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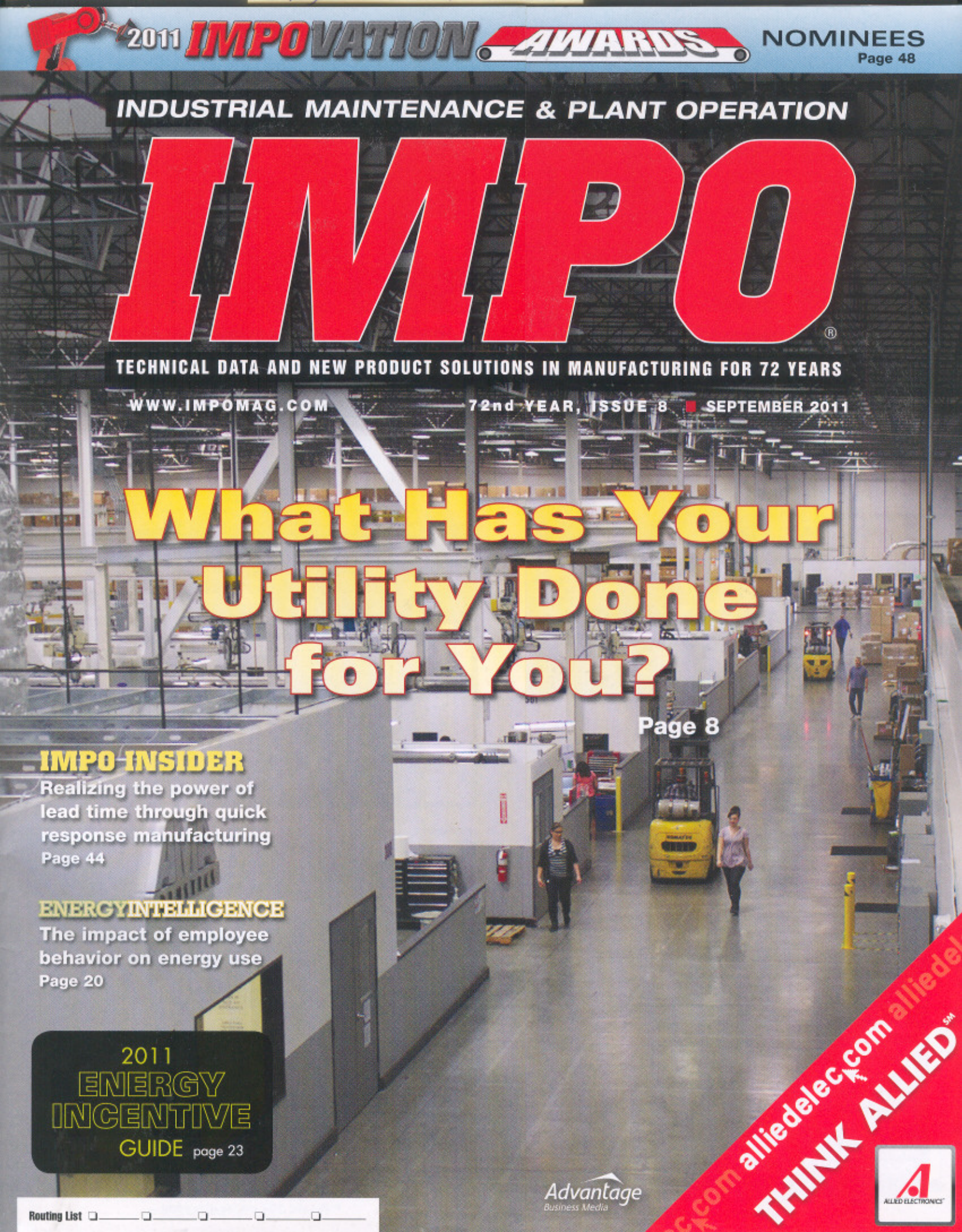

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Glass Blending With Abrasion Resistant Rotary Mixer

From a humble beginning more than 80 years ago, as a manufacturer of red glass for railroad signals, Kopp Glass now claims to be the world's leading producer of precision molded industrial quality technical glass.

The company is known worldwide among the industries it serves as a producer of molded borosilicate glass, a tough material that can withstand harsh industrial environments and is resistant to degradation from sunlight and weathering. The company offers more than 300 standard glass compositions, plus custom formulations, in any desired shade of color.

Kopp produces its glass in small batches, typically in the range of 100 to 1,000 pieces, says David Pungratz, the company's mix and melt manager. The powdered ingredients are mixed, melted in a pot furnace, then molded by skilled craftsmen. "All our products are made by hand," he says.

Thorough Mixing

The mixer is a vital part of Kopp's operation. "A batch may contain anywhere from five to 15 ingredients that must be mixed thoroughly in order to guarantee product quality," says Pungratz.

Kopp uses a rotary mixer made by Munson Machinery Co., Inc. (Utica, NY). It replaced a rotary pan mixer that had been in the plant for many years. The rotary mixer is a horizontal, rotating drum that is supported on either end by trunnion rings and driven by rollers, powered by a 5 hp (3.7 kW) motor. It has a stationary inlet at one end and a stationary outlet, with a discharge gate, at the other end. Mixing flights or baffles tumble the batch in a multi-directional manner.

The mixer (model GB10 glass batcher) has a capacity of 10 cu ft, or 1,500 lb for glass. However, Kopp's operation is limited to 700 lb by the size of the hopper. Pungratz explains that larger hoppers cannot be used because of the limited clearance above the mixer.

The liner and other contact surfaces in the glass batcher are made of abrasion-resistant steel, designed to withstand the abrasive mixture of ingredients, particularly sand, in Kopp's formulations. Mixing times are only about 5 min. — less than half the time required by the pan mixer, says Pungratz. Nevertheless, the machine's slow tumbling action, aided by the baffles, makes for "a homogeneous mix. We make the best hand-pressed glass in the world, with minimal defects," he asserts, "so our standards are very high."

Once a batch has been mixed, it is discharged into a wheeled cart or wagon and taken to a furnace. Kopp has two furnaces, one of which can accommodate 16 melting pots and the other 12 pots.

A Matter of Individual Skill

When a batch of glass is ready for use, the pot is opened and cooled to a working temperature, then the glass is cast in molds of stainless steel or cast iron. This operation is carried out by two skilled craftsmen, whose respective job titles are glass gatherer and presser.

Each piece is made individually. The gatherer accumulates the appropriate amount of glass needed for the piece, using a punty — a steel rod that has a clay ball on one end. The punty is placed into the mouth of the pot until it touches the molten glass, then the punty is turned in a way that gathers glass on the clay ball. The glass is carried to and released into the mold and the presser shears off the flow, then pulls a lever to bring the plunger (the mold's male part) into the mold.

Pungratz notes that the glass gatherer and the presser use their experience to calculate the exact amount of glass needed for a piece. Large products, such as 24 in. dia Fresnel lenses, are made by layering three molten gobs of glass.

Meanwhile, the mixer provides a continual supply of mixed glass ingredients to the furnaces. As soon as one batch has been discharged, the machine is cleaned and readied for the next batch. The machine processes 10–20 batches per day, typically of several different colors, so it is important to avoid residue from one batch that might contaminate the next one.

However, contamination has not been a problem with the glass batcher, says Pungratz. Essentially all the material is rapidly discharged, leaving minimal residue, he says, and cleaning takes only about 10 minutes, using a dedicated vacuum. A door on the side of the machine provides full access to the interior.

A second vacuum system removes any airborne dust that results from the cleaning operation. However, in contrast with the pan mixer, the rotary mixer generates very little dust, says Pungratz, and "this was a big selling factor for us." He adds that the rotary machine is "extremely quiet, while the pan mixer was very noisy."

Another big advantage is that the mixer is essentially maintenance free, he says. "We just have to grease a couple of fittings about every two weeks, and in the six years we've owned the machine we have not seen any wear on the liner and have had to replace only one seal."

For more information, visit www.munsonmachinery.com. **IMPO**