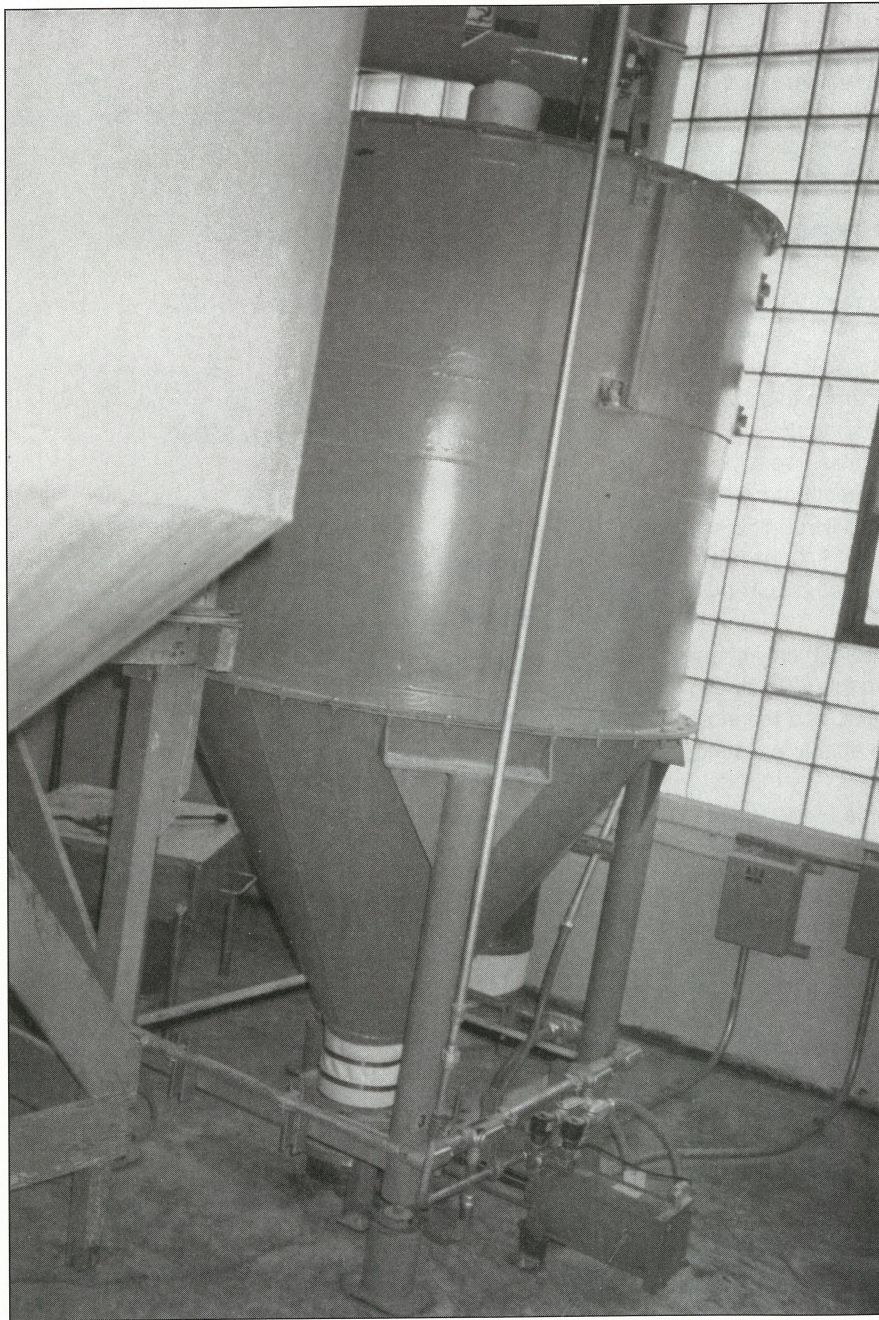


Giving Good Weight

The Rainier Brewing Co. improves batch weighing accuracy with a new weighing system.

By Richard Martin



Wide angle view of 1,500-lb. E-malt hopper at Rainier Brewery in Seattle, Washington. One Kistler-Morse Load Disc transducer is placed beneath each of the hopper's legs, which allows for automatic addition of ground malt into the brewery's corn grits hopper.

Many of today's regional breweries were built early in the century with technology that is now outmoded. By the same token, many rapidly expanding microbreweries are finding it necessary to add new equipment as volume expands. In both cases, it is obvious that brewery engineers can achieve gains in productivity, reliability and product quality with installation of modern equipment.

For example, the Rainier Brewing Co. of Seattle, WA, has realized gains in batching accuracy and improved plant productivity since converting to a new weighing system two years ago. The brewery, founded in 1878, removed its outdated mechanical scales and converted to a weighing system based on electronic load cells and Microcell sensors from the Kistler-Morse Corp. of Redmond, WA.

Previously, the brewery used mechanical scales to weigh ground malt and corn grits loaded into 6,200-lb feed hoppers. The mechanical scales were typically accurate within 300 lbs on each feed hopper, according to Terry McAdams, the brewery's electrical engineer. In other words, the mechanical scales provided approximately 5.0% accuracy per loaded feed hopper. The feed hoppers empty into a 15,000-lb ground malt hopper, which then empties into the mash tun cooker.

Two years ago, the brewery installed four Kistler-Morse Load Disc weight transducers underneath the facility's 15,000-lb ground malt hopper. Since installation, the Kistler-Morse weight transducers provide accuracy within 100 pounds for the ground malt hopper, according to McAdams. In other words, the brewery's new weighing system is now accurate within 0.70%—providing a nearly sevenfold improvement in weighing accuracy.

How does that affect the brewery's productivity and product quality? According to McAdams, the difference is quantifiable. "Roughly each batch of beer we make is about 450 barrels, at 31 gallons per barrel. If we're off by 100 pounds in our ground malt, that equals about two barrels," McAdams says.

Using these figures, we can deter-

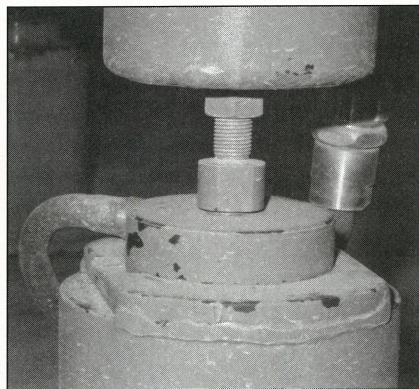
mine that the old system with mechanical scales provided a margin of error in weighing accuracy equal to 372 gallons per batch; the new system with electronic load cells has reduced the margin of error to 62 gallons, as outlined in Table 1.

Actually, the exercise in Table 1 understates the improvement of the new weighing system, because the old mechanical scales were measuring on smaller hoppers (6,200 lbs) compared to the 15,000-lb ground malt hopper on which the new electronic load cells are installed.

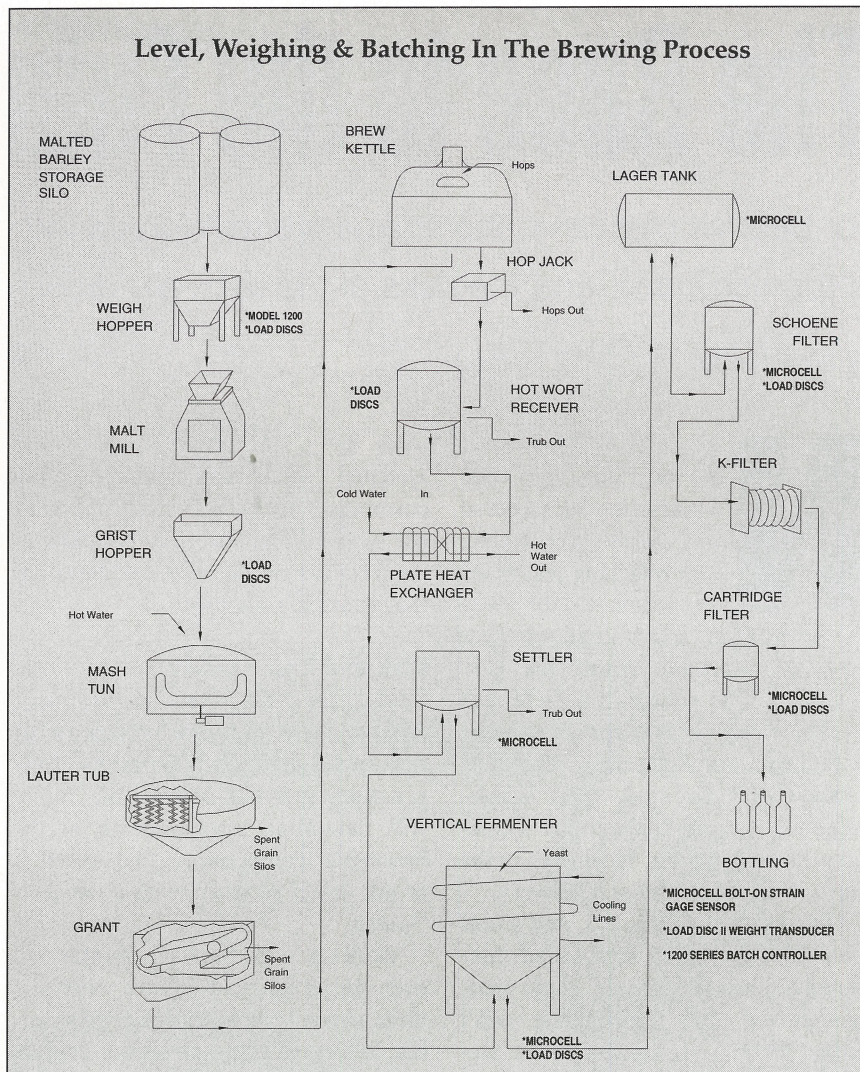
And McAdams points out another advantage of the new weighing system. "Before, when we were weighing the feed hoppers, there was always a little bit of product loss because of the dust that's pumped off them (feed hoppers)," McAdams says. "But, with the new system, we're now weighing the actual finished product without any dust loss, right before it goes into the mash tun cooker."

In addition to the four Load Disc transducers installed under the 15,000-lb ground malt hopper, Rainier Brewery has made extensive use of other Kistler-Morse equipment. The company uses one Kistler-Morse Load Link transducer on each of its 6,200-lb feed hoppers, to track weight levels in each hopper. Another Load Link is used on a 7,500-lb corn grit scale hopper. And four Kistler-Morse Load Disc transducers are used on an E-Malt hopper with a capacity of 1,500 lbs, but which typically weighs 750 pounds of malt for the corn grits cooker.

"Now we're totally automatic," McAdams says. "The reliability from



Close-up of Kistler-Morse Load Disc transducer used on a 1,500-lb. E-malt hopper that provides malt for the corn grits cooker at the Rainier Brewery in Seattle, Washington.



the Kistler-Morse equipment has been very good. We've only had one problem with one of the early Load Links that failed. In our view, they have to be that good, because if they don't get those weights right, then we're dead in the water."

The Kistler-Morse equipment functions in a washdown environment, and is exposed to heat fluctuations as low as 40 degrees Fahrenheit in the winter and as high as 100 degrees Fahrenheit in the summer. Each weight transducer interfaces with a third-party programmable logic controller (PLC) via 4-20 mA outputs, though digital signals are also available.

McAdams added that the installation of the Load Disc transducers on the E-Malt hopper have removed a particular headache for him. The ground malt weighed into the E-Malt hopper is added to the cooker with corn grits. "The grits need the enzyme in the malt to break down the corn starch into fermentable sugar," McAdams says.

With the new equipment, the facility can extract a bit of ground malt from the main process line to obtain the enzyme—the Kistler-Morse Load Disc transducers tell the operators how much malt is added into the E-Malt hopper.

Previously, an operator had to manually add a liquid enzyme into the corn grits cooker. "That (new weighing system) saves us money," McAdams says, "because now we don't have to buy the liquid enzyme. More importantly, we don't have to worry about somebody forgetting to add the liquid enzyme—we just add the ground malt automatically. If someone did forget, it could waste the entire batch of brew. So that's one less thing we have to worry about."

Richard Martin graduated from the University of Massachusetts at Amherst with a B.A. in Journalism. Based in Seattle, Martin is a freelance writer and market researcher for manufacturers of capital equipment.