Plant manager's stubborn streak pays off

He has level indicator modified for hot mix storage silo

"Now I can come right to the point where the silos are empty and all the jobs are done at the end of the day."

Ingenuity — and a good old stubborn streak — paid off big for a California hot mix asphalt supplier. Teichert Inc., of Sacramento learned that sometimes you shouldn't take "No" for an answer.

Teichert, founded in 1887, has a 200-acre (80-hectare) facility which supplies construction aggregates and hot mix asphalt for subdivisions, streets, underground pipelines, parking lots, and highways throughout northern California. During peak season, the company employs 2,000.

At the storage and load-out area for two asphalt plants, Teichert "didn't have any way to determine if there was enough asphalt in our silos to load the last few trucks of the day," says Brent Hubbard, plant manager. "We had previously used Sonocells manufactured by Kistler-Morse of Redmond, Wash., to determine product levels in crushers, silos holding crushed rock products, and water levels for our sump pump controls. We had good success previously."

So, Teichert asked Kistler-Morse about the feasibility of installing K-M Sonologic ultrasonic systems atop seven steel silos used for storing and loading out hot asphalt.

Hubbard was motivated by a new regulation by the California department of transportation (Cal-Trans) designed to fight mix segregation. "Cal-Trans said we had to have an indicator that told us when the asphalt was down to the cone portion of our silos," Hubbard says.

"They didn't want us to load any trucks from just the cone, unless it was the last truck of the day." Cal-Trans wanted to avoid repeated truck loading from just the cone portion of the silos because of segregation during the process of working the mix through the

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narrow cone. "They wanted a good, non-segregated mixture of fine and coarse sizes," Hubbard says.

Previously, Teichert used mechanical switches to indicate product levels in its seven silos. Each silo measures 12 feet (3.6 meters) in diameter. Five silos are 32 feet (9.6 meters) tall and hold 200 tons (180 metric tons) of hot asphalt; two stand 16 feet (4.8 meters) tall and hold 100 tons (90 metric tons). But the mechanical measuring process wasn't sophisticated enough to meet the new Cal-Trans standards.

"If we filled a silo 20 times, for a total of 4,000 tons (3600 metric tons), and emptied it 20 times in the course of the day, our count at the end of the day could be off by as much as 10 or 15 tons (9 to 13.5 metric tons)," Hubbard says. "It could be a problem if there wasn't enough left for the last truck, especially if the plant mix operator had gone home."

The discrepancy in the amount of material remaining in the silo at the end of the day was caused by a 0.5 percent variance in batching accuracy for 80,000 lb. (36,000 kg) loads. And there was no way to visually monitor asphalt levels in the silo.

Motivated by Cal-Trans' new regulation and his own desire to improve monitoring of hot asphalt levels in the silos, Hubbard was determined to use the ultrasonic units for the application. A heated, oil jacketed system on the silos keeps the asphalt at 300° F (147° C). Prior to installing the ultrasonic system, "The manufacturer advised us there was an operating temperature limitation for that particular model of 160° F (70° C)," Hubbard says.

Not to be swayed, Hubbard told his electrician to build special housings for the ultrasonic transducer units. The steel pipe housings for the ultrasonic units were linked together with PVC pipes to keep the transducers cool. "We were able to create a vortex that prevented the air temperature in the housings from getting to the silo temperatures," Hubbard says. He estimates that it took six to eight hours to build each housing and another day to install them. It took three weeks of experimentation before the system worked properly. He estimates it cost about $20,000 for installation of the units and the special housings for seven silos.

And now? "When we measure the distance in the silos, we can measure it much more accurately. We can see a bar graph on the computer screen which shows what's left in the silos," Hubbard says. "They (ultrasonic units) tell us how much is in the silo. When it's real busy we have a visible picture.

"Plus it meets the Cal-Trans requirement," Hubbard adds. "When the mix gets to the cone portion of the silo, our monitoring screens change color from green to red — it's in the 'Don't Load' mode when it's red."

How do the ultrasonic systems work? They determine the level of material in a vessel by sending an acoustic signal down to the material's surface, then measure how long it takes for the signal to make a round trip back to the unit's transducer. This is used to calculate the depth or height of material within the vessel.

And how does the move to ultrasonic equipment help Teichert save money? "It's prevented problems, for instance, when there is imminent rain. In the past I know I've had to throw some product away due to extra cold weather or rain." At a cost of $25 per ton, Hubbard estimates that he used to waste 100 to 200 tons (90 to 180 metric tons) of hot asphalt annually ($2,500 to $5,000 per year). Since the installation of the Sonologic units, Hubbard says, "I've basically had to waste nothing.

"That's not the main reason I have them," he continues, "but it's a nice bonus. The main thing is I have 1,000 tons (900 metric tons) of storage capacity, and now I can come right to the point where the silos are empty and all the jobs are done at the end of the day."■

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