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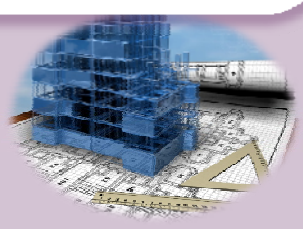
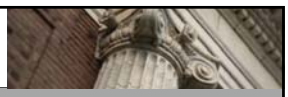
FACILITIES DEISGN & MATERIAL HANDLING



Instructor Information



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- – Favorite …

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Teacher Assistant

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Objective

- Learn the layout of different production or service process
- How to estimate the material flow in a plant
- How to design plant layout, warehouse layout, etc.
- How to locate your plant, warehouse

Text and Reference Book

- Meryers, Manufacturing facilities design and material handling, Prentice Hall
- 蔡临宁，物流系统规划，机械工业出版社
- Tompkins, Facilities Planning, Jonh Willy
- Heragu, Facilities Design, PWS

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Software you may need to learn/use

- Flexim
- Proplanner
- Factory CAD
- Visio
- Smart Draw
- Auto CAD

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Calendar

Week	Date	Contents	Remark
1	2010/09/17	Introduction/Lean Production	
		Information source of facilities design	
2	2010/09/26	Capacity Planning	9/24
		Product/Service/Process/ Design	
3	2010/10/01	Holiday	
4	2010/10/08	Material flow Analysis Value Stream Mapping, Process Chart	
		Activity Relationship Analysis	
5	2010/10/15	Introduction to Systematic Facilities Planning Layout planning method(SLP)	
		Computerized layout planning method	
6	2010/10/22	Lab	
		Material Handling	
7	2010/10/29	Material Handling Equipment	
		Warehouse Operation	
8	2010/11/05	Manufacturing System	
		Review	

Grade

- 20% assignment
- 10% Lab
- 70% exam
  - NO copy
  - NO late of due date
  - NO reason
  - Score: ZERO for any reason

Assignment Requirement

- Assignment#number_学号_姓名
  - Aassignment#01_2007010888_张三
- No PDF version
- Deanline: 24:00 Wednesday

Result

- You will get
  - 1. Plant layout, including the space, road, MHS, …
  - 2. Report
- You will learn
  - 1. Theory/Concept/Principle: LP, SLP
  - 2. Method: Layout
  - 3. Tools: Proplanner

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First day topic

- What is facilities?
  - Plant, warehouse, bank, hospital, restaurant,
  - Machine,
  -
- What is planning? What is layout?
  - Facilities layout
  - Facilities design
  - Facilities planning
- Facilities planning in Lean Times

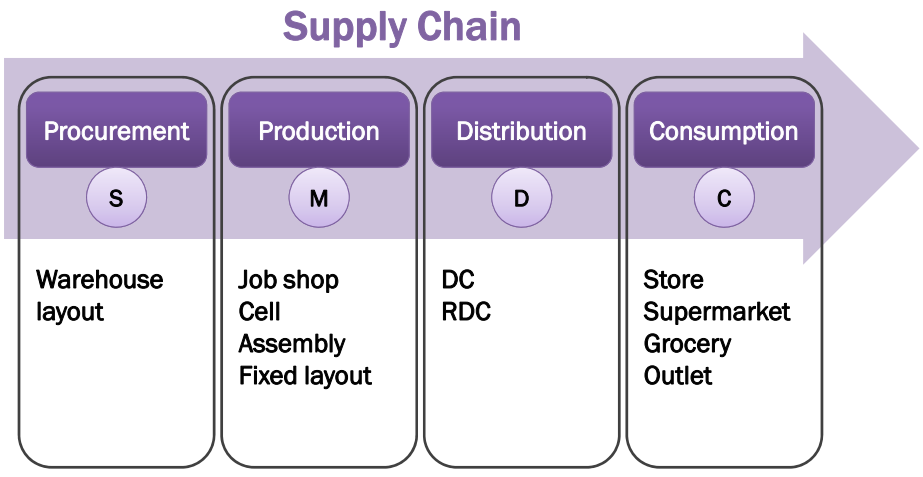
Outline

- 1. Concept
  - 1.1 facilities
    - 1.1.1 facilities in a supply chain
    - 1.1.2 facilities in service area
  - 1.2 facilities layout
    - Smart Car Plant/ OPEL Plant layout
  - 1.3 LM/SCM
- 2. Architecture design and facilities design
-

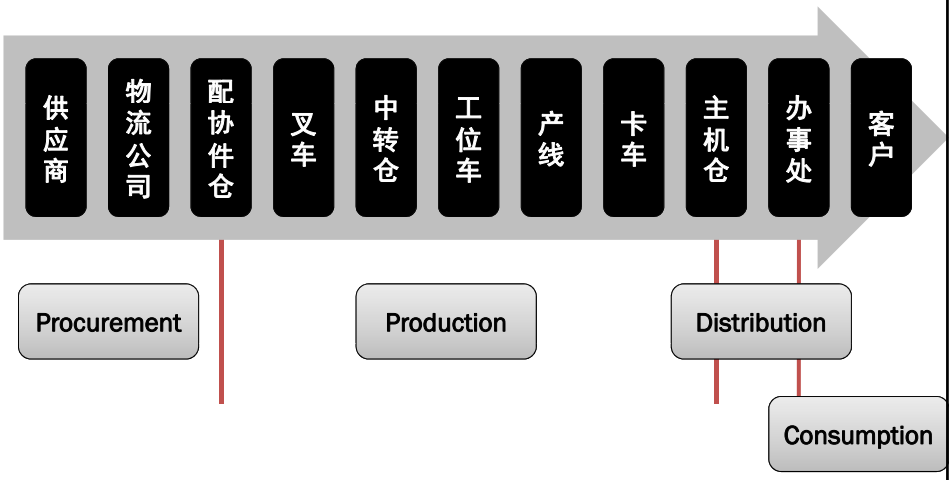
1.1 Facilities

- Facilities in your life?

1.1.1 Facilities in a supply chain



Example: YUCHAI



1.1.2 Facilities in service area

1.1 Facilities

Manufacturing	Service
Plant	Department Store
Job shop	Grocery Store
Assembly line	Supermarket
warehouse	Outlet

1.2 Facilities Layout

Benz Smart Car

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OPEL, Germany

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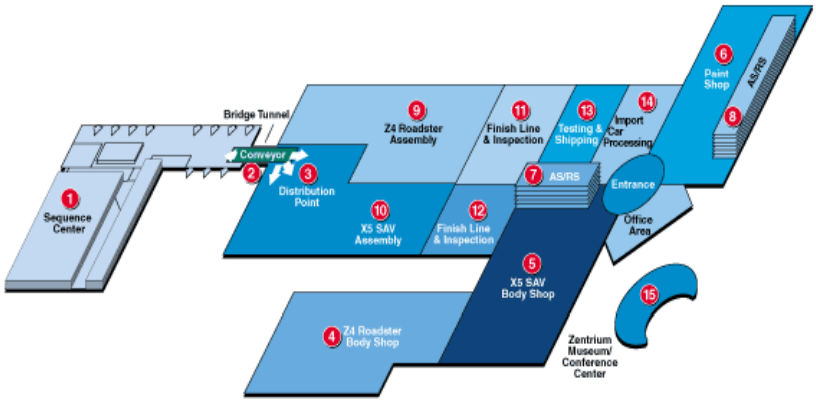
OPEL，2002

What is the difference between OPEL and Smart Car plant

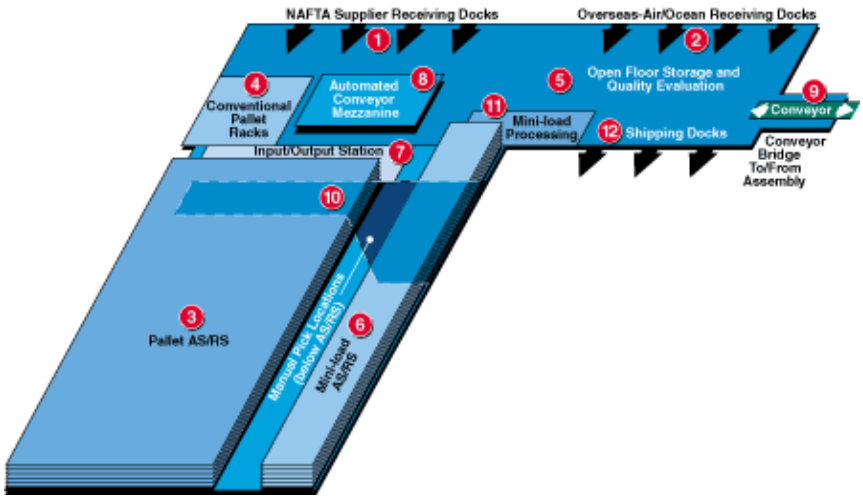
1.3 Logistics Management

- 1. Logistics Management/ Supply Chain Management
- 2. Material flow/Material Handling

BMW, SC, USA



BMW Sequence Center



Your IE Skills and the Desig n Process

"The involvement of Industrial Engineers in the design process enhances and optimizes all aspects of architectural professional practice in commercial, healthcare, or industrial projects. Traditionally. IEs possess skills and analytical tools for determining **site selection, space requirements, flow/activity analysis, and space/function relationship programming**. Using these skills, the engineer brings value to the overall design by assisting in operations planning, concept design, and layout evaluation and therefore yielding a more cost-effective and functional design."

Industrial Engineering Services Supporting Architectural Design

PRIMARY SERVICES

Facility Location
- Site Analysis
- Optimal Location Modeling

Process Evaluation
- Process Flow Charting
- Simulation
- Room/Equipment Utilization
- Benchmarking

Systematic Layout Planning Process

SECONDARY SERVICES

Project Management
Financial Analysis
Maintenance Planning and Scheduling

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The Architectural Design Process

Predesign
bubble diagram

Schematic design
existing floorplan
schematic floorplan
existing elevations
schematic elevations

Design development
site plan
floor plan
elevations
section
3D model

Construction documents
cover sheet
site plan
floor plan
roof plan
elevations
sections
details

Predesign

of a project occurs immediately after a client signs the contract. During this phase, the owner and the Principle in Charge establishes the owner's program of financial and time /'space requirements. Spatial requirements and relationships are diagramed as studies.

Schematic Design

is the stage in which the general scope, conceptual design and the scale of the project components are established. The bubble diagram is convert to floorplan and elevations.

Design development

The design development phase refines the scope of work previously approved in the schematic design phase. In this phase, the project is developed to a level of detail necessary to work out a clear coordinate description of all aspects of the project.

Construction documents

During this phase, the team is focused on finalizing the drawings and specifications for all components and systems of the building. A set of contract documents will be produced for the contractor to use to bid and build the project. The drawings are signed, sealed and issued to the city for permitting.

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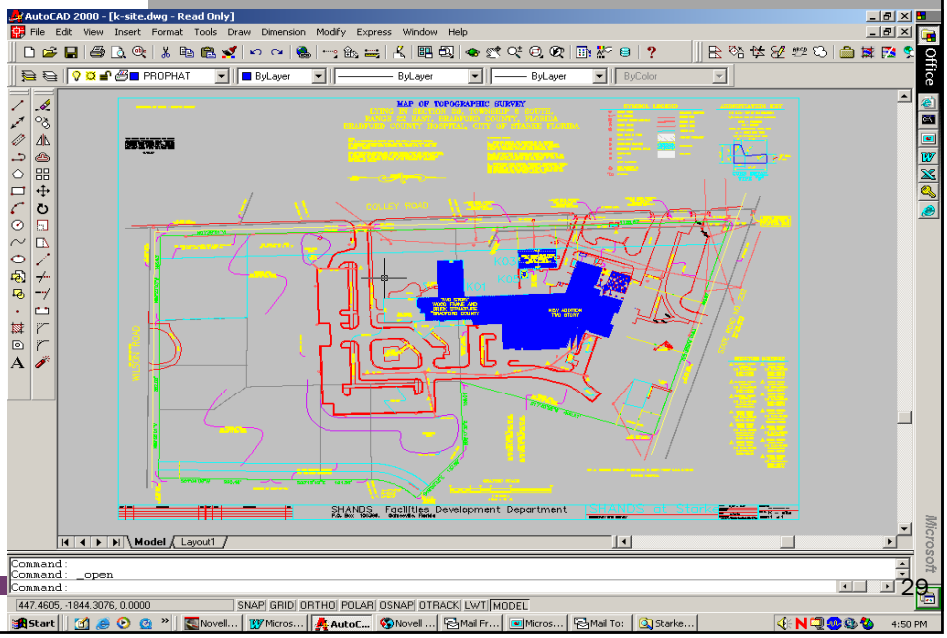
Example: Site Plan



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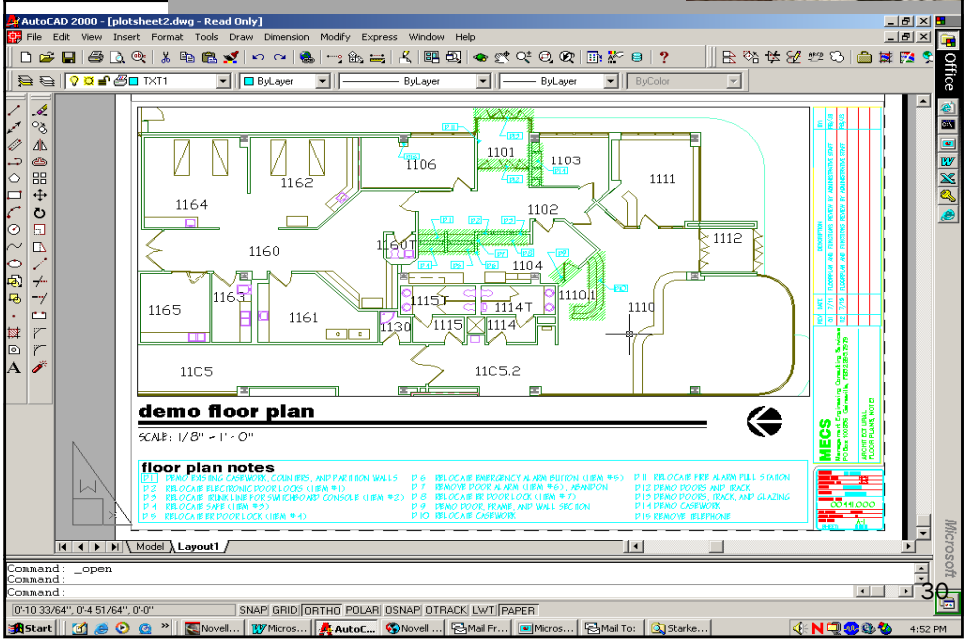
Example: Floor Plans - DEMO



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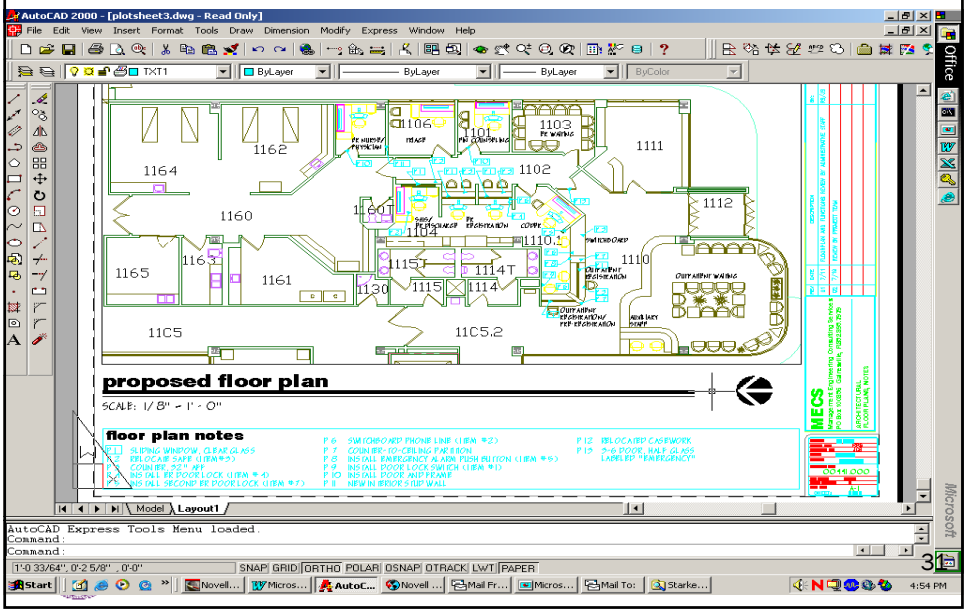
Example: Floor Plans - PROPOSED



Key Points to Remember

SITE

- Orient client to site using the “1,000’ view”
- Factors that effect the site: roads, supply avenues, utilities, parking, access
- North seeking arrow
- Label major roads and places of interest that surround the site

Layout

- Demo plan and proposed floor plan
- Clearly identify all changes
- Remember the 3D environment, floor to ceiling
- Review feasibility with client prior to finish layout
- Not sure? Ask an expert.
  - Architect
  - Engineers - Civil, Mechanical, Electrical, Structural
  - Contractor
  - Developer

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Assignment

- 1. Is the facilities planning still hot?
  - Hint: Keywords, and database search