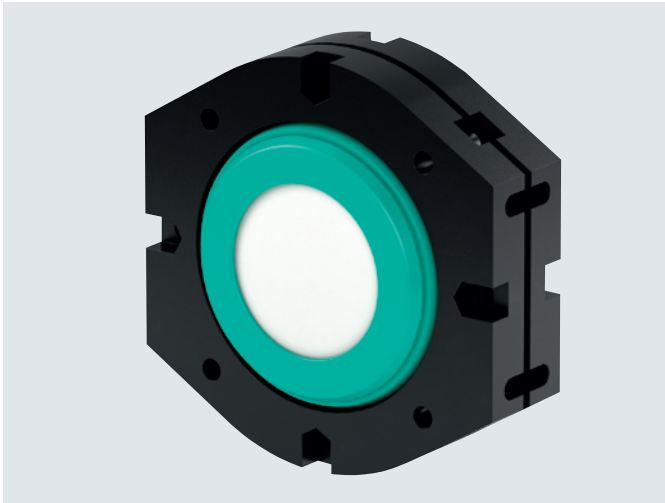


Wood Supply for Combined Heat and Power Plants

Level Monitoring in the Fuel Silo

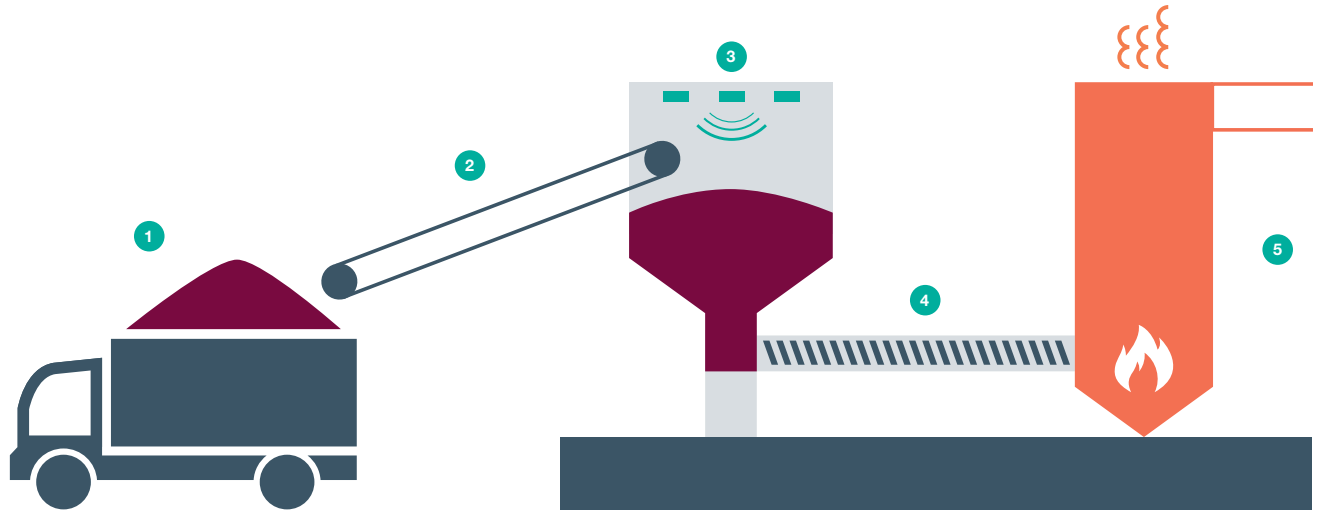


The Application

A combined heat and power plant fueled by wood waste generates electricity and heat for the surrounding industrial area. The fuel material is delivered on trucks and transported on a conveyor belt to the silo, which is filled with material.

At the bottom of the silo, worm conveyors transport the wood waste to the adjacent burning chamber. To ensure that the plant can operate continuously, the fill level of the silo is monitored and filling is controlled automatically. Ultrasonic measurement is the best choice for this process because the

sensor functionality is not affected by adverse conditions like wood chip dust. The 6.5 m high silo has a rectangular base. In order to fill it evenly, the end of the conveyor belt pivots between three positions. Significant quantities of dust are created during filling. The moisture contained in the wood evaporates and creates an atmosphere with very high humidity levels. Most surfaces in the silo are covered with sticky, moist wood dust. The silo is equipped with three F260 ultrasonic sensors, which have a detection range of 10 m. These sensors cover the entire filling material surface and send signals for conveyor belt control.



Schematic Process Flow in the Power Plant

- 1 Truck**
The fuel material is delivered on trucks
- 2 Conveyor belt**
A conveyor belt transports the material into the silo
- 3 Silo/sensors**
Three ultrasonic sensors cover the entire surface of the filling material and send signals for conveyor belt control
- 4 Worm conveyors**
At the bottom of the silo, worm conveyors transport the wood waste to the adjacent burning chamber
- 5 Burning chamber**
In the burning chamber, the fuel material is burned

The Goal

To ensure continuous power plant operation, there must always be enough wood in the silo. The fuel should be evenly distributed so that the worm conveyors have material to move at all times. The control system ensures that fuel is supplied at the correct time and that it is evenly distributed.

The Benefits

Ultrasonic sensor functionality is not affected by the stirred-up dust or the high humidity levels. Because the sensors detect the fill level from the top, no large deposits can build up on the ultrasonic transducer. Accumulations of wood dust, which are unavoidable in this application, do not influence the measurement. The temperature and color of the material also have no effect. Because the sensors are noncontact and are not sensitive to external conditions, they require no maintenance.

The Solution

Three synchronized ultrasonic sensors provide full fill level surface coverage for the entire silo. Measurement parameters like the beam angle are set so material accumulations on the silo wall have no influence on the measurement. Through accurate parameterization, you can also minimize other interference factors such as the rotating worm conveyors or flying pieces of wood. The solution averages ten measured values to ensure a smooth, consistent output.

At a Glance:

- Reliable fill level control
- Even filling
- Easy adjustment using SONPROG parameterization software
- Large functional reserve (10 m detection range)
- Maintenance-free operation

More information at
<http://www.pepperl-fuchs.com/ultrasonic>