

SIEMENS



PROCESS INSTRUMENTATION

Delivering hot and ready **automation** **reliability in flour production**

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It's pizza night with the family – cheesy and saucy, piled high with your favorite toppings. Sitting at the dinner table you look across the River Chelmer to Carr's Flour Mills Ltd. in Maldon, England.

Little did you know that the flour in your pizza dough was milled in your very own neighborhood. Throughout the milling process, Siemens instrumentation helps create that delicious meal you've just enjoyed.

From the farm to your kitchen

In addition to white and whole wheat flours, Carr's supplies UK supermarkets and bakeries with specialty blends such as chapatti flour, malted wheat flour, as well as cake mixes and pizza flours. With over 120 years on this site, the company now ships 150 tons (165 short tons) of flour each day – more than 54,000 tons every year. In other words, enough flour to make more than 195 million pizzas each year!

With all of this production, Carr's depends on precise inventory and process control throughout their milling and packaging operations. Grain from farms around the UK as well as those in France and even Canada arrives at Carr's in 28-ton trucks (31 short ton). On busy days the facility will see up to 15 trucks





From the raw material storage silos to the dusty midds bins, SITRANS LR560 gives Carr's Flour accurate and reliable level measurement.

unloading their grain into the 62- and 68-ton (68- and 75-short ton) storage silos.

From these storage silos, grain moves throughout the facility to be cleaned and conditioned, broken up by roller mills, and then sieved through a series of sifters to remove impurities and determine the flour's consistency.

After flour is blended, pipes move the finished product to 20 storage silos before the flour is packaged into 5- to 25-kilogram (11- to 55-pound) bags and shipped by truck to customers in the UK.

24-hour flour production

With the demand for Carr's products, the facility runs 24 hours each day. Since the mill resides in a fairly residential neighborhood, however, trucks only enter the facility during the day. This calls for precise inventory tracking, since technicians don't want to run out of raw grain during the night shift.

Previously Carr's used manual level measurement to monitor inventory. A worker would climb the eight flights of stairs and use a tape measure to manually dip the silos and convert the resulting measurement into a volume of grain. The time this type of manual checking takes adds up every day, week, or year!

With an emphasis on increasing the facility's automation, Carr's Electrical Engineer Harvey Sykes wanted to find a better method of inventory management. Partnering with Siemens via their technical partner Process Instrumentation Sales Ltd., Sykes installed SITRANS LR560 radar transmitter for solids level measurement on top of all 26 silos.



SITRANS AS100 acoustic sensor monitors for a no flow situation in the raw material pipe, alerting operators of any material stoppages.

Tricky measurement meets device simplicity

Fourteen of these silos pose a challenge for any level measurement device: the bottom of each 70-year-old concrete silo has a "cheese wedge" shape, slicing down into a sharp, narrow point. However, with the transmitter's narrow four-degree beam angle, SITRANS LR560 has no trouble measuring into the sharp cone area.

Located away from the silo's fill point, SITRANS LR560 was easy to install and set up, using the device's Quick Start Wizard. The transmitters relay their level readings through a 4 to 20 mA connection to a central location on the ground, where operators can easily monitor grain inventory without climbing a single flight of stairs!

"It's the simplicity of the device combined with the many advanced features SITRANS LR560 offers," says Sykes.

Nothing wasted

Carr's uses the complete grain – after machinery separates the different parts of the wheat, the leftover wheat midds (also known as millfeed) don't go to waste. Rich in protein, fiber, and phosphorus, the wheat midds become animal feed for local livestock.

The company stores this by-product from the production process in their "midds bins," three connected silos monitored again with SITRANS LR560 radar transmitters. Despite the silos' dusty environments created by the flowing grain particles, the 78 GHz high-frequency transmitter has no problem "seeing" the material and reporting reliable levels to operators.



SITRANS LPS200 level paddle switches monitor high and low levels in the gluten hopper.



A SIMATIC HMI panel monitors the company's finished flour bagging operations and can be customized to the bagging operations.



Finished flour awaits shipment to supermarket and bakery customers around the UK.

Continued automation

In addition to the success Carr's has experienced with the radar transmitters, the company has installed an assortment of other process instrumentation from Siemens to simplify and automate operations.

SITRANS AS100 acoustic sensor notifies operators in case of a no flow situation in the pipe carrying raw grain to the screw conveyors loading the storage silos. Operators know immediately if a blockage occurs and can fix the problem without a great deal of interruption to the production process.

Siemens SITRANS LPS200 level paddle switches monitor high and low levels on a small stainless steel service hopper containing gluten. When this fine powder reaches the low level, gluten is added to the hopper from the main gluten storage silo, which then stops filling the hopper once material reaches the high level. From here the gluten is dosed into the main finished product flour stream according to each recipe.

Previously Carr's used another company's level switch, but the clutch assembly inside the rotary switches broke down fairly quickly. The SITRANS LPS200 switches, however, have been in service for more than four years without any problems.

A grain of truth: success with Siemens

With all of this process instrumentation from Siemens, Carr's Flour is able to produce their thousands of tons of flour each and every year.

Add to that lack of instrument maintenance, increased health and safety by removing operators from locations that contain moving grain, and alerts that tell operators if and when a stoppage in production occurs.

All of this means a recipe for success – as delicious as that first bite into your next slice of pizza!

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