Lecture 1: Overview

1. Course goals and syllabus
2. Logbook expectations & logbook review form
3. Mass Production vs Lean Enterprise Systems
4. Lean Manufacturing overview
5. Plant layout models.

Mass Production System

* Example: Ford

* Status as of 1950
  8000/day
  Low-skilled immigrant labor
  Vertical integration
  Abundant investment capital

* High volume, low mix

* Capital, Quantity, Repeatability

Lean Enterprise System

* Example: Toyota

* Status as of 1950
  - 2500/year
  - Diversified market
  - Limited capital
  - Dedicated, high skilled labor

* Low volume, high mix

* People, Quality, Flexibility

Definition of Lean

"A *systematic* approach to *identifying* and *eliminating waste* (non-value-added activities) in a company's operations.

Lean emphasizes *flowing* the product at the *pull* of the customer."

Lean is implemented through both rapid and continuous improvement.

***Kaizen*- "kai' means "little" or "ongoing". "Zen" means "for the better" or "good." Small continuous improvements on everyone's part leads to world class manufacturing.**

Concept of Value-Added Activity

Value-Added Time

- Any activity that increases the market form or function of the product or service. (These are things the customer is willing to pay for.)

Non-Value Added Time (Waste or *muda*)

- Any activity or use of resources that does not add market form or function or is not necessary. (These activities should be *reduced, integrated, simplified, or eliminated*.)

Common Manufacturing Terms:

Batches

Order of Operations

Inventory

Work in Progress (WIP)

Fixturing

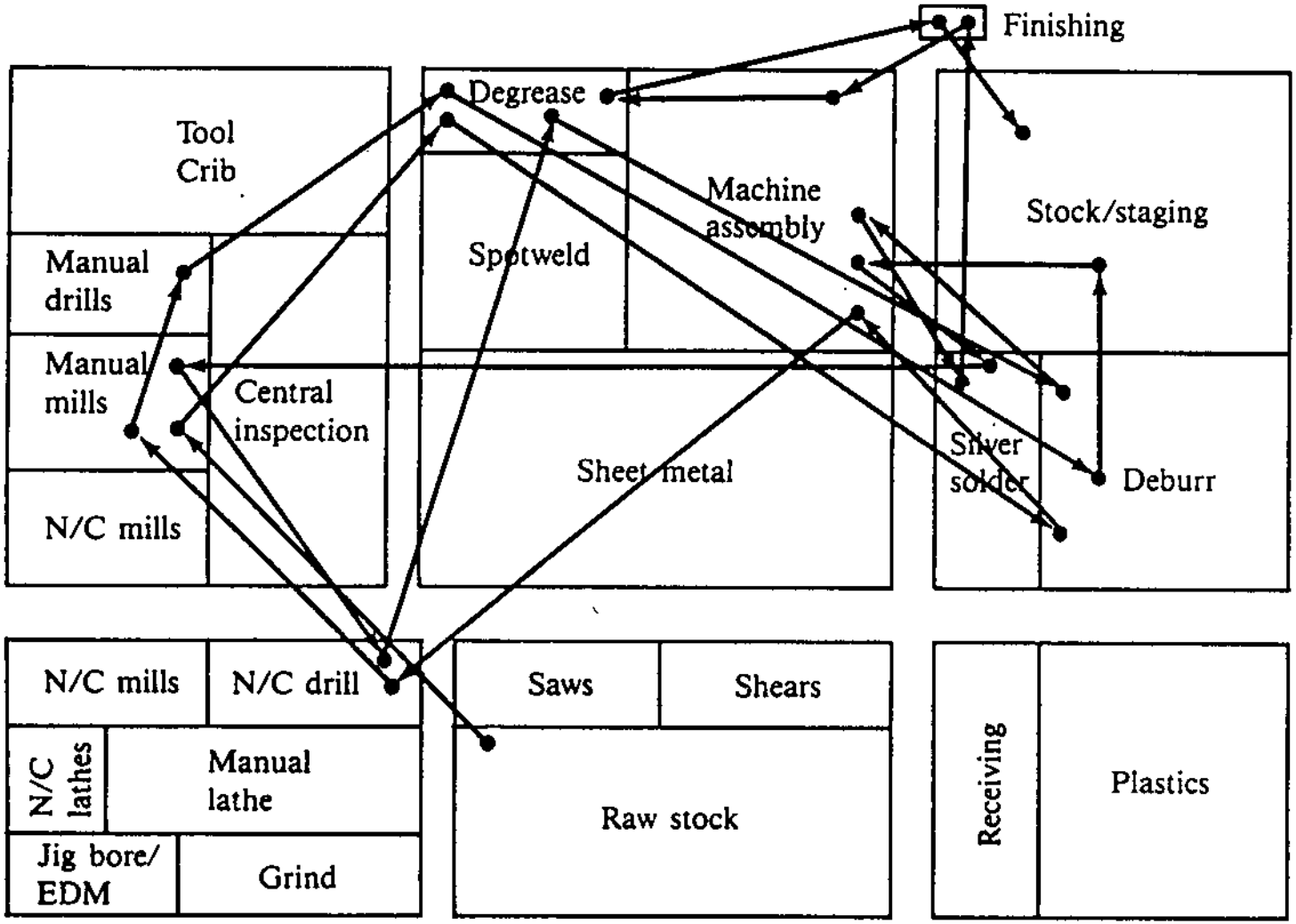
Set-Up Time

Inspection

Plant Layout

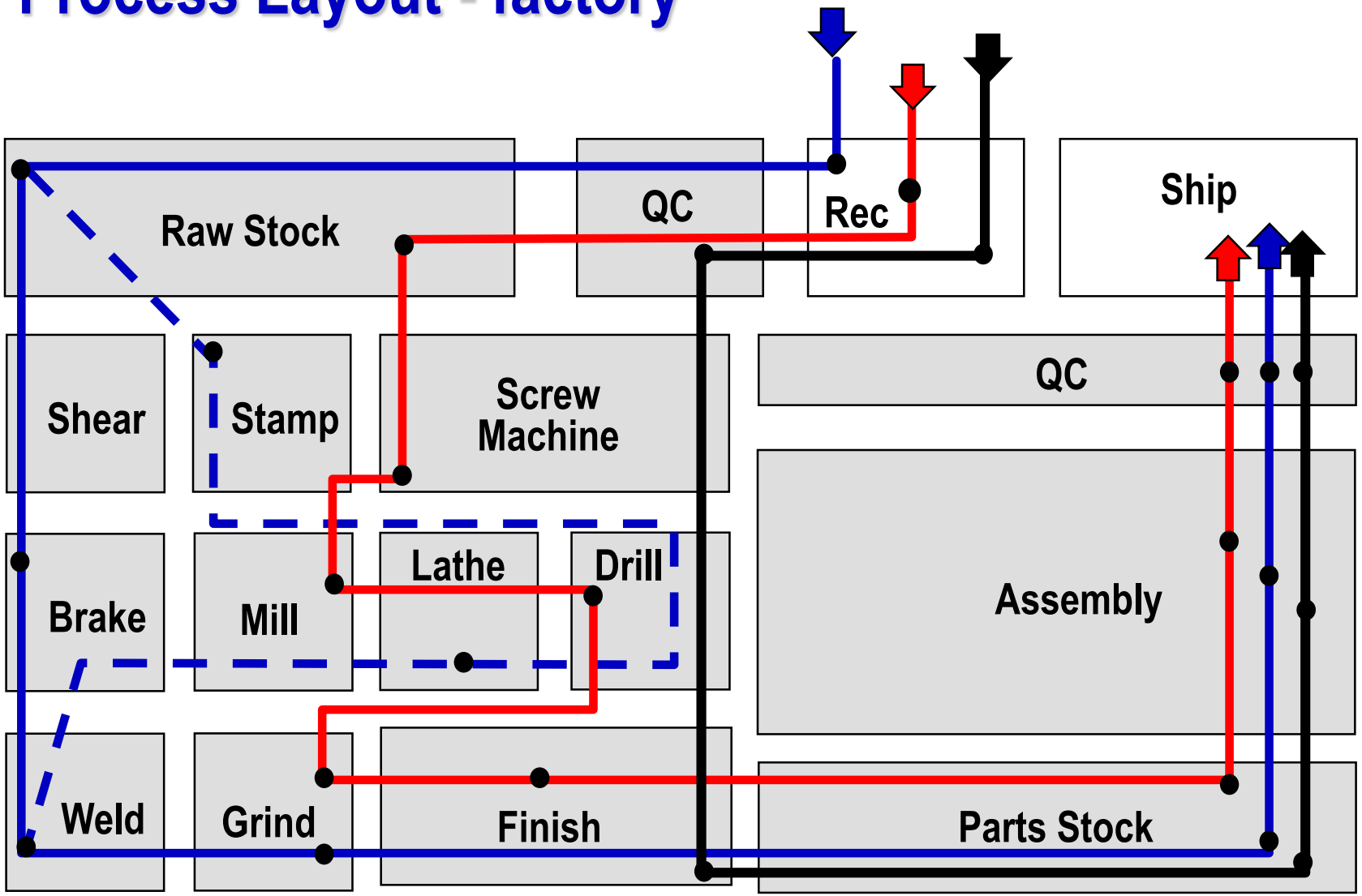
Manufacturing Lead Time (MLT)

Process Layout – small shop



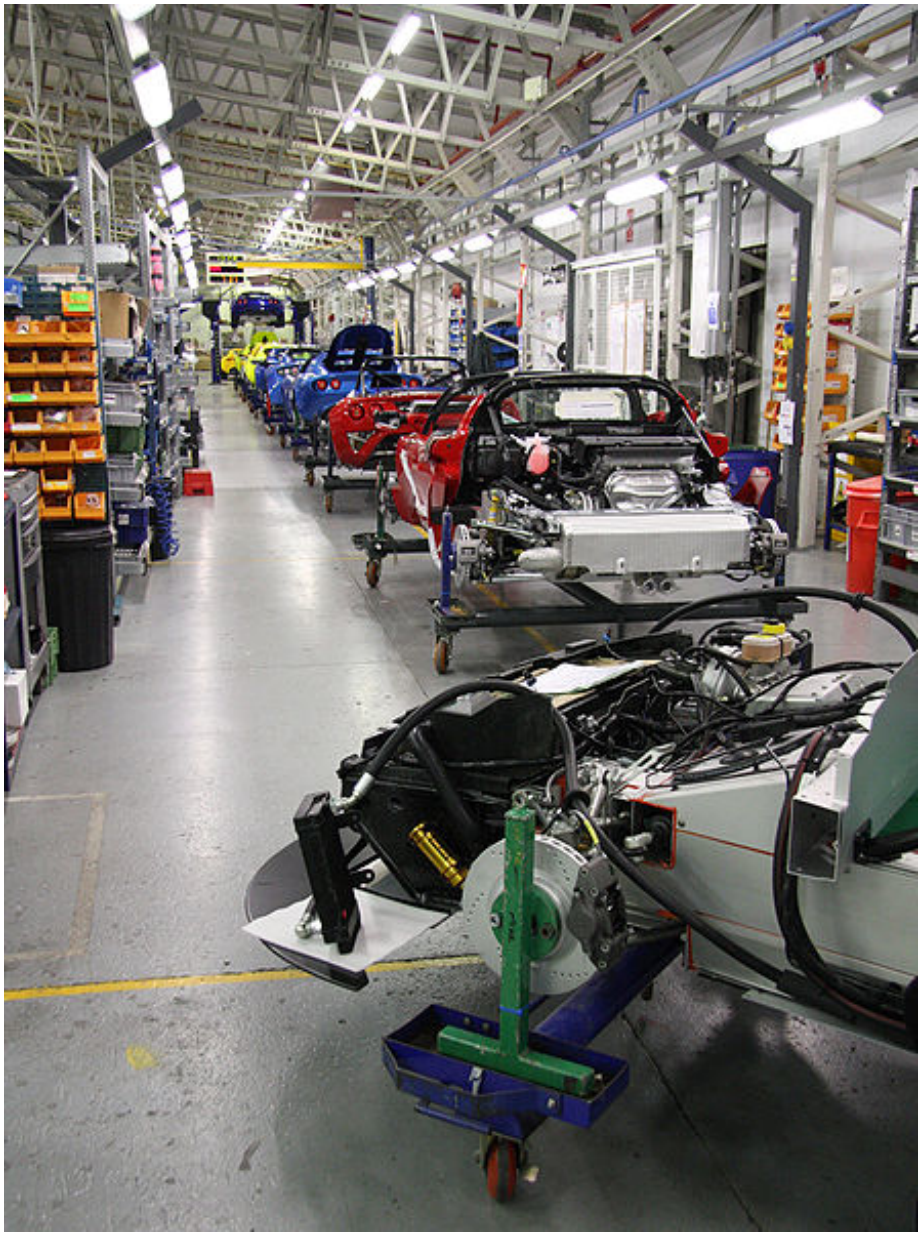
TECHHELP

Process Layout - factory



Product Layout

- Products typically ride along on conveyor belts or chains.
- This layout may have several parallel lines of processes combining at one node.
- This arrangement is relatively inflexible compared to a Process Layout.

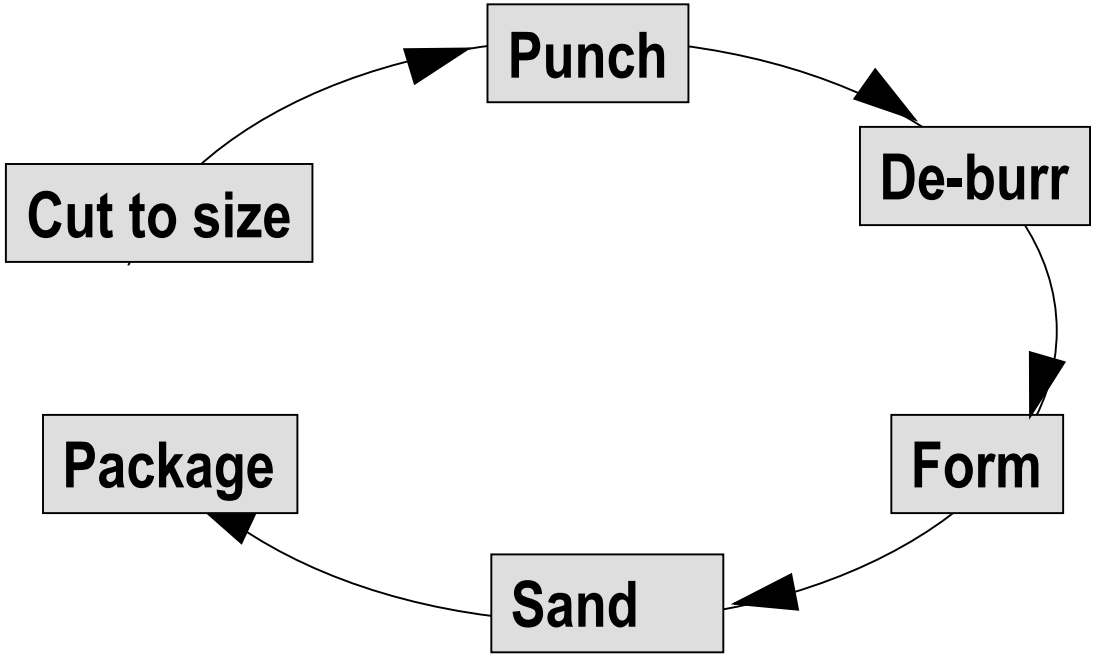


Fixed Position Layout

In this layout, the product's position is fixed due to its size or weights such as a jetliner. Equipment, components, and labor is brought to the product for the operations. When the product is complete, it is then moved.

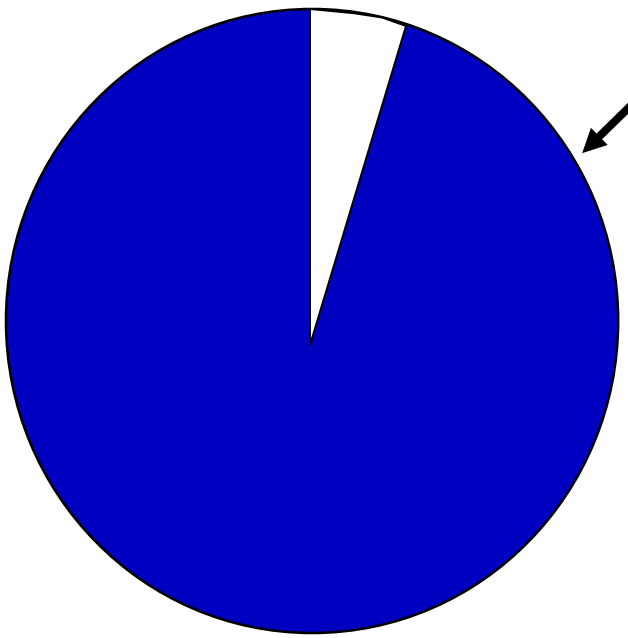
Cellular Layout

Linking of manual and machine operations into the most efficient combination to maximize value-added content while minimizing waste.



Lean = Eliminating Waste

Value-Added



Non-Value-Added: Hold all waste in a "CLOSED MITT"

- Complexity
- Labor
- Overproduction
- Space
- Energy
- Defects

- Materials
- Idle Materials
- Transportation
- Time

Typically 95% of all lead time is non-value-added

Lean Building Blocks