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Ingenuity for life

Hey neighbor, can I borrow a few thousand cups of sugar?

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SITRANS LR560

Imagine that you own a chocolate factory. You are in the middle of a large-scale production when your sugar silo is suddenly, and quite unexpectedly, empty.

Why? Because the devices that are supposed to tell you how much sugar is in that silo have all failed.

Who can you borrow sugar from? Do you know anybody who has upwards of a couple thousand cups of it lying around?

This was precisely the problem for a chocolate company in Ontario, Canada.

The Canadian plant is primarily responsible for the production of specialty confectioner coatings, and, as you might expect, this requires a lot of sugar.

It also requires the ability to efficiently store and precisely measure that sugar. Unfortunately, the technique in use—having been put in place many years earlier by the former owners—was often inaccurate.



Sticky sugar won't interfere with readings due to SITRANS LR560 innovative sealed lens antenna design.



The small size of the SITRANS LR560 makes it easy to carry and install.

The problem

The sugar is stored in a single, 15-meter silo that holds about 86,000 kilograms. Historically, the amount of sugar in this storage vessel was calculated using point level devices in the form of four vibrating forks that separated the space into 13,600-kilogram increments. These four level switches were communicated to the inside of the plant to a panel for operations to view.

The biggest problem with measuring product this way is the most obvious one: with point level measurements, you are never sure of exactly how much material is in the silo. Naturally, this makes it very difficult to make any kind of production plan.

The company knew they had a problem. "We just didn't trust the system," admits the Senior Industrial Electrician at the plant.

And with good reason, the error-prone sensors had already resulted in both of the following unwanted scenarios:

Less sugar in the silo than the devices indicated: One of the problems with the vibrating fork point level device is that product will sometimes build up directly on the fork, tricking it into reporting a false level, even when the silo is empty.

Indeed, this is precisely what happened, causing the plant to run out of sugar in the middle of a busy production. They managed to avoid a costly shut-down by using individual bags of sugar but it was more expensive, labour intensive, and negatively impacted the overall production schedule.

There was more product than was reported: This may not seem as serious a problem as a product depletion, but it has potential repercussions just the same. With no reliable way to know

exactly how much product is in a silo, then there is always a risk of an overflow during filling.

Whenever this happened, the filters on the top of the silo got plugged up, requiring an expensive and time-consuming cleanup. Not only that, but the company had to pay money for extra delivery time for a truck that couldn't be fully emptied.

Fortunately, the plant engineers knew what to do. They knew that Siemens was a global leader in level measure-



Flush mount flange of the SITRANS LR560 allows the transmitter to be installed directly onto an existing standpipe.

ment technologies with successful applications in many other sugar silos around the world. They approached the local Siemens channel partner for a recommendation.

During an initial visit to the factory, the representatives discussed a number of possible solutions from the wide-ranging Siemens catalogue of process instruments and weighing technologies.

At first, it was hoped that a weigh scale system could be used, as it offered the best accuracy. However, it was found to be prohibitively expensive because the existing silo would need to be retrofitted.

Ultimately, the engineers determined that a non-contacting process device—either ultrasonic or radar—was needed, and it would have to meet the following requirements:

1. Level measurement accuracy needed to be 1%.
2. Since the silo is very narrow, and has a conical-shaped bottom, the transmitter must have a narrow beam for reliable operation over the full range.
3. Since the silo is filled pneumatically, the transmitter needs to perform well in a very dusty environment.

The solution

When it came down to it, there really was only one clear choice: the SITRANS LR560. It had a four-degree beam angle that could accurately measure the narrow silo.

It provided the most accurate level measurements in the industry even in dusty environments. And, as an added bonus, had a flush mount that wouldn't intrude into the silo.

As if that weren't enough, the SITRANS LR560 also boasted the following added advantages:

Ease of installation: The technicians easily installed the unit themselves by mounting it onto an existing flange. Then they routed the loop powered 4-20 mA connection to their existing control system so that level measurement readings were available to anyone in the plant who needed them, including the truck loader, operations, and procurement.

Reduced need for maintenance: "I'm impressed," says their Industrial Electrician, about SITRANS LR560. "We haven't touched it since we put it in."

The benefits

The company had a record breaking year in 2013, producing 33 million kilograms of product. Yet in 2014, thanks in large part to their new SITRANS LR560, they shipped 3.5 million kilograms in the month of August alone—well ahead of 2013.

The plant's success hasn't gone unnoticed within the company either: other locations are interested in following the Ontario division's lead by installing their own radar devices.

Production planning is much simpler now, comments their Industrial Electrician. "The biggest advantage", he says, "is knowledge and confidence."

As a result, they know exactly how much they can push the system if they're having a more productive weekend than expected.

Their Industrial Electrician acknowledges this when he pays the device the highest compliment an experienced engineer can.

"The accuracy we're getting is more than what we need," he states proudly. "That's how good it is."



Level information is easily accessible in the control room, providing operators access to real-time information.

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