

P1. Process Analysis of Bread-making Operation

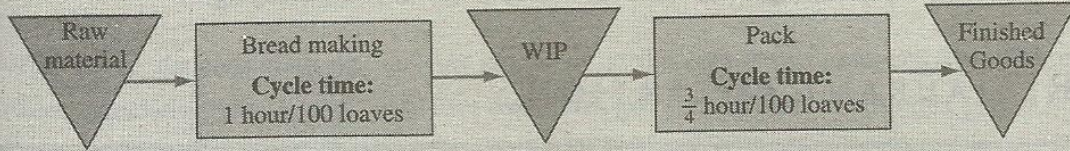
For the manager of a bakery, a first priority is to understand the products that are made and the process steps required. The figure below is a simplified diagram of the bread-making process. The first step is preparing the dough and baking the loaves. The second step is the packaging of the loaves. Due to the size of the mixers in the bakery, bread is made in batches of 100 loaves. Packaging needs only 0.75 hour to place 100 loaves in bags. If we assume that the bread-making and packaging activities both operate the same amount of time each day, then

- (a). What is the cycle time for the bread-making activity?
- (b). What is the capacity utilization of packaging operation?
- (c). Identify the bottleneck activity in this process.

Now, suppose that instead of having only one bread-making operation, we now have two, as shown in the figure. The cycle time for each individual bread-making operation is still one hour per 100 loaves. When both the bread-making lines are operating together and both the bread-making and packaging are operated the same number of hours each day, compute the following:

- (i). If both the operations are working on single shift of 8 hours per day, what is the daily output of bread loaves?
- (ii). Identify the bottleneck activity in this case?
- (iii). What is your suggestion to make the daily capacity of both the activities identical? What would be the capacity of the bakery in this case?
- (iv). Comment on the inventory build-up in this case. Compute the average WIP inventory in the system and the average time that the loaves are in WIP.
- (v). What is the throughput time of the bakery?

A. Bread making on one line



B. Bread making on two parallel lines

