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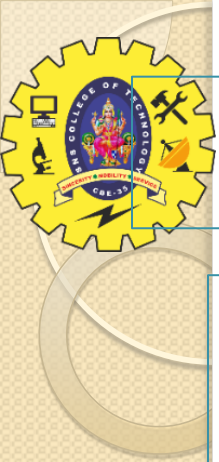
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DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19AUZ405 – LEAN MANUFACTURING

IV YEAR / VII SEMESTER

Topic – Cellular Manufacturing



Cellular manufacturing

Cellular Flow Manufacturing is a method of organizing manual and machine operations in the most efficient combination to maximize value-added content and minimize waste.

Cellular manufacturing is a process of manufacturing which is a subsection of just in time manufacturing and lean manufacturing encompassing group technology.

The goal of cellular manufacturing is to move as quickly as possible, make a wide variety of similar products, while making as little waste as possible.

Cellular manufacturing involves the use of multiple "cells" in an assembly line fashion.

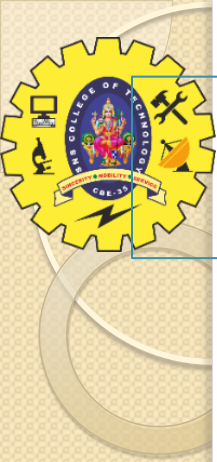
Each of these cells is composed of one or multiple different machines which accomplish a certain task.



Cellular manufacturing

Cellular Manufacturing Benefits

- Simplified scheduling and communication
- Minimal inventory needed between processes
- Increased visibility
- Provide quick feedback and problem resolution
- Development of increased product knowledge
- Workers are trained to understand the total process
- Shorter lead times
- Small lots and one piece flow
- To match customer demand



Cell Design

Cells

- Cells are created in a workplace to facilitate flow.
- This is accomplished by bringing together operations or machines or people involved in a processing sequence of a products natural flow and grouping them close to one another, distinct from other groups. This grouping is called a cell.
- "A cell is a small organizational unit...designed to exploit similarities in how you process information, make products, and serve customers.

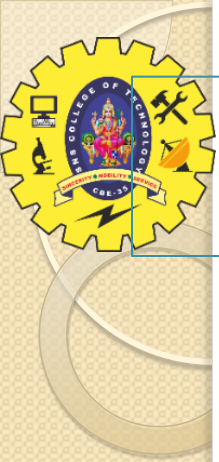


Cell Design

Cell Design Criteria

The following is a list of general criteria to consider as part of a good cell design:

1. Be sure that material flows in one direction.
2. Reduce material and operator movement.
3. Eliminate storage between operations.
4. Eliminate double and triple handling.
5. Locate parts as close as possible to point of use.
6. Utilize task variation to reduce repetitive motion.



Cell Design

7. Locate all tools and parts within easy reach.
8. Ensure short walking distances.
9. Eliminate all wait time.
10. Keep in mind that vertical storage requires less space than horizontal storage (include Kanban material).
11. Lay out machines and tools by process sequence.
12. Involve operators in the design process (incorporate economies of motion).



Cell Layout

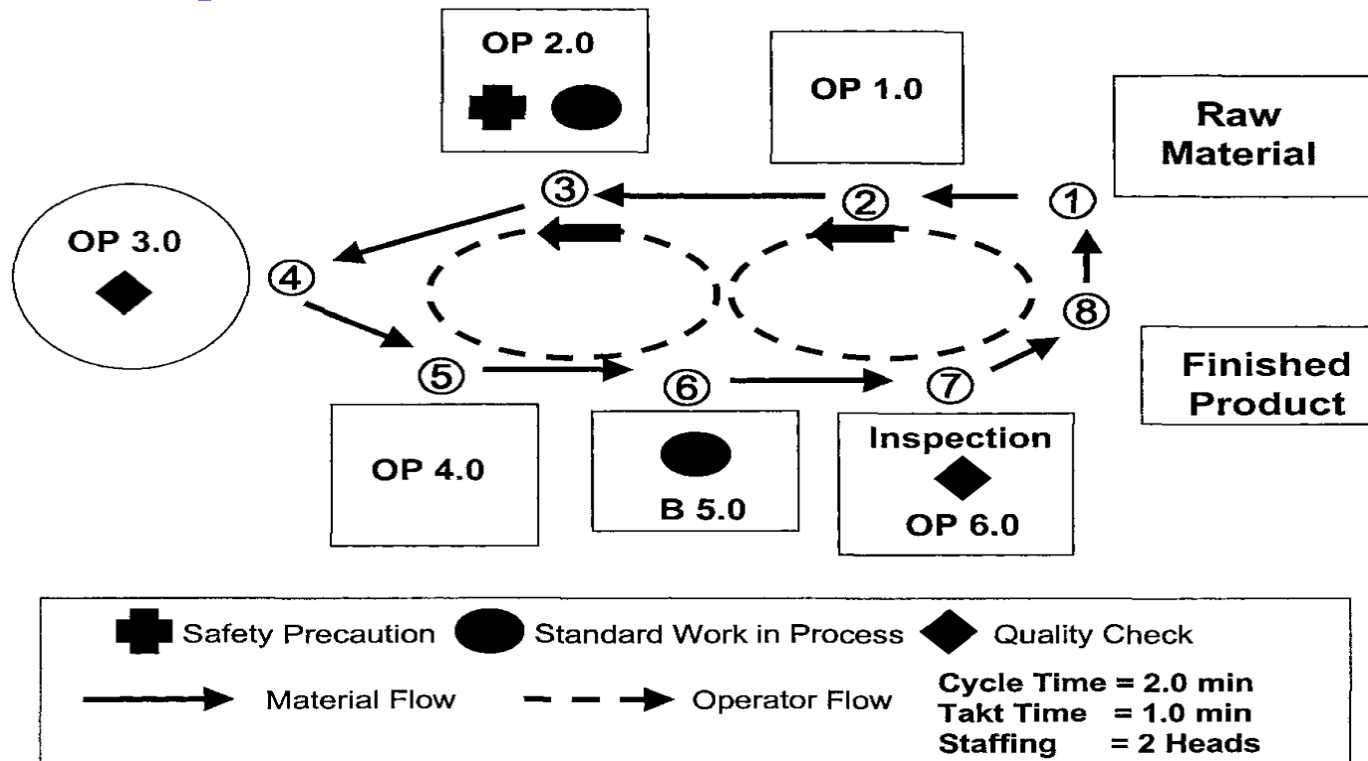
Objectives of Cell layout

- The cell layout is a graphical representation of the operator flow and material flow.
- It depicts the path of the overall material movement through the cell and describes the designed operator sequence and operations.
- It shows the staffing levels, takt time, cycle time, designed in-process stock levels, and quality and safety checks required by the cell.
- The cell work layout chart can then be supported at a more detailed level with graphical work instructions for each operation.
- The cell work layout is primarily for training new operators, communicating standard work to management, and driving continuous improvement initiatives



Cell Layout

Cell Layout





Pull system

What Is a Pull System?

A pull system is a lean manufacturing strategy used to reduce waste in the production process.

Objectives.

Pull system, components used in the manufacturing process are only replaced once they have been consumed .

This system only make enough products to meet customer demand.

It used for producing goods that will immediately be sold and return a profit.

This process is pulled through the manufacturing process by the consumer's demand.



Pull System vs. Push System

Pull System vs. Push System

The push system, units are produced based on forecasted demand and then pushed into the market.

VS

The pull system uses actual demand.

The push system must predict what the customer will want to purchase and in what quantity, which is difficult as sales can be unpredictable and vary from previous years.

VS

In a pull system, the quantity produced is just enough to meet current demand



Pull system

Advantages Of Using a Pull System

1. Using a pull system reduces waste within a company since no overproduction occurs.
2. This also frees up space in the workplace and reduces the cost of storing excess inventory.
3. use a pull system experience increased customer satisfaction as products are manufactured specifically to fulfill their requests.
4. A pull system allows manufacturing facilities to save time that would be spent planning for future demand and producing goods that may never be sold.
5. The pull system experience increased flexibility, as they can rapidly respond to changes in demand..
6. A pull system reduces total costs for the business, whether directly or indirectly, resulting in increased profit.



Kanban Sizing

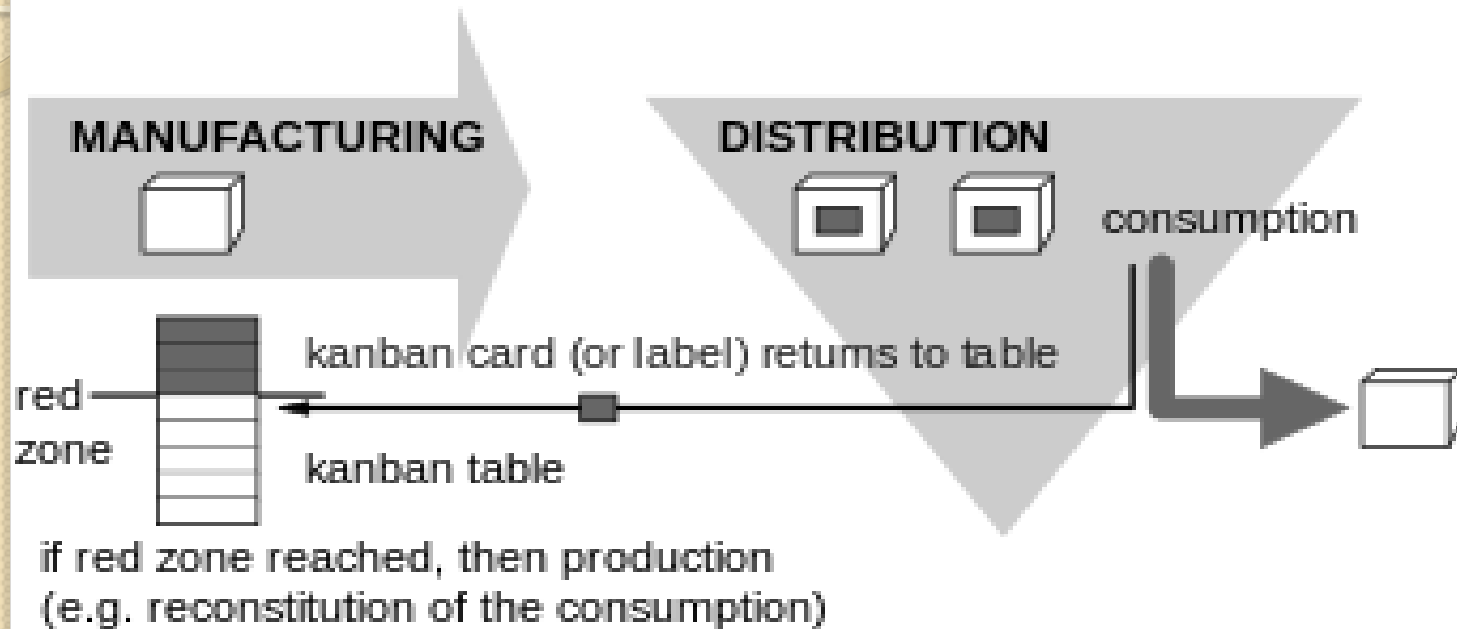
Kanban in manufacturing is an inventory organization structure that uses visual cues to move inventory through various stages of the manufacturing process.

It is a tool for lean manufacturing that aims to **prevent inventory pileup by initiating production only to restock empty reserves.**

Kanban is a “pull” system, meaning it responds to demand rather than predicting it. More inventory is created only when old inventory is “pulled” out of stock.



Kanban Sizing



- Kanban maintains inventory levels; a signal is sent to produce and deliver a new shipment as material is consumed. These signals are tracked through the replenishment cycle and bring extraordinary visibility to suppliers and buyers.



Kanban Sizing

What Are The Benefits of a Kanban System?

- Efficient
- Prevents Inventory Pileup
- Lowers Overhead
- Facilitates Teamwork
- Controls Workflow
- Improves Communication
- Prevents over production
- Provides managers progress reports
- Improves responsiveness to changes in demand
- Improves teamwork
- Kanban can reduce inventories by 75% in some industries
- Lowers overhead costs



Kanban Sizing

Toyota's Six Rules

1. Each process issues requests (Kanban) to its suppliers when it consumes its supplies.
2. Each process produces according to the quantity and sequence of incoming requests.
3. No items are made or transported without a request.
4. The request associated with an item is always attached to it.
5. Processes must not send out defective items, to ensure that the finished products will be defect-free.
6. Limiting the number of pending requests makes the process more sensitive and reveals inefficiencies



Kanban Sizing

Kanban (cards)

- Kanban cards are a key component of Kanban and they signal the need to move materials within a production facility or to move materials from an outside supplier into the production facility.
- The Kanban card is an essential component of Kanban, a work management framework which helps you visualize your work, limit work in progress (WIP), and maximize efficiency (or flow).
- A Kanban card contains valuable information about the task and its status, such as a summary of the assignment, responsible person, deadline, etc.



Kanban Sizing

Kanban card should have the minimum identification requirements:

1. Part number
2. Part description
3. Part quantity
4. Point of supply
5. Point of consumption
6. “One of... cards” (e.g., 1 of 3; 2 of 3; 3 of 3)



Kanban Sizing

Part Description				Part Number	
Smoke-shifter, left handed.				14613	
Qty	20	Lead Time	1 week	Order Date	9/3
Supplier	Acme Smoke-Shifter, LLC			Due Date	9/10
Planner	John R.		Card 1 of 2		
			Location	Rack 1B3	



Thank You !