



APPLICATION NOTE

Chemicals

Level measurement in a cement silo

- Continuous monitoring to control production and secure supply
- Reliable measurement in extremely dusty atmosphere with product featuring minimal reflectivity
- No flushing systems or alignment mechanisms necessary

1. Background

A large recycling company manufactures cement as a raw product for use in a variety of its own products as well as for sale to other companies. The cement is stored in a large silo with a holding capacity of several thousand tons. Different batch sizes are taken from there for further processing.

2. Measurement requirements

In order to control production and ensure supply, the level of the cement in the silo (more than 20 m high) must be continuously measured. The product itself features some inherent challenges: cement is powdery and compresses easily, i. e. when it is being removed from the bottom of the tank, the level does not decrease evenly. Instead, deep pits form and large chunks stick to the walls. Cement has very low reflectivity (dielectric value approx. 1.8 – 1.9) and the atmosphere in the silo is extremely dusty. The request was for contactless level measurement which had previously been done using ultrasonic, but this method often failed due to the great amount of dust in the atmosphere and thus needed to be replaced. There is no compressed air supply on the roof of the silo.

3. KROHNE solution

An OPTIWAVE 6300 radar level meter was used for continuous, non-contact measurement. When it came to the antenna, a polypropylene drop antenna (specifically designed for solid applications) with a nominal size of DN80 was used. The device was placed directly on the opening of the silo roof.

4. Customer benefits

This solution allows the operator to monitor the cement level at any time and thus eliminates any danger of putting the production process at risk.

The OPTIWAVE 6300 provides stable, reliable measurement despite the harsh conditions in the silo. The ellipsoidal and completely enclosed shape of the antenna as well as its smooth surface prevent dust deposits on the antenna. No special dust protection or flushing system is required and the antenna features no moving parts. This eliminates the need for regular maintenance.

The low reflective surface of the product is reliably measured thanks to the high signal dynamic of the device. The FMCW technology is not affected by the angle of repose which means that the antenna does not have to be laboriously aligned. The device comes pre-configured; at the time of on-site start-up, only a few parameters such as silo height, block distance and cone shape were input per device.



OPTIWAVE on the cement silo

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
- Basic version with DN 80 drop antenna measures up to a height of 30 m
- Pre-configured ex works
- Simple start-up thanks to the installation wizard and its prompting for the necessary parameters
- Also available with DN 150 drop antenna for measuring range up to 80 m



Contact

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