



ALAN MACCORMACK

The Boston Cranberry Company

The Boston Cranberry Company operated a small facility where berries were unloaded from trucks, washed and packed, then delivered to local convenience stores for sale to consumers. The facility only operated during the cranberry-harvesting season, which lasted for 100 days each summer. Last year, the company experienced problems with the amount of overtime it had to pay truck drivers, who drove the cranberries from the local farms where they had been harvested to Boston Cranberry Company's facility for processing. In particular, by lunchtime, the cranberry holding bins (known as "dumper bins") had filled up, causing the incoming trucks to "back-up" and wait before they could unload their cranberries.

Mr. W. Boggs, the plant manager, was charged with fixing the problem. Several suggestions had been made, from adding more dumper bins to leasing more machines to speed up the plant's processing rate. He asked you to advise him on the best approach.

On a typical day, trucks containing cranberries arrived at a rate of 6 trucks per hour, beginning at 8am, when the facility opened, and ending at 4pm, 8 hours later. The facility remained open until all of the berries had been washed and bagged. Each truck delivered a full truckload of berries. The trucks unloaded their berries into one of four dumper bins – each of which held two truckloads of cranberries. A conveyor belt carried the berries from the dumper bins into a single "washer" unit, where the berries were sprayed with a mixture of water and preservatives to ensure that they were clean. The washer had a *maximum processing capacity* of 5 truckloads/hour. After the cranberries left the washer, the conveyor belt dropped them into one of two "bagging" machines, where they were packed in plastic bags. Each of these machines had a *maximum processing capacity* of 2 truckloads/hour. The finished bags were manually loaded onto the company's delivery trucks for delivery (you can ignore this part of the process).

- 1) Draw the process flow for this operation.
- 2) What is the bottleneck in this process (i.e., the limiting step)?
- 3) How fast will inventory build up on a typical day (if at all)?
- 4) Where does inventory build up in this process (if at all)?
- 5) At what time will the trucks begin to wait (if at all)?

Professor Alan MacCormack prepared this case. This case is not based on a single individual or company but is a composite based on the author's general knowledge and experience. Funding for the development of this case was provided by Harvard Business School. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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Boggs has provided the following data to help you evaluate potential improvements:

- 1) Truck drivers were paid \$10 per hour while they were waiting to unload
- 2) Leasing 4 more dumper bins for the season would cost \$10,000 (dumper bins could only be leased in quantities of 4; it was not possible to lease a single bin).
- 3) Leasing an additional washer unit for a season would cost \$5,000
- 4) Leasing an additional bagging machine for a season would cost \$10,000

What improvements would you recommend that Boggs make?

[Hint: work out how much overtime you have been paying truck drivers on a typical day. Then look at how each proposed option would affect the facility's operations on a typical day.]