

Quote: Five bins at a time on the box wagon are brought into and removed from the orchard rows.

Rotating Box Wagon Harvesting System for Apples

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Harvesting methods have improved significantly in recent years. Three aspects that need improving included partially filled bins, bin positioning and retrieval, and efficiency. Harvesting on a per-bin basis required the harvesters to fill as many bins as possible. Bins needed to be positioned in the orchard before harvesting could begin and were removed individually. Differences in individual harvesting rates caused some pickers to finish earlier than others, thus decreasing their efficiency.

The Rotating Box Wagon System was created after the 1997 IDFTA tour in New York to improve harvesting efficiency. Managers at Kropf Orchards discussed many of the different methods presented for harvesting into bins on a wagon. We decided to use an expanded version of the Rotating Box Wagon System.

THEORY: ORGANIZING THE TEAM

The Rotating Box Wagon system consists of a manager and assistant manager and harvesting teams under their supervision. Teams consist of counter/quality control persons, box wagon drivers, harvest team members, floater wagon drivers and truck loaders. Each person performs certain tasks in the harvest system to increase efficiency (Figure 1).

Manager and Assistant Manager

There are two managers for the four teams. Managers oversee all aspects of the daily operations of harvesting with the Rotating Box Wagon System including start times, block changes, floater wagon positioning, paper work, and administrative duties.

Counter/Quality Control

Each team has a counter/quality control person. This person is responsible for tracking and recording each member's total number of picked buckets. This person also monitors bucket levels and the sound of the picking near them. If any bruising or mishandling occurs, the counter/quality control person is within complete hearing distance. Pickers are paid on the basis of the number of buckets picked, not the number of bins filled.

Box Wagon Driver

Each team has a box wagon driver. The driver is responsible for cleaning out any leaves or foreign objects in the bins before harvesting begins. He also removes any twigs or leaves while picking buckets are dumped into the bins. The driver levels each bin and makes sure each bin is filled to its maximum capacity.

Harvest Team Members

Each harvest team has 10 to 14 members. They pick into buckets that are then delivered to the bin and are counted. Members work as partners, i.e., husband and wife or two or three friends. Partners work on the same tree and move from tree to tree together.

Floater Wagons

There are three floater wagons for every four teams. Floater wagons take the box wagon of empty bins to a harvesting position in a row. Two are needed approximately 80% of the time and the third wagon is needed approximately 20% of the time.

Truck Loader

One loader at the box pad loads the full bins onto the trucks. The loader breaks the bins open and lines them up for the box wagon to pick up.

Operation

Each team has approximately the same number of members. Each team harvests two rows at a time. Partners finish harvesting an entire tree and then take the next available tree in their row. The team members fill the front bin first and work back. The box wagon should stay in front of the crew. This will be more important in higher density orchards. The tractor pulling the box wagon should be running only when it has to move. When the box wagon is full, its bins are dropped at the loading pad. A floater wagon moves into the harvesting area when the original wagon is full. After dropping the full bins, the wagon picks up empty bins and becomes a floater wagon. The box wagons constantly rotate positions between being filled and being a floater.

Improvements

Bin Levels. In past systems, bins were not always filled to maximum capacity because team members harvested by the bin. Because the team members harvest by bucket and the drivers are responsible for checking the bin levels before removal, bins are consistently filled.

Bin Positioning. Staging bins the night before and removing each bin individually costs more labor hours than necessary. Five bins at a time on the box wagon are brought into and removed from the orchard rows. After each wagon is filled, it takes all 5 bins and drops them at the loading pad.

Efficiency. Harvesting in past systems was slower than necessary. Because team members do not pick at the same rate, harvesting by bin caused some pickers to be idle at the end of a block. With the Rotating Box Wagon System, if a team falls behind, other faster teams can be brought into the row to help finish the row. Also, because partners move from tree to tree together, no one picker falls behind. It is a team effort.

Benefits

Number of Bins/Bin Levels. Because harvesting is by bucket and drivers check bin levels, the number of bins used decreases. Kropf Orchards averaged one bushel per bin more with this system, decreasing the number of bins used by approximately 5%.

Efficiency. Harvesting is faster with less idle time. With the Rotating Box Wagon System all teams in a block start and finish together. Harvest team members are harvesting within minutes of each block change.

The box wagons allow five bins at a time to be brought into the orchard so they no longer have to be distributed in the orchard rows before harvest. After each wagon is filled, it takes all 5 bins and drops them at the loading pad. Bins are no longer handled 2-3 times before reaching the pad. All bins are out of the orchard within 10 minutes of the last block being finished. Each day box wagons will make fewer trips out of the orchard, therefore decreasing fuel usage and wear on the tractors.

Flexibility. The Rotating Box Wagon System can work in many different conditions. It works with any number of teams and in older, widely spaced orchards as well as high-density orchards.

Other Benefits. Because harvesting is a team project, pickers develop good working relationships.

This system provides better quality control during harvesting. With more harvest team members in a smaller area, bruising and incorrect picking techniques are easier to control.

As a solution to problems associated with older harvest systems, Kropf Orchards adapted the Rotating Box Wagon System. After only one season, there has been marked improvement in harvesting. Additionally, the system's flexibility will guarantee its continued use for years to come.

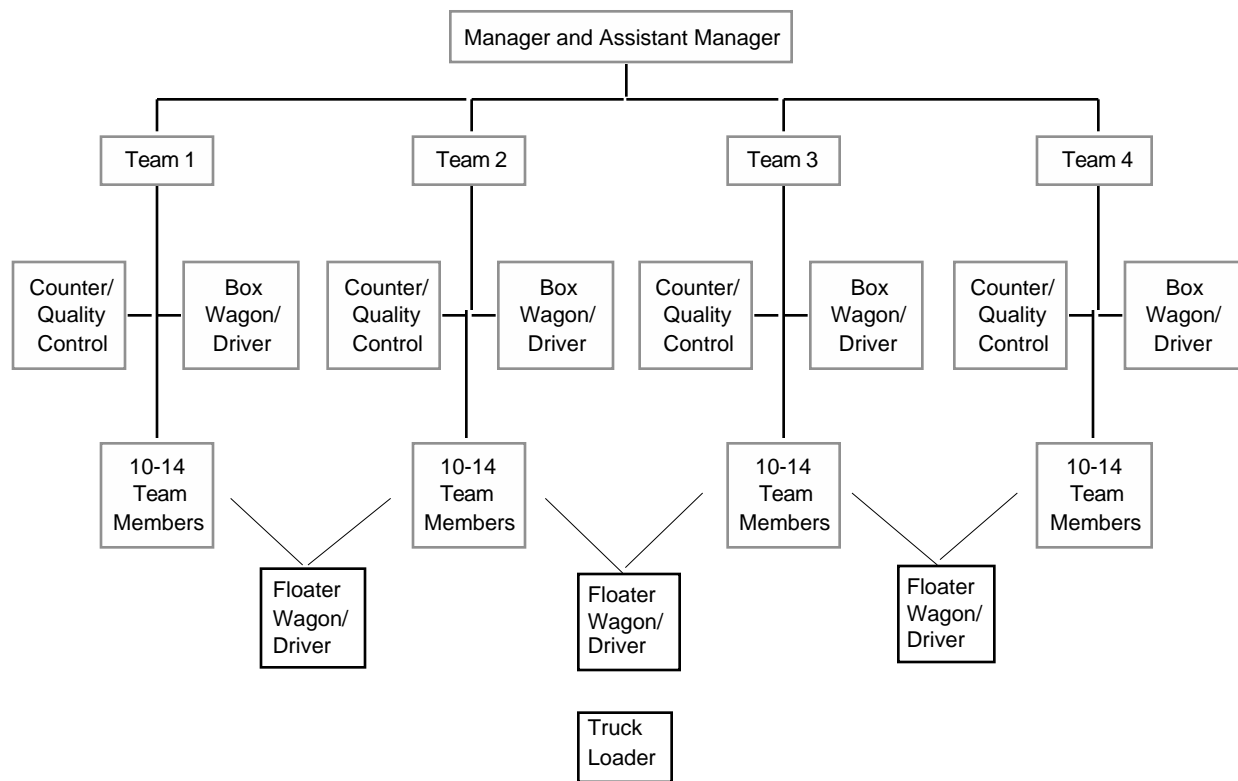


Figure 1. 50-member rotating box wagon system.