

# Problem 15

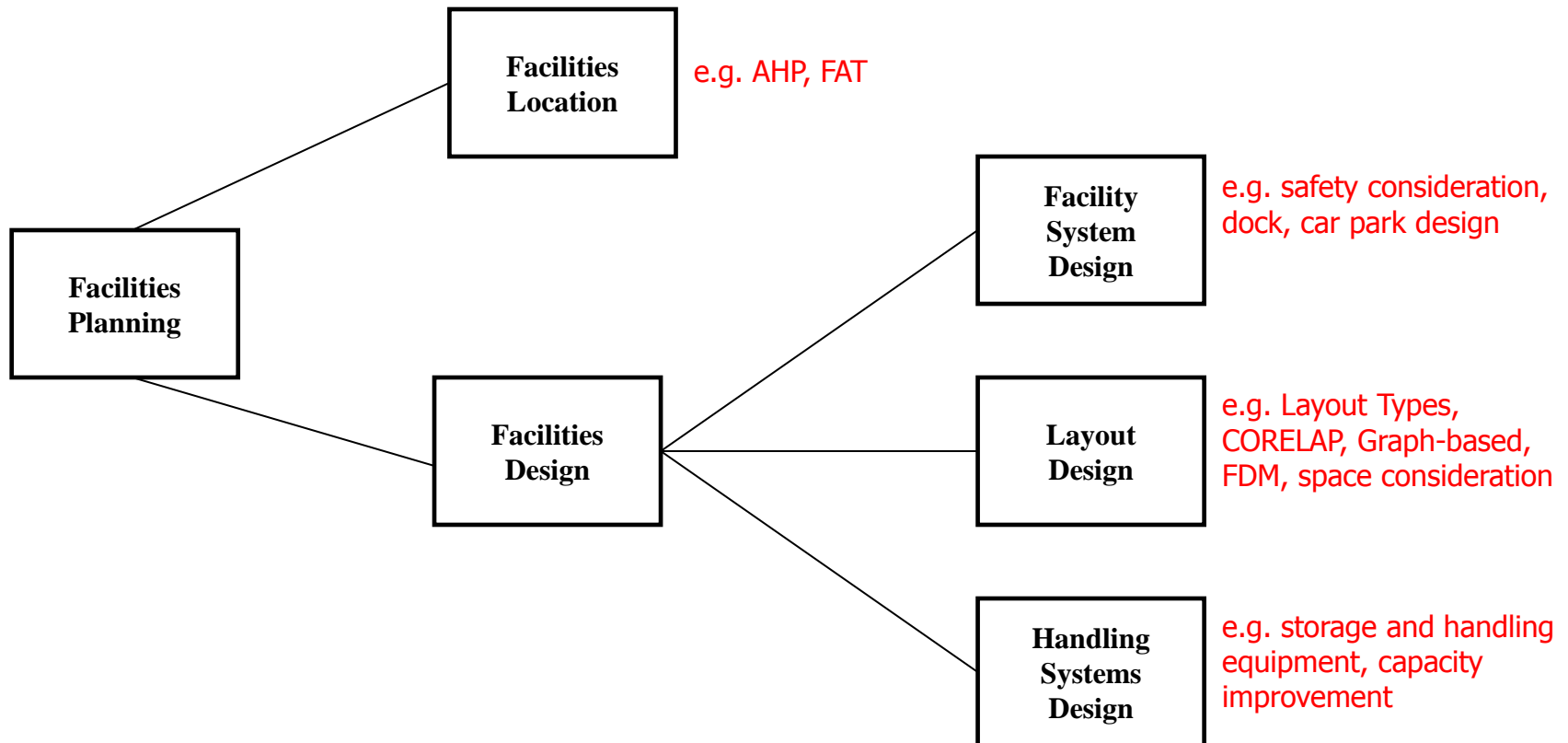
## Reviewing RP Sport Facilities for SEA Game 2015

SCHOOL OF  
ENGINEERING

# Recall : Facilities Planning Hierarchy



Facilities planning covers both facilities location and facilities design.



# Recall: Factors Affecting Location Selection

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- Regional factors
- Market location
- Raw material and supplier proximity
- Transportation facilities
- Labour climate
- Quality of life
- Government

# Recall: Facilities Design

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Facilities design consists of the facility systems, layout and handling system:

- o Facility systems – structural, atmospheric, enclosure, lighting, electrical, communications, safety and sanitation systems
- o Layout – equipment, machinery, furnishings and fittings within the facility envelope
- o Handling system – the mechanisms needed to satisfy the required movements within the facility

# Recall: Facilities Planning for Personnel Requirements

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Key aspects to consider when doing facilities planning:

- Locker rooms – proximity to staff entrances, allocation by gender, ventilation, traffic flow
- Restrooms – near work area, minimum number required, privacy, allocation by gender
- Food services – number of staff, kitchen and dining area layout, ease of cleaning, aesthetic factors, location, ventilation
- Drinking fountains – quantity, location, distribution
- Health services – first aid room and first aid kits, location, evacuation routes
- Car parks – number of staff, space utilization, traffic flow

# Recall: Layout Types

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## **Basic layout types:**

1. Fixed-position
2. Product
3. Process
4. Cellular
5. Mixed

## **Types of flow: Materials, People, Equipment, Documents**

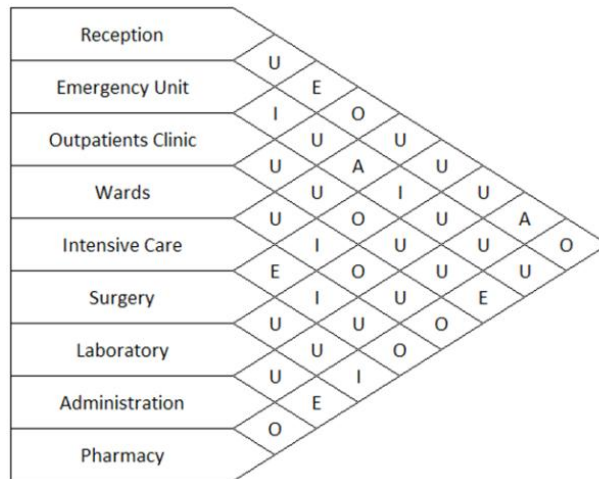
- Flow can be within workstation, within a department (intra-cell) or between departments (inter-cell)
- Equipment requirements planning is important for layout planning.

# Recall: REL Chart and CORELAP



A relationship (REL) chart shows the relationship between all the department

The manual CORELAP algorithm is an initial process layout method which makes use of the REL chart. CORELAP algorithm attempts to maximize the Weight Placement (WP) values between the departments.



Example of REL Chart

# Recall: Space Requirement

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- Determining the amount of space required in a facility is perhaps the most difficult determination in facilities planning
- Determine the space requirement based on workstation specifications for equipment, materials, and personnel and departmental specifications.
- Aisles has to be taken into account when doing space planning. Typical aisle space for personnel: 3 feet

# Facility Systems

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- 1) **Structural System:** Refers to the steel skeleton frame or reinforced concrete skeleton frame used in most industrial facilities
  
- 2) **Enclosure System:** Refers to the floor, walls and room within a facility
  
- 3) **Atmospheric System:** Refers to systems for heating, ventilation and air-conditioning that control the temperature, humidity and cleanliness of a facility
  
- 4) **Electrical and Lighting System:** Refers to electrical mains, switchgear, transformers, feeders, panel boards and circuits
  
- 5) **Life Safety System :** Refers to systems that are designed to control emergency situations created by fire, seismic events and power failure
  
- 6) **Sanitation System :** Refers to refuse handling system and plumbing system

# Recall: Materials Handling Equipment

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## **Types of Material Handling Equipment**

- Industrial Trucks
- Automated Guided Vehicles
- Monorail
- Conveyors
- Cranes & Hoists
- Fork Lifts
- Automated Storage/Retrieval Systems (AS/RS)
- Hand Trucks

## **Material Handling Principles**

- |                              |                                |
|------------------------------|--------------------------------|
| 1) Planning Principle        | 6) Space Utilization Principle |
| 2) Standardization Principle | 7) System Principle            |
| 3) Work Principle            | 8) Automation Principle        |
| 4) Ergonomic Principle       | 9) Environmental Principle     |
| 5) Unit Load Principle       | 10) Life Cycle Cost Principle  |

# Recall: Vehicle Parking Design

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## **Procedures:**

- 1) Determine the number of vehicles to be parked
- 2) Determine the space requirement for each vehicle
- 3) Determine the available space
- 4) Determine alternative parking layouts for different parking configurations
- 5) Modifying alternatives based on any other requirements
- 6) Select the most suitable layout

# Some Guidelines and Regulations for Facility Plan

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- 1) Workplace Health and Safety Act
- 2) Environmental Pollution Control Act
- 3) Singapore Fire Safety Act
- 4) Provision of Parking Places and Parking Spaces Rules

# Example of an Facility Evaluation Report



## CONTENTS

1. disclaimer
- I. SITE CHARACTERISTICS
  - A. Existing conditions
  - B. Grounds maintenance
- II. BUILDING STRUCTURES
  - A. Interior
  - B. Exterior
- III. SYSTEMS AND EQUIPMENT
  - A. General
  - B. HVAC
  - C. Electrical
  - D. Plumbing
- IV. SAFETY AND FIRE PROTECTION
  - A. General safety
  - B. Fire protection
- V. ENVIRONMENTAL COMPLIANCE
  - A. Regulatory
  - B. Internal
- VI. DEPARTMENT OPERATIONS
  - A. Organizational
  - B. Personnel
  - C. Quality of service
  - D. Records retention
- VII. EVALUATION SUMMARY
- VIII. SUPPORTING DOCUMENTATION
- IX. CORRECTIVE ACTION PLAN

## Corrective Action Plan

PLAN OF ACTION				
(compliance schedule for recommendations taken from the Physical Plant Operations August 1988 department assessment)				
PRIORITY	RDC #	RECOMMENDATION	RESOURCES NEEDED	EST. COMPLETION
1	47	Develop a policy for use of Physical Therapy Department equipment by non-patient personnel	Plant Operations/Physical Therapy Depts	Sept 88
2	48	Develop policies that address access to the emergency area by vehicles	Plant Operations Dept	Sept 88
3	49	Have Departments safety manual reviewed by the Safety Committee	Plant Operations Secy Safety Committee	Sept 88
4	50	Implement a hazard surveillance program which reports findings to the Safety Committee	Plant Operations Dept Risk Manager Safety Committee	Sept 88
5	51	Monitor the results of safety programs for their effectiveness at least annually	Plant Operations Dept Safety Committee	Ongoing
6	52	Contingency plans need to be developed in the event of the loss of communications systems in the hospital - this includes telephone, nurse call and paging systems	Plant Operations Dept	Sept 88
7	53	Fire Drill critiques do not show corrective actions taken	Safety Committee	—
8	54	All individuals are in-serviced on the use and handling of hazardous materials needs documented	Plant Operations Dept Risk Manager	Ongoing
9	55	Include the nurse call and paging systems in the communication system PM program	Plant Operations Dept Computerized PM program	Sept 88
10	56	Develop alternate means of communications for systems where failure can have life threatening consequences	Plant Operations Dept	Sept 88
11	57	Install a call bell in the laboratory patient restroom	Maintenance Section	Sept 88

Extracted from Facilities Evaluation Handbook 2<sup>nd</sup> Edition  
 K.L Petrocelli and Albert Thumman,  
 The Fairmont Press, Inc

# P15 Suggested Solution



# Problem Statement: Evaluating the Existing Facility Plan

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When evaluating a facility layout plan, there are some questions you may want to consider:

- 1) What is the facility objective(s)?
- 2) Is the facility suitably located?
- 3) What is the layout type used?
- 4) Is the layout type suitable?
- 5) What are the material handling equipment used?
- 6) How does the traffic flows within the facility?
- 7) Does the layout suits the facility objective(s)?
- 8) Are the sport amenities placed appropriately?
- 9) Are there sufficient facility system (Example: life safety equipment) and are they suitably located?
- 10) Does the facility adhere to various guidelines and requirements? (Example: aisle space, amenities space and etc.)
- 11) How will the facility systems be maintained?
- 12) How could the facility layout and plan be improved?

# Facility Plan of RP Aquatics Facilities

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## Strengths:

- Olympic size swimming pool with training pool.
- Ample equipment for swimming events
- Good access control in place

## Weakness:

- Small Parking lots for coach buses and cars.
- Size of changing room and waiting area
- Need to relook into the flow of human traffic during big events.

## Potential Area for Improvement:

- Car Park Lot Expansion
- Expansion of changing area and waiting area to meet the SEA Game capacity

## Other Area for consideration:

- Accessibility for the handicapped
- Human Traffic Flow during large sporting events
- Emergency exit plan and routes setup for big event

# Learning Objectives

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- Identify and analyze the strengths and weaknesses of an existing layout based on requirements.
- Prepare a facility evaluation report for an existing layout plan