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DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19AUZ405 – LEAN MANUFACTURING

IV YEAR / VII SEMESTER

Topic –Types of Cellular Manufacturing Layout



Group Technology Layout

- Group Technology Manufacturing Layout is a type of layout used in manufacturing that groups machines with similar functions and processes together. This layout allows for efficient production and reduces the time and resources needed to manufacture products.
- Additionally, the grouping of machine functions can improve safety and quality control in the manufacturing process.



Fixed Position Layout



- Fixed position manufacturing layout is a type of layout where the location of the product is fixed, and the resources are moved to it. This is usually used for large and/or complex products, like ships, aircraft, or large machinery.
- It is also used for highly specialized products like medical devices. This type of layout is designed to ensure the highest quality since the product is not moved during the production process.



Modular Manufacturing Layout

- A modular manufacturing layout is a type of manufacturing system in which a factory is divided into modules or distinct production areas. Each module is designed to produce a specific product or range of products.
- The modules are arranged to maximize the efficiency of production, and the parts and components that are used in the various modules are supplied from a centralized source. Modular manufacturing is often used by companies that produce a variety of products and need to switch from one product to another quickly.



Assembly Line Layout

- Assembly line layout is a production layout in which workstations are arranged in a line, and materials are moved from one workstation to the next in a continuous flow. The goal of an assembly line layout is to streamline production, reduce costs, and produce products quickly and efficiently.
- This type of layout is used in many industries, including automotive, electronics, and food production.



Flexible Manufacturing System (FMS) Layout



- A Flexible Manufacturing System (FMS) Layout is an organized arrangement of machines, workstations, and other components used to produce a specific product or family of products. The layout of an FMS is designed to optimize production flow and maximize worker productivity.
- It typically includes conveyor systems, robotic arms, automated material handling systems, and other specialized equipment. The layout is also designed to be flexible enough to accommodate changes in production requirements.



Kanban Manufacturing Layout

- Kanban Manufacturing Layout is a type of Lean manufacturing system that uses visual signals to regulate the flow of material and goods through the production process. This system is based on the Japanese word “Kanban,” which means visual signal. The layout is composed of the production stage, the input sources, and the output destinations.
- The material is moved through the stages using a pull system, where the demand from the downstream production stages “pulls” the material from the upstream steps. This system is designed to reduce waste and increase productivity.



Hybrid Manufacturing Layout

- Hybrid Manufacturing Layout is a layout that combines different types of manufacturing and automation processes in order to increase efficiency and reduce production costs. This type of layout is typically used in larger manufacturing facilities looking to maximize output while minimizing costs.
- The layout typically involves a combination of traditional manual production, automated production, and even robotic production. This type of manufacturing layout is designed to increase flexibility, reduce waste, and improve overall quality.



Linear or I-shaped Cellular Layout

- A linear or I-shaped cellular manufacturing layout is a factory floor plan where machines are arranged in a linear sequence to produce a product. This type of layout is designed to reduce the movement and labor required to make a product, resulting in shorter production times, lower costs, and improved quality.
- Additionally, this type of layout is helpful in providing quick and easy access to parts and materials.



U-shaped Cellular Manufacturing Layout

- A U-shaped cellular manufacturing layout is a production line layout where machines are arranged in a U-shape, allowing for easy access to each station by the operator.
- This type of configuration has the advantage of allowing for quick and efficient workflows, and the proximity of machines to each other often allows for reduced cycle times. It also makes it easier to track and monitor the production process and identify any potential problems quickly.



O-shaped Cellular Manufacturing Layout

- An O-shaped cellular manufacturing layout is an arrangement of machines and workstations in which each workstation is located in a separate, distinct area (cell) within the production facility. The machines and workstations are arranged in an 'O' shape, with the devices located at the outside of the 'O' and the workstations located in the middle of the 'O'.
- This type of layout facilitates the flow of materials, reduces material handling costs, and allows for quick product changeover. The layout also encourages machine operators to work together as a team and helps reduce production costs.



T-shaped Cellular Manufacturing Layout

- A T-shaped cellular manufacturing layout is an arrangement of production equipment and workers in a factory in which machines are arranged in the shape of a “T,” with the vertical line representing the main production line and the horizontal line representing the secondary production line.
- This layout facilitates the efficient movement of materials and workers between the production lines, allowing for a more efficient production process.



S-shaped Cellular Manufacturing Layout



- An S-shaped Cellular Manufacturing Layout is a manufacturing production system in which machines are arranged in a U- or S-shaped configuration. This arrangement allows for more efficient production. It is because the machines are set in a continuous loop, and the products can move from one machine to the next without having to be transported between multiple workstations.
- This arrangement allows for the elimination of wasted motion, which in turn leads to increases in productivity and cost savings.



Benefits of Implementing Cellular Manufacturing



- **Increased Efficiency:** Cellular manufacturing increases the efficiency of production by allowing for the same production tasks to be done in smaller, more manageable batches. This reduces the amount of time spent on each task and allows for more efficient production.
- **Reduced Costs:** Cellular manufacturing reduces costs by reducing the amount of time spent on each task and eliminating the need for many machines and workers. Smaller batches of products can be produced more quickly, leading to reduced production costs.
- **Improved Quality:** By reducing production times and increasing efficiency, cellular manufacturing can help to improve the overall quality of manufactured goods. This is due to the fact that fewer errors are likely to occur, and production lines are better able to focus on the quality of each product.



- **Higher Customer Satisfaction:** Because of the improved efficiency and quality of production, customers are more likely to be satisfied with the products that are produced using cellular manufacturing. This leads to higher customer retention and repeats business.
- **Easier to Train Employees:** The organized nature of cellular manufacturing makes it easier for new employees to learn the production process. This can reduce the amount of time and money that is needed for training.
- **Reduced Wasted Space:** By organizing the workplace into cells, it reduces wasted space as everything is placed in an efficient manner. This helps to reduce costs as well as the waste of resources.



Thank You !