

Free plant location and design case study sample

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Introduction

In any manufacturing firm, the location and design of plant lay are two crucial factors that determine the efficiency of the processes. A good plant layout should be able to convert raw materials into finished products in the most efficient and economical manner. There are various types of plant layouts depending on the products; processes involved and the site space available. Before deciding on the layout to adapt, considerations such as availability of waterpower and space are important.

Able Co. manufactures harnesses and cables and its location to a green field will have to make decisions pertaining to which plant layout to adopt. To arrive at this decision, engineers and the management team will have to consider various factors such as the raw materials involved, material handling, processes involved, the products and the space available at the new site. Moreover, the engineers should also decide on the location of other facilities such as the sewerage, offices and powerhouses. Decisions made while the shift will determine the profitability and the efficiency of the company in entire.

Considering the products that Able . Co handles and the space available, there are two basic plant layouts which prove to be plausible. The two plant layouts are

- Combined plant layout
- Product plant layout

Therefore, followed with justifications, this paper will explain why the above chosen plant layouts prove to offer practical solutions to the manufacturing company. Additionally, the paper will give comparative advantages, and

disadvantages of the two plant layouts.

1. Combined plant layout

Combined plant layout utilizes all the advantages derived from each of the individual plant layout types such as product, process and job shop layout. It is a useful method of planning plants in a majority of firms, with plants employing either of the pure forms of plant layout producing highly specialized products and as such requires little or no interdependence with various functions within the production process for them to be complete products. In many instances, however, firms utilize both the production and assembly functions in making their products. Manufacturing firms are an important example here, especially fabrication and assembly plants.

Fabrication utilizes the process layout, while the assembly function employs the product layout. Such a firm will have to utilize a hybrid of the two processes in order to enjoy all the benefits provided by them.

In the case of Able Co., the application a combined plant layout provides all the advantages of efficient production, while also improving the interdependence between units in utilizing shared facilities such as stores and equipment testing bays. The location of similar functions in a centralized place enhances material movement. This also reduces space that would be lost by duplicating efforts. The standard product production units for instance are process oriented and effort aimed at maximizing productivity and production efficiencies, while the specialized product area focuses on product plan in a bid at enhancing the product quality. Setting up of these sections with an inappropriate plant plan reduces they're ability at efficient production.

Proposed combined plant plan

The proposed plan, therefore will incorporate different areas according to their intended function and ease of mobility of products and materials through the plant. Mobility of the staff and the products within the firm is a consideration that is paramount to this plan. The employee parking being on the north west; the entry shall be on the south west accessed through the service road. Entrance of materials will also be on the same side, thus the stores being located averagely in the middle of the plant. To the left of the stores, shall be the Machine shop for the metallic components. The machine shop shall enjoy a strategic proximity to the stores for acquisition of materials. The components thus produced are stored in a store located in the store area, since they are raw products in latter processes. 30% of the metal parts produced will be sent to dispatch and product stores near the south gate. In addition to the machine parts produced, the central store area shall hold the store for sourced materials such as wires, the general kitting cell for wires needed within the firm and the kitting cell for specialized orders. These shall be the Sub-assemblies in the store area in order to minimize traffic from the various departments coming for individual components. To the right of the central store area shall be the standard product assembly cell. The immediate location of this cell next to the stores is the expected volumes of materials it will transact being the major operating unit. Bordering the standard product cells will be the testing bay. Its location ensures that it is shared by the special product and the standard product sections. The special product producing cells will boarder testing bay to the extreme right of the layout. To the south of the layout, will be the dispatch store cells, each

holding their distinct product types ready for dispatch. Its position ensures that it is in proximity to the producing cells, while at the same time being in proximity to the main road. By incorporating the job shop approach in the metallic components cell, the process production lay out in standardized product and product approach to the specialized product cells; the plan makes optimal use of the limited space available for the firm.

2. Product plant layout

In this layout, the products dictate the design of the plant. This means that machines and other plant components are arranged in a sequence as dictated by the needs of the products being handled. In this sense, the product forms the primary consideration and the process comes as a secondary consideration.

In this scenario, it is apparent that the company's products can be divided into two. There are the standard products and the specials. The standard products are manufactured in bulk in a single batch whereby the specials are manufactured in small quantities.

As seen except for the testing stage, these two categories of products use different machinery and equipment. This means that the plant should be product focused.

Each category requires a different plan and arrangement of plant components. The company also deals with custom-made products whereby a client places an order with desired characteristics of the product. This means that the engineers have to settle a standard for manufacturing such products. This calls for regular rearrangement of plant components in order to meet the needs of the standard. Unlike, a process focused layout that is

highly rigid, product-focused layout allows the manufacturer to rearrange plant components and machinery in a way that offers a greater chance of uniformity for a standard. The product focused layout is ideal for job orders. As seen in the case of Able. Co, the manufacturer deals with orders that require specific configuration of the plant layout according to the demands imposed by the requirements of the order. Upon completion of a given order, plant components may be re-configured according to a standard developed for the new order.

In this case, product layout has a number of comparative advantages over other methods and that way justifying its applicability.

- Advantages of product layout
- Reduced costs of material handling since it uses a straight line of flow
- There is maximum utilization of labor and machinery
- Effective control and reduced costs of supervision
- Its short and quick movements ensure a short operating cycle.

Considering that the green field has a relatively reduced space, it is logical to have a plant layout that ensures flexibility of plant components. The product layout is comparatively flexible as compared to other layouts.