

Safe Fuel Transportation in Coal-Fired Power Plants

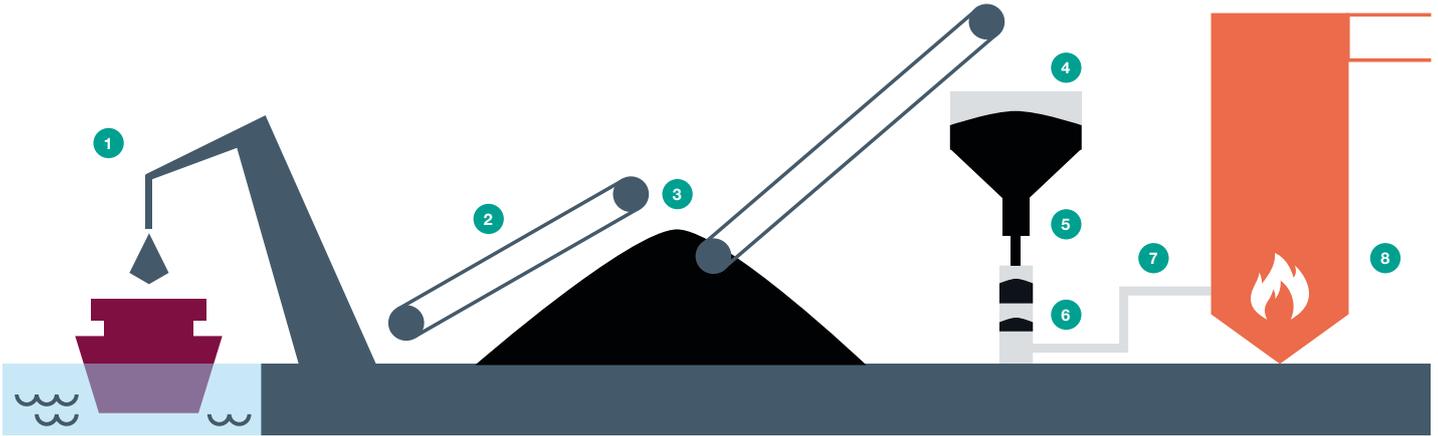
Monitoring and Control of Conveyor
Systems by Interface Modules



Application

Coal to be used as fuel for driving coal-fired power plants is mostly delivered by ship or by rail and then transported by enclosed conveyor systems, first to a warehouse then to a day bin. In the crushing tower, the pieces of coal are broken down into smaller pieces, distributed to pulverizers via conveyor belts, pulverized, and dried using exhaust gases from the dust firing system. To ensure efficient operation, all drives must be reliably monitored and controlled. For this to occur, signals must be transmitted between the plant and the control room securely, without any interference.

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Schematic process of a coal-fired power station from coal delivery to burner

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| <p>1 Delivery with train or ship</p> <p>2 Delivery with train or ship
Measured values: rotational speed, slip, temperature, direction of rotation</p> <p>3 Storage place
Measured value: level</p> <p>4 Day bin
Measured value: level</p> | <p>5 Crusher tower
Measured value: level, in case of pressure-based crushing: rotational speed</p> <p>6 Coal mill
Measured value: level, rotational speed, temperature</p> <p>7 Drying of pulverized coal by hot flue gas
Measured value: temperature</p> <p>8 Burner</p> |
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Transport of coal by conveyor belts

Goal

The bearings on conveyor belts and coal pulverizers are monitored for blockages and excessive temperatures to prevent fires or a dust explosion. This can occur if a faulty bearing is blocked or in the case of overloading. The crushing tower is another highly flammable area. It is also important to monitor the delivery rate to ensure optimum burner efficiency.

monitor slip, frequency, and synchronization. Temperature converters with trip values are mainly used in day bins, crushing towers, and coal pulverizers to detect temperatures that exceed the permissible limits. Transmitter power supplies and fill-level transmitters are used to monitor delivery rates and achieve a continuous supply.

Benefits

The interface modules of the K-System, which features galvanic isolation and delivers functional safety up to SIL3, transmit signals between individual system components and the control room without any interference. The range of products includes both isolated barriers for intrinsically safe applications, to protect the hazardous area against an excessively high energy input, as well as signal conditioners for nonhazardous areas. These products monitor conveyor belts and motors for overloading, check that coal pulverizers and day bins do not exceed the maximum permissible temperatures, and determine the necessary delivery rate.

Solution

Using frequency converters to measure motor speed in hazardous areas is a solution that is especially beneficial for spiral conveyors and coal pulverizers, to allow the potential risks of a dust explosion to be detected and prevented at an early stage. In addition to detecting the direction of rotation, these devices

At a Glance

- Slip and frequency monitoring prevents excessively high temperatures from developing and sparks from forming in conveyor belts, spiral conveyors, and coal pulverizers.
- Temperature converters with trip values for thermocouples, potentiometers, and resistance thermometers ensure that temperatures are monitored and allow settings to be changed without the need to intervene in the control system.
- Optimum burner efficiency is achieved by monitoring delivery rates.

More information at www.pepperl-fuchs.com/signalconditioner-k-system