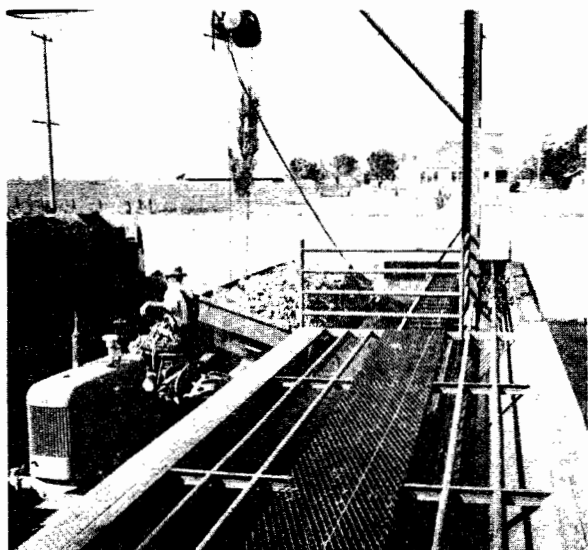


# WINE GRAPE BULK HANDLING EQUIPMENT AND COSTS



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# WINE GRAPE BULK HANDLING EQUIPMENT AND COSTS

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The development and use of bulk handling equipment for wine grapes has progressed rapidly during the past three years. During this time, certain basic types of equipment with various modifications have evolved in San Joaquin County. This study was undertaken to attempt to compare the relative efficiencies of the various types of equipment in use and to attempt to provide growers with information on the practicability of conversion to such equipment, especially where relatively small tonnages are involved.

## FIG. 1

FIELD

PICKING

AND

DUMPING

INTO

TRAILER

TANK



FIG. 2



USE OF  
FIELD  
LOADER IN  
LOADING  
FILLING  
TRUCK  
TANK

Included in this study are the two main types in use in the county, that is the trailer-tank and the field loader with truck tanks. In addition to these, another type, the skid-tank, is included. This was of special interest because it represented the only attempt by the grower to reduce the actual picking cost. These three types were compared to the conventional box type of operation where the boxes are hauled and dumped at the winery.

The trailer-tank as shown in figure (1) consists of a minimum of two such trailers plus suitable field power. Pickers pick into buckets or boxes, carry them to the vineyard avenue, and dump directly into the low tank. When filled, the trailers are moved to the winery where the tanks are dumped by means of a power hoist. There are several variations in the construction of these trailers. Some are four-wheel trailers; others semi-type trailers.

Figure (2) shows the field loader type of operation. Here the pickers pick into buckets or boxes, carry their fruit to the vineyard avenue where they dump into the loader. The loader, which is generally pulled behind the truck, then loads the fruit into the truck tanks. A minimum of two trucks with tanks and one field loader are required. Dumping at the winery is similar to the trailer tank operation.

The skid-tank operation is shown in the field in figure (3). The pickers pick in buckets or boxes and dump into the low skid tanks. The tanks move down every fourth row in the vineyard so the pickers do not have to move to the vineyard avenues. When full, these small tanks are moved out to the vineyard drive and loaded onto a low trailer as shown in figure (4). The dumping at the winery is essentially the same as in the other two types described. Six tanks and one trailer plus field power comprise a minimum unit here.

FIG. 3

SKID

TANK

MOVED

DIRECTLY

INTO

VINEYARD

ROW





FIG. 4      LOADING SKID TANK ONTO TRAILER  
FOR MOVEMENT TO WINERY

A comparison of some of the features of the various units is given in Table 1. From this table, it may be noted that the skid-tank is the only unit which reduces actual picking cost. The larger load of the skid-tank could be adjusted by use of smaller tanks or by hauling two instead of three tanks if desired. The greatest saving in loading and dumping is afforded by the trailer tank and loader type of operation. The only special operation involved with any of this equipment is the chopping of cane ends needed for clearance of the skid-tank. The cost of this chopping was included with the picking cost in Table 2.

TABLE 1 - BULK HANDLING EQUIPMENT - CHARACTERISTICS

	Box	Trailer	Loader	Skid Tank	
Reduce picking cost?	No	No	No	Yes	
Size of load	5 T.	5 + T.	5 + T.	9 T.	
Size of crew	( Loading	2	pickers	pickers	2
	( Dumping	1	1	1	1
Time to	( Load	45 min.	-	-	25
	( Dump	45 "	6	6 - 8	12
Extra field power	None	None	Loader	Tractor	
Special operations	None	None	None	Chopping	

TABLE 2 - BULK HANDLING EQUIPMENT - GROWERS COSTS, 1954

COSTS PER TON

Cooperator: Number	Method	Total Tonnage	Picking: Cost Per Ton	Container: Cost Per Ton	Load,Haul: and Dump Labor Per Ton	Supple- mental Field Power	Load,Haul: Equipment: Cost Per Ton	Constant for Truck: Operating: 45¢/Ton	Total Delivered to Winery
1	Pick & haul in box.	380	\$7.20	\$ .29	\$1.30	-	\$ .34	\$ .45	\$ 9.58
2	Pick & haul in box.	453	6.16	.64	.90	-	.33	.45	8.48
3	Pick into trailers	885	6.50	.02	.33	-	.36	.45	7.66
4	" " " (Semi)	917	6.35	.01	.45	-	.44	.45	7.70
5	" " " "	1064	6.25	.01	.32	-	.40	.45	7.43
6	Pick into loaders pulled by tractor	632	7.30	.01	.53	.13	.36	.45	8.78
7	Pick in loader hooked behind trl.	372	6.19	.01	.54	.01	.35	.45	7.52
8	Pick into skid tank:	608	4.72	.01	.62	.32	.68	.45	6.80

Table 2 shows growers' actual costs in operating the various types of equipment during the 1954 season. The following are included under the various headings.

Picking cost - pickers, foreman, checkers, special operations

Load, Haul and Dump Labor - truck drivers, swampers and loading help

Supplemental Field Power - cost of pulling and operating loader, cost of pulling and loading skid-tanks

Load and Haul Equipment Cost - depreciation and interest on loaders, trucks, trailers, tanks, etc.

Constant for Truck Operating - based on hauling 6 loads at 5 T./load, 9 hr./day. Includes moving of trailers in vineyard while picking

From Table 2, it will be seen that all systems effected a saving over the conventional box, but that the greatest saving was effected by the skid-tank units, primarily because of the reduced picking costs.

In order to better compare the various types of equipment on the basis of equivalent tons handled during a given year, Table 3 was set up. The figures of Table 2 were converted where necessary. In the case of the picking costs, except for the skid-tanks, the average of all units was used since no saving was afforded by these other methods.



TABLE 3 - BULK HANDLING EQUIPMENT - 500 AND 1,000 TONS

COST PER TON

Method	Cost	Cost	Load	Supple-	Con-	Load and Haul	Total		
	Per T.	Per T.	Dump Labor	mental: Field Power	stant for Truck Opertn	Equip. 500 T.: 1000 T.	Cost 500 T.: 1000 T.	Delivered to Winery 500 T.: 1000 T.	
Pick and haul in boxes	6.56	.46	1.10	-	.45	.28	.28	8.85	8.85
Pick into trailer	6.56	.01	.37	-	.45	.76	.38	8.15	7.77
Pick into loader	6.56	.01	.53	.07	.45	.35	.18	7.97	7.80
Pick into skid tanks	4.72	.01	.62	.32	.45	.83	.41	6.95	6.53

The only variations in costs between the 500 T. and 1,000 T. operations are in the equipment costs. In the case of the conventional box method, no variation was used because it was felt that one truck was needed for each 500 tons hauled. Although the greatest savings are realized by the 1,000 ton operation, Table 3 shows that even the 500 ton grower can realize a sizeable savings which should be weighed against the cost of conversion. It should also be noted that the skid-tank operation, because of the picking cost reduction, maintained its lead in total cost even in the 500 ton situation.

In setting up any system, the grower should consider the cost of conversion and the probable savings as well as any special features needed for his own operation. Modifications are possible for all of the units discussed here.

In the case of the trailer-tank operation, two power units, usually the existing truck or pickup and tractor, are required as well as two trailer-tanks. Recently more semi-trailers have been built, many growers feeling that they are safer and more easily handled on the highway and at the winery. These trailer-tanks vary in price, but a number of units have been sold at around \$850.00 each.

The loader and tank operation requires two trucks, usually one is already available, two sets of tanks (1 to 2 per truck) valued at about \$400.00 per set, and one field loader valued at about \$400.00.

The skid-tank operation as set up here would require 1 truck, usually available, converted to handle the semi-trailer. One trailer, valued by the grower at \$1,700.00 is needed and two sets of tanks (3 tanks per set) valued at \$600.00 per set.

## SUMMARY

The information developed here shows that all types of bulk handling equipment included will effect a savings to the grower over the conventional box method, even with a 500-ton enterprise. The cost of conversion will vary with the equipment on hand and the type of operation which is established. By far the greatest saving was afforded by the skid-tank operation because it was the only system which went into the vineyard after the grapes thus affording a real picking cost reduction. All of the other units afforded only a labor saving in loading and dumping. It would seem that in considering the use of any type of bulk handling equipment the grower should try to establish a system which will afford savings in both the picking and hauling operations.

April, 1955