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QUARRY APPLICATION REPORT

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An Efficient Way to Weigh

Truck scales with hydrostatic load cells help streamline productivity at Florida Rock's Macon, Ga., quarry

Hydrostatic load cells provided by Emery Winslow provide a fast, accurate, dependable and long-lasting weigh system for trucks that enter and leave the Macon, Ga., quarry of Florida Rock Industries.

By Kyle Nichol

Customer satisfaction is a top priority for Florida Rock Industries, one of the larger crushed stone producers in the country. It requires fast efficient, dependable equipment that will load trucks to the exact weight ordered for short haulers, and the top legal road weights for the long haulers.

Hydrostatic load cells are washed down on a regular basis without fear of malfunction. They can be flooded or hosed down with no ill effects.

Florida Rock's Macon, Ga., quarry accomplishes that with its new load-out scale system, which includes two 70-foot, 100-ton-capacity Flat-top truck scales from Emery Winslow Scale Co. "It used to take 5 minutes to load a truck on the old mechanical scale, now I average 1 minute per truck on the Emery Winslow hydrostatic scale," says Philip Sanders, weighmaster for Florida Rock. "Everybody goes out with a full load," says Sanders.

The combination of the new scales, along with a new top-off machine, allows trimming the truck weights to the exact amount while the trucks are on the scale. This process prevents pulling off the scale to adjust loads and eliminates a second trip onto the scale.

"I can add or remove material in a matter of seconds," states Sanders. Accuracy is within 20 lb., which is critical because the truck weights are periodically checked by the DOT. If the trucks are overweight, the drivers are subject to hefty fines.

The efficiency and reliability of the load-out

system was enhanced with the addition of pneumatic tubes for delivering tickets to the drivers; scoreboards so the truck drivers can see their weight; a computer truck-scale program and a grounding grid for the instrumentation.

Selecting the right truck scale

The engineers at Florida Rock wanted scales that would be fast, accurate, and most important of all, rugged and dependable under heavy use. They were faced with three basic choices in scale technology: mechanical lever, electronic load cell, and hydrostatic load cell designs.

Florida Rock had mechanical scales, and knew that they were fairly dependable, but had some drawbacks. Material runoff could build up and interfere with the levers, and accumulated sand would cause wear of the bearings and other moving parts. Cleaning out the scale pits would usually take hours to accomplish, all while the scale was not being used. Truckers could also inadvertently hit the side rails, knock bearing stands and levers out of adjustment, and even break levers with heavy axle loads. The result would be down-time, weighing errors, and delays for customers. Overhauls of mechanical scales can cost thousands of dollars when levers need to be replaced.

Scales with electronic load cells often have a low-profile design, which eliminates much of the pit cleaning problem. However, electronic load cells are known to be vulnerable to water damage, and at Florida Rock, they wash out under the scale platforms with high-pressure hoses. Electronic load cells can also be damaged by lightning and power surges.

Each year, thousands are replaced at high cost. Warranties are often limited to two years, and there are usually annual charges for continued coverage, if offered at all. Even if a damaged cell is covered by a warranty, few pay for the installation, down-time or damaged customer relations.

"In the aggregate business, if you cannot move trucks quickly, they will go to your competition," says Bill Aspinall, Macon quarry plant manager. "Time is money for everyone -- for us and our customers."

The Florida Rock engineers decided that the hydrostatic load cells offered them the best possible choice. These load cells operate on a thin film of oil, only .030 inches thick, which sends a high-accuracy pressure signal to the summing totalizer in the scale house, where the digital readout is located.

The result is a weighing platform that has no moving parts, no levers or bearings, and most significantly, no electronic components at all. The hydrostatic load cells are manufactured of grade 304 stainless steel for superior corrosion resistance, and have a lifetime warranty against water and electrical damage. They can be flooded or hosed down with absolutely no ill effects.

Top-off machine adjusts truck loads with trucks on the scale - one trip over the scale delivers exact weight.

When properly maintained, these high-quality truck scales have been known to go years without any calibration adjustments needed. Says Aspinall, "Any delays would be disastrous to our excellent record of customer satisfaction. Since the scales have been installed, we have experienced several lightning storms, and we have not experienced any downtime."

Engineer-designed

The weighbridge design of the truck scales are low profile which eliminates the problems of clean out. Florida Rock Industries' project manager, Hal Elkin, P.E., and draftsman, Roy Hiis worked with Sam Sagarsee, mechanical engineer at Emery Winslow Scale Co. to increase the clearance under the weighbridge by adding 30-in. piers. The extra 30-in. height reduced the amount of time required for wash down.

"The mechanical scales took us over 30 hours to clean out. The new scales require two hours with high-pressure water hoses. We don't have to worry about the hydrostatic load cells because they are immuned to water," says Sanders.

The installation of the two 10- x 70-ft., 100-ton scales was done by distributor, Delta Scale (now Scale Systems, Inc.), of Norcross, Ga. Installation included mounting the weighbridge on the 30-in. piers, start up and calibration. This was completed ahead of schedule by Delta Scale personnel. The scales were certified by the state Department of Weights and Measures and placed into service. PQ

Information for this article was contributed by **Emery Winslow Scale.** *For more details, call 203-881-9333. New photos were added for increased clarity.*

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