



# APPLICATION REPORT Minerals & Mining

## Level measurement of gravel in an aggregate quarry

- Managing inventory supply without overfilling of silos
- Accurate level measurement of low reflective media in a dusty atmosphere
- Process control at reduced installation and maintenance costs
- Reliable monitoring of products with non-flat surfaces



### 1. Background

EIE GUERRIER, a French manufacturer of quarry equipment, supplied conveyors to an aggregate quarry in the South of France. The quarry produces stone of different size (e.g. gravel) for the construction industry. The stone is washed before being transported to different storage places.



Aggregate quarry

### 2. Measurement requirements

Lorries unload the stone into a feed hopper. A tripper conveyor running below, transports the stone to the cleaning centre to be washed. After the cleaning process, a second conveyor transports the stone into a conical storage silo of 10 m / 32.8 ft height. This silo fills lorries carrying the product to the construction sites.



A lorry unloading stone



Feed hopper

In order to ensure the uninterrupted supply of stone to these sites, the level of product inside the hopper and storage silo must be continuously monitored.

Traditional measuring devices based on ultrasonic technology struggle with the uneven product surface, dust and build-up of this low-reflective medium ( $\epsilon_r 1.6$ ). Hence, the customer was looking for a more reliable measurement solution to manage his inventory supply.



## 3. KROHNE solution

KROHNE installed 2 OPTIWAVE 6400 C. The 24 GHz FMCW radar level transmitters are ideally suited for measuring solids from granulates to rocks. They were supplied with G1½ process connection and DN80 / 3" PP Drop antenna on this production site. The first device is fitted above the feed hopper where it continuously measures the level of stone to prevent the conveyors from running empty. The same device shows a green light to the lorry driver to indicate when he can unload more stone into the hopper.



OPTIWAVE 6400 installed on top of the storage silo



The second OPTIWAVE 6400 C, installed on top of the storage silo, reliably measures the level of stone to guarantee constant stock and smooth supply to the construction sites. This OPTIWAVE 6400 C transmits the measured values to the DCS in a control room.



OPTIWAVE 6400 installed above feed hopper

## 4. Customer benefits

The customer benefits from an automated stock management that allows for an end-user oriented supply of stone. As the measuring values are provided in the control room, the operator of the quarry is able to optimise its inventory supply without taking the risk of overfilling the silos. Due to its built-in configurations for different surface profiles as well as its state-of-the-art FMCW radar technology and electronics, the OPTIWAVE 6400 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 (PP) 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 6400 C to all these advantages, this solution gives the customer a fast return on investment.

## 5. Product used

### OPTIWAVE 6400 C

- 2-wire 24 GHz non-contact radar (FMCW) level transmitter for solids – from granulates to rocks
- With built-in configurations for different surface profiles
- PP or PTFE Drop antennas: Insensitive to product build-up
- Small beam angle (4° with DN150; 6" PTFE Drop)
- Unaffected by angle of repose – no need for antenna aiming kits
- Measuring distances up to 100 m / 328 ft
- Antenna extensions to suit any nozzle length
- Converter compatible with all OPTIWAVE 6300 process connections
- Extensive choice of process connections
- ±2 mm / ±0.08" accuracy
- PACTware™, HART® DDs and DTMs provided free of charge with full functionality



### Contact

Would you like further information about these or other applications?  
Do you require technical advice for your application?  
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