

The National Cranberry Cooperative case illustrates an interesting operational challenge. While the information about the cranberry production industry may be dated, we will focus on the process analysis which is real and universal. After reading the case, provide concise answers to the following questions (with supporting computation):

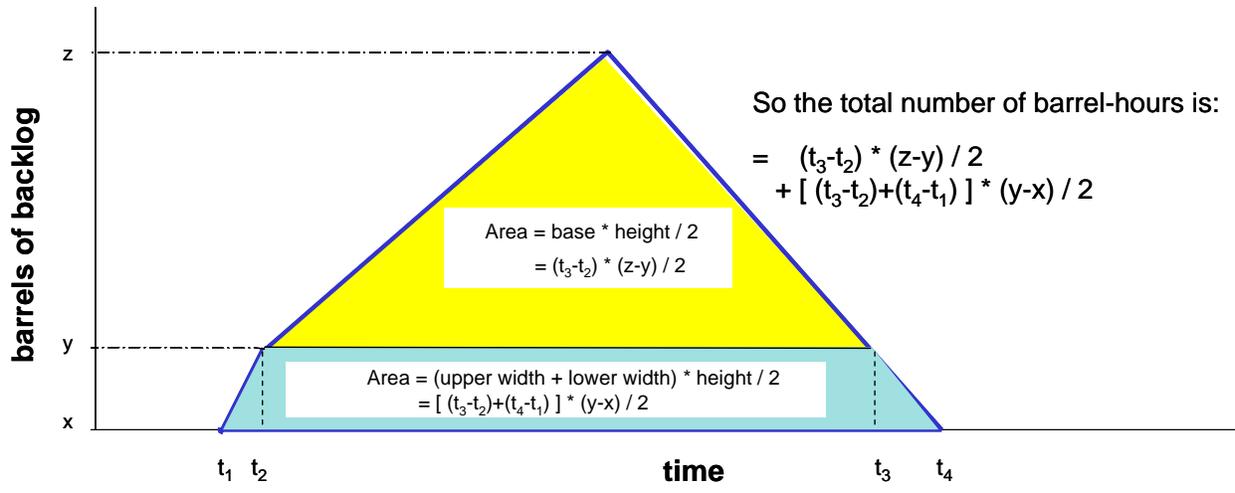
1. What are the problems facing RP1?
2. Draw a process flow diagram for RP1. Compute the capacity of each station in barrels per hour. What's the "Herbie" (i.e. bottleneck)? Upon what assumptions do your capacity calculations depend?
3. What happens on a peak day? More specifically:
 - a) How does the backlog of berries grow over time?
 - b) How much overtime labor is used? How much money does that represent?
 - c) At \$25 per truck per hour, how much money does all the truck waiting time cost?
4. What recommendations, both short and long term, would you make to Mr. Schaeffer? Specifically,
 - a) Given the peak-day costs developed in Questions 2 and 3, would you follow Walliston's recommendation to buy dryers (at \$40,000 each) and to convert the dry holding bins to hold either wet or dry berries (at \$7,500 each)? How many, if any, would you pay for?
 - b) Independent of any equipment purchases, what changes to peak-day operations would you recommend to Hugo Schaeffer?

To simplify matters and focus attention, use average numbers in all the analysis. Assume that:

- On a peak day, 18,000 barrels of berries are to be processed. The arrival of berries is evenly distributed over a 12 hour period starting at 7 am (i.e. ignore Exhibit 1 for now!).
- The delivery load varies from truck to truck; use the average of 75 barrels per truck in your analysis.
- Each truck takes 5-10 minutes to process at the dumper; use the average of 7.5 minutes.
- 70% of the berries are wet.
- Use the shift start times given in Figure E: 7 am for Receiving, 11 am for destine, dechaff, dry, milling, etc.

Hint for Question 3c):

- To find the number of truck-hours spent waiting (in order to compute truck waiting cost), it suffices to find the number of barrel-hours and then divide it by 75 (the average load of each truck).
 - First find how many barrels are waiting to be unloaded over time.
 - Then the area underneath the curve represents the total number of barrel hours. The following graph is an example.



So the total number of barrel-hours is:

$$= (t_3 - t_2) * (z - y) / 2 + [(t_3 - t_2) + (t_4 - t_1)] * (y - x) / 2$$