

# Our day at the ZOO

When the engineers at Rice Lake Weighing Systems designed the RoughDeck® series of floor scales, they set out to build something that could withstand demanding industrial abuse. Reckless forklift driving, incautious loading and other common mistreatment scenarios were taken into account and precautions were built into the design, such as welding a full 6lb structural channel frame to a durable steel deck for increased rigidity. However, the engineers probably didn't think a RoughDeck would be in a situation where a 486-pound silverback gorilla climbs to the highest point it can find and rockets itself down on the scale in a display of dominance. Reminiscent of a scene out of "King Kong", this is one of the ways silver-back gorillas at the Denver Zoo test the limits of Rice Lake's RoughDeck.

The zoo is currently undergoing construction efforts to increase the quality of life for its impressive variety of animals. The exhibit sizes are being super-sized and re-planned to provide more of a natural, open-air environment and minimize animal stress. New exhibits such as the Asian Tropics are also being planned. With these new and improved exhibits, scales are needed. Rice Lake RoughDecks are often being utilized for the medium- to large-sized animals including primates and large cats such as lions and hyenas.

Why is it important to weigh animals at the zoo? The casual zoo visitor might think animal care is as simple as throwing a juicy T-bone steak into the exhibit once a day and the rest will take care of itself.

However, there's much more science that goes into ensuring animal health.

BJ Schoeberl, curator of primates and carnivores

for the Denver Zoo, explains "Just like in humans, monitoring weight helps in assessing proper diet amounts and health. We always try to keep our animals at optimum weights for their health and well-being. By monitoring weight, we can adjust diets to keep them at target body conditions."

It turns out that animals are very similar to humans in weight fluctuations – age, disease, pregnancy and change in activity levels are all contributing factors to changes in weight. The animals' diet is constantly being monitored and adjusted to compensate for these fluctuations. Exercise is also promoted by placing props, such as furniture-like platforms, ropes, and other enrichment items to encourage movement and make them "work" for food. Imagine if there were similar challenges for humans. Before getting your dinner, you would have to climb and swing from ropes rather than slowly inch your car through a drive-thru. Instead of a bacon double cheeseburger, you would be rewarded with healthy treats tailored to your current weight. Maybe the zoo is onto something!

However, if the health of an animal deteriorates because something is wrong (rather than natural factors such as old age), there's no way for them to vocalize how they feel. No Dr. Dolittle exists to translate between the animals and humans. If they're depressed, anxious or sick, eating habits are often the first thing to change. This is their way of sending a message. Obtaining accurate weight readings is the most effective means of reading these messages this side of an animal psychic. The weights are then used to determine daily food intake and, if needed, proper medication dosage. Getting that weightment is sometimes a challenge in itself.

Primates are smart...very smart. One look into their expressive eyes and you can tell there's more going on behind them than the typical animal. With proper incentive (apple sauce, sugar-free juice, pudding, jello®, raisins, nuts, grapes, or uncooked pasta), primates can be trained to do almost anything,

Photo Credit: David Parsons/Denver Zoo





Chad Stedman of Colorado Scales.

including standing on a scale. While a giant handful of uncooked pasta might not seem like the most appealing treat, if your typical daily diet consisted of a mixture of 18 pounds worth of primate chow and leafy greens, those crunchy spaghetti noodles would suddenly look pretty good (they are also regularly given fruit, vitamins, yogurt, popcorn and nuts) and you might be willing to stand on a scale for a few seconds to get a taste.

While their intelligence eases training, it is also a double-edged sword. Because they are so curious, they often want to monkey around with the scale. They

### “The weekly lion weighing has been transformed into a public experience.”

see something interesting and want to investigate. Bolts can be turned by powerful gorilla fingers and it doesn't end there. The primates' social awareness also introduces a unique challenge. In the animal world, where you are in your pack is one of the most important elements of who you are. If you are a leader, it is important for you to demonstrate this and weighing time provides a perfect outlet to do so. “Displays are a big part of male gorilla behavior,” said BJ Schoeberl. “During display behavior,

they are usually interested in making a big visual impression on whomever is watching, so the louder and bigger the actions are, the more impressive the display. They jump, bang and hit objects, including cage furniture. Sometimes the scale takes the brunt of these displays.”

One look at a silverback gorilla and it's clear these are strong animals. Their bodies are reminiscent of a post-year-2000 Barry Bonds (minus the alleged back acne and plus a lot of hair), with muscles seemingly on top of other muscles. One can only imagine the force being displaced on the surface of an 18" x 24" RoughDeck during a powerful display of bashing, throwing and jumping. Even though the heaviest gorilla is just shy of 500 pounds, 2200-pound load cells have been installed to help withstand the abuse. “Over time, the load cells hold up incredibly well,” said Chad Stedman general manager of Colorado Scale Center, who installed and maintains the zoo's Rice Lake equipment. “Even with the occasional gorilla climbing up on a ladder and jumping down on the scale, the RoughDeck and load cells have held up. They have even tried to pick up and bend the scale. The zoo has been very happy. Before we went to a Rice Lake load cell, they were going through load cells pretty quickly. The performance has really moved them over to Rice Lake. Performance is the proof.”

Of all the scales at the zoo (all animals are weighed at intervals ranging between bi-weekly and bi-yearly), many require routine maintenance or regular replacement. The Rice Lake RoughDecks are under some of the most abusive conditions yet require only occasional maintenance.

A longtime animal lover and regular zoo visitor even before the installations, Chad relished the opportunity to install Rice Lake scales at the Denver Zoo. “It was exciting to see areas that are usually

off-limits to visitors,” Stedman said. “I was happy to install the RoughDecks for them because I knew they would hold up more than any other scale.” Typically, animal weighments are done in a special room where the animals aren't visually exposed. This helps reduce anxiety on the more social species like primates. However, some species aren't as sensitive to onlookers.

The zoo's Predator Ridge exhibit is a world-class, large, open-air environment mimicking a natural setting for the pride of lions who live there. Ten-foot-tall mounds were constructed so the lions can be “king of the hill” and get a lay of the land. Selected rocks are electronically wired for heat, providing a premiere napping locale. Nearby animals are rotated, stimulating the lions' olfactory sense just like it would be in the wild. Making the animals feel more at home is an effort to decrease the stress of captivity and increase their overall health.

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Photo Credit: David Parsons/Denver Zoo

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

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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

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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

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

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.

Mosdal Scale Systems designed and built a system that includes 12 hoppers,



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.

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](http://www.ricelake.com/ricelakemagazine) for the video.

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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