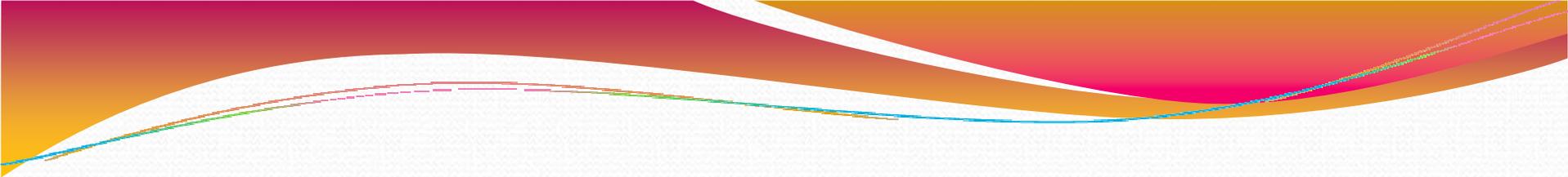


O. M. Beketov National University of Urban Economy in Kharkiv

COURSE «OPERATIONS MANAGEMENT »



Lecturer:
Associate professor
C.I. Kalashnikova



Content module 1. The theoretical basis of operations management

Lecture 4. Process selection and design

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Issues to be discussed

- Process Analysis
- Process Flowcharting
- Types of Processes
- Manufacturing Process Selection and Design (video)
- Measuring Process Performance

Process Analysis Terms

A Process: Is any part of an organization that takes inputs and transforms them into outputs that, it is hoped, are of greater value to the organization than the original inputs.

Cycle Time: Is the average successive time between completions of successive units.

Utilization: Is the ratio of the time that a resource is actually activated relative to the time that it is available for use.

Process Flowcharting

Process flowcharting is the use of a diagram to present the major elements of a process.

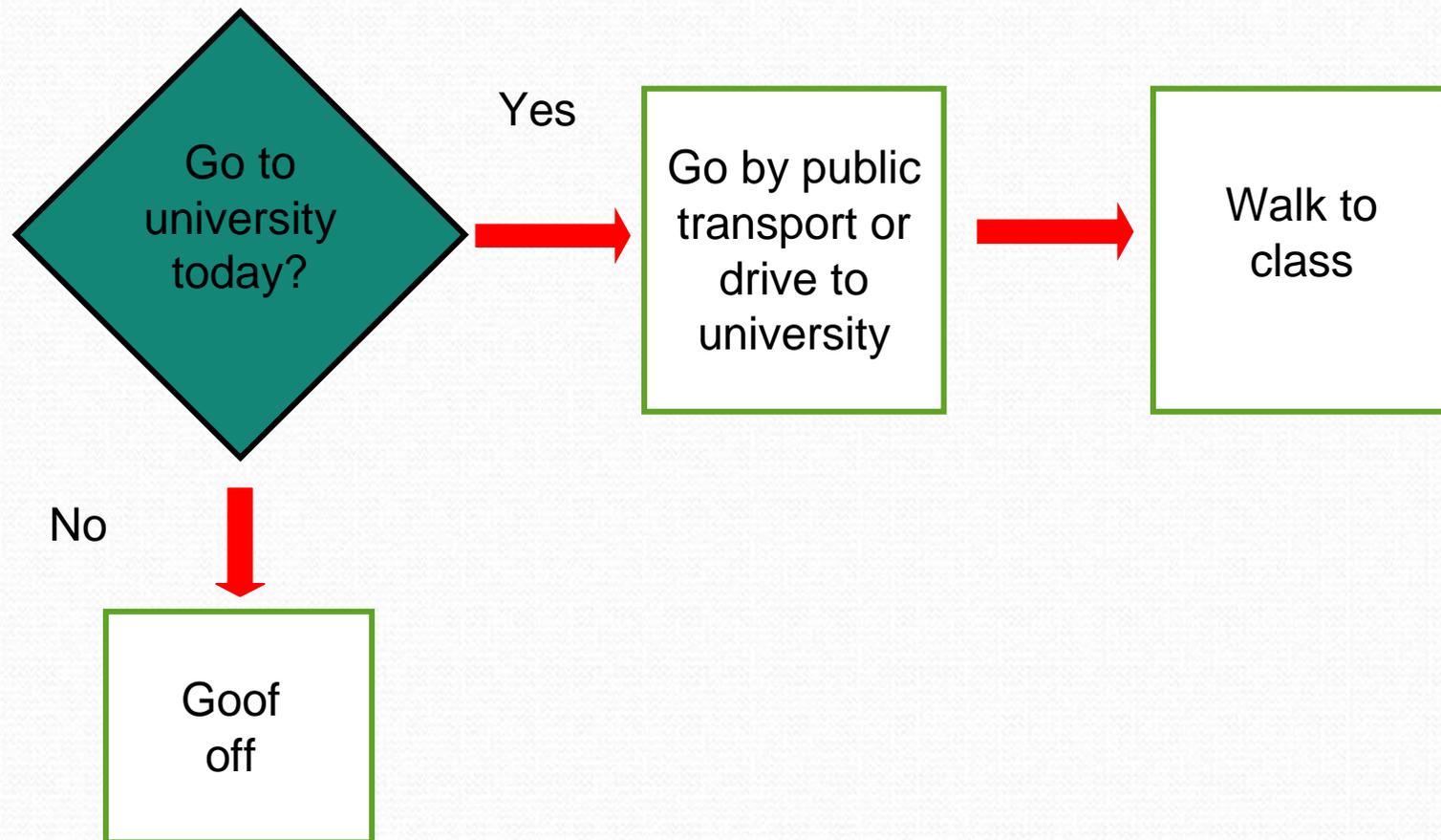
The basic elements can include tasks or operations, flows of materials or customers, decision points, and storage areas or queues.

It is an ideal methodology by which to begin analyzing a process.

Flowchart Symbols

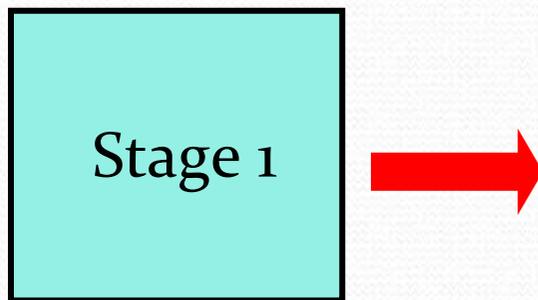
Flowchart Symbol	Purpose	Example
	Tasks or operations	Giving an admission ticket to a customer, installing an engine in a car, etc.
	Decision Points	How much change should be given to a new customer or which equipment should be used, etc.
	Storage areas or queues (waiting lines)	Store houses, lines of people waiting for a service, etc.
	Flows of materials or customers	Customers moving to a seat, mechanic getting a tool, etc.

Example: Flowchart of Student Going to University

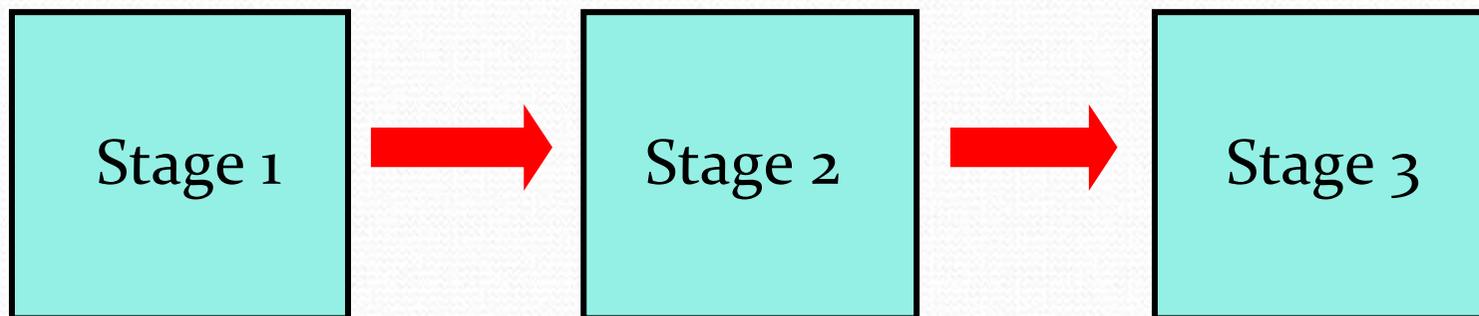


Types of Processes

Single-stage Process



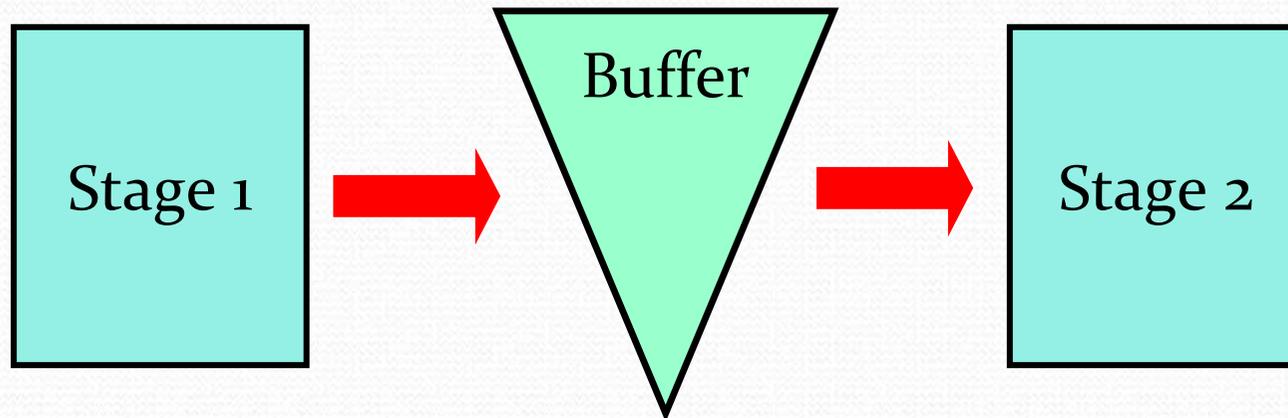
Multi-stage Process



Types of Processes (Continued)

A **buffer** refers to a storage area between stages where the output of a stage is placed prior to being used in a downstream stage.

Multi-stage Process with Buffer



Other Types of Processes

Make-to-order

- Only activated in response to an actual order
- Both work-in-process and finished goods inventory kept to a minimum

Make-to-stock

- Process activated to meet expected or forecast demand
- Customer orders are served from target stocking level

Manufacturing Process Selection and Design

Process selection refers to the strategic decision of the selection which kind of production processes to have in the manufacturing plant.

For example, in the case of Honda motors, if the volume is very low, we might just have worker manually assemble each motor by hand. On the other hand, if the volume is very high, setting up an assembly line might be appropriate.



Types of Manufacturing Processes

At the most basic level, the types of processes do the following things:

- Conversion (ex. Iron ore into steel sheets)
- Fabrication (ex. Cloth to clothes)
- Assembly (ex. Parts to components)
- Testing (ex. For quality of products)

Process Flow Structures

A **process flow structure** refers to how a factory organizes material flow using one or more of process technologies.

A. Hayes and M. Wheelwright have identified four major process flow structures:

- ***Job shop*** (ex. Copy center making a single copy of a student term paper)
- ***Batch shop*** (ex. Copy center making 10,000 copies of an advertisement for a business)
- ***Assembly Line*** (ex. Automobile manufacturer)
- ***Continuous Flow*** (ex. Petroleum manufacturer)

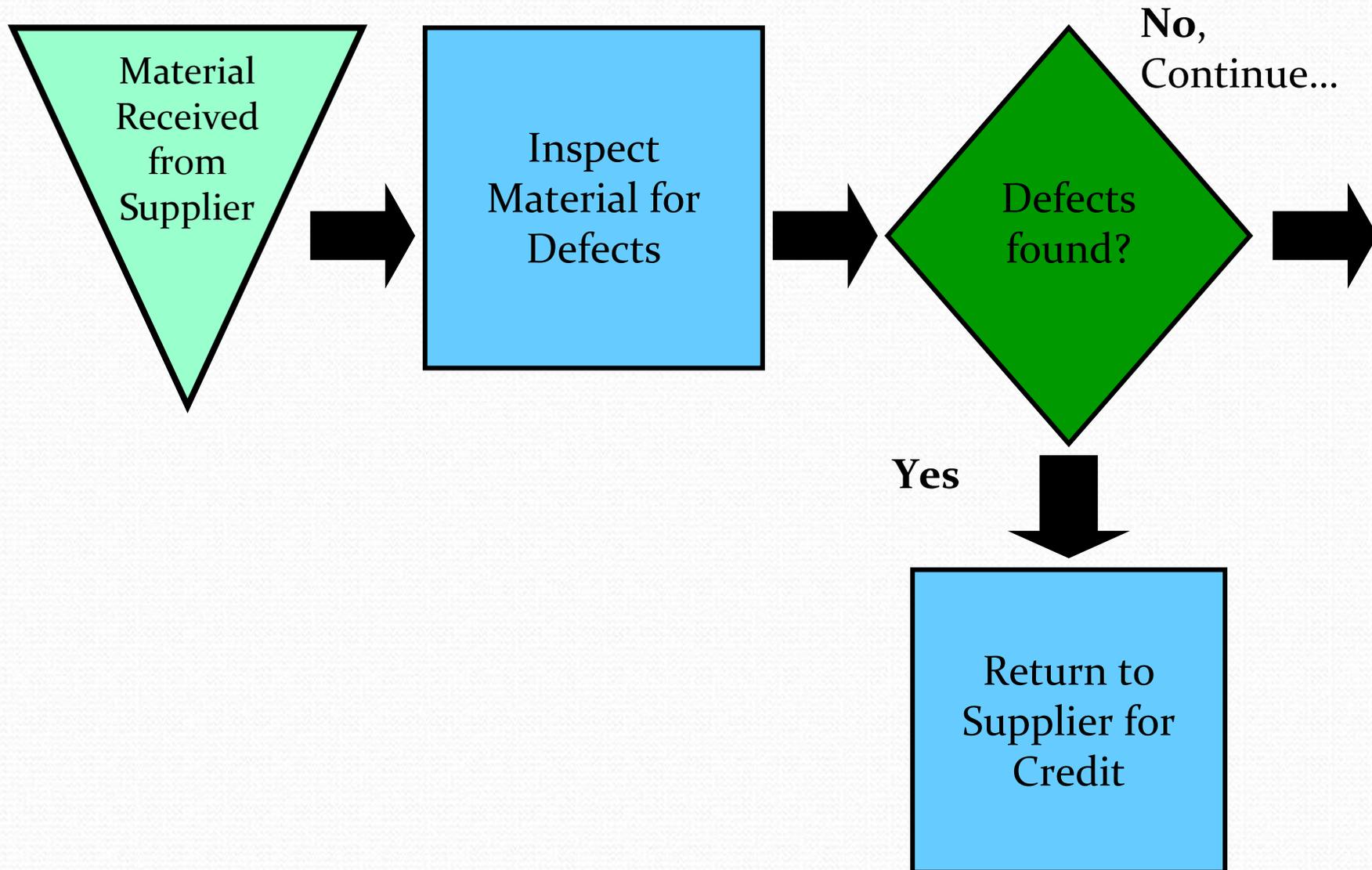
Manufacturing Process Flow Design

A **process flow design** can be defined as a mapping of the specific processes that raw materials, parts, and subassemblies follow as they move through a plant.



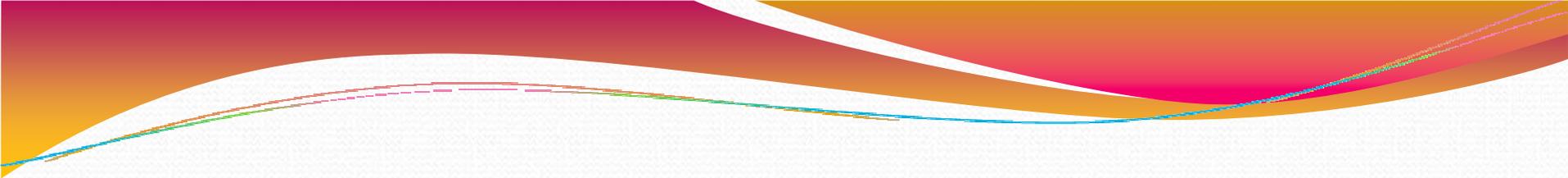
The most common tools to conduct a process flow design include assembly drawings, assembly charts, and operation and route sheets.

Example: Process Flow Chart



Process Performance Metrics

- *Operation time = Setup time + Run time*
- *Throughput time = $\frac{\text{Work-in-process}}{\text{Throughput rate}}$*
- *Velocity = $\frac{\text{Throughput rate}}{\text{Value-added time}}$*
- *Cycle time = Average time between of completion of units*
- *Throughput rate = $\frac{1}{\text{Cycle time}}$*
- *Efficiency = $\frac{\text{Actual output}}{\text{Standart output}}$*
- *Utilization = $\frac{\text{Time activated}}{\text{Time available}}$*



Thank you for your
attention!