SIAM WHITE CEMENTCOMPANY LIMITED

Airflow Controls by Installing Inverters

SUMMARY OF THE OPTION

Siam White Cement Co., Ltd (SWCC) is located the Saraburi, Thailand, and is the largest white cement producer in Thailand with a production capacity of 160,000 tons of white cement.

A 75 kW secondary air fan, a 30 kW cooler fan and a 75 kW fan for the electrostatic precipitator (i.e. equipment for collecting fine particles from the exhaust gas) are used in SWCC's production line 2. Because the fans are oversized, dampers were used to control the airflow. But dampers reduce the airflow but not the electricity consumption, and they increase pressure loss which could affect the production process. The dampers were replaced with inverters which do not cause electricity and pressure loss.

Investment costs for the installation of inverters was US$25,000, annual savings are US$22,250 and the payback period was 14 months. Each year 380,300 kWh is reduced, which is equivalent to 235 tons CO_2 emissions.

KEY WORDS

Cement, Thailand, Electricity, Fans and Blowers

OBSERVATIONS

From its inception in 2000, most equipment was purchased with a higher capacity than needed for current production because the company took into account the future expansion of its production capacity.

The Team found that a number of over-sized fans are used in the company's production line 2: a 75 kW secondary air fan, a 30 kW cooler fan and a 75 kW fan for the electrostatic precipitator (i.e. equipment for collecting fine particles from the exhaust gas). As the over-sized fans are not compatible to the present production capacity, therefore their airflow rates (i.e. for sucking/pushing and cooling purposes) have to be reduced.

Dampers used for controlling airflow rates of such fans were 32%, 20% and 60% opened, respectively. This causes inefficient use of energy because dampers reduce the airflow rate of fans but not their electricity consumption. In addition, controlling airflow rate by damper will increase the pressure loss that could affect the process.

OPTIONS

Inverters are more energy efficient in controlling the airflow rate, because an inverter controls the airflow rate by increasing or decreasing the speed of motor used to drive the fan. By using inverters, the airflow rate and electricity consumption are reduced and the pressure loss is less compared to using dampers.

SWCC's Team proposed to replace dampers with inverters. Two 75 kW inverters were installed at the secondary air fan and the electrostatic precipitator fan, and a 30 kW inverter was installed at the cooler fan.

RESULTS

The results below are therefore based on a comparison between historical electricity consumption data (of fans equipped with dampers) and limited data collected since the installation of inverters on fans.

Financial Benefits

- Investment: US$ 25,000
- Annual cost savings: US$ 22,250 (= 380,342 kWh X 0.0585 US$/kWh)
- Payback period: 14 months

Environmental Benefits

- Annual electricity savings: 380,342 kWh (estimated at 5.4 kWh/ton)
- Annual GHG emission reduction: 235 ton CO_2/year (= 380,342 X 0.000618 tCO_2/kWh)

FOR MORE INFORMATION

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