



APPLICATION NOTE Iron, Steel & Metal

Automated filling of a collecting machine on a coke oven

- Continuous non-contact level measurement during filling operation
- Tracks rapid changes in level to ensure that bunkers are consistently filled

1. Background

A large metallurgical plant in Duisburg produces millions of tonnes of steel every year. The company operates a coke oven battery whose ovens are filled from above using a machine. The machine has four collecting hoppers and always fills four ovens simultaneously.

2. Measurement requirements

At the end of each filling operation, the machine's collecting hoppers must be filled up again. To do this it runs under a platform with four coal ramps. To automate the process and to guarantee a constant rate of filling of the ovens with the same amount of coke, the level in the collecting hoppers is measured while the machine is being loaded.

In the past, guided radar devices installed inside the collecting hoppers have been used for level measurement. Since the cable probes in the tanks always broke during loading and had to be repaired at great cost, the operator was looking for a non-contact solution.



Coke oven battery with loading platform (top right)

3. KROHNE solution

For this application, four non-contact OPTIWAVE 6300 C radar level meters were installed on the loading platform. The meters measure the content of the machine's approx. 4 m high, cone-shaped collecting hopper during loading. They are equipped with DN 80 PP drop antennas.

The challenge with this application is that as soon as the machine stops under the platform, the measuring devices must detect a significant change in "level" or the distance to the surface within seconds. The subsequent filling of the machine also takes place very quickly (in less than a minute). Since changes in height of more than a few metres in such a short time are not typical for level applications, KROHNE modified the device software to give a faster response.



Four OPTIWAVE 6300 devices are installed next to the loading ramps

4. Customer benefits

After a few tests, the customer was very satisfied with the new solution: non-contact measurement meant it was now possible to install the devices on the platform. As a result, the devices cannot be damaged by the product and guarantee uninterrupted operation.

Despite the short filling time, OPTIWAVE devices provide reliable and stable measurements. Strong signal bundling of the drop antennas ensures reliable measurement even if dust forms during the filling operation.



The distance measurement jumps from 9 m to approx. 1.5 m in a very short time.

5. Product used

OPTIWAVE 6300 C

- Radar level meter for solid applications
- 2-wire FMCW 24...26 GHz radar
- Software specifically developed for solid applications
- Continuous, non-contact level measurement
- Pre-configured ex-works
- Simple start-up thanks to installation wizard
- Basic version with DN 80 drop antenna measures up to a height of 30 m
- DN 150 drop antenna for a measuring range up to 80 m or a low reflective medium



Contact

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