

Layout Strategy

Operations Management
Chapter 9

1

Objective

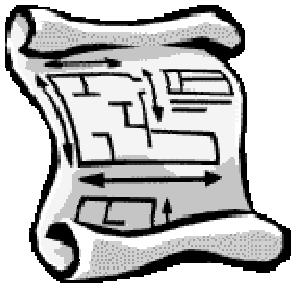
- ◆ To develop a cost-effective layout that meets the firm's competitive needs.
 - Utilization of space, equipment, people
 - Improved flow of information, materials, people
 - Improved employee morale
 - Improved customer/client interaction
 - flexibility

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Types of layouts

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



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Main considerations

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

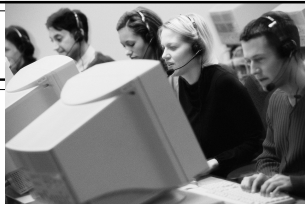


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Office

- 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



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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)

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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.

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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

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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

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Warehouse/Storage



**Optimum trade-off
Handling costs – warehouse costs**

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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

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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

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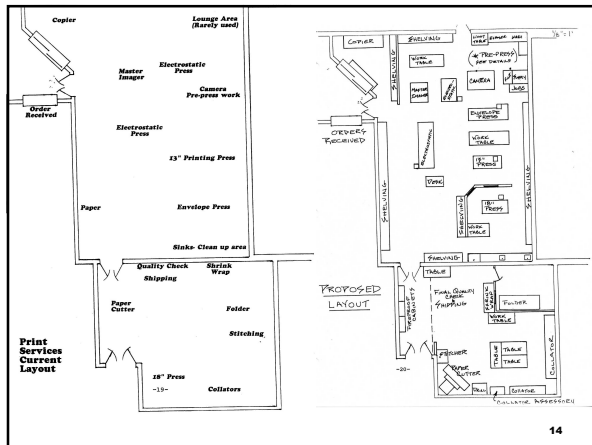
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Process-Oriented

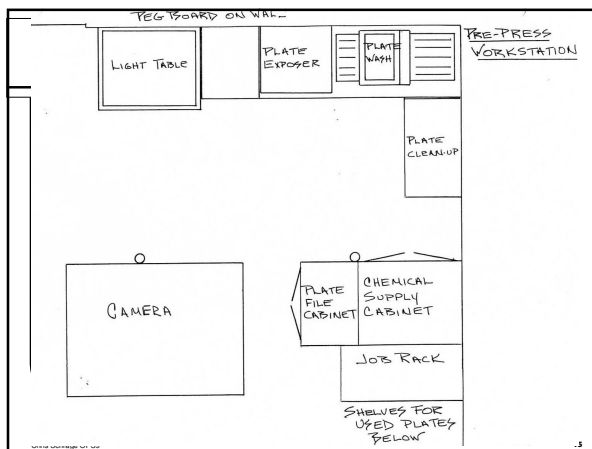
- High variety of production
- Machines/or equipment grouped into process groupings
- Most work described as job lots
 - Print order
 - Small batch of parts
- Considerations
 - Number of loads or people to be moved in a given period
 - Distance-related costs of moving the above

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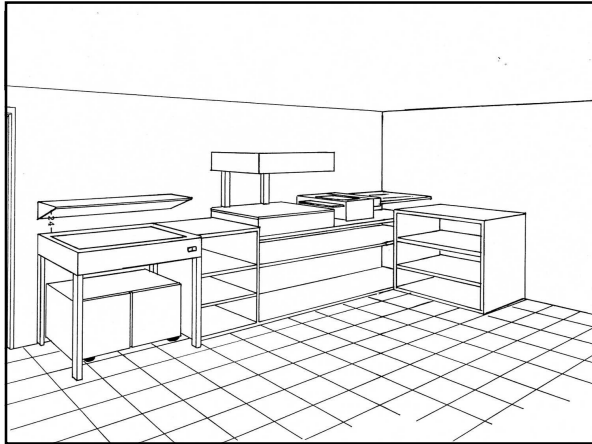
13




14



15



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

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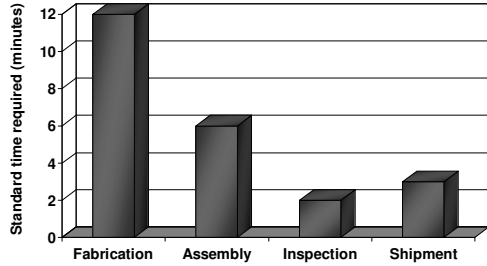
Balancing Work Cells

- ◆ Pace of production to meet customer demands.
 - ◆ Takt time = $\frac{\text{Total work time available}}{\text{Units required}}$
 - ◆ Workers required = $\frac{\text{Total operation time required}}{\text{Takt time}}$



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Balanced Work Chart



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Repetitive / Product-oriented

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



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Assembly Line Balancing

- | | |
|--|--|
| <ul style="list-style-type: none">• Advantages<ul style="list-style-type: none">• Low variable costs• Low material handling cost• Reduced WIP inventory• Training easier• Rapid throughput | <ul style="list-style-type: none">• Disadvantages<ul style="list-style-type: none">• High volume required• Work stoppage ties up entire flow• Reduction of flexibility |
|--|--|

**Minimize imbalance
Fabrication or assembly line**

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Cycle time

- ✿ Maximum time allowed at each workstation

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

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22

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

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23
