Resource Requirements Planning: MRP and CRP

Materials Requirements Planning (MRP)

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Elements of MRP

Bill-of-Material BOM
Bill-of-Material
Product Structure Tree

- Bicycle (1)
- Handle Bars (1)
- Frame Assembly (1)
- Wheels (2)
- Frame (1)

Flexible Manufacturing Systems (FMS)
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  - Kits of materials/parts for a product are loaded on the materials-handling system
  - Code is entered into computer identifying product and its location in the sequence
  - Each production machine (without a worker):
    - Receives settings/instructions from computer
    - Automatically loads/unloads required tools
    - Carries out its processing instructions
  - Product automatically transferred to next machine

Capacity Requirements Planning (CRP)
- Tests MPS for feasibility
- Utilizes routings to determine labor/machine loads
- If schedule feasible, recommends freezing
- If schedule overloads resources, points out processes that are overscheduled

Flexible Manufacturing System (FMS)
- Computer
- System
- Workpiece in queue
- Machine 1
- Machine 2
- Machine 3
- Computer
- Tools
- Tools
- Tools

Automated Storage & Retrieval Systems (ASRS)
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  - Receive orders for materials from anywhere in operations
  - Collect the materials from locations in warehouse
  - Deliver the materials to workstations in operations
  - Three major elements of ASRS are:
    - Computers and communication systems
    - Automated materials handling/delivery systems
    - Storage and retrieval systems in warehouse

Computer-Integrated Manufacturing (CIM)
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  - “All of the firm’s operations related to production are incorporated in an integrated computer system to assist, augment, or automate the operations.”
  - Covers the chain of events from sales order to product shipment
  - Output of one activity becomes the input to the next activity
Enterprise Resource Planning (ERP) Systems

- Enterprise Resource Planning Systems is a computer system that integrates application programs in accounting, sales, manufacturing, and other functions in the firm.
- This integration is accomplished through a database shared by all the application programs.

Supply Chain Management

- Materials - any commodities used directly or indirectly in producing a product or service.
  - Raw materials, component parts, assemblies, finished goods, and supplies
  - Supply chain - the way materials flow through different organizations from the raw material supplier to the finished goods consumer.

Supply Chain for Steel in an Automobile Door

- Logistics usually refers to management of:
  - the movement of materials within the factory
  - the shipment of incoming materials from suppliers
  - the shipment of outgoing products to customers

Logistics

- Materials management
- Logistics management