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Case Study

Panametrics Ultrasonic Flow Meters monitor steam flow measurement in boilers at Alcoa-San Ciprian

Benefits

- Energy savings with no pressure drop
- Reliability
- Accuracy
- Drift free solution

A global leader in lightweight metals technology, engineering and manufacturing, Alcoa innovates multi-material solutions that advance the world. Its technologies enhance transportation, from automotive and commercial transport to air and space travel, and improve industrial and consumer electronics products. A pioneer in the aluminum industry for over 125 years, today Alcoa employs approximately 15,000 people in 15 countries to deliver value-add products made of aluminum, and produce best-in-class bauxite, alumina and primary aluminum products.

Problem

Alcoa used three steam boilers, operated in parallel, to provide the production units with steam to support the production process. In order to measure the steam flow, Alcoa initially installed flow nozzles, which is a type of flow measurement based on differential pressure methodology. Each flow nozzle provides a flow measurement that is used to control the load of a boiler. With three boilers, one may have a higher load (meaning more work) than the other boilers depending on the steam demand. The customer suspected that flow nozzles were measuring in excess because the yield of the system had been too high since installation, and the flow measurement was not sensitive to any process actions taken to reduce energy usage.

Solution

Alcoa needed to improve the flow measurement to:

- Understand the current efficiency of the boilers to produce steam
- Measure improvements in boiler efficiency and control, based on process actions
- Control and improve steam quality

They ultimately decided to install Panametrics, a Baker Hughes business, GS868 ultrasonic steam flow meter with FTPA buffers and BWT transducers in a flowcell. With the new meters in place to monitor steam flow measurement in boilers, Alcoa was able to get the actual yield of the steam production and monitor the impact of the flow measurements taken to improve steam production.

Payback

After installing GS868 Flow Meter, Alcoa confirmed that the flow nozzles were measuring flow rates 6-10% higher than the actual flow. Using the ultrasonic flow solution, Alcoa began to improve the yield of steam production and monitor the impact of improvements. With the use of the ultrasonic flow meter, Alcoa reported a yield increase of 2-3.5% in steam production. With this 2.5% improvement in steam yield results, Alcoa realized a total yearly savings of over $220,000 for the three boilers:

- Annual steam generation: 110T/h*20h/day*300day/year=660kT/year
- Approximate steam cost: $4.5/T
- 2.5% yield improvement = 16,500T additional steam produced
- 16500T*$4.5/T= $74.25k per boiler per year.- $222k/y savings for three boilers

Benefits

Panametrics GS868 ultrasonic steam flow meters quickly detect any change or problem in the steam generation, either in quantity or quality. The ultrasonic technology provides accurate and repeatable flow measurements across a wide flow range of 1-200 T/h (high turndown), cause no pressure loss, have no moving parts, no drift and no maintenance. With pressure and temperature inputs, the GS868 also provides a direct mass flow measurement, which simplified Alcoa's overall system installation and wiring requirements, resulting in lower overall installation costs and on-going operating costs. Alcoa commented that the "repeatability and lack of drift over the years is amazing."

Panametrics, a Baker Hughes Business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement. Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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