

27.10: Facility Location and Layout

Learning Objectives

- Explain facility location
- Explain facility layout

Facility Location

Of all the pieces of the planning puzzle, facility location is the most strategic and critical. Once you build a new manufacturing facility, you have made a substantial investment of time, resources, and capital that can't be changed for a long time. Selecting the wrong location can be disastrous. Some of the key factors that influence facility location are the following:

- Proximity to customers, suppliers, and skilled labor
- Environmental regulations
- Financial incentives offered by state and local development authorities
- Quality-of-life considerations
- Potential for future expansion

The next step, after planning the production process, is deciding on plant layout—how equipment, machinery, and people will be arranged to make the production process as efficient as possible.

? Practice Question

<https://assessments.lumenlearning.co...essments/14461>

Facility Layout

After the site location decision has been made, the next focus in production planning is the facility's layout. The goal is to determine the most efficient and effective design for the particular production process. A manufacturer might opt for a U-shaped production line, for example, rather than a long, straight one, to allow products and workers to move more quickly from one area to another.

Service organizations must also consider layout, but they are more concerned with how it affects customer behavior. It may be more convenient for a hospital to place its freight elevators in the center of the building, for example, but doing so may block the flow of patients, visitors, and medical personnel between floors and departments.

There are four main types of facility layouts: process, product, fixed-position, and cellular.

The **process layout** arranges workflow around the production process. All workers performing similar tasks are grouped together. Products pass from one workstation to another (but not necessarily to every workstation). For example, all grinding would be done in one area, all assembling in another, and all inspection in yet another. The process layout is best for firms that produce small numbers of a wide variety of products, typically using general-purpose machines that can be changed rapidly to new operations for different product designs. For example, a manufacturer of custom machinery would use a process layout.

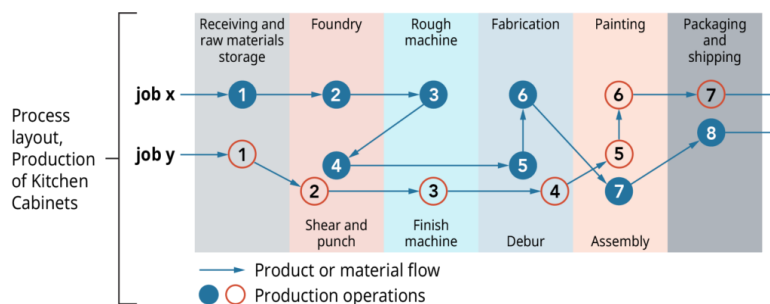


Figure 27.10.1: An Example of a Process Facility Layout. Source: Adapted from Operations Management, 9th edition, by Gaither/Frazier.

Products that require a continuous or repetitive production process use the **product** (or **assembly-line**) **layout**. When large quantities of a product must be processed on an ongoing basis, the workstations or departments are arranged in a line with products moving along the line. Automobile and appliance manufacturers, as well as food-processing plants, usually use a product layout. Service companies may also use a product layout for routine processing operations.

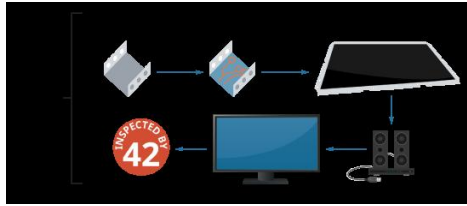


Figure 27.10.2: An Example of a Product Facility Layout. Source: Adapted from Operations Management, 9th edition, by Gaither/Frazier.

In the following video, Jansen, a Swiss steel maker, describes how the company's offices were designed to maximize the productivity and creativity of its engineers:



You can view the [transcript for “Office Space – Jansen”](#) (opens in new window) or [text alternative for “Office Space – Jansen”](#) (opens in new window).

Some products cannot be put on an assembly line or moved about in a plant. A **fixed-position layout** lets the product stay in one place while workers and machinery move to it as needed. Products that are impossible to move—ships, airplanes, and construction projects—are typically produced using a fixed-position layout. Limited space at the project site often means that parts of the product must be assembled at other sites, transported to the fixed site, and then assembled. The fixed-position layout is also common for on-site services such as housecleaning services, pest control, and landscaping.

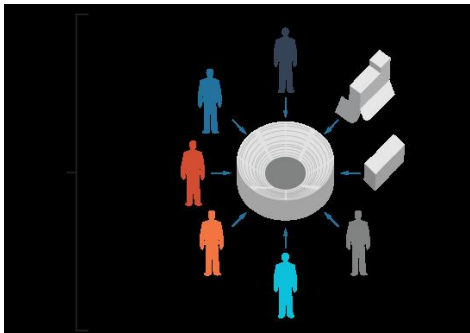


Figure 27.10.3: An Example of a Fixed-Position Facility Layout. Source: Adapted from Operations Management, 9th edition, by Gaither/Frazier.

To see an excellent example of fixed-position layout, watch the following video that shows how Boeing builds an airplane. (Note that this video has no narration; only instrumental music. Access audio description by using the widget below the video.)



Access the [text alternative for “Making of a Boeing Airplane”](#) (opens in new window).

Cellular layouts combine some aspects of both product and fixed-position layouts. Work cells are small, self-contained production units that include several machines and workers arranged in a compact, sequential order. Each work cell performs all or most of the tasks necessary to complete a manufacturing order. There are usually five to 10 workers in a cell, and they are trained to be able to do any of the steps in the production process. The goal is to create a team environment wherein team members are involved in production from beginning to end.

? Practice Question

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