

4. Facilities Engineering and Energy Management

Facilities Engineering is concerned with the arrangement of physical resources to support the optimal production and distribution of goods and services. Energy Management includes the planning and operation of energy required in facilities to support the production and distribution of goods and services. Their close interrelationship accounts for their knowledge topic described in a common section.

4.1. Facilities Location

- 4.1.1. Single-facility placement
- 4.1.2. Multiple-facility placement and tradeoffs with a single facility
- 4.1.3. Location-allocation problems
- 4.1.4. Global facilities

4.2. Facilities Sizing

- 4.2.1. Customer demand/market analysis/inventory implications
- 4.2.2. Product, process, and schedule analysis
- 4.2.3. Equipment selection and requirements analysis
- 4.2.4. Personnel requirements analysis
- 4.2.5. Space requirements analysis
 - 4.2.5.1. Workstations
 - 4.2.5.2. Storage
 - 4.2.5.3. Departments
 - 4.2.5.4. Aisles
 - 4.2.5.5. Offices

4.3. Facilities Layout

- 4.3.1. Basic layout types
 - 4.3.1.1. Applications
 - 4.3.1.2. Advantages
 - 4.3.1.3. Disadvantages
- 4.3.2. Data requirements
- 4.3.3. Traditional approaches
 - 4.3.3.1. Systematic layout planning
 - 4.3.3.2. Flow process chart
 - 4.3.3.3. Activity relationship chart
 - 4.3.3.4. From-to chart
 - 4.3.3.5. Distance measures
- 4.3.4. Basic algorithms
 - 4.3.4.1. Construction
 - 4.3.4.2. Improvement
 - 4.3.4.3. Hybrid
- 4.3.5. Americans with Disabilities Act
- 4.3.6. Evaluation of alternative layouts

4.4. Material Handling

- 4.4.1. Material handling principles
- 4.4.2. Unit of measure
- 4.4.3. Equipment types and selection
- 4.4.4. Models for material handling system design

4.5. Storage, Warehousing, and Distribution

- 4.5.1. Storage/warehouse/distribution functions
- 4.5.2. Storage policies
- 4.5.3. Order picking methods and design principles
- 4.5.4. Analytical models of order picking functions
- 4.5.5. Storage/retrieval equipment and systems
- 4.5.6. Location and layout of docks
- 4.5.7. Design for racks and block stacking
- 4.5.8. Warehouse layout models

4.6. Plant and Facilities Engineering

- 4.6.1. Building codes compliance and use of standards
- 4.6.2. Structural systems
- 4.6.3. Atmospheric systems
- 4.6.4. Enclosure systems
- 4.6.5. Lighting and electrical systems
- 4.6.6. Life safety systems
- 4.6.7. Security and loss control systems
- 4.6.8. Sanitation systems
- 4.6.9. Building automation systems
- 4.6.10. Facilities maintenance management systems

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