In Search of the Perfect Pig

Weight counts, but manners matter. OEM Mosdal Scale builds custom equipment to measure livestock perfection.

Modern agricultural operations that raise livestock for food and animal products must have precision weighing equipment to measure and promote optimal animal wellbeing from start to finish. Mosdal Scale Systems Inc., in Broadview, Montana, has been manufacturing custom-designed feeding and weighing equipment since 1976 and they've been a Rice Lake customer for more than two decades.

Thelmer Mosdal was in the hog business when he built his own feed cart because nothing available that met his standards. Then, he built one for his neighbor (still in working condition three decades later). Soon Thelmer sold the hogs to concentrate on feed carts. Toward that goal, he built his own metal shear, ironworker, hydraulic leaf brake, pipe bender, roller, band saw and press brake (still in working condition).

At the heart of Mosdal Scale's success stands Grace Mosdal, Thelmer's wife, business partner, sales director, public relations director and office manager and baker of cinnamon buns. She smiles to remember all the scale systems that were designed at the big round kitchen table. "We designed a hanging scale to weigh penguins in Antarctica for a University of California research project." Coffee and cinnamon buns were served.

After growing up working with his grandfather in the shop, Jarred Mosdal, a mechanical engineer, has taken over the business. "Today our feed systems are being used in China, Holland, England, Brazil, Australia, Mexico, Canada and at least 40 different states.

"One of our feed systems saved a big food processor a million dollars compared to a competing system. A research facility in Iowa figures with our equipment, they can cut costs by 25¢ per hog per year; saving more than enough to support their entire research farm."

"In the beginning we used the Rice Lake 310 indicator that ran on a special battery. Our indicator of choice today is the IQ plus® 390-DC. Customers love it. It runs on standard C batteries. The stainless steel enclosure can be washed down. It has a big display that is easy to see in a dusty dark barn. And the three-stage digital filtering feature (RATTLETRAP®) and LiveWeigh® option gives you an accurate weight even if there is vibration or animal motion causing the weight to fluctuate.

Jarred Mosdal of Mosdal Scales says the tools his grandfather made are still in working condition.

To see some Mosdal equipment in use, we visit two swine research facilities in Lafayette, Indiana; at Purdue University's Department of Animal Sciences where they run swine nutrition trials, and the Hickory Ridge Research & Consulting facility, where they conduct swine pharmaceutical trials for a private company.

The Science of Sniff

According to the National Pork Producers Council, today there are more than 67,000 "pork operations", a fraction of the nearly three million hog farms that punctuated the roadsides in the 1950s. However, the majority of these (53 percent) now produce 5,000 or more pigs per year. Not only are there fewer hog farms, there is far less farmland as communities make their claim for housing and golf courses. Not surprisingly, when the wind blows in the direction of those neighbors, complaints can be heard all the way to city hall. Lawsuits and government regulations have forced the swine industry to address what is "blowin' in the wind."

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A special apparatus was created to publicly weigh the lions which utilizes Rice Lake's IQ plus® 355 digital weight indicator and a RoughDeck floor scale.

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The weekly lion weighing has been transformed into a public experience because, unlike the primates, cats don't react as extremely to human observation.

A special apparatus was created which utilizes Rice Lake's IQ plus® 355 digital weight indicator and a RoughDeck floor scale. "The lions are trained to get on the scale and perform other husbandry behaviors for the keepers as part of the public demonstration," said BJ Schoeberl. "This is one of the most popular demonstrations at the zoo!" The IQ plus 355 indicator is an ideal choice because its large .8" bright LED display makes it easy for spectators to see the lions' weight (approximately 430 pounds for the males and 285 pounds for the females). Its digital filtering capability also allows for an accurate weight reading despite movement on the scale.

Going Green

As the Denver Zoo is planning for the future with their exhibit remodeling and additions, another important project is underway.

It is difficult to watch the news without hearing about a global climate change taking place. While still being debated in selected realms of science, it is generally accepted that the past 100 years of industrial developments and increasing pollution is taking its toll on our planet. One of the main contributors to increasing pollution is the overwhelming use of plastic. It's cheap, relatively strong and moldable to virtually any shape; however, plastic doesn't biodegrade. Instead, it disintegrates into increasingly smaller particles. So, where do these plastic particles end up? Often, it's in the ocean.

Right now, there is an area of the Pacific Ocean between the coast of California and Hawaii which serves as a pooling station for non-biodegradable garbage from both the U.S. and Japan. The North Pacific Gyre collects this trash through a pattern of swirling ocean currents and deposits it in a central location known as "Garbage Island," which has now blossomed to a size twice that of Texas. The marine life in this area has a better chance of eating plastic particles rather than plankton. When that same marine life ends up on our dinner plates, we ingest chemicals thought to cause disease and sterility—not exactly the breakfast of champions.

The only way to stop the damaging effects on the environment and, in turn, our health is if we all chip in. The Denver Zoo is doing its part—it has eliminated plastic and Styrofoam® containers distributed in its on-site cafeteria and other concession locations throughout the zoo. The garbage receptacles are color-coded by material for recycling purposes. However, this is no typical recycling plan. The zoo is mixing specific ingredients of human garbage and animal waste to create fuel through a gasification process.

Paul Quick is working on the gasification project and explains the process. "When the color-coded containers are picked up on a Jeep, they're weighed and identified so we know how much of each material is being acquired. We use a mix of about 50-50 between animal waste and compostable materials. Then, we shred and process it and reduce the moisture content to 15-20% so that everything has a similar density. The downdraft gasification process is a controlled oxygen conversion, so instead of burning the waste, it is being forced to chemically break down inside of a chamber."

"When it breaks down, the waste gives off gases such as methane, hydrogen and carbon monoxide. We then combust those gases in a combustion engine and capture the energy in a generator. In this process, a lot of heat is generated; 60 percent results in heat and 30 percent results in electricity, and only 10 percent is lost. Most combustion engines are only 20-25 percent efficient."

The new 10-acre Asian Tropics area will feature abundant water exhibits. The waste-powered generator will run its water circulation pumps, heat the buildings and provide hot pools for the elephants. "By controlling which materials enter the gasification process," Quick said, "we're able to achieve a more efficient output." Monitoring the quantity of each ingredient entering the process is all done by weight, and Rice Lake load cells are being used for their durability.

The zoo has developed a customized press to extract moisture from animal waste, leaving a dry and combustible product. The waste is loaded into the press and a lever is pulled downward. As the waste is compacted, the moisture is removed. Four RL9000 TWM Series stainless steel weigh modules are mounted in this press to give accurate data on how much usable waste is being collected.

Repurposing the zoo's daily waste output into electricity and heat is an ideal example of how we can reduce our impact on the environment. Using sustainable resources and creating plans that reuse waste may be the key to preventing Garbage Island from becoming Garbage Continent. ■

Do you want to see the waste press in action? View this article online at www.ricelake.com/ricelakemagazine for the video.

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Purdue University Department of Animal Sciences' mission is to educate students, and to research efficient and sustainable production of animal products that optimizes animal wellbeing and promotes sound environmental practices. Associate professor, Brian Richert, Ph.D., is conducting nutrition trials to develop a diet that will lessen air emissions from large commercial hog-raising facilities. Dr. Richert explains, "In the past, trials were conducted using hogs at several different facilities, each being fed an experimental diet and measuring the air emissions at each facility and comparing those results. But that wasn't very satisfactory because conditions were not identical at each facility. Each had different ventilation systems, different handlers and different methods used by the research teams.

"We built this research in facility in 2004. This is called a "hotel-style" facility. It has a large central hallway separating 12 self-contained units housing 60 hogs each. The idea here is to raise hogs under the same roof and conditions, without co-mingling the atmosphere."

Dr. Richert investigated several feed systems before he settled on the self-propelled Mosdal feed carts equipped with Rice Lake 390-DC indicators. "One of the possible solutions we looked at was using a feed kitchen and conveying the food to the separate rooms, but that would have co-mingled the environment and also would cost a great deal of money.

"Another solution was to feed the various diets from 50-pound bags brought to each unit. We feed 500 tons a year. That method would also be costly. The cost of the feed sacks alone would come to $10,000 to $12,000 a year. The cost of the manpower and sore backs is also a big item. Kansas State University had a custom Mosdal Multi-Feed System that worked well for their operation, so we gave Jarred a call." Dr. Richert figures the Mosdal system saves 50¢ per bag or a penny a pound.

> "The idea here is to raise hogs under the same roof and conditions without co-mingling the atmosphere"

Mosdal Scale Systems designed and built a system that includes 12 hoppers, each containing a custom diet and one with a control diet. The custom hoppers can be loaded on self-propelled pallet jack equipped with a scale and Rice Lake 390 indicator. The hopper is tared and each group of hogs is fed the proper weight of custom diet.

The "wall air" from each unit and manure pit emission is piped to a computer room where it is sampled, analyzed and recorded. Reductions in odor and gases often come at the expense of weight gain and other desired characteristics. So the research goes on to find cost-effective, growth-enhancing, efficiently digested swine nutrition. Masking agents, bacterial preparations, feed additives, chemicals, oxidation processes, air scrubbers, biofilters, and new ventilation systems continue to be studied.

We have to ask a silly question, "Why don't you feed the hogs some Beano®?"

Dr. Richert smiles, "Actually that's a good question. Of course Beano would not be cost-effective. An enzyme would have to work on the undigested compounds

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Mosdal teams the Rice Lake 390-DC to their custom equipment. The stainless steel enclosure can be washed down and the big display can be seen in dusty barns.

The twelve sets of hoppers contain custom feed formulas for each of units, as well as one control group.

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of the particular diet being fed. Ways to reduce nutrient excretion creating the odors are needed. One strategy is minimizing nutrient excesses by more closely meeting the pig's actual needs."

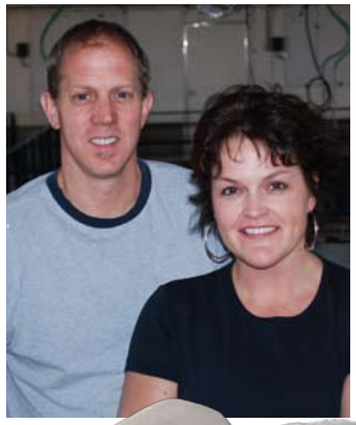
So far, the Purdue University has been able to reduce emissions by a breathtaking 40 percent. The results of the trials have been made public in reports, and the commercial feed industry has been able apply the findings and reduce air emissions by 20 percent.

The Search for Healing

The brand new **Hickory Ridge Research & Consulting Facility** is our next stop. Here, owners and operators Dr. Karen (DVM) and David Lehe conduct swine trials for pharmaceutical companies. Dr. Lehe is a highly respected veterinarian in the field of swine medicine and is the principle investigator on the research trials run through the barn. Dave Lehe, Karen's husband and partner, manages the day-to-day operations of the facility and is a good hand with data collection as well as the management side of the business with the acumen acquired with a business degree.

Their facility is clean as a hospital and we need to "shower in", after promising we've been "out of hogs" for at least three days, to meet the stringent biosecurity requirements. The barn is populated with several pens of baby pigs for the pharmaceutical trial they are running during our visit. The current trial is a disease challenge study and the pigs are divided into three groups: Challenged/Untreated, Challenged/Treated, and Control (Unchallenged/Untreated). They can do a variety of studies in the research barn, including comparison studies of disease treatment and prevention, molecular discovery studies, post-approval studies investigating new uses for approved products, as well as growth studies. Dr. Lehe says, "At Hickory Ridge, the service we provide to our customers is generating and collecting data that they will use to sell their products. It is absolutely essential that we have tools like the Mosdal pig scale to generate accurate and reliable data." ■

Owners and operators Dr. Karen (DVM) and David Lehe.



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