Layout Strategy

Operations Management
Chapter 9

Objective

- To develop a cost-effective layout that meets the firm’s competitive needs.
- Utilization of space, equipment, people
- Improved flow of information, materials, people
- Improved employee morale
- Improved customer/client interaction
- Flexibility

Types of layouts

- Office
- Retail
- Warehouse
- Fixed-position
- Process-oriented
- Work-cell
- Product-oriented
Main considerations

- Material handling equipment
- Capacity and space requirements
- Environment and aesthetics
- Flows of information
- Cost of movement between work areas

Office

- Relationship charts
- Guidelines
  - 100 SF per person
  - 400 SF per executive
  - 25 SF per person in conference rooms
  - Not universal
- Technology has impacted space requirements—especially in virtual operations

Work Space Design

- Size
  - The trend is away from traditional allocation of space based on organizational status towards a flexible open space design that accommodates group and team activities.
- Arrangement
  - Open arrangements foster social interaction and influence the formality of relationships
- Privacy
  - Individual employee needs for workplace privacy are largely a function of the type of work that the employee does (e.g., programmers, HR managers, receptionists)
Work Space Design (cont’d)

- **Feng Shui**
  - Designing work surroundings so the "Chi" or life force of the space is in harmony and balance with nature.

- **Workspace Design and Productivity**
  - Workspaces alone don’t provide substantial motivation.
  - Workspaces make it easier for employees to perform behaviors that make them more effective.
  - "Cognitive ergonomics": matching the office to the brain work.

Retail

- Consider customer behaviors
  - Placement of high-draw items (milk and bread)
  - Flow of both stockers and customers
  - Allocation of space to product type
  - Slotting fees

Maximize profitability per square foot of floor space

Servicescapes

- Ambient conditions
  - Pianist at Von Maur
  - Cinnabon in airports
- Spatial layout and functionality
  - Sitting areas in Barnes and Noble
- Signs, symbols, artifacts
  - Applebees’ photo and collectibles of area sports teams
Warehouse/Storage

Optimum trade-off
Handling costs – warehouse costs

Options

- ASRS
  - Automated Storage and Retrieval Systems
- Cross-Docking
  - Tight scheduling
  - Accurate product identification system
- Random Stocking
  - Place goods in open slots throughout the facility
- Customizing
  - Produce grading
  - Repackaging into different size lots

Fixed Position

Stationary projects
- Workers come to site
- Equipment is mobile
- Some aspects may be completed in another location
- Wausaw Homes
- American Design

Coordination of materials and labor
Process-Oriented

- High variety of production
- Machines/or equipment grouped into process groupings
- Most work described as job lots
- Print order
- Small batch of parts

Considerations
- Number of loads or people to be moved in a given period
- Distance-related costs of moving the above
Work Cells

Advantages
- Inspection is immediate
- Fewer workers needed
- Smaller work spaces
- Space more balanced
- Enhanced communication

Focus on single or groups of related products

Balancing Work Cells

Pace of production to meet customer demands.
- Takt time = Total work time available/Units required
- Workers required = Total operation time required/Takt time
Balanced Work Chart

Repetitive / Product-oriented
- Volume is adequate for high equipment utilization
- Stable product demand allows for investment
- Fairly standard product
- Materials and components standard

Assembly Line Balancing
- Advantages
  - Low variable costs
  - Low material handling cost
  - Reduced WIP inventory
  - Training easier
  - Rapid throughput
- Disadvantages
  - High volume required
  - Work stoppage ties up entire flow
  - Reduction of flexibility

Minimize imbalance
Fabrication or assembly line
**Cycle time**

- Maximum time allowed at each workstation

\[
\text{Cycle time} = \frac{\text{Production time available per day}}{\text{Units required per day}}
\]

**Heuristics**

Heuristics can provide solutions but not necessarily indicate the most optimal

- Longest task time
- Most following tasks
- Ranked positional weight
- Shortest task time
- Least following tasks