at standard cost.
- Calculating the value of WIP and measuring performance by calculating variances against standard cost.

In the world of ETO and project-based companies, monitoring performance is critical, but in this environment the measurement is against the original estimate and not against a standard cost. It is important to show throughout the system the Estimate, Planned Cost, Actual Cost and Cost to Complete.

The problem is that most systems, which claim to support actual costing, do not truly reflect all the actual costs throughout the system at the time the actual costs hit the books. Try this simple test:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Typical Item-Based ERP System</th>
<th>Encompix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planned</td>
<td>Actual</td>
</tr>
<tr>
<td>Job BOM Line Item</td>
<td>$1000</td>
<td>$1000</td>
</tr>
<tr>
<td>Job Cost Report</td>
<td>$1000</td>
<td>$1000</td>
</tr>
<tr>
<td>General Ledger</td>
<td>(variance) $251</td>
<td>$1000</td>
</tr>
<tr>
<td>WIP Report</td>
<td>Does not appear</td>
<td>$1000</td>
</tr>
</tbody>
</table>

Step 1. Create a job with a planned cost of $1000 for material.
Step 2. Enter a purchase order with a planned cost of $1000 for the material.
Step 3. Record the receipt of material.
Step 4. Post the invoice at the actual cost of $1251. In a traditional costing system, the planned cost ($1000), not the actual cost ($1251), is reported against the job, and a variance ($251) is shown in the general ledger.

Ask:
- Does the system show both the original planned cost and the actual cost?
- Does the system reflect the true actual cost as described above?
- Does the system reflect the true actual cost as described above?

Q7. Can you perform progress billing when agreed milestones are met?
ETO companies will have projects that last for weeks, months and even years. In this environment, cash management is essential. It is common practice for companies to bill their customers at various stages of the project when agreed upon milestones are completed. This practice, known as Progress Billing, ensures cash flow during the life of a complex project. The traditional manufacturing system has a difficult time with Progress Billing because it is set up to send an invoice after the final delivery, when the job is closed. In addition, most systems have problems dealing with multiple invoices for a product quantity of one.

Ask:
- Does the system allow you to bill the customer based on reaching a specific milestone or on percent complete?
- Does the system automatically create an invoice based on reaching a milestone rather than final shipment?
• Does the system allow you to recognize revenue to support Generally Accepted Accounting Practices (GAAP)?

Q8. Does the system handle field service, installation and warranty?
Unlike companies that deliver their products from stock, completing the manufacturing process is not the end of the project for ETO companies. ETO and project-based manufacturers typically will install the product on their customer's site and provide on-site maintenance and services as well as a warranty. In this environment it is essential to track the warranty and service information to a specific piece of equipment. In addition, many companies now generate significant revenues from spare parts business where margins are typically higher. Planning and controlling spare parts is now an important part of an ETO company's business plan.

Ask:
• Where is the focus of the system post manufacturing–warehousing, transportation and logistics, or installation, service and warranty tracking?
• Does the system automatically create a serialized master record with warranty and service information?
• Does the system allow you to link all service costs back to the original project if required?

Q9. Do I have complete visibility and control over all my projects?
Having a complete and true picture of the status of all projects is essential for any ETO company. Especially important is the ability to know exactly how you are doing against the original estimate in terms of time and money. ETO companies need to be able to answer such questions as: "Will we meet the delivery date? Are we running under or over budget? What changes can we make to get back on track? What other projects are affected?"

In many midsize companies Microsoft Project is the preferred project planning and management tool. Once the project steps are created in MS Project, can the data be used to automatically generate routings? If changes occur on the shop floor is MS Project automatically updated? In other words, are your plans and schedules always synchronized?

Ask:
• Does the system integrate with a project management tool, such as Microsoft Project?
• Does the system allow your project managers to enter the estimate-to-complete in both time and money?
• Does the system provide comprehensive project reporting so you know exactly how much profit contribution each project is estimated to make?

Q10. Is the company focused on Engineer-to-Order?
Many software vendors with large customer bases claim to have customers using the software in make-to-order and engineer-to-order environments. But how much do they really know about ETO? What is the percentage of ETO customers to the whole customer base? Many ERP vendors sell software to a broad spectrum of manufacturers, claiming one size fits all, for make-to-stock as well as make-to-order. This causes problems for their ETO companies attempting to use the software. As the software provider decides what enhancements the next version will incorporate, will those enhancements be designed for ETO, or make-to-stock? If a large percentage of the customers are make-to-stock, then expect new features that are of little or no value to ETO companies.

You want to ensure that the software vendor is focused on your business, and has a customer base of companies that have similar characteristics, processes and problems. You want to ensure that the consultants from the software vendor have the experience of implementing the system in companies similar to yours, and have not come straight from completing an implementation at a process company.

Ask:
• What industries are supported by the vendor? Look at the marketing material. Is it generic or does it focus on the needs of your company?
• Does the product contain optional modules that are of no interest to you?

• Does the vendor have many customers in consumer-type products?

NEXT STEPS
Aptean has filled the manufacturing software requirements of Engineer-to-Order companies since 1992. Today, we continue our commitment to developing business application solutions that encompass the complex areas of project-based and job-based manufacturing. Our goal is to provide our customers with a competitive advantage in their own markets by improving bottom line results.

Encompix was designed by, and for, project-based companies. Our customers have played a big part in our development process. Unlike many traditional manufacturing systems, Encompix grew out of the requirements of a consortium of project-based companies who felt that traditional MRP-based systems did not adequately address their needs. Much of our development over the years has its roots in enhancements built to address specific business problems faced by our customers.

Today, Aptean continues to work closely with our customers as we grow and prosper, based on our commitment to design, develop, market, install, and support the best possible solution for designers and builders of capital equipment.

More than 9,000 customers around the world rely on us to give them a competitive edge. By providing innovative, industry-driven enterprise application software, Aptean helps businesses to satisfy their customers, operate most efficiently, and stay at the forefront of their industry.

For more information, visit: www.aptean.com