Early engagement between Euromecc and SICICAL enabled detailed discussions on project requirements and customised solutions prior to the manufacturing stage

Feed, empty, go!

Euromecc srl has supplied its new ECO-HOPPER for clinker unloading to Italian cement producer SICICAL in the port of Augusta, Sicily. The new equipment was commissioned in June 2022 having successfully accommodated specific project requirements and addressing site restrictions.

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SICICAL operates a cement plant in Sicily, in the south of Italy. The company is a joint venture between the La Ferla Group, which specialises in the trade and manufacture of limestone products, and the Speziali Group, an independent company involved in the manufacturing and trading of cement. In late 2020, SICICAL approached Euromecc to discuss requirements for a new ECO-HOPPER for clinker handling to be installed at the port of Augusta, Sicily. At the time Euromecc was investing resources in the design of a similar product due to greater demand for this type of equipment stemming from an increase in the delivery of raw materials via sea.

Euromecc's ECO-HOPPER for SICICAL was built at the supplier's manufacturing hub where a trial assembly helped reduce on-site installation time

Equipment description

Euromecc's new ECO-HOPPER for clinker unloading using grab cranes is based on the company's other designs for the cement and coal industries developed over the last two decades. These bespoke concepts have increased Euromecc's bulk materials handling expertise and know-how, enabling the company to start from a solid base.

The ECO-HOPPER has wide top access (~6000 x 6000mm) with a total storage capacity of 90m³ split into two sections. The top section is directly served by 12m³ grabs, and is designed to accept material quickly to avoid dust release.

Operations are controlled by the working platform above the discharge spout

Under the upper section is a screening grid located on top of the self-closing dust flap that prevents the escape of particles.

The overall action is then enhanced by the presence of two large filter units (16,000m³/h each) which are connected to the lower section and maintain negative pressure for high-efficiency suction.

The lower section of the hopper, made of anti-wear Hardox, is connected to a dedusted discharge spout suitable for feeding tipper trucks at a maximum rate of 400tph and which operates with a dedicated 1800m³/h filter. This section also has a radar level indicator to monitor the filling level and the presence of material.

The ECO-HOPPER is equipped with four axles and wheels, two of which are equipped with hydraulic steering devices. This enables the hopper to be pulled towards the dock and reduces the grab's journey according to the vessel's emptying geometry. Therefore, once the ship is docked, no further movement required is required as all operations are addressed by the grab and the ECO-HOPPER, which also has hydraulic stabilisers that activate once the positioning is over. Moreover, once operations are completed, the equipment can be pulled to a parking area, keeping the dock free.

In terms of the electrical power supply, the unit is fully independent thanks to a 100kW genset that can meet total power requirements.

When it comes to health and safety considerations, care has been taken to avoid personnel working at height during normal operations. As a result, any components that need to be maintained are served by platforms that have appropriate guarding. There are no ladders to climb as there is stair access to all areas from ground level to the top.

Discharging options

During the design phase of the SICICAL project Euromecc explored different discharging options to control the flow and measure delivered products. This tool gives the operators the advantage of analytically monitoring discharge operations, as well as managing third-party deliveries straight from the hopper.

Load cells

The first option to be proposed was the use of load cells. With the hopper section installed on load cells, it would be possible to achieve a real understanding of the material quantity. For efficiency, it would be necessary to add an intermediate belt or a rotary valve before the loading spout so that the discharge flow could be controlled and monitored, and also be virtually "isolated" when the grab loaded material, having a software compensation.

The advantage of this solution was the reliability of the load cells balanced against the need for an accurate setting of software as well as additional discharge equipment. To calculate the flow of the material, the software needs to be set accurately. Although the flow onto tipper trucks is regulated by a rotary valve, it changes with the filling level of the Eco Hopper. Therefore, an algorithm needs to be set.

Extracting belt

The second option was the use of a discharge belt that would bring the material from the hopper to the loading spout, which is installed with an offset from the hopper instead of over the same axle. This means the tipper trucks do not have to drive through the hopper for loading. As a result, the belt would be long enough to install a weighbridge to monitor material flow.

The advantage of this solution was the possibility of using the area under the hopper to store additional equipment but would mean uncovered loading operations.

Pneumatic knife-gate valve

Instead, Euromecc decided to adopt a third option due to its simplicity. In the selected option, discharge takes place via a pneumatic knife-gate valve and, if required, a hammer gate to control the flow. Material is gravity-fed, straight onto the discharge spout that loads the tipper trucks. After loading, the tippers are weighed on a nearby weighbridge. The key advantages of this set-up is the reduced amount of equipment required and lower costs, although reading of the measurements and monitoring are not as immediate as the aforementioned two options.

From CAD to start-up

During the design phase Euromecc's technical department and the SICICAL team worked together to discuss the project's requirements and any potential areas for customisation. Following on, the project then moved to the manufacturing stage. Euromecc has a highly-automated manufacturing hub in Misterbianco, Italy, where most activities are carried out by robots and computer numerical control (CNC) technology, guaranteeing high-quality equipment and a high degree of precision during each phase of the process.

After the main components were manufactured, trial assembly was carried out at the manufacturing facility. This is particularly recommended for projects situated in restricted areas as Euromecc can ensure that assembly at the site is carried out as quickly and smoothly as possible. Before final packaging, the ECO-HOPPER was prepared and painted with a C5 classified coating system to withstand the high corrosion environment of marine conditions.

Once on site, Euromecc performed the assembly and commissioning of equipment, similar to a turnkey project. Including some fine adjustments, equipment was up and running in just four weeks.

Conclusion

Euromecc's ECO-HOPPER is the result of over 20 years of experience in the bulk materials handling and storage industries. It combines the quality and reliability of the Euromecc brand with a high degree of flexibility for the engineering of bespoke solutions. ■

Euromecc's ECO-HOPPER for SICICAL was installed in a restricted area of the port of Augusta, Sicily, Italy