FACILITIES DESIGN
An Introduction

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FACILITIES: Examples

SUMMARY
- Fixed assets like building structures and inanimate resources that support the operations of a given activity.
- Facilities put together with humans, $ and/or materials, energy result in the activity

FACILITIES PLANNING

- Determines how an activity’s tangible fixed assets best support achieving the activity’s objectives.
- Planning determines course of action ahead of time so subsequent decisions can be made efficiently
- Design more technical details that with a use of model, describe the implementation of the plan

Facilities Planning Hierarchy
- Structure design: building and support services - gas, water, light, air, etc.
- Layout design: space requirements and location of resources in available space.
- Handling system design: movement of material, people, information and equipment.

Major functions of facilities design engineering viewpoint
- Location of the facility w.r.t. customers/suppliers
- Choice of resources
- Layout of resources/components
- Performance evaluation

The design process ends when the implementation phase of the physical design begins
2. Motivation

2.1 Reasons for facilities planning/design

• New field of endeavor
• Expansion due to volume or diversity
• Replacing an obsolete facility
• Relocating or consolidation
• Legal: Occupational Safety & Health Act (1970)

2. Motivation

2.2 Importance of facilities planning

• 1st phase in facility’s life cycle, significant savings can accrue

3. Facilities Planning Process

3.1 Problem Definition

• Criteria, wishes, constraints -- data: products / services to delivered and quantities
• Objective: to maximize overall efficiency & minimize total costs.
• Important costs:
  - Design - Construction - Installation - MIH
  - Transportation/distribution - Operating & maintenance
  - Wip - Change
• Criteria: may be mathematical function or wishes
  - Productivity - Capital investment - Space utilization
  - Flexibility - MIH effectiveness - Aesthetics

3.2 and 3.3 Analysis & synthesis: Fact gathering; primary and secondary support activities and their interrelationship -- space required

• Alternatives: generated by a search procedure
  - Exert the necessary effort
  - Do not get bogged down in details too soon
  - Make liberal use of the questioning attitude
  - Seek many alternatives
  - Avoid conservatism
  - Avoid premature satisfaction or rejection
  - Refer to analogous problems for ideas
  - Attempt to divorce your thinking from the existing solution
  - Consult others
  - Try the group approach

2. Motivation

2.2 Importance of facilities planning

• Majority of an organization’s capital investment is in facilities -- 8% of GNP ($250 billion) spent annually of facilities.
• Single most important cause of high material handling costs is lack of strategic facilities planning
• Material handling account for 20 - 50% of operating costs in manufacturing
• Effective material handling can reduce costs by 10 - 30%
• Long term effect: versatility, expandability, flexibility
• Environmental implications: hazardous waste disposal
• Safety, convenience, appearance - influence worker morale
• Lead to economic development
3. Facilities Planning Process

3.4 Evaluation: use models to assess performance w.r.t. criteria
- Scale (iconic) models - Symbolic (mathematical) models
- List of pros and cons - Ranking
- Factor analysis - Cost comparison

3.5 Selection: approvals

3.6 Implementation: physical execution and monitoring

“Single most important cause of high material handling costs is lack of strategic facilities planning”