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Traditional Line Manufacturing System

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Introduction

Due to rising competitiveness and globalization, manufacturing enterprises in the twenty-first century face increasingly changeable and unexpected market imperatives. Companies must employ manufacturing systems that not only create their goods at a high rate but also allow them to respond quickly to market challenges and changing consumer needs in order to stay competitive. Manufacturing systems include assembly and machining systems, for example. The dedicated manufacturing line (DML) and the flexible manufacturing system were the two most frequent production system types available toward the end of the twentieth century (FMS). Assembly systems are used in almost every sort of durable goods production. Manual assembly, assembly systems that blend human assemblers and automated processes, and completely automated assembly systems are the three major types of assembly systems. Manufacturing processes are combined to build a manufacturing system (MS) in a plant to generate a particular set of items.

Description

The production system takes certain inputs, adds value, and transforms them into customer-facing goods. It's crucial to understand the difference between the production system, which encompasses the manufacturing system, and the service system. To transform raw material into a finished product, a manufacturing process employs production procedures, operations scheduling software, machinery, and personnel. There are five basic manufacturing processes, and most businesses that produce goods fit into one of these five categories:

- Repetitive Manufacturing
- Discrete Manufacturing
- Job Shop Manufacturing
- Continuous Process Manufacturing
- Batch Process Manufacturing

The repetitive manufacturing method is used in basic manufacturing, which involves creating the same product on an assembly line. These forms of rapid manufacturing processes will mass-produce the same or very comparable products on a continuous basis . This type of production method is used in the following manufacturing industries:

- Automotive
- Electronics
- Semiconductor
- Durable consumer goods

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Because consumer demand for the finished product is consistent and predictable, these mass production industries are suitable for repetitive manufacturing. As one product is created throughout time, the assembly line will remain relatively stable, with little adjustments. Discrete manufacturing, like other types of manufacturing, uses production lines, but the finished commodities produced vary greatly. The assembly line arrangement needs frequently be altered while transitioning between different product models [1-3].

This is known as a changeover in manufacturing plants, and it comes with setup costs in the form of time, labor, and resources. In the computer business, for example, technology not only evolves at a breakneck pace, but buyers also expect mass customization. The assembly line will need to be modified to create and assemble orders that require the latest electrical components as part of the production process for newer PCs and laptops. Instead of an assembly line, production spaces such as workstations and workshops are employed in the job shop manufacturing process. When the product passes through their station, before it is sent on to the next, each worker may add something to it until the final product is completed. Because it is slower and generates a small number of highly personalized products, this technique of manufacturing is perfect for custom manufacturing. Because it operates 24 hours a day, manufactures the same or comparable items continually, and produces greater order numbers, continuous process manufacturing is very similar to repetitive production.

Conclusion

The main distinction is that instead of solid-state components, gases, liquids, powders, and slurries are used as raw materials. Pharmaceutics, Chemicals/industrial gases, Fertilizers, Power stations, Oil refining, Paper, and Furnace - Steel, Iron, and Alloys are some of the traditional industrial manufacturing businesses that use continuous processes. Aside from the variation in raw materials, it works almost identically to repeated manufacturing. A pharmaceutical company that generates vast quantities of painkillers is an illustration of this in practice. Batch manufacturing differs significantly from continuous manufacturing and is more akin to discrete and job shop manufacturing. The number of batches created will be sufficient to meet the needs of each customer. The equipment will be cleaned in between batches and left alone until another batch is necessary. Because the raw materials are liquids, gases, powders, and slurries, they are more akin to continuous process production. A hybrid manufacturing method, which integrates different manufacturing processes, can be beneficial in some cases. To achieve process control, it's critical to use the correct manufacturing systems and invest in the right manufacturing technologies after choosing the right production process [4,5].

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