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INTRODUCING OWL EYE®

Owl Eye® is an innovative system for real-time volume measurement and management of bulk solids stockpiles with >98 % accuracy. This lowers costs, avoids excess stock and promotes efficient utilisation of raw materials and, ultimately, improves the efficiency of processes.

The Owl Eye® Monitoring System was developed for use in the bulk solids industry, including cement production. It offers a unique solution for volume measurement and digital management of bulk solids stockpiles. It enables precise inventory taking and efficient management of materials, leading to improvements in the production process and a reduction in operating costs.

The system offers numerous benefits for the operators of bulk solid stockpiles. It helps to lower costs as it avoids excess stock and supports the efficient use of materials. The system's digital platform facilitates collaboration and communication between different company departments and operational sites. Data are stored in the Owl Eye digital platform and can be retrieved at any time on a computer or mobile device. There is an innovative dashboard and a user-friendly web interface.

Precision due to independent hardware

The Owl Eye Measurement System uses light detection and ranging (LiDAR) technology, which has made considerable advances in recent years. The technology determines distances by firing a laser at an object and measuring the time for the reflected light to return to the receiver. LiDAR sensors enable volume measurements to be completed with high precision and speed, leading to a considerable improvement in efficiency in the management of bulk solids stockpiles.

A key question to ask is whether to depend on one single sensor manufacturer or choose software that

An Owl Eye Monitoring System keeping an eye over raw materials in an covered outdoor storage facility.

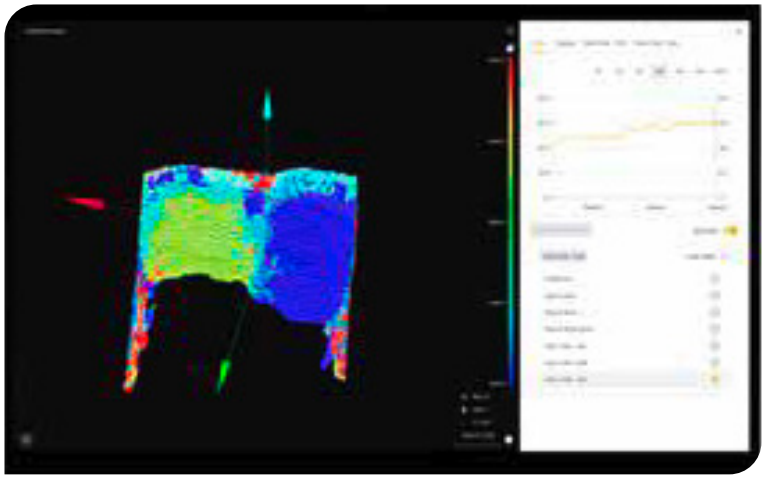
is independent. The advantage of applying sensor-agnostic software is that the best available sensors on the market can be chosen, with deferring to any one particular manufacturer. Moreover, current rapid development of the software needed to measure bulk solid volumes enables greater flexibility and adaptability to customers' specific requirements. The solution can therefore be tailored individually to the needs and circumstances of each site to ensure maximum efficiency and accuracy.

Sachtleben Technology employs experts in sensor engineering and has conducted extensive benchmarking analysis to identify and sell the best sensors on the market. The analysis takes into account a large number of factors, including accuracy, reliability, interfaces, integration as well as price-performance ratio. It is important to know that there are considerable differences in sensor quality, which can have a direct impact on performance and reliability. With the application of the best available sensors, higher precision and accuracy are achieved, which is crucially important in applications like the measurement of bulk solids volumes with LiDAR.

The digital stockpile

By connecting analogue activities in the storage facility with digital data management and analysis with Owl Eye, the user can utilise value-creating analysis functions for more efficient stock inventory. One practical example shows how these functions can be used. Let's say your cement plant has a covered outdoor storage facility for incoming refuse-derived fuel (RDF). This can vary somewhat in density, particle size and moisture content. It is crucial to know how much storage space is available for incoming material. Without this information, there is a risk that the RDF will have to be stored outdoors. This is undesirable in tropical or temperate regions with a lot of rain, as wet RDF will have to either be dried or will act as a drag on efficiency as the excess water is driven off in the kiln.

With Owl Eye®, any information can be input into the 3D stockpile. For this purpose, an algorithm is used that subdivides the stockpile into small cubes, Each cube can be tagged with information individually or in groups. The stockpile can be tagged with a time stamp or any other information. This means that users can instantly see where any given material is and how much is available. The software also reliably identifies when a new consignment is added, and tags it as 'new.' Corresponding information is then assigned to the new zone for instance, that the material there has not yet been sampled. Once a sample is taken and analysed, the relevant information can be input into the system. It is always possible to output



Different parts of a stockpile colour-coded by age.

quantities of the individually-stored information or even display individual items of information from within the middle of the stockpile while hiding everything else.

Optimising production

The Owl Eye system is not only a tool for stock management and analysis, but also other areas such as process optimisation. As it provides real-time information on stock levels, it helps users to avoid bottlenecks, improving the productivity and efficiency of the overall production process. It offers efficient storage of stocks based on valuable analysis functions; avoidance of quality losses and financial losses thanks to better monitoring of stock levels; Improved quality control based on easy storage and retrievability of sample data in the 3D stockpile.

Flexible measurement campaigns

Owl Eye can also measure material volumes on heavy-duty dumper trucks. An interesting potential application is the benchmarking of different dumper trucks based on volume and fuel consumption, as carried out recently at a crushed stone plant.

In this case, the Owl Eye was installed at a crusher building and every delivery on truck or heavy-duty trucks measured over a certain period. The different vehicles were stored in the software with the empty-scanned dumper body to obtain reliable results. The volume between the empty and full measurement was calculated automatically and summarised in a report. The analysis of the resulting volume data can help to reduce operating costs and enhance efficiency. Users can calculate and compare the fuel consumption per unit of volume for various dumper trucks to enable the choice of the most cost-efficient vehicles.

Owl Eye systems can be used for dumper trucks.

Digital tools maximise opportunities

Another important benefit of digital storage is the objectification of stocks. Often stock is managed by people with many years of experience. They have built up and perfected their knowledge and skills over many years. This represents a huge resource for a company, but comes with the risk of the company becoming dependent on the expertise of a single operative.

Digital tools, for example automated inventory systems or inventory management software, enable companies to utilise the knowledge and expertise of their experienced employees and at the same time to reduce dependence on a single operative. Digitalisation enables the standardisation of procedures and processes, which increases efficiency and flexibility in storage operations. In addition, with digital inventory systems, costs can be saved in the long term as automated processes save time and entail fewer sources of error than manual processes.

Managing dust

To ensure that the Owl Eye monitoring system functions reliably in every environment, Sachtleben Technology offers individual dust chamber tests. Here the cleaning system is adapted to the specific requirements of the customer and material that the system has to work with. In these tests, the material is placed into a special dust chamber and the sensors of the Owl Eye system are exposed to it. Then the cleaning system is tested to ensure that it works effectively and reliably so the sensors stay clean. With these individual dust chamber tests, Sachtleben can ensure that its customers profit optimally from the Owl Eye monitoring system in every environment and with every material. The dust chamber tests also offer an excellent possibility to test the efficiency and, if required, optimise the cleaning methods to obtain the best possible cleaning performance.

CO_2 footprint

Imprecise inventory management can also massively impair the CO_2 footprint of a supply chain. Year after year, the water level of the river Rhine/Germany drops to almost dry so that raw materials must be transported by lorry rather than barge. The outcome from an ecological perspective: the CO_2 footprint increases from 34g/t/km for a barge to 59g/t/km for a truck, i.e. by almost 75%. With the Owl Eye system, an operator may be able to mitigate these kinds of situations by moving 'excess stock' when water levels are high.

Incorporating other data sources

The Owl Eye system offers a broad array of functionalities to improve the management and analysis of materials. A particular strength of the system is that it is able to import data from external systems such as malware scanners and drones, manage it and evaluate it automatically. With this system, information can be collated from various sources to give a comprehensive picture of the storage or production processes. Furthermore, it is possible for warnings to be issued by email when values either do not reach or exceed certain thresholds or if certain plausibility conditions are breached. This enables those in charge to respond quickly to any changes in the process and avoid potential problems.

In practice, the above-mentioned requirements mean a very detailed and individualised design process of the Owl Eye monitoring set-up. This process consists of the following six steps: In the scanning step, the existing stock is scanned with the laser scanner in 3D and then in the follow-up evaluated with dedicated software. In the simulation, the type, position and number of the sensors are determined. The determined installation design ensures, however, optimum scanning coverage of the bulk solids. After discussion and any modifications to meet (usually further) customer requirements, the Owl Eye monitoring system is installed and configured. Besides adjustment of the hardware, this final step includes training and fine tuning to meet detailed requirements of the users.

Concluding remarks

LiDAR-based stockpile management systems, including the Owl Eye Monitoring System, offer a number of process, cost and operational advantages for cement plant operators, including lower costs, reduced CO_2 emissions, fewer bottlenecks and smoother flows of materials around the plant.