



## Are your scales on target?

**W**HAT did your cows eat today?

Think of all the steps required to put feed in front of your cows. Your nutritionist formulates a diet, your feeder mixes it, feed is delivered to the cows and they consume it throughout the day. Every step comes with the risk of errors, which means your cows might not actually eat the diet intended for them — and you might notice that in terms of animal health and performance.

As we discovered in a recent Vita Plus project, many farms might overlook another potential point of error in this sequence: the TMR mixer scale.

If the mixer scale is inaccurate, you probably aren't feeding the diet you thought you were. Checking the scale system is another important step in the art of feeding cows.

### Develop a system of checks

A system check starts with a look under the mixer.

1. Is the mixer clean of debris from mud or feed sticking to the frame? How long has it been since you cleaned the mixer? Even on farms with mostly concrete driving surfaces, equipment picks up feed and dust that can stick to components and potentially interfere with the operation of load cells.

2. Check to see if any of the support arms are rusted tight or broken. The arms need to be in good shape for the load cells to function properly.

3. Check for any shifts in the frame mounts. These could include worn collars, broken bolts, worn wheel bearings and other items that may cause the mixer to ride on the frame and not allow a load cell to properly flex.

We refer to these three items as binding challenges. Most binding challenges are not found by checking only one loaded weight. You may or may not find the challenge by checking multiple loaded weights. However, visually looking at the mixer should be the first

and easiest part of a system check.

4. Check the performance of individual load cells. The load cells will weigh in a given tolerance of your known weight. For example, if you use 250 pounds of weight with a scale tolerance of 10 pounds, each load cell should register between 240 and 260 pounds. If a load cell is going bad, the weight will be outside of that range.

5. Develop a system specific to the load cell configuration of your mixer. The common load cell points are three, four or five load cells. Work with the manufacturer to determine if it's best to weigh at the corners or to add a weight to the mixer and alternate the load cell that is read through the junction box.

This involves unplugging all the load cells and then plugging in each load cell one by one. The scale indicator should display the known weight within your scale tolerance. If it doesn't, evaluate why a given load cell may not be reading correctly.

Performing these steps might seem like a lengthy process. However, it's worth the time investment as it will help find more challenges than verifying overall mixer weights with a different scale. Remember, your TMR mixer is one of the few pieces of equipment you use every day, and it handles a high volume of your farm's costs. As such, this could be one of the most important equipment maintenance activities you do.

### What's your risk?

Recently, we took on the challenge of evaluating TMR mixer scale accuracy. Since many farms do not have easy access to semi scales, we implemented a research program that included a "fitness plan."

Many scale options are available, but the best for doing this check were low-profile pads that are much larger than those used by the highway patrol departments. On every farm, we used

"portable" pads (weighing 100 pounds each) to check axle weights.

We arrived to each farm early in the day to unload the scale on a level concrete surface. We had to pick a spot where we would be out of the way and the feeder could drive over the scale. We measured empty and full weights on every farm. When we had time, we gathered weights between different ingredients. This step is actually where we learned the most.

### Using portable scales

One of our biggest lessons is that a good deal of thought needs to go into using the portable scales. Questions to consider include:

- Do you have a large concrete or asphalt surface with a slope that's less than 1 degree?
- Will the tractor and implement tires fit on the scale's pads?
- Does the implement have a single or tandem axle?
- Can the tractor and implement drive slowly and stop on the pads with each axle?
- Can multiple empty and loaded weights be attained?
- Is it feasible to weigh between ingredients?

For example, you must consider whether you're working with single or tandem axles as multiple balance platforms are needed to keep the tongue of the mixer wagon from shifting. On the first tandem mixer weighed in this project, the tongue tipped with the 1-inch-thick scale platform and changed the loaded mixer weight by 2,000 pounds from the actual known weight. A trip to the local lumberyard for some sheets of plywood was a simple solution to balance the mixer wagon.

We surveyed 35 farms in this study but could only use data from 22 due to challenges in using portable scale pads or attaining multiple weights for verification of errors. Of

the 13 farms where we encountered challenges, seven could only provide one empty and one full weight while we were at the farm.

### Accurate half the time

We did gain interesting insight on the other 22 farms by finding the mixer scales to be accurate in only about half of the weights measured.

Two mixer scales required recalibration of the scale heads as they had never been calibrated to the specific mixer load cells. This created consistent but large errors in the overall weights. This greatly affected each farm's feed efficiency calculations as neither had their dry matter intakes calculated correctly.

Six mixer scales appeared to have challenges with binding or load cells not working properly. This is not a challenge that is easily detected by attaining just full and empty weights. This challenge is best detected by performing the system check plan outlined earlier. Cross-checking weights between ingredients or mixes of different sized batches will potentially find the challenge but not identify what needs to be fixed.

Again, feed accounts for one of your farm's biggest investments. Ensuring your diet is as close to its original formulation as possible can help you effectively manage your feeding program and reach your herd's performance goals. 🐄

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