

Experiences with Automatic Tare Samplers

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Down through the years the problem of taking accurate samples for determining tare on beets has been a constant source of concern, both on the part of the grower and the processor. With the advent of central tare-houses whereby the samples are washed and crowned mechanically under constant supervision by Growers Association and company personnel, there is little concern left as to how accurately the job is done. This leaves only the sampling operation where there can be any doubt as to accuracy.

It has been pretty well established that by taking a certain number of samples per day from loads delivered and by taking the sample from the same part of each load, the resulting average tare of such samples for the day will check, within tolerable limits of accuracy, with the actual tare of loads delivered. Where then, can any doubt exist? We believe that the doubtful point is the "human factor"—the man who actually takes the sample. Accuracy can be attained by human hands but it depends entirely upon the integrity of the individual who is doing the sampling. Assuming the sampler is honest and will endeavor to catch each sample to the best of his ability, we still have a condition, at least in the Hardin factory area, whereby it is almost physically impossible for a human to catch an accurate sample.

In a major portion of the Hardin area, the soil is a heavy gumbo type that will adhere to the beet when moist, and will form unbreakable clods when dry. In either of these conditions, it seems that it is impossible to force the hand sampler back through the stream of beets and clods to a point underneath the apron below the screen. It is doubtful if this is ever accomplished even in good clean beets because of the awkward position of the man, and the little purchase he has on the operating handle to force the sampler completely through the stream of beets.

It was for this reason that in 1946, I. R. Cool, who was then chief agriculturist at Hardin, began thinking of something mechanical that would eliminate the human element. He directed the construction of the first mechanical taresampler and like the first model of any machine there were a lot of bugs to eliminate. The important thing was that obviously it would be a success. The mechanical sampler has the power to force the bucket completely through the stream and is designed in such a manner that the bucket must complete the forward cycle before it will reverse and retract from the stream. Incidentally, the bucket cannot hesitate in the stream of beets for over a fraction of a second, which was one complaint always made against a hand-operated tare taker.

After many trials with various concerns, Silver Engineering Company became interested and built the first models in 1954. Two of these models were purchased for the Hardin area and were installed on the two stations that we considered the toughest from the standpoint of delivery and con-

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dition of beets and mud or clods. These earlier models were simply the mechanized version of the hand model and required a man up in the tare-house to lift out the sample bucket and empty the sample into the bag. These two models were very successful from the mechanical point of view and were enthusiastically accepted by the growers. With this successful step accomplished, we insisted on going ahead, as was originally envisioned, and add a self-dumping feature which would deliver the sample down to the ground level through a chute where it would be caught in a bag.

We asked Silver Engineering for such a model, and in 1955 they produced four machines which we installed on pilers in the Hardin area. We had a few mechanical difficulties to begin with; the major one being that beets would sometimes get between the sample bucket and the tub on the boom of the piler which would stop the travel of the sampler. All of the problems were worked out and we now believe the machine is as mechanically sound as any piece of machinery.

The control for the taresampler is located on the back of the piler where the piler operator stands. The operator was chosen as the one to determine the time at which the sample is to be taken because he is the only one who can observe how much of the load has been delivered and also can be sure that the screen is running full when the sample is taken. The sample man, who is on the ground, collects the tare ticket from the truck driver and then steps over to the sampler chute, places the ticket in the tare bag and then places the opening of the bag around the chute and waits for the sample to fall. After the sample has been bagged, he places the sample on a pile to the side of the piler and has time to help prepare for the next truck. The whole operation has taken place in full view of the grower or person who delivers the beets, which we find to be a very favorable psychological effect.

We like the idea of having the sample man on the ground not only for the above mentioned reason, but there are always some stations where delivery is not sufficient to warrant three men; but is necessary because the tareman is up in the tarehouse where he cannot assist in any of the work connected with the dumping of trucks. In most cases one man can be eliminated, even on larger stations after the peak of deliveries has passed.

Numerous tests on the size of the sample indicated an average of 21 to 27 pounds per sample depending upon the area from which the beets were delivered. Very rarely does the sampler catch too small a sample and when it does it is a simple matter for him to signal the operator for another sample.

We have all our pilers electrified with 440-volt current and use 440-volt equipment in connection with the tare taker; but I presume 110-volt equipment could be used, which would allow their use on more pilers which are not equipped for an electric motor on the piler.

As indicated previously, the growers have enthusiastically approved the machine and we think enough of these taresamplers that we intend to have one on each piler in the Hardin area.
