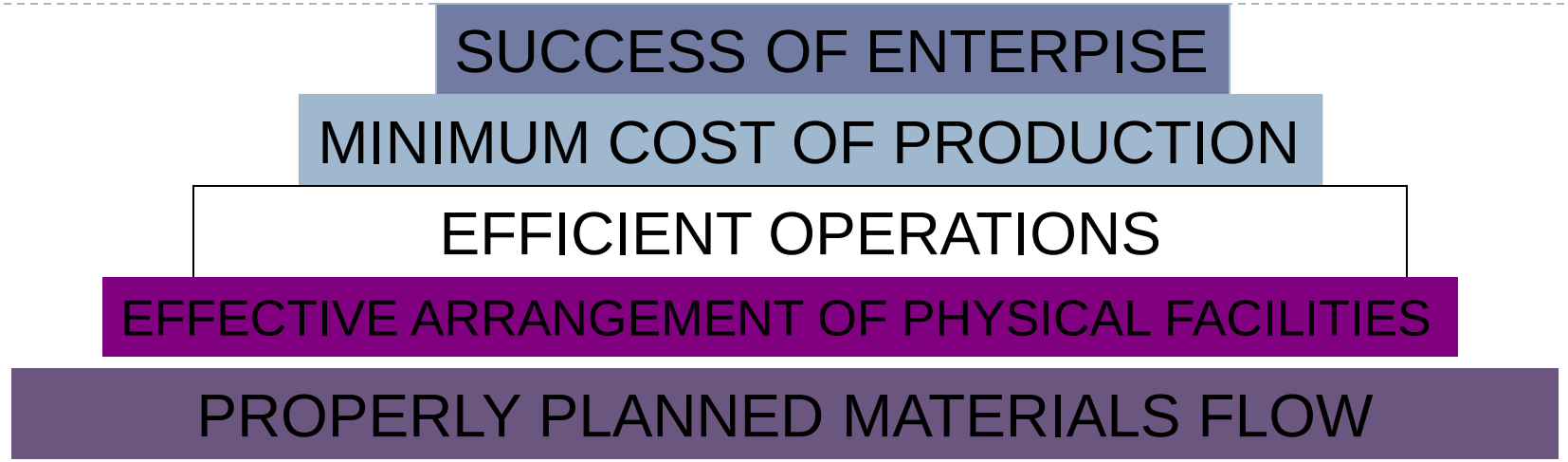
DESIGNING OF MATERIAL FLOW

4-5th week

Productivity is best served by an efficient flow of the elements that move through the facility.

A primary objective in planning an efficient enterprise is to provide for element flows that will facilitate the efficient movement of the elements through the activities



Important of the material flow pattern

The material flow pattern becomes the foundation for not only the basic design of the facility, but for the overall efficiency of the entire operation.

The overall success of an enterprise or at least its profitability, is a direct reflection of the effort that goes into the flow planning

Advantages of planned material flow:

1. Increased efficiency of production, productivity
2. Better utilization of floor space
3. Simplified handling activities
4. Better equipment utilization, less idle time
5. Reduced in-process time
6. Reduced in-process inventory
7. More efficient utilization of work force
8. Reduced product damage
9. Minimal accident hazards

10. Reduced walking distances
11. Reduced traffic congestion in aisles
12. Basis for an efficient layout
13. Easier supervision
14. Simplified production control
15. Minimal back-tracking
16. Smooth production flow
17. Improved scheduling process
18. Reduced crowded condition
19. Better housekeeping
20. Logical work sequence

Factors for consideration in PMF:

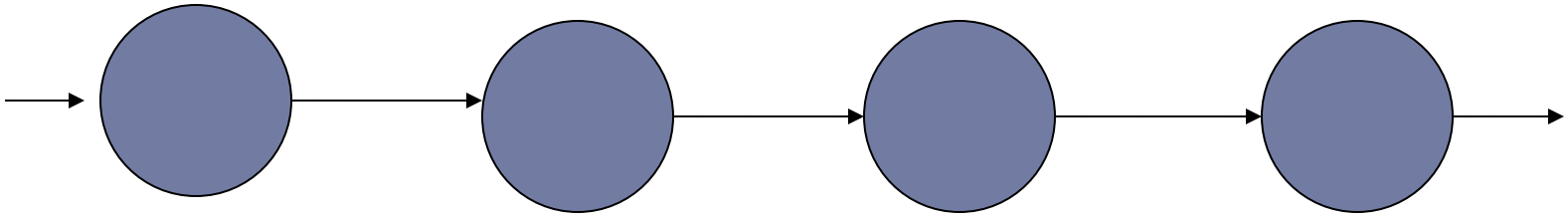
1. Material or product: characteristics, volume of production, number of different parts, number of operations, storage requirements
2. Moves: frequency, speed, volume, scope, area, distances, sources, destinations, cross traffic, required flow between work areas, location of receiving and shipping
3. Handling methods: unit handled, possible use of gravity, MH principles, desired flexibility, equipment required, possible alternatives, preliminary MH plans.

3. Process: type, sequence of operations, possibility of performing during move, specific requirements of activities, product vs. process layout, quantity of equipment, space requirements, number of sub-assemblies
5. Building: size, shape, type, number of floor, location of doors, location of columns, aisle width or location, ceiling height, desired location of department
6. Site: topography, transportation facilities, expansion possibilities
7. Personnel: number, movement, safety, working conditions, supervisory requirements

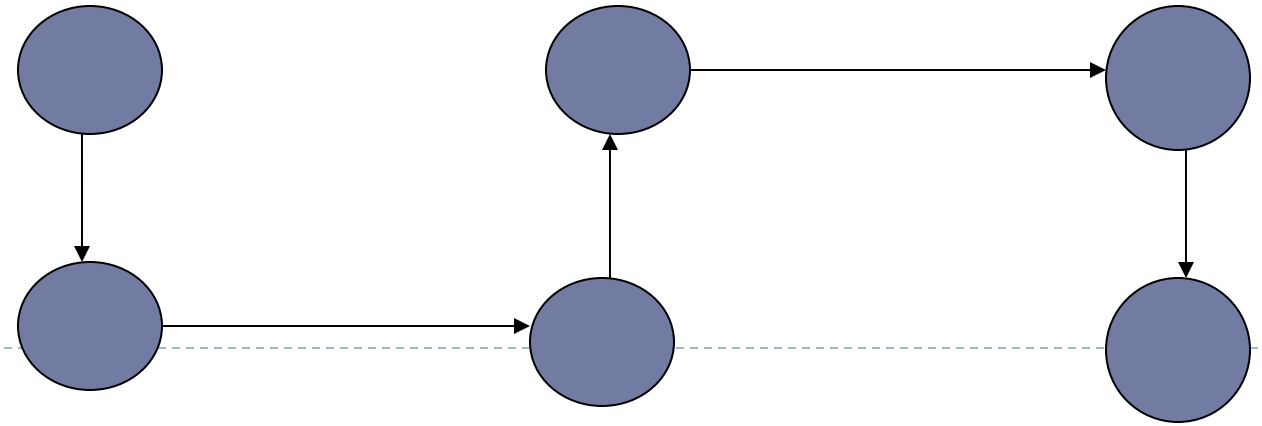
8. Miscellaneous: location of auxiliary services and activities, possible damage to materials, cost of implementation, production control, flexibility, expandability, levels of activity.

General flow patterns

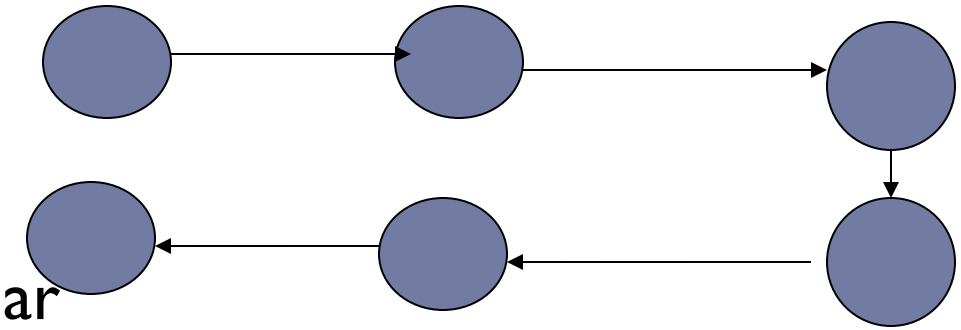
- Straight line



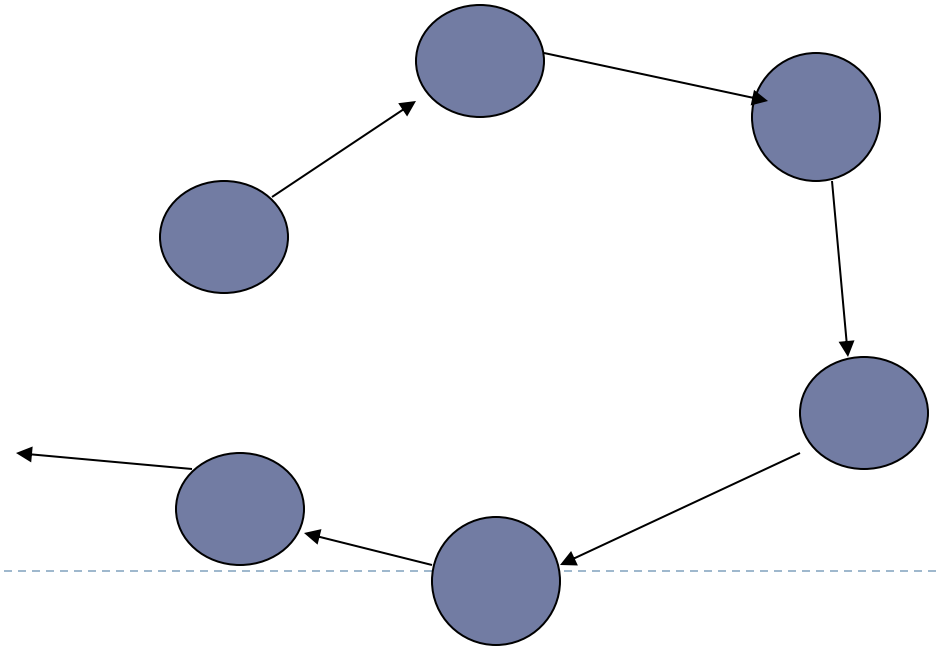
- Serpentine or zig-zag



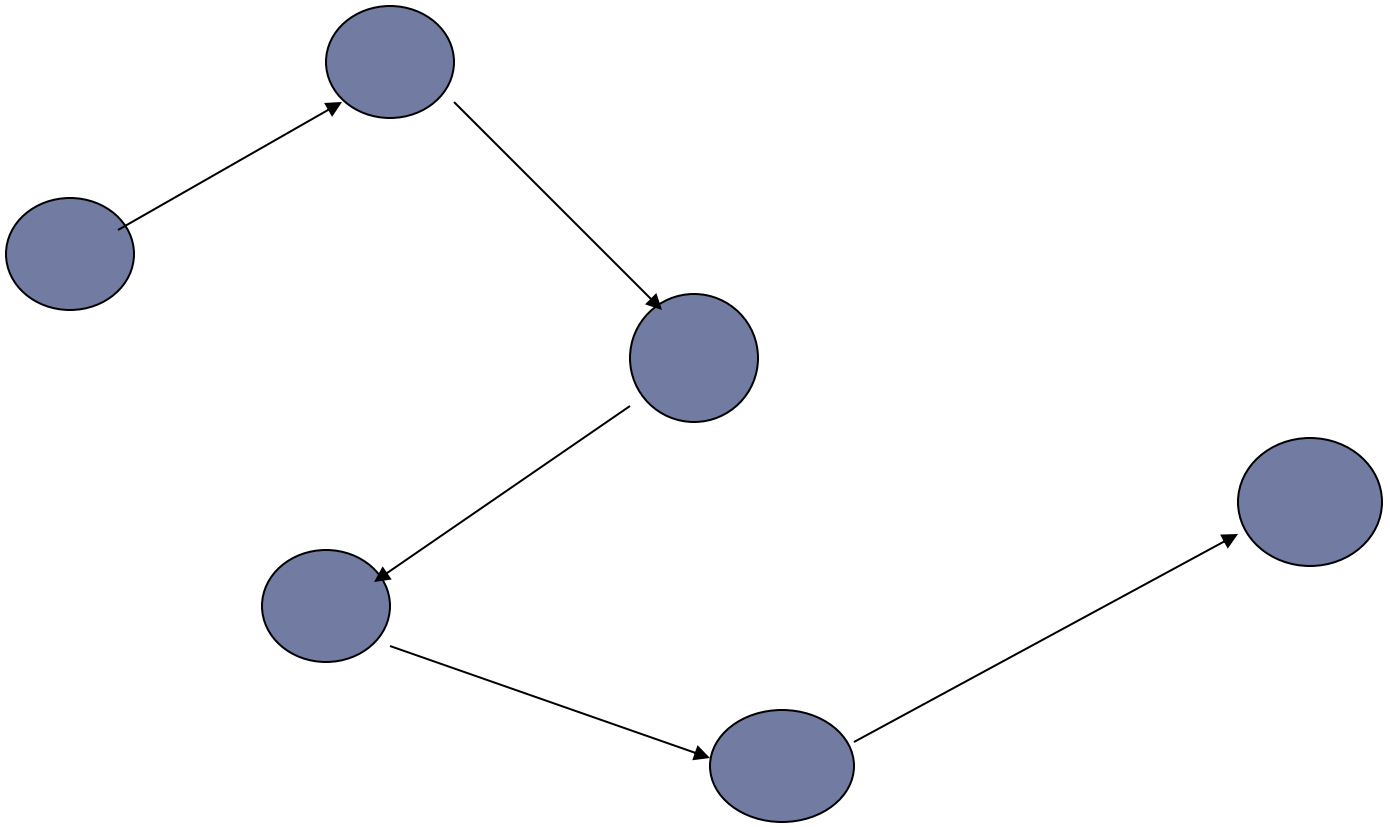
- U-shaped



- Circular



- Odd-angle



Conventional techniques for analyzing MF:

1. Assembly chart
2. Operation process chart
3. Multi-product process chart
4. String diagram
5. Process chart
6. Flow diagram
7. Flow process chart
8. From-to chart
9. Procedure chart
10. Critical Path Method

Quantitative techniques for analyzing MF:

1. Linear programming technique
2. Assignment problems
3. Transportation programming problems
4. Transshipment programming problems
5. The traveling salesman problem
6. Integer programming technique
7. Dynamic programming technique
8. Level curve technique
9. Queuing theory technique
10. Conveyor analysis
11. Simulation