



PROCESS INSTRUMENTATION

Drilling fluid producer discovers the Coriolis advantage

Process instrumentation and control systems

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Drilling fluid is critical for successful oil extraction. Typically made up of water, clay and a complex mix of chemicals, it supports the drilling process in a variety of ways – from lubricating and cooling the drill bit under high-temperature and high-pressure conditions, to lifting drill cuttings to the surface, to maintaining oil well stability and safety.

But drilling fluid is not a “one size fits all” solution. To work properly, the fluid must be optimized for the unique geographic conditions of individual well sites. One North American manufacturer blends the chemicals used to produce drilling fluid, and they rely on process instrumentation from Siemens to meet every customer’s requirements with precision and consistency.



Siemens Coriolis transmitters monitor onsite flow operations and transfer flow, density and temperature data to the facility's control system.

Highly demanding requirements

A very large oilfield services company employs tens of thousands of people across the world and supports all sectors of the global oil and gas industry. Their plant in the Midwestern United States specializes in manufacturing the chemical mixtures that are essential components of drilling fluid.

The plant takes in extremely large quantities of bulk chemicals, including sulfuric acid, nitrogen and brine, along with smaller amounts of fine chemicals and proprietary additives. The individual chemicals are then measured in an area of the facility known as the mixing house to create tailored solutions for a wide array of drilling and oil well maintenance applications.

As the specifications for each chemical blend are unique and quite strict, pipelines in the mixing house must be equipped with flow measurement technology that is exceptionally accurate, repeatable and reliable – even when hundreds or thousands of gallons are passing through. For many years the plant had relied on load cells for their ability to handle large volumes of fluid, but they used up a significant amount of valuable floor space and required regular recalibration. The load cells also couldn't measure until their tanks were full, often resulting in slower-than-ideal operation.

Seeking greater efficiency

Looking for a way to improve time and cost efficiency without sacrificing measurement performance, the plant opted to test a Coriolis mass flowmeter on one of their pipelines as a potential replacement for the load cells. But the meter was no match for the challenging conditions inside the mixing house. Line noise, pipe vibrations and fluctuating measurement parameters quickly rendered it inoperable.

A number of radar level, point level, pressure, temperature and positioning devices from Siemens were already in operation across the facility, all of which were integrated into APACS+ and SIMATIC PCS7 distributed control systems. So when the initial test meter failed, the plant turned to Siemens for an alternate option. That's when they learned about the SITRANS FC430.

The Coriolis advantage

A Siemens technician worked with the plant to install a SITRANS FC430 digital Coriolis flowmeter in the same location on the pipe. Right out of the box and without any adjustments to compensate for specific application conditions, the FC430 performed better than the competitor's meter since its durable construction minimizes the effects of process noise. Then, after some fine-tuning from the technician, the meter's accuracy skyrocketed to 0.1% of flow rate – a level of precision the load cells had never achieved.

Plant operators also appreciated the meter's compact footprint; while two space-consuming load cells with tanks were required to measure flow through each pipe, a single FC430 could do the same job. And the graphical Human Machine Interface (HMI) greatly simplified commissioning, with an intuitive menu structure and programming wizards that guided even the most inexperienced users through each part of the process with ease.

The Siemens Coriolis solution soon proved that its accuracy was repeatable over an extended duration, and the plant developed enough confidence in the meter to remove the load cell installation entirely. Productivity increased rapidly since, unlike the load cells, the FC430 measures flow in-situ and provides real-time readings – a major advantage that enables the plant to produce more drilling fluid in less time.

Today, dozens of FC430 units are monitoring multiple applications throughout the facility. Siemens now maintains local inventory for the company to ensure the fastest possible delivery, and operators are pleased with the high level of responsiveness they experience whenever contacting Siemens with a new order or for product support.



An ultra-compact SITRANS FC430 Coriolis flow meter measures chemical flow through a mixing house pipeline.

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