CLINKER COOLER DEDUSTING: REALIZATION OF FIRST WASTE HEAT UTILIZATION PROJECT

Scheuch has for many years attached great importance to the optimization of operating costs as part of the life cycle costs of a plant. Thus, we began to focus more and more on energy-related issues, especially with respect to energy savings, minimizing the use of energy and the recovery of energy. The result is a new concept for waste heat utilization during clinker cooler dedusting.

Waste Heat Utilization

It is well known that, depending on its design, a clinker cooler generates approximately 1.4 - 2.0 Am^3 of exhaust air per kilogram of clinker. During normal operation, the air has a temperature of circa 220 - 300 °C and a dust load of circa 10 g/Am^3. During upset operation, these values can increase for short periods of time to 450 °C and 30 g of dust per Am^3.

In order to ensure that economically available filter media can be used, exhaust gas cooling is used to adjust the gas temperatures (filter intake temperature) in conjunction with a reduction in the exhaust gas volume flows that require cleaning.

The amounts of energy released by this process are considerable: the cooling of 200,000 Am^3/h of dry air by 100 °C corresponds to a thermal output of approximately 3.5 megawatts [MW]. Scheuch's new approach to regenerative waste heat utilization addresses precisely these energy losses.

The Project

LEUBE GmbH invested 31 million Euros to modernize its clinker production facility at the company's cement plant at Gartenau/St. Leonhard/Austria. Scheuch delivered the dedusting system with the new waste heat utilization concept. In the future, the system's air/oil heat exchanger will make available 1.3 MW of otherwise unused thermal energy for pre-heating of heavy oil and space heating purposes.

The system uses an EMC filter dimensioned for approximately 150,000 Am^3/h, an air/air heat exchanger to cool the exhaust gas to a maximum temperature of 130 °C, and an air/oil heat exchanger to transfer heat from the cooling air to the thermal oil loop.

The Results

Project Leader Klaus Czepl assesses the new installation and the benefits of heat extraction as follows:

"After just the first few weeks of operating experience, we were able to confirm that operation of the cooling system with the heat extraction concept is very stable and that the calculated 1.3 MW of heat energy can be recovered. In the first phase, we now use about 800 kW to pre-heat the heavy oil. The system is just now being adapted for use with our building heating system. Although we are currently using only half of the recovered heat, the amortization period for all additional costs associated with heat extraction is clearly less than one year.

It is also very beneficial to the clinker manufacturing process that the dedusting plant - cooler and EMC filter - does not cause pressure fluctuations. The differential pressure profile is very uniform - absolutely stable. This makes it easy to control pressure at the kiln head. We are extremely satisfied with the technical concept and the performance of the plant."