



APPLICATION NOTE Minerals & Mining

Coking plants: level monitoring in coal silos and coke bunkers

- Level monitoring
- Extremely dusty and dirty atmospheres
- Fully automatic filling / drainage and storage monitoring

1. Background

Coke plant operations refine coal. Coke products are generated in the process and are adapted to certain requirements depending on the intended use. These include water content, ash content, sulphur content, grain size, solidity and abrasion resistance. The most common end products today are blast furnace coke and foundry coke. The coal is delivered by train. Conveyor belts transport the coal to be stored in the silos which are as tall as 50 m. From the silos, the coal is then transferred again by conveyor belt to mixing and grinding plants and from there it spends 15–30 hours in combustion furnaces. When the coal is heated up to approx. 1000 °C, the gaseous components are released. One of the things the coking plants use the gas released for is to create energy. The slaked and finished coal is loaded into trains. These trains fill the coke bunkers with the finished, partially still warm coke and it is then transported directly to be fired in blast furnaces, for example.

2. Measurement requirements

The extremely dusty and dirty atmosphere places very high demands on measurement technology. This includes the precise measurement of the coal stock in the silos. When measuring, it is important to note that the silos narrow at the bottom like a funnel. Two measuring devices are to be installed per coke storage bin so that there is a clear message sent as to how full the bins are.

3. KROHNE solution

KROHNE provided OPTIWAVE 6300 C radar level measuring devices for these applications. Thanks to the FMCW radar technology, the OPTIWAVE level measuring devices function with a great dynamic range. For this reason, extremely dusty atmospheres and minimally reflective surfaces have no effect on the measured values. FMCW = **F**requency **M**odulated **C**ontinuous **W**ave



Monitoring of coke storage bin



Monitoring of coal silo

Because measuring in the silos has to reach right to the tip of the funnel-shaped narrowing at the bottom, the devices were fitted with a rotating mechanism. It was also necessary to extend the antennas in order to be able to install the devices on the up to 60 cm thick concrete slabs. The distance to the inclined chutes in the storage bins is approx. 5m. The devices are set up at a 90° angle to the chutes. The measuring ranges are very small. The coal that is dumped in slides down the chute directly to processing.

4. Customer benefits

Our customers are now in a position to completely automate the entire manufacturing process in coking plants. The coal stocks can be called up at any time. Because previously used measurements were very unreliable, whether or not the coke storage bins were empty or full, a visual assessment was always necessary to give clearance to fill the coke storage bin.

5. Product used

OPTIWAVE 6300 C

- Radar level meter for solid applications
- 2-wire FMCW 24...26 GHz radar
- Continuous, non-contact level measurement
- Specifically designed for measuring solids
- Installation wizard for simple setup
- Basic version with DN 80 drop antenna measures up to a height of 30 m
- Also available with DN 150 drop antenna for measuring range up to 80 m



Contact

Please visit our website for a current list of all KROHNE contacts and addresses.



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