What is ETO / Project-based Manufacturing ?

Engineer-to-order (ETO) or project-based manufacturers are also referred to as "custom", "make-to-order" or "contract" manufacturing companies. All of these terms describe a style of manufacturing rather than any particular industry segment.

These terms describe manufacturers that produce unique and often complex products that are designed to customer specifications, and may require unique engineering design or significant customization. As a result, each customer order will have a unique set of item numbers, bills of material and routings.

Other characteristics that typically distinguish ETO manufacturing from standard "repetitive", "discrete" or "make-to-stock" manufacturing are shown in the table below. Some of these characteristics (for example, installation on site) may not apply to every ETO manufacturer, or to every product produced, but most of them do.

Discrete / Make-to-stock	**Project based / Engineer-to-order**
Price List	Estimate, Quote and Part List
Wins a sale / receives sales order	Wins a contract / receives job order
Standard Products Unique Products	Standard Cost Actual Cost
Purchase Material to Stock	Purchase Material directly to a Project
Cost Variances to Standard	Cost Variances to Original Estimate
Flat Bills of Material	Deep & Unique Bills of Material
Ship From Finished Goods	Ship from Work-in-Process
Product Lead Times in Days/Weeks	Product Lead Times in Weeks/Months/Years
Invoiced on Delivery	Progress Billing by Milestones completions
High Unit Volume Production	Low Unit Volume Production
Focus on Material Planning	Focus on Production Scheduling
Plan with Master Schedule	Plan with Project Management
Forecast Driven	Project Driven
Standard MRP	MRP by Project
Delivery to Customer	Installation on Site
Product Based	Project / Job Order Based
Design Completed Before Production	Design Integral Part of Production
No or only a few Engineering Changes	Many Engineering Changes / Variations

Important consequence of these characteristics is that ETO manufacturers have special systems requirements. This is particularly true for their ERP [MRP and materials management systems requirements including specific accounting & costing requirements),.

Information System for Project based Manufacturers

In today's challenging business environment, midsize manufacturers are faced with increasing pressures from both domestic and overseas competition. Pressures to reduce costs, improve & maintain quality and decrease lead times. Capital equipment manufacturers face special challenges due to the complexity of the products and the unique requirements of this project based, **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 the1960s. 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. 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.

ETO or project based manufacturer should carefully consider the following quest before invest in new software to run your business:

1. Does the system allow you to purchase material directly to a 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, order size and stock. This process is good for building products to stock and using standard BOM & costing. ETO companies purchase 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.

- 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?
- Can you monitor the purchase status project wise, item wise, vendor wise, etc?
- Can you monitor project wise purchase, stock and consumption?

2. Are the Engineering functions integrated with Manufacturing Operations?

ETO companies design and build products to customer specifications; a significant amount of time and cost goes in to the design stage of the project. The engineer creates part and BOM information in the CAD system at different stages /periods.

- Can all the main & sub assemblies of a project can be merged in a single screen/report?
- Can engineer release component level bills of material rather than waiting for the bill of material for the entire project?
- Can the drawing be viewed by all appropriate persons?

3. Does the system reflect the true actual cost?

Most of the MRP-based systems are designed around standard costing. To address the needs of the engineer-to-order market they have tried to add actual costing capabilities. The problem with many systems is that the costing is based on :

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

Does the system show project wise planned cost, purchase value, material receipt value and the true actual cost/consumption?

In the world of ETO companies, monitoring performance is critical, 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.

4. Can you perform revenue recognition based on progress billings & percentage of completion

ETO companies will have projects that last for months and 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 is completed. This practice known as Progress Billing ensures cash flow during project cycle.

Many ETO companies recognize sales revenue while expenses are accruing over the course of a long-term project, providing a more realistic view of the company's financial status.

- Does the systems allow you to invoice 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)?

5. Does the system handle Project closing?

- Does the system provides project closing option?
- Options to review the contract terms, expenditure, etc
- Does the system provides transfer of non moving stock & reduce inventory cost?

6. Do You have complete visibility and control over all projects?

Having a complete and true picture of the status of all projects is essential for any ETO company. to know exactly how you are doing against the original estimate in terms of time and money.

- Does the system capture data of 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?
- Does the system provide status of projects at different functions.

7. Financial Performance Tracking

Being able to convert meeting milestones and costs will lead to higher profits and industry leading cash flow. Because in the end, its all about taking milestones, cost, and earned value and getting proper revenue recognition

- Standard reports that track project status, costing, and earned value
- Project wise MRP & cost, assembly cost, production performance & pending,
- Project wise delivery, sales and pending
- Project wise purchase, inventory, non-moving stock, consumption, etc
- Access to historical costs, quotes, and projects for rapid bidding

Balachandra K V
Director

Apoorva InfoLab Pvt Ltd
Bangalore, India
Phone: 080 26653121, 26530622
Mobile: 98453 80403
Mail: info@apoorva.info
URL: www.apoorva.info