- an up-and-down repetitive movement in demand

- Seasonal pattern
  - an up-and-down repetitive movement in demand occurring periodically

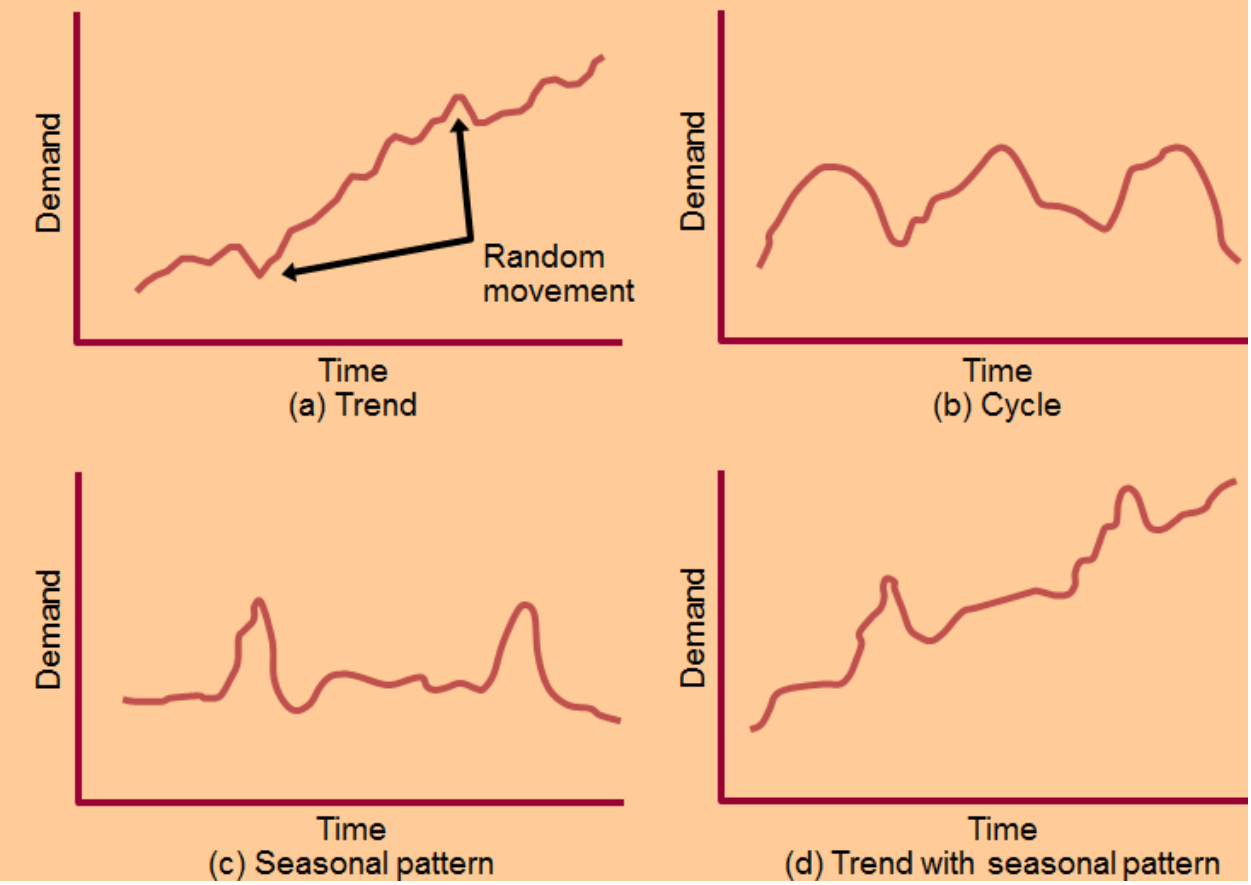

Fig 3.3 Forms of Forecast Movement

CHAPTER-IV
FACILITY PLANNING

To produce products or services business systems utilize various facilities like plant and machineries, ware houses etc.

Facilities can be broadly defined as buildings where people, material, and machines come together for a stated purpose – typically to make a tangible product or provide a service.

The facility must be properly managed to achieve its stated purpose while satisfying several objectives. Such objectives include producing a product or producing a service

• at lower cost,
• at higher quality,
• or using the least amount of resources.

4.1 Definition of Facilities Planning

Importance of Facilities Planning & Design Manufacturing and Service companies spend a significant amount of time and money to design or redesign their facilities. This is an extremely important issue and must be addressed before products are produced or services are rendered.

A poor facility design can be costly and may result in:
• poor quality products,
• low employee morale,
• customer dissatisfaction.

4.2 Disciplines involved in Facilities Planning (FP)

Facilities Planning (FP) has been very popular. It is a complex and a broad subject. Within the engineering profession:
• civil engineers,
• electrical engineers,
• industrial engineers,
• mechanical engineers are involved in FP.

Additionally,
• architects,
• consultants,
• general contractors,
• managers,
• real estate brokers, and
• urban planners are involved in FP.

4.3 Applications of Facilities Planning (FP)

Facilities Planning (FP) can be applied to planning of:
• a new hospital,
• an assembly department,

• an existing warehouse,
• the baggage department in an airport,
• department building of IE in EMU,
• a production plant, • a retail store,
• a dormitory,
• a bank,
• an office,
• a cinema,
• a parking lot,
• or any portion of these activities etc.

4.4 Factors affecting Facility Layout

Facility layout designing and implementation is influenced by various factors. These factors vary from industry to industry but influence facility layout. These factors are as follows:

- The design of the facility layout should consider overall objectives set by the organization.
- Optimum space needs to be allocated for process and technology.
- A proper safety measure as to avoid mishaps.
- Overall management policies and future direction of the organization.

4.5.1 Break-Even Analysis

The objective is to maximize profit. On economic basis only revenues and cost need to be considered for comparing various locations.

The steps for locational break-even analysis are :

- Determine all relevant costs for each location.
- Classify the location for each location in to annual fixed cost and variable cost per unit.
- Plot the total costs associated with each location on a single chart of annual cost versus annual volume.
- Selwct the location with the lowest total annual cost(TC) at the expected production volume.

Question:

Potential locations A,B and C have the cost structures shown below for manufacturing a product expected to sell for Rs 2700 per unit. Find the most economical location for an expected volume of 2000 units per year.

Site	Fixed Cost/year	Variable Cost/Unit
A	6,000,000	1500
B	7,000,000	500
C	5,000,000	4000

Solution:

For each plant find the total cost using the formula

TC=Fixed cost+ Variable cost/unit (volume)

= FC+VC(v)

Site	Total Cost
A	6,000,000+1500*2000=9,000,000
B	7,000,000+500*2000=8,000,000
C	5,000,000+4000*2000+13,000,000

From the above table, the cost of for the location B, is minimum. Hence it is to be selected for locating the plant.

Production Volume	Site A	Site B	Site C
500	6750000	7250000	7000000
1000	7500000	7500000	9000000
1500	8250000	7750000	11000000
2000	9000000	8000000	13000000
2500	9750000	8250000	15000000
3000	10500 000	8500000	17000000

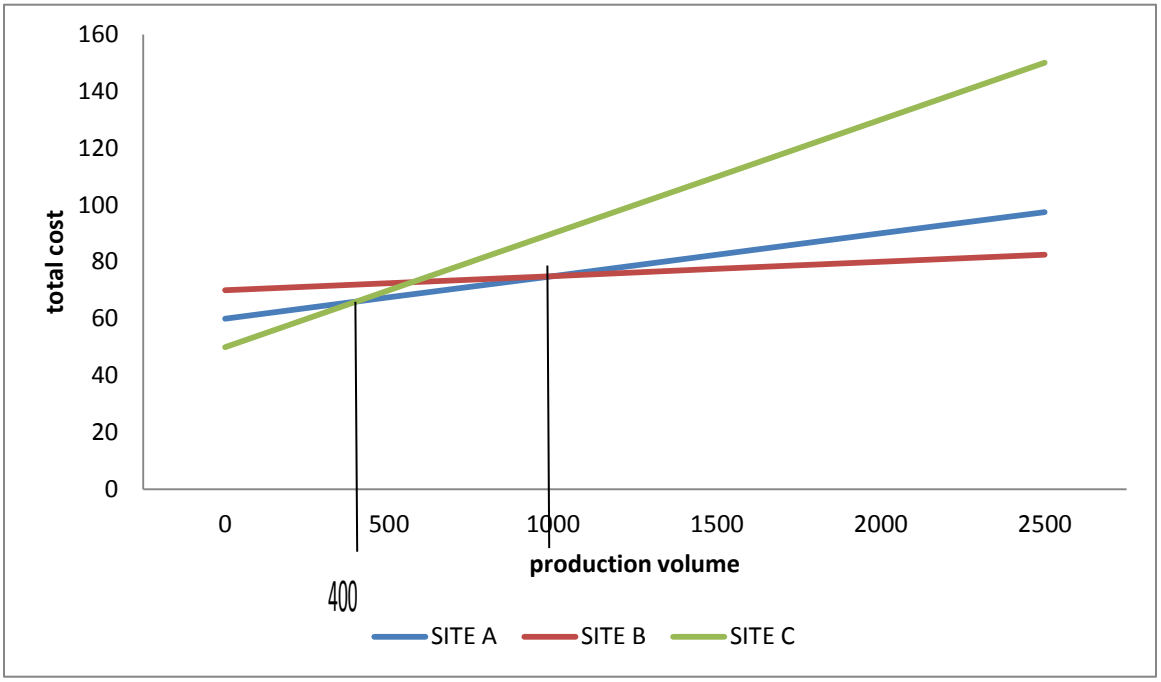

Fig 3.1 Break even analysis