1. General Definition & Terms

Primary Business Processes

1. Product Life Cycle Process
2. Order Fulfillment Process

Production: parts manufacturing plus assembly + logistics

Assembly: to combine two or more components in a *defined time* and a *certain order* (reversible or irreversible)

Activity Groups During Assembly

feeding, checking, adjusting, axuiliary functions, joining

Production Principles

a) **Place principle: Local/Box** (fixed station) assembly

b) **Place principle: Standalone (Workbench)** assembly

c) **Flow principle: Sequence** assembly

d) **Flow principle: Flow-line** assembly

e) Semi-automatic assembly

f) Automatic assembly

a) Local/Box (fixed station) Assembly

Definition:

• Assembly object is located in a defined place
• Staff and material is brought just in time (synchronized) to the assembly object
• Product will be finished at the assembly station (not necessarily the erection location)
• Throughput time: sum of all times on the site + material provision time, organisational transition, set-up, changeover time

Applications:

• Special vehicles / prototyping
• Special machines and plants
• Switch cabinets
• Shipyards
• Buildings

Disadvantages:

• Lots of space needed; all parts must be present at one assembling area
• extensive material and information flow
• different fitters (assembly steps, parallel groups) will lead to frictional losses
• much need for synchronisation and control; finish date risk
• high throughput time

Advantages:

• good for voluminous and complex products
• very high flexibility
• few assembly object transports

2. Organisational Forms of Assembly Systems

Assembly systems are described by:

- the product to be created and the production numbers
- the processes in the system
- the arrangement of the processes in the system (structure)
- performance (takt time)
- throughput time

Factors Influencing the Assembly

Technical	Economical
product dimensions	production program with quantities (per unit time) and variant frequencies (degree of repetition)
number of components	throughput time
product structure	flexibility
product variants	costs
material properties, mass	
assembly processes with difficulty	

b) Standalone (Workbench) Assembly

Definition:

• Workbench Production or Standalone Assembly describes a single type of system, **which has as no transition to a second workplace**
• In general, the assembly takes place on benches or tables (according to Lotter)
• Components or single parts are supplied loose in containers or pallets.

Applications:

• for products of low to medium complexity
• for products in small to medium series size
• electrical and precision engineering industry

Advantages:

• fail-safe and flexible

Disadvantages:

• less efficient than flow principle
• limited number of components

Differences: Local-Box and Flow-Line Assembly

Local/Box Assembly	Flow-Line Assembly
- lots of material and information flow	- once preplanning is extensive, higher requirements on punctuality
- high requirements on synchronisation	