## Automated stock management in an aggregate quarry

- Storing aggregate in silos and open air stockpiles
- Level measurement of low reflective medium in dusty atmosphere
- Managing supply inventory levels without overfilling of silos

## 1. Background

A recently built quarry produces aggregate (stone, gravel, sand) for the construction industry. Once extracted, the rock is crushed into fragments of different sizes. The resulting material is screened to obtain aggregates of the desired grade before being transported by a conveyor to the different storage places of the quarry.

## 2. Measurement requirements

Aggregate with small fragment size is stocked in 7 closed concrete silos [12 m high (40 ft)] whereas product with bigger fragment size is transported by tripper conveyors to 8 open air stockpiles. The distance between conveyor top and product surface often exceeds 25 meters (82 ft). Another conveyor runs below the concrete silos and stockpiles. It transports the extracted aggregate to 7 conical supply silos [10 m high (33 ft)]. These silos fill lorries which carry the product to construction sites. The quarry keeps a permanent stock of different aggregates which must be continuously monitored in order to ensure an immediate supply to the end user. Hence, the customer was looking for a reliable technical solution to automate its stock management. It was a special requirement that the device provided accurate measuring values despite of the dusty atmosphere and the low reflective medium.



Conveyor above open air stockpiles

KROHNE

## 3. KROHNE solution

KROHNE installed 22 OPTIWAVE 6300 C with Drop antennas and G1½ process connection on this production site. 8 were mounted with DN 80 (3") PP Drop antennas and installed on 4 tripper conveyors leading to the open air stockpiles. Fitted on top of each conveyor, on either side, right where the product drops from the belt, they measure the level of each pile. Another 7 devices with the same antennas measure the level inside the conical supply silos. The level in the closed concrete silos is measured by the same device but with DN 150 (6") PP Drop antennas. The OPTIWAVE 6300 C transmits the measured values to the DCS in a control room.

## 4. Customer benefits



Conical supply silos



OPTIWAVE 6300 C with DN 80 (3") PP Drop antenna on tripper conveyor measuring level of stock pile



OPTIWAVE 6300 C (DN 150 (6")) measuring level in concrete silos

The customer benefits from an automated stock management that allows for an end-user oriented supply of its different aggregates. As the measuring values are provided in the control room, the operator of the quarry is able to optimise its supply inventory without taking the risk of overfilling the silos. Due to its specific algorithms for solids as well as its state-of-the-art FMCW radar technology and electronics, the OPTIWAVE 6300 C produces accurate and reliable measurement values even in the dusty atmosphere of the quarry. Despite of the low reflective medium with its uneven or moving surface, the measurements can be taken during the filling or emptying process. As the ellipsoidal shape and smooth polypropylene surface of the Drop antenna avoids crusting, the customer no longer needs to climb on the silo roofs for periodic cleaning of the devices. Thus, undesirable interruptions of the production cycle can now be avoided. Thanks to the installation wizard and PACTware™, the meters are easy to set up. Being 2-wire devices, they also need less wiring. This reduces the installation and operating costs. Adding the competitive price of the OPTIWAVE 6300 C to all these advantages, this solution gives a fast return on investment.

## 5. Product used

### OPTIWAVE 6300 C

- 2-wire 24...26 GHz non-contact FMCW radar, ideal for solid applications
- No more purging systems: the Drop antenna made of plain PP or PTFE minimizes product build-up and condensation
- Measuring heights up to 80 m (262 ft)
- PACTware and DTMs available fully functional and free of charge
- Wizard driven setup
- Reduced installation cost

Contact

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

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