

## CAPACITIES cases

1a-

Sara James Bakery, described in Examples S1 and S2 , has decided to increase its facilities by adding one additional process line. The firm will have two process lines, each working 7 days a week, 3 shifts per day, 8 hours per shift, with effective capacity of 300,000 rolls. This addition, however, will reduce overall system efficiency to 85%. Compute the expected production with this new effective capacity.

1-

Kleber Enterprises would like to evaluate three accounting software products (A, B, and C) to support changes in its internal accounting processes. The resulting processes will have cost structures similar to those shown in Figure 7.3 . The costs of the software for these processes are:

	TOTAL FIXED COST	DOLLARS REQUIRED PER ACCOUNTING REPORT
Software A	\$200,000	\$60
Software B	\$300,000	\$25
Software C	\$400,000	\$10

Solve for the crossover point for software A and B and then the crossover point for software B and C.

1a-

Your boss has told you to evaluate the cost of two machines. After some questioning, you are assured that they have the costs shown at the right.

Assume:

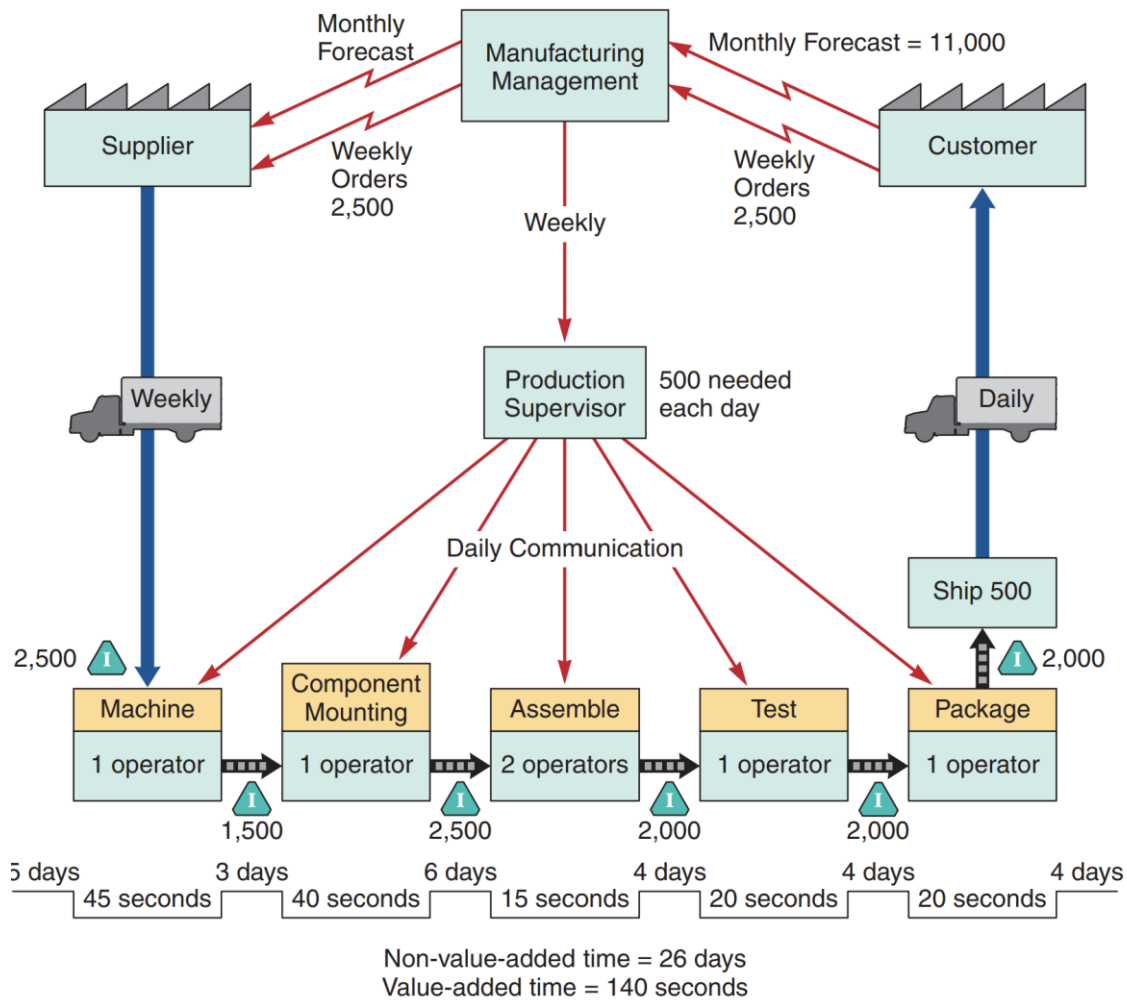
a) The life of each machine is 3 years.

b) The company thinks it knows how to make 14% on investments no riskier than this one.

Determine via the present value method which machine to purchase.

2-

VALUE STREAM MAPPING



**Solution**

From Figure 7.6 we note that large inventories exist in incoming raw material and between processing steps, and that the value-added time is low as a proportion of the entire process.

How might raw material inventory be reduced?

3-

**Determine capacity utilization**

Sara James Bakery has a plant for processing Deluxe breakfast rolls and wants to better understand its capability. Last week the facility produced 148,000 rolls. The effective capacity is 175,000 rolls. The production line operates 7 days per week, with three 8-hour shifts per day. The line was designed to process the nut-filled, cinnamon-flavored Deluxe roll at a rate of 1,200

per hour. Determine the design capacity, utilization, and efficiency for this plant when producing this Deluxe roll.

First compute the design capacity and then use Equation ( to determine utilization and Equation to determine efficiency)

4-

### **EXPANDING CAPACITIES**

The manager of Sara James Bakery (see Example S1 ) now needs to increase production of the increasingly popular Deluxe roll. To meet this demand, she will be adding a second production line. The second line has the same design capacity (201,600) and effective capacity (175,000) as the first line; however, new workers will be operating the second line. Quality problems and other inefficiencies stemming from the inexperienced workers are expected to reduce output on the second line to 130,000 (compared to 148,000 on the first). The utilization and efficiency were 73.4% and 84.6%, respectively, on the first line. Determine the new utilization and efficiency for the Deluxe roll operation after adding the second line.

First, determine the new design capacity, effective capacity, and actual output after adding the second line. determine utilization and Equation to determine efficiency.

5-

### **BOTTLENECKS**

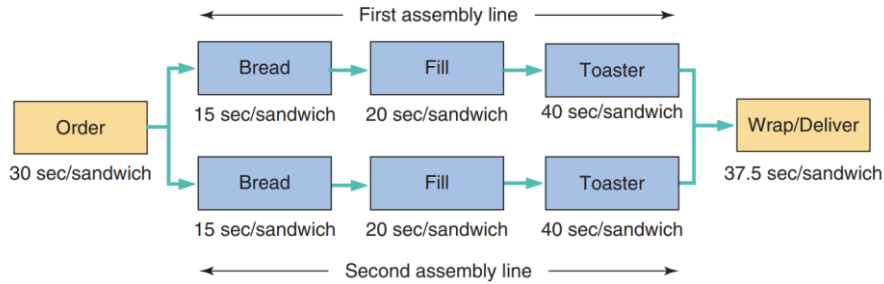
Howard Krays's sandwich shop provides healthy sandwiches for customers. Howard has two identical sandwich assembly lines. A customer first places an order, which takes 30 seconds. The order is then sent to one of the two assembly lines. Each assembly line has two workers and three operations:

(1) assembly worker 1 retrieves and cuts the bread (15 seconds/sandwich),

(2) assembly worker 2 adds ingredients and places the sandwich onto the toaster conveyor belt (20 seconds/sandwich),

and (3) the toaster heats the sandwich (40 seconds/sandwich). Finally, another employee wraps the heated sandwich coming out of the toaster and delivers it to the customer (37.5 seconds/sandwich).

A flowchart of the process is shown below. Howard wants to determine the bottleneck time and throughput time of this process.



Clearly the toaster is the single-slowest resource in the five-step process, but is it the bottleneck? Howard should first determine the bottleneck time of each of the two assembly lines separately, then the bottleneck time of the combined assembly lines, and finally the bottleneck time of the entire operation. For throughput time, each assembly line is identical, so Howard should just sum the process times for all five operations.

**6-**

T. Smunt Manufacturing Corp. has the process displayed below. The drilling operation occurs separately from and simultaneously with the sawing and sanding operations. The product only needs to go through one of the three assembly operations (the assembly operations are “parallel”).

- a) Which operation is the bottleneck?
- b) What is the throughput time for the overall system?
- c) If the firm operates 8 hours per day, 22 days per month, what is the monthly capacity of the manufacturing process?
- d) Suppose that a second drilling machine is added, and it takes the same time as the original drilling machine. What is the new bottleneck time of the system?
- e) Suppose that a second drilling machine is added, and it takes the same time as the original drilling machine. What is the new throughput time?

