Production lay-outs

Product layout or assembly line is designed to handle products that are manufactured using specialized machines in an assembly line (Product lay-out). Each line is designed to address specific requirements of a product line in a sequential manner. There is a smooth flow of production (i. e. conveyor-supported) from one specialized machine to another which is desirable in mass production where demand is predictable while volumes are high. This type of layout, therefore, is fitted in producing consumer products for a general market rather than producing for several segments of the market.

The advantages of the product layout are its order and efficient processes that can lead to faster customer response and less demand on lead times. It also promotes cheap labor because skill requirements are low that causes relaxation of high salaries. Although this layout is efficient and easy to use, it is highly inflexible because a change in one assembly line can lead bottleneck in its production. Further, in product development, acquiring a whole new set of machines and working area is necessary to address specific requirements of the product. When demand is low, the assets can be underutilized.

As it produces ships and airplanes, fixed position layout is a technique applied to vulnerable, hard-to-move and specialized products (Layout and Flow). Factors of production (e. g. labor, machine, equipments and tools) are required to meet in a single production location to handle manufacturing tasks there. It is customary to leave machines in the site when not used to prevent breakage or damaged in addition to the costly transportation required for pull-out and getting back to the site.

Further, to minimize the high capital in acquiring new machines, most companies are using contractual leases because their use of the machines is under limited time frame. Its advantages are reduced movement of machines that aids in minimizing risk of damage or lost and continuity of processes because the need for re-planning is reduced as people meet in one place. However, some of its disadvantages include are higher salaries as workers must have specific skills to finish the project, movement of people/ machines to site can be very costly and idle machines can have low utilization because they remain idle rather use for productive means when the production is at cease.

Unlike fixed position, functional or process layout distinguish the work group into different departments that give rise to different and distinct workstations (Facility layout). As production is intermittent and batched, functional layout is compatible in serving different market segments that have highly differentiated needs. Compared to product layout, volumes are considerably low while the demand can fluctuate considerably from one period to another. There is specialization in functional layout such as separation of men, women and children's clothes in a department store.

Machines in this layout are for general use while workers are knowledgeable on how to operate machines within their station. The advantage of this layout is opposite the disadvantage of product layout (i. e. flexibility) while the vice versa is also true (i. e. functional layout is inefficient). Disadvantages such as backtracking, bottlenecks and delays are common. Further, the storage rooms for raw materials are huge while inventories of the finished products are low because they are immediately delivered to

customers. The critical issue to consider in this layout is to find the relationship of each station to machine centers to establish a more space-efficient design between them.

To address the issue to space-efficiency between stations and machine centers, cellular layout is idealized to combine the advantages of product and functional layouts (i. e. efficiency and flexibility). Cells represent a workstation that produces similar customer requirements. A machine that cannot be allocated in space is strategically located between cells that require machine processing to create a point of use. The usual design is that the assembly line is observed in producing components and parts while process layout take-over the relationship of each component-producing cell.

With the use of information systems, locating cells and identifying idle machines can be easily carried out. Resulting to substantial paperwork to maintain the cellular layout, workers can also operate machines within their departments like functional layout. Its advantages are reduction in material handing and transit time, minimal set-up time, minimized work-in-progress, efficient use of human capital, control and automation. On the other hand, it can have backlash such as absence of sufficient number of part stations to create cells, imbalanced cells, more training and strict allocation of workers and increased capital expenditure.

Justification of the most appropriate layout

Although challenging to establish, the currentenvironmentand production needs of Manychip should use cellular layout. First, its plant and sales channels are located in developed economies where quality and expensive

human resources are dwelling. Second, it operates in a highly volatile demand that can be easily affected by environmental changes that flexibility is required to prevent cost associated with over-forecasting. Third, it is carrying only six main memory chip products which likely have significant similarities in design and internal parts. This will enable creation of cells because the number of stations is sufficient.

Fourth, its operations in asset-intensive while its depreciation can significantly affect its profitability. When cellular layout is adopted, assembly lines can efficiently produce component parts for the six product lines which will prevent idle machines. On the other hand, functional layout are flexible that can be applied when orders are placed and products are ready for final assembly. Fifth, the production of Manychip requires high lead times which can be minimized when applied with cellular manufacturing as components are ready to undergo assembly once order is in place.

On having greater agility, Manychip will not loose quality systems because specific stations are under stand-by mode that can be called if random quality test is necessary. With the consideration of the three conditions, approval of cellular layout is very necessary. Different components can create cells, the administrative group can act like a quality group in which case a station can be brought up for them near their respective process interests and shipment in different geographical location can be addressed by timely delivery of products. However, Manychip must consider that substantial funding is required to establish a hybrid strategy such as cellular manufacturing. It must also monitor its product development programs to prevent dissolution of important cells.

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