



# Handling Pears in Bulk Bins

By Don Langmo

Industrial Engineer  
Oregon State University

In recent years there has been rapid growth in use of bulk bins for handling deciduous fruits. A bulk box will replace some 20 to 25 field lugs, and cost of bins is approximately 45% lower than field lugs for equal volume of fruit.

Orchard size, tree maturity, picking speed, hauling distance, labor and equipment availability, and ownership of containers all influence the cost of handling. A change in handling methods may affect fruit quality, picking, transportation, receiving, dumping, and container storage and maintenance. A change to bin handling may be an aid to management, but never a substitute for management.

Washington and Oregon studies show no increase in physical damage to apples or pears from handling in bins instead of lugs. Lug-handling often requires numerous rough transfers in moving the product to the processor. Bins cannot be manhandled.

Recent California studies of comparative costs of orchard and highway transportation of fruit in field lugs and bulk bins show bins gain advantage as picking rate and hauling distance increase. The following table shows lowest-cost handling methods in relation to output and distance:

Rate of output (Lugs per hour)	One-way hauling distance			
	1 mile	3 miles	5 miles	10 miles
50. . . . .	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>
100. . . . .	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	B <sub>1</sub>
150. . . . .	L <sub>1</sub>	L <sub>1</sub> , B <sub>1</sub>	B <sub>1</sub>	B <sub>1</sub>
200. . . . .	L <sub>1</sub>	B <sub>1</sub>	B <sub>1</sub>	B <sub>1</sub>
250. . . . .	L <sub>1</sub> , B <sub>2</sub>	B <sub>1</sub>	B <sub>1</sub>	B <sub>1</sub>
300. . . . .	B <sub>2</sub>	B <sub>1</sub>	B <sub>1</sub>	B <sub>1</sub>

- L<sub>1</sub> -- Lugs are hand-stacked on low-bed trailers that are pulled to the plant by farm tractors.
- B<sub>1</sub> -- Bins are handled in the orchard with fork-lift equipment and moved to the plant on flat-bed trucks.
- B<sub>2</sub> -- Bins are handled in the orchard with fork-lift equipment and moved to the plant on tractor-drawn, low-bed trailers.

This table applies to containers owned by the processor. When the grower owns the containers the lowest handling cost always favors bins, regardless of rate of output or hauling distance.

Studies for outputs lower than about 15 lugs per hour favor leaving bins on a low-bed trailer and moving them through the orchard as the fruit is picked. No lifting equipment is needed in the orchard.

Use of bulk bins in the orchard enables pickers to spend more time picking. Studies show pickers using field boxes spend about 8% of their working time handling containers and leveling fruit. This is not necessary with bins. Direct labor costs for picking are not reduced where pickers work on a piece rate, but fewer pickers are required and management costs are less.

For example, inspection for picking damage is simplified in bins, since much of the fruit is exposed to view. This is not always true where pickers stack empty lugs on top of filled ones. Checkers who keep a tally of each picker's production find their work easier and less subject to errors, since they need count only a few bins rather than a large number of lugs. Need for fewer pickers should reflect a savings in costs of procurement, picking equipment, employee service, record-keeping, payroll administration, and termination activities associated with harvest labor.

Rapid handling of bins in receiving and dumping operations will reduce the time required to return empty containers, and thus fewer containers will be needed. Off-season storage is simplified with bulk boxes, but a few damaged boxes can make a serious reduction in handling operations. Good handling practices and preventative maintenance can reduce container damage.

#### Suggestions for procurement and use of pallet bins

- . The more expensive container may cost less per year of useful life than an inexpensive one.
- . Wood parts should be of good structural quality, preferably of wood dried before fabrication. A nontoxic wood preservative and sealing compound may justify its cost through increased life and reduced weight variations of bins exposed to wet environments.
- . Bins with internal framework will hold more fruit in a given space than bins with an external frame.
- . Internal surfaces of the bulk box should be smooth and free of protrusions that might injure the fruit.
- . Bins used to hold fruit being cooled in storage should have about 10% of either the bottom or the sides vented for air circulation.
- . Bin users within a region handling similar products may save money by establishing standard container dimensions.
- . Bin pallets with two-way entry are stronger and easier to build than four-way-entry pallets.
- . Insert forks of lift equipment completely before tilting to avoid damage to bin bottom boards and agitation of the fruit.
- . Never push bins with tips of the forks.
- . A level surface for stacking bins may help prevent damage to fruit and containers.