Chapter 6
Manufacturing and Process Selection Design

October 15, 2006

Types of Processes

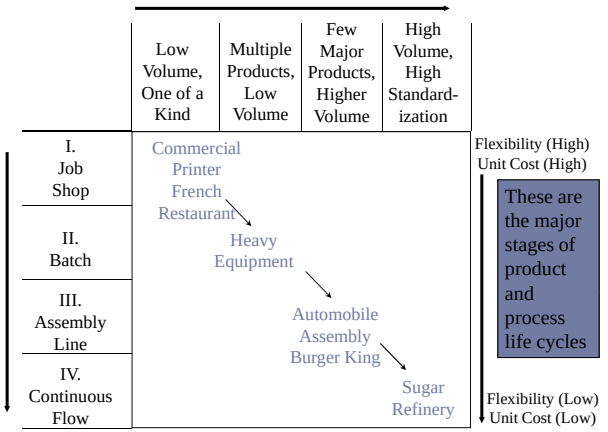
- **Conversion (ex. Iron to steel)**
- **Fabrication (ex. Cloth to clothes)**
- **Assembly (ex. Parts to components)**
- **Testing (ex. For quality of products)**

Process Flow Structures

- **Job shop (ex. Copy center making a single copy of a student term paper)**
- **Batch shop (ex. Copy center making 10,000 copies of an ad piece for a business)**
- **Assembly Line (ex. Automobile manufacturer)**
- **Continuous Flow (ex. Petroleum manufacturer)**

Product-process Matrix

Exhibit 6.10



Ref. The Product Process Matrix: DVD

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Break-Even Analysis

- **A standard approach to choosing among alternative processes or equipment**
- **Model seeks to determine the point in units produced (and sold) where we will start making profit on the process or equipment**
- **Model seeks to determine the point in units produced (and sold) where total revenue and total cost are equal**

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Break-Even Analysis (Continued)

Break-even Demand=

$$\frac{\text{Purchase cost of process or equipment}}{\text{Price per unit - Cost per unit}}$$

or

$$\frac{\text{Total fixed costs of process or equipment}}{\text{Unit price to customer - Variable costs per unit}}$$

This formula can be used to find any of its components algebraically if the other parameters are known

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Break-Even Analysis (Continued)

Example: Suppose you want to purchase a new computer that will cost $5,000. It will be used to process written orders from customers who will pay $25 each for the service. The cost of labor, electricity and the form used to place the order is $5 per customer. How many customers will we need to serve to permit the total revenue to break-even with our costs?

Break-even Demand:

$$= \frac{\text{Total fixed costs of process or equip.}}{\text{Unit price to customer} - \text{Variable costs}}$$

$$= 5{,}000/(25-5)$$

$$= 250 \text{ customers}$$

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Manufacturing Process Flow Design

- **A process flow design can be defined as a mapping of the specific processes that raw materials, parts, and subassemblies follow as they move through a plant**
- **The most common tools to conduct a process flow design include assembly drawings, assembly charts, and operation and route sheets**

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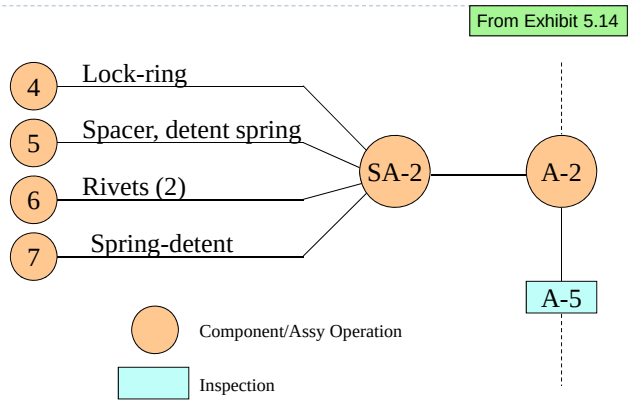
Example: Assembly Chart (Gozinto)



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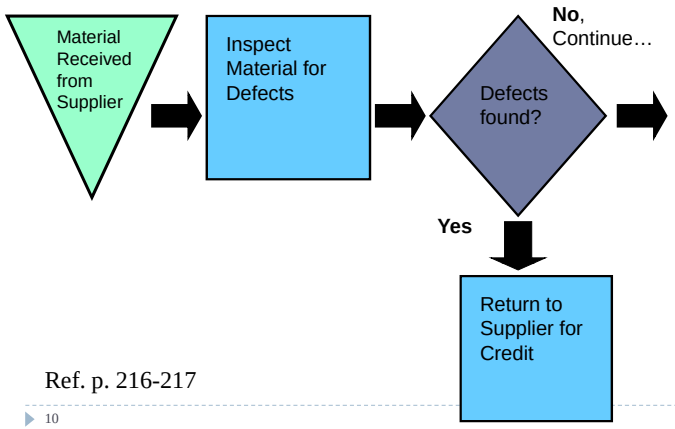
Example: Process Flow Chart



Ref. p. 216-217

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Question Bowl

What is the break-even in demand for a new process that costs $25,000 to install, will generate a service product that customers are willing to pay $500 per unit for, and whose labor and material costs for each unit is $100?

a. **400 units**
b. **250 units**
c. **100 units**
d. **62.5 units**
e. **None of the above**

Answer:
d. 62.5 units
(25,000/(500-100)=62.5)

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Question Bowl

Which of the following is an example of a Continuous Flow type of process flow structure?

a. **Fast food**
b. **Grocery**
c. **Hospitals**
d. **Chemical company**
e. **None of the above**

Answer: d. Chemical company

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Question Bowl

Which type of process is by changing of raw materials into some specific form (such as sheet metal into a car fender)?

a. **Conversion**
b. **Fabrication**
c. **Assembly**
d. **Testing**
e. **None of the above**

Answer: b. Fabrication