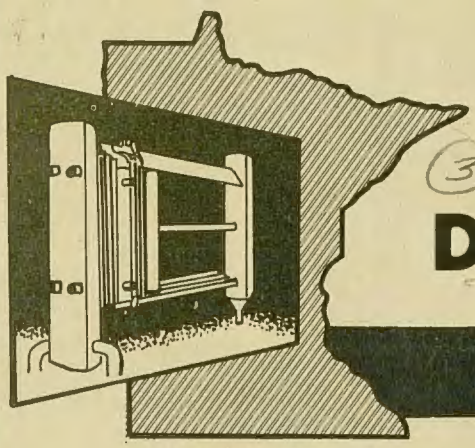

Minnesota

Dairy Products Processor

AGRICULTURAL EXTENSION SERVICE • INSTITUTE OF AGRICULTURE
UNIVERSITY OF MINNESOTA • ST. PAUL 1, MINNESOTA

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Bulk handling of milk, while bringing many advantages to the industry, has not progressed without its share of problems, as expected in the development of any new technology. Not all difficulties can be predicted in advance. It is necessary to apply corrective procedures, in some cases, after the system is introduced and problems recognized.

It is possible to obtain much helpful information, though, from those who have made bulk conversions and resolved many of the unanticipated issues.

RECEIVING ROOM LAYOUT

John Beardsley, Creamery Package Manufacturing Company, at the Michigan State University dairy engineering conference noted the following considerations in laying out a bulk receiving area.

Factors directly influencing the layout are:

1. Location and area available.
2. Number of trucks unloading on peak days.
3. Traffic pattern.
4. Manpower utilization.
5. Existing building or new construction.
6. Anticipated growth.
7. Utilities available.
8. Receiving equipment capacities.

Each of these factors should be investigated before deciding upon the layout best adapted to individual operations.

ARRANGEMENTS SUITED TO SPECIFIC VOLUME HANDLED

A layout for backing in trucks is more desirable than the drive-through setup for one supervisor to operate. In general, a plant handling 150,000 pounds per day or less will find the two-stall back-in or one-stall drive-through most efficient for the investment. This setup will handle 11 to 12 1,800 to 2,000 gal. tankers in 8 hours, with one man attending. This capacity is based on a 200 gpm pump for unloading and a 15-minute automatic cleaning cycle.

In a plant receiving up to 350,000 pounds per day, a third stall should be added to a back-in arrangement. One supervisor can unload up to 22 trucks with a 300 gpm pump and a 15-minute automatic cleaning cycle. Some assistance from drivers and close scheduling of trucks will be necessary to receive this load in an 8 hour day.

Above 400,000 pounds per day, a two-lane drive-through layout is generally needed, and two men required to supervise the operation at least part of the day. If drivers connect their trucks for cleaning, one man can handle this receiving load. Again this is based on a 15-minute cleaning cycle.

PHYSICAL LAYOUT

Truck aisles should be 11 to 13 feet wide with a minimum of 3 foot islands between aisles. Control panel operated doors will help keep dust and drafts to a minimum. At least 5 feet of clearance above the highest truck is required to allow enough space for the cleaning head and balancer.

To facilitate hose connecting, an 8 foot working space behind trucks is recommended.

Floor pitch to drains at the rear of the truck should be at least 5/8 inch per foot, but 3/4 inch per foot is better. Always allow for the longest truck anticipated.

The drive-through layouts should have a CIP position and an unloading position in each aisle. Some receiving rooms have a pre-unloading position as well, but this saves little time and increases the building investment by one-third.

A washroom for drivers will keep unnecessary traffic out of the plant. Some plants also provide a store room for farm supplies to be delivered by the hauler.

A parts washer for loose pump parts can be helpful.

Plan layouts to save steps, avoid confusion, and provide room for efficient operation.

COMPARISON OF FAT TESTS... BULK AND CAN

Many people have been and still are concerned about the difference between butterfat tests made on bulk milk compared with can milk. In talking to farmers and plant men one is struck by the possibility that bulk handling gives both higher and lower tests than the can operation used before.

Although it would be desirable to have a large number of comparisons to use in judging the merits of each system, only a limited amount of work has been done. Bradfield (1) compared split lots of milk from both Holstein and Jersey herds and found the average difference to be 0.019 percent. The greatest difference was 0.05 percent for a Holstein herd and 0.07 percent for a Jersey herd.

Another investigator (2) studied DHIA records on 43 herds over a 4-year period and found that bulk systems yielded 0.06 percent higher butterfat test than the previous can operation.

Most plant experience and research articles would lead to the conclusion that there is very little difference, if any, between fat tests made under the two methods of milk handling.

SOURCES OF TEST VARIATIONS

Preston (3) has found the most important cause of variations in fat test to be natural day-to-day fluctuations.

His other findings were:

1. Size and shape of tanks and length of agitation over 2 minutes did not effect the results. Therefore 2-minute agitation was deemed sufficient.

2. Samples from different positions in the tank varied less than successive samples from the same position. If samples are taken from one location, better results might be obtained by taking several samples rather than a single large one.

3. The butterfat content of 10-day and 15-day composites was lower than the average of corresponding fresh samples, the differences being greatest in milk of high fat test.

4. Conversion to bulk lowered the loss of milk solids by 0.4 percent to the producer and 0.1 percent to the plant (in comparison to can handling of milk).

ACCOUNTING FOR BULK MILK RECEIPTS

Most plants have voiced greater concern over volume losses in milk than with butterfat test discrepancies.

Losses in milk between farm and plant storage tanks have been reported to average around 0.7 to 0.8 percent. Figures as high as 2.6 percent loss have been indicated by some plants.

The need for evaluating bulk milk receipts cannot be underemphasized. Some of the methods available are: (4).

1. Sanitary flow meters... The accuracy of these devices is within $\pm$ 0.5 percent for some units when properly installed and operated. Because milk may incorporate air in bulk tanks and during transport, the use of air purging devices prior to metering the milk is urged.

2. Scales... Platform type scales for weighing the tanker before and after unloading are frequently used. The tolerance of scales is $\pm$ 0.1 percent. This provides an accurate means for measuring milk quantity but extreme caution must be exercised to prevent changes in the tare weight between weighings. Melting snow, misplaced tools, etc., can cause inaccuracies.

3. Load cells... Placed under storage tanks these devices can perform very adequately. They also lend themselves to automated processes and will likely see greater use in the future.

4. Liquid level measuring devices for use in storage tanks are not generally considered accurate enough to do the job.

5. Dip sticks for use in the tank truck prior to unloading are being used to some extent, but a wait period of 15 minutes prior to making a measurement makes the method quite time consuming.

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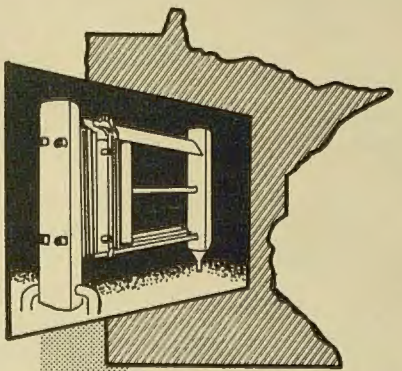

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