

PRESENT EFFICIENCY OF SUGAR BEET HARVESTERS

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The use of the term efficiency as applied to a sugar beet harvester is misleading. Perhaps the term effectiveness would better cover the functions of a sugar beet harvester, although any analysis of the subject must cover quality of work performed, rate of accomplishing this work, and a study of the extent of utilization by various classifications of users. Material for this discussion was gained from records of 112 Marbeet Harvesters and 7 International harvesters used by growers for the Spreckels Sugar Company in 1946.

Since the Company owned the majority of the harvesters and was concerned with maximum utilization, accurate records were maintained of the acreage harvested by each machine. These records included also such machines as were owned by growers or commercial harvesting contractors. Three classifications of harvester users were examined with a view toward determining how a maximum load factor could be obtained from a large number of harvesting units. An examination of the harvest records revealed that owners, renters, and contractors harvested the acreages indicated in the following tabulation:

<u>Number</u>	<u>Harvester Make</u>	<u>No. of Rows</u>	<u>Group</u>	<u>Average Acreage</u>
20	Marbeet	2	Owners	216.2
50	Marbeet	2	Renters	287.2
10	Marbeet	2	Contractors	452.3
10	Marbeet	1	Owners	171.0
22	Marbeet	1	Renters	156.3
7	International	1	Owners	49.5

Perhaps the most striking of the above figures is the large acreage accomplished by contractors. The explanation, of course, lies in the fact that a contractor's dollar income depends on the extent to which he utilizes his capital equipment. It is, therefore, only natural that the contractors as a group would see to it that harvesters were idle no longer than absolutely necessary.

The average acreage accomplished by renters of Company owned machines is influenced largely by the Company's agricultural staff as regards their ability to allocate harvesters with a view toward reducing idle time. To a lesser extent this acreage is influenced by the choice of conscientious growers, properly equipped with the necessary tractors and trucks.

The small acreage accomplished by owners of 2-row Marbeet harvesters (relatively larger in the case of one row Marbeet harvesters) is due to the fact that grower-owners customarily harvested only their own acreage and infrequently perform custom work.

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The relatively small acreage harvested by owners of International harvesters must be viewed with the realization that these harvesters were not made available until the harvest season was approximately half over.

#### FACTORS INFLUENCING THE QUALITY OF WORK

Many users of sugar beet harvesters complained about heavy field losses arising either from beets left in the ground or inaccurate top gauging whereby excessive amounts of beet tissue remained on the tops. The extent to which these criticisms were justifiable varies in proportion to the human tendency toward maligning innovations. It is unfortunate that no extensive investigation could be made of actual field losses. Certain small-scale tests were made on an accurate basis, and many less accurate estimates were made. It was evident, however, that field losses varied over a tremendously wide range, this range being estimated at 4 to 15 per cent based on total marketable tissue available in the field at harvest time.

It is not the function of this discussion to assign all of the many causes of field losses to the various harvesters, but rather to stress the important need for future accurate investigations of field losses together with a follow-up of mechanical changes necessary to minimize them. It would appear that too much stress has been laid on the value of harvesting acres rather than the complete recovery of beets from each acre.

Those factors which apparently contributed most heavily to severe field losses fell very naturally into two classifications--difficult field conditions and incompetent operators.

Most of the difficult field conditions were self-evident. Extreme weed conditions, irregular stands of beets with consequent wide variation in beet size are perhaps the two outstanding reasons for incomplete recovery of beets as well as being factors which made proper topping a practical impossibility. (This is not an implication that the topping system of Marbeet harvesters is not capable of considerable mechanical improvement--a weakness to which much of the topping losses must be attributed.)

The ability of machine operators and tractor drivers to perform properly their duties was outstandingly evident by even the most casual observation. It is unfortunate that the nature of California agriculture is such that the farmer rarely operates his own equipment. In fact, the term farmer is generally a misnomer since the majority of beet fields in California are farmed by employees of large scale agricultural operators. It is noteworthy that wherever beet growers personally operated their own harvesters, the quality of work is far above average. The usual casual laborer employed as a tractor driver tended to steer inaccurately and to make abrupt changes in direction resulting in beet breakage on Marbeet harvesters for each such change. Similarly untrained laborers acting as harvester operators lacked the intuitive skill required to recognize improper performance and make even simple adjustments.

In general, the effectiveness of a harvester crew is a function of their experience. Crews who had operated harvesters in 1944 and 1945 were in general far more skillful than inexperienced operators--both the quality and rate of work contrasted favorably with inexperienced operators.



## TRENDS IN HARVESTER OPERATION

The most outstanding trend in California is toward the ownership of harvesting units by growers or commercial operators. (The latter group includes many growers who do custom work in addition to their own acreage.)

There is a slowly growing realization among growers of the financial considerations attendant to improved root recovery. It will be necessary to stress to growers the importance of improving recovery as well as the perfection of harvesting machines in this direction. It is questionable if increased seasonal acreage per machine is a desirable goal. In any event, the most pressing need at this time is the improvement of field recovery together with such other operating economies as may reduce the overall cost of mechanical beet harvest.