Online Vibration Monitoring Reduces Mill Downtime by Nearly 50 Percent

RESULTS

- Saved an estimated $52,000 per year on average
- Reduced production delays by identifying bearing faults early
- Fewer delays expected in the future

"We expect a continued reduction in these delays as a result of learning more about analyzing and applying the predictive data delivered by online monitoring"

Greg Evans
Reliability Engineer

APPLICATION

A baghouse employs three large fans to remove air-borne melt shop contaminants created by a state-of-the-art electric arc furnace (EAF), which is not permitted to operate unless the fans are functional. Two fans run at 890 RPM, each driven by a 2200 HP motor. A third fan turns at 1175 RPM and is driven by a 480 hp motor.

CUSTOMER

CMC Steel South Carolina is a subsidiary of Commercial Metals Company of Irving, Texas, a global recycler, manufacturer, and marketer of steel, other metals, and related products. At CMC Steel in Cayce, South Carolina, scrap is melted down in just 55 minutes in the 95-ton EAF. Skilled steelmakers then produce quality steel bar products in angles, channels, flats, squares, rounds and rebar in a range of sizes, grades, and lengths.

CHALLENGE

Two of the three fans were equipped with an unreliable online shutdown system. The fans tripped so frequently in 2007 that the melt shop experienced delays of more than 1500 minutes, resulting in a production loss of $192,000. The mill, which takes pride in operating efficiently with state-of-the-art melting and casting equipment, clearly needed an effective early warning system to prevent extensive damage to these fans followed by lengthy production delays.

SOLUTION

In 2008, the mill installed a CSI 4500 (now called CSI 6500) Machinery Health™ Monitor system to provide continuous, real-time vibration data on all three fans. Information collected at 30 permanently installed monitoring points is transmitted to the AMS Suite predictive maintenance software as well as the PLC – based control system.

For more information:
www.assetweb.com

EMERSON™
Process Management

Alarms based on this diagnostic data identify issues such as fan imbalance, mechanical looseness, bearing defects, etc. These alarms occur long before a developing fault is serious enough to cause severe equipment damage. Mill personnel also use predictive intelligence from the AMS Suite to determine when to shut down the EAF to minimize downtime for fan repairs.

The online monitoring system paid off within months when a problem with one of the west baghouse fans was detected. In the space of just three days peak vibration suddenly jumped, accompanied by increasing base vibration levels. Reliability personnel knew something was wrong and worked with production to plan downtime for fan inspection. The inspection showed such severe rotor cone damage that a catastrophic failure of the 8-foot diameter, 16,800 pound rotor had been a distinct possibility. Instead, the fan assembly was repaired with a delay of only 477 minutes at a cost that would have been much higher without the predictive technology.

In the last two years, the average amount of down time was 407 minutes less than in the prior two-year period. This resulted in an actual financial benefit to CMC Steel South Carolina of $52,000 per year. This number is expected to increase significantly as the economy improves, placing a greater demand on the mill for higher production.

Analysts at the mill used multi-spectra views to follow and evaluate the development of the bearing fault, confirming its severity and pinpointing its location. Based on this data, mill management decided to stop production to replace the bearing, knowing that the repair would take up to 12 hours. This action precluded a sudden failure that might have caused additional damage and taken much longer to repair.

Other benefits of the online system include continuous monitoring, easy access to trend information, and automatic storage and presentation of timely data without manual intervention.

Emerson Process Management
Asset Optimization Division
835 Innovation Drive
Knoxville, Tennessee 37932
T 1(865) 675-2400
F 1(865) 218-1401
www.assetweb.com

EMERSON
Process Management