



Silo-Weigh succeeds where others fail in providing reliable weight data for Lafarge-Roofing

AV Technology's innovative Silo-Weigh retrofit weighing system is playing an important stock management role at the Lafarge Roofing plant at Rassau, near Ebbw Vale in the heart of the Welsh Valleys. The system is being used to measure the weight of material in two 120 tonne crushed slate silos

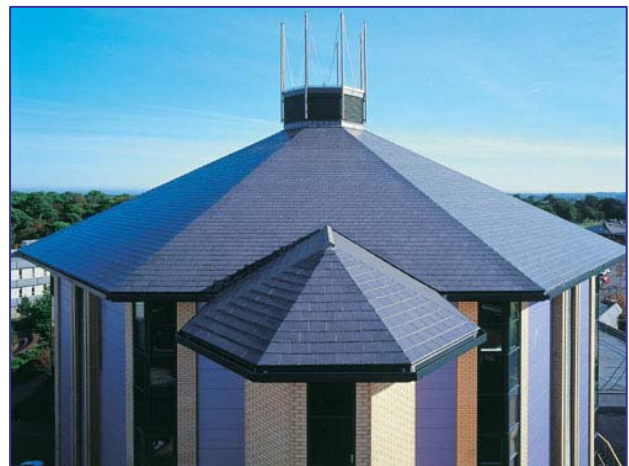


and a 60 tonne calcium carbonate silo. With a weekly usage of over 200 tonnes of raw materials, accurate content monitoring is essential to ensure bulk tanker deliveries are optimised without affecting production.

Operating in the UK and Ireland, Lafarge Roofing's goal is to deliver high quality roofing solutions that perfectly match its customers' expectations. The crushed slate is mixed with the calcium carbonate and bonded with resin to produce Cambrian roofing slates, which, the company claim, 'embody the beauty and character of natural slate'.

The silos had originally been fitted with load cells, but the cost and logistics to replace the failed units had been prohibitive. Subsequent trials with ultrasonic level measuring technology had failed to provide acceptable accuracy, primarily due to the irregular and changing surface profiles inside the silos as product is added and removed. Lafarge already had good experience with the AVT system on three silos at their Burlescombe plant so had no hesitation in adopting Silo-Weigh at Rassau.

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AVT have brought a fresh approach to high capacity silo weighing, emanating from their extensive experience in stress analysis and structural monitoring. Unlike traditional weighing companies, they have a detailed understanding of the behaviour of structures, based on over 20 years' experience. While most current retrofit sensors are based on electrical resistance strain gauges, which struggle to provide sufficient stability and accuracy, the Silo-Weigh system uses specially developed 'low strain' VWG sensors. These devices are insensitive to moisture, long cable runs and low signal levels. The Silo-weigh system, which is totally non-intrusive, can

be fitted without having to stop the process or empty the silo, and has proved to be effective on both steel and concrete silos.



The main error sources in retrofit systems are temperature, differential support deflection and structure interaction (cross talk). Temperature changes in different parts of the structure will affect the sensors to different extents and the magnitude of these errors is usually significantly greater than the required system accuracy.

However as AVT's Technical Director Neil Parkinson is keen to point out:

"The accurate measurement of these extremely small and often irregular strains is not as straightforward as it might seem, and many early attempts at strain gauge based weighing systems have given the technique a bad reputation. However we believe our practical and logical approach is effective in minimizing inherent system anomalies, and it is in the handling and post-

processing of data where we have been so successful.

After some ten years of ongoing trials and development work, we have developed compensation techniques which are effective in reducing these errors to acceptable levels. Rather than try to utilise standard weighing instrumentation, we utilize a robust multi-channel Control Unit to handle the data. This provides multi-functional capabilities for introducing non-linear calibration factors, combined with individual calibration factors for each silo support if necessary. In parallel, temperature data is used to provide real time thermal compensation. The system can also carry out intelligent data validation and signal conditioning together with data storage for weight trending. A single Control Unit can be expanded to accommodate any number of silos thereby providing a very cost effective solution for multiple silo applications."

In the Lafarge application, on each of the silos the sensors are spot welded to the legs at four selected points. Each one has its own temperature sensor which accurately measures the temperature of the steel directly where the sensor is fitted. For outdoor applications additional temperature sensors can be installed to provide additional compensation data.



The system provides local weight displays on the external walls of the silo house and an analogue voltage signal back to the main SCADA system in the control room. In parallel an Ethernet interface connects into the LAN to send weight data to a designated computer running proprietary data logging software.



Plant Manager Nick Payne is very pleased with the overall system and as he concludes: *“Accurate and reliable silo contents measurement is essential to our operation. The Silo-Weigh system was installed with minimum disruption to production and required no structural changes. Operators can now see at a glance the current stock status and the data logging facility records usage trends. During the set up period, data from the installation*

was transmitted to AVT’s offices in Stockport via the GSM modem in the Control Unit. This remote monitoring capability allowed AVT engineers to have a continual view of what was going on at our site over 200 miles away and fine tuning adjustments were carried out as appropriate.”



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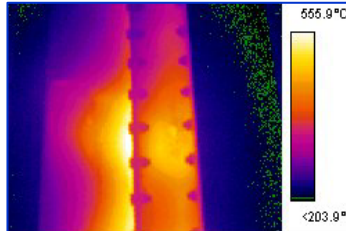
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