



**DISCRETE MANUFACTURING**

GLOBAL INDUSTRY OVERVIEW

### About Discrete Manufacturing

Discrete manufacturing, which differs from process manufacturing, refers to a production environment in which separate units or individual products are created. In other words, the products that are manufactured in this environment are easily identifiable. In process manufacturing, a product is made or transformed through mixing or through chemical reactions, for instance, and cannot be transformed back into its original state. An example would be refining crude oil into gasoline. An example of discrete manufacturing is the production of television sets, which can be taken apart and reassembled.

### Business Trends

Several business trends characterize discrete manufacturing today:

- Manufacturers face brutal global competition.
- Agility is key to remaining viable.
- Skilled labor is in short supply.
- Manufacturers must increasingly consider their environmental impact.

According to the U.S. Bureau of Labor Statistics, in 2006 manufacturing productivity increased in North America, Asia, and in 15 of 16 countries in Europe.

“This is the most brutally competitive marketplace the world has ever seen,” says Hank Cox, a vice president at the U.S. National Association of Manufacturers. “Manufacturers in the states compete with people in South America, Europe, and Asia.” To succeed in this global environment, companies need to ensure efficient customer service, supply chain visibility, as well as product quality.

For most manufacturers – which are often small businesses with less than 500 employees – the most logical approach is to focus on quality. “You can’t sell shoddy merchandise anywhere in this world,” says Cox.

Another avenue of differentiation for small manufacturers is agility. They must constantly be aware of market trends and have the flexibility to react to customer demands. “You have to constantly refocus because there’s such rapid change,” says Cox, adding that there is a downside to this situation. “One of the biggest problems facing manufacturers is a shortage of skilled labor. Workers need a higher level of education and training than they did 20 years ago. Half of our members have unfilled positions because they can’t find qualified applicants.”

Many manufacturers today are considering “green” initiatives. In part, this is because of growing public concern over the environment and in part because of governmental regulations – and sometimes both. Though some manufacturers find environmental regulations stifling, others find that more environmentally friendly production methods (including recycling and installation of newer, more efficient equipment) actually reduce costs. Government regulations, on the other hand, often force companies to modify production methods to ensure their products and components are in compliance. An example is the European regulation governing the restriction of the use of hazardous substances (RoHS) – which specifically targets waste from electrical and electronic equipment (WEEE).

### Technology in Discrete Manufacturing

Technology has affected how companies operate, and today several trends have become apparent:

- Factory machines are increasingly linked to back-end databases through “shop floor to top floor” connectivity.
- Radio-frequency identification (RFID) and other technologies are used to increase efficiency, quality, and customer service.
- Data and process visibility remain concerns.
- Integrated software applications help with supply chain visibility and product design.

Most companies today believe that information technology can help them maintain their competitive edge. One of the most critical advances in manufacturing has been the connection of shop-floor equipment to a company’s IT network.

Previously, manufacturing equipment was constructed to function separately from the back office. Now, with built-in network connectivity, manufacturing equipment can transmit information to a monitoring or inventory system. In this scenario of “shop floor to top floor” connectivity, an interruption on the assembly line triggers an alert and transmits the information to an inventory application. The appropriate managers can then adjust shipping and delivery schedules if necessary. Integration with financial applications also helps companies calculate the cost of downtime, a key metric in determining the viability of purchasing or updating equipment.

Many companies are turning to IT to improve manufacturing-related processes. For example, some are using RFID technology to track materials or pallets;

others are deploying robotics to improve precision or using laser-sensing devices to check consistency in finished products. "Every day somebody comes up with ways to manufacture product more efficiently. It's straight out of science fiction," says Cox.

Yet companies feel they can gain even more benefits from IT. For example, in a 2006 Accenture survey of 178 European senior manufacturing executives, 59% said they wanted more visibility into the forecasting process. The report also cited issues around improving efficiencies in product life-cycle management (PLM), customer relationship management, supply chain management (SCM), as well as collaboration with partners and suppliers.

Many manufacturers now use PLM applications to track design life cycles, components, upgrades, and quality improvements. Companies also use the software to manage purchasing processes more effectively, improve control of inventory, and expedite processing of warranties and returns.

With SCM software, companies can achieve better visibility of the manufacturing process and enhance workflow, communications between suppliers, and logistics. For those manufacturers that are challenged by partners who insist on interoperability between installed applications, it is advisable to implement applications that can be easily integrated with same- and nonbrand software.

For the smaller manufacturer, one of the most important elements of success is easy, centralized access to transparent information. With a clear, consistent view of metrics and opera-

tional data, these manufacturers can compete more effectively against the larger organizations.

### Regulatory Issues

Several regulatory trends characterize discrete manufacturing today. For example:

- Environmental regulations are changing the way companies manufacture products.
- Manufacturers must work hard to ensure product safety.
- Consumers are paying more attention to social and environmental issues.

Government agencies are scrutinizing manufacturers more intensely regarding not only the content of what they make but also manufacturing by-products. As an example, Europe is revising RoHS regulations regarding the content of lead and other chemicals in finished goods. To ensure compliance, manufacturers must know exactly what goes into their products, which requires clear, transparent data throughout the supply chain.

In addition, the increasing concern over product safety requires due diligence on the part of the manufacturer. In the United States, the Consumer Product Safety Commission requires companies to notify distributors and retailers about any product safety issues as soon as they are discovered. In order to respond in a timely manner, manufacturers must be able to quickly and easily access key information.

Nowadays, many customers are increasingly scrutinizing manufacturers' environmental policies, treatment of employees, and other actions. In response, several international

manufacturers, retailers, and watchdog organizations have created the Fair Factories Clearinghouse to audit factories worldwide and help ensure conscientious and fair practices.

### Resources

#### European Committee of Domestic Equipment Manufacturers

[www.ceced.org](http://www.ceced.org)

Organization that promotes the increased performance of appliances while reducing the environmental impact

#### European Factory Automation Committee

[www.efac.org](http://www.efac.org)

Organization for manufacturers of assembly and handling technology

#### Fair Factories Clearinghouse

[www.fairfactories.org](http://www.fairfactories.org)

Organization that promotes fair treatment of employees in factories worldwide

#### International Electronics Manufacturing Initiative

[www.inemi.org](http://www.inemi.org)

International organization representing electronic manufacturers

#### National Association of Manufacturers

[www.nam.org](http://www.nam.org)

U.S. association representing manufacturers across industries

#### U.S. Department of Labor, Foreign Labor Statistics

[www.bls.gov/fls](http://www.bls.gov/fls)

Site for comparative metrics across multiple countries

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