

Molenaar Concrete industry in Goes Honouring the small.....

Introduction

Molenaar Betonindustrie is a manufacturer of specialized concrete construction products, such as cover spacers, formwork spacers and formwork accessories. Despite of being relatively small elements, they are essential parts for concrete constructions and concrete products. Indeed, they determine the position of where reinforcement is place inside the formwork of the concrete construction.

The correct size and composition of the spacers is important for the dimensions as well as the strength of a concrete construction, while at the same time, they prevent deterioration of the concrete because, when placed correctly, erosion of the steel becomes impossible. Spacer's seem to be an elementary part, yet they have to fulfil strict quality specifications. Besides this, the spacer has to merge with the concrete in such a way that it becomes an indivisible part of the total structure. If this is not warranted, the spacer will, in time, separate itself from the concrete causing cracks allowing for

leakage and subsequent decay of the structure.

For Molenaar Betonindustrie this means they have to customize their spacers to the specific requirements of the particular job at hand. A highly flexible production process is thus a prerequisite to meet customer demands.

Molenaar Betonindustrie is a dynamic company, operating in The Netherlands and abroad. Over 60 years of innovation, quality, customization, materials selection and fast delivery, evolved Molenaar Betonindustrie to a leader in the concrete construction industry. Their products are sold across market segments including residential building, civil engineering, and commercial construction, reinforcement perpetrators as well as via wholesalers.

From the construction of the Zeeland Bridge and the Heine Noordtunnel in the Netherlands, an oil jetty in Aruba, the central market halls on Curacao to the

Oosterschelde barrier to name but a few exceptional sites, all were built using Molenaar products. They also supply concrete spacers for numerous drilled tunnels including the Sluiskiltunnel in Zeeuws-Vlaanderen and the 6,6km long Westerscheldetunnel in the Netherlands.

Molenaar Betonindustrie started with the production of spacers in Dordrecht (NL) in 1953. In 1959 the company moved to the harbour area of Goes, which has an ideal waterfront location, allowing for the expansion of the concrete plant. Water ways offer the most economical transportation of sand, gravel and other bulk material required for concrete manufacturing. In 1988 Molenaar built the current factory including a concrete production installation consisting of bunkers to hold sand, limestone and gravel, a belt weigher to transport same, an elevator belt to transport bulk from the weigher to the mixer, two cement silo's fitted with extraction screw conveyors and a cement weigher with a



Production facility with counterflow mixer and cement weigher





Hardening spacers Discharge of concrete in the moulds



Control panel

discharge valve. Water dosing is done by means of determining the humidity level of the material in conjunction with a counter-flow mixer.

The control system

In the start-up years, at the premises in Goes in 1988, Molenaar Betonindustrie chose to install a progressive computer based controller to manage the weighing and mixing plant. PENKO Engineering B.V. provided a fully automatic sequencer performing all dosing actions consecutively. The dosing of water was controlled by means of humidity measurement in the mixer.

In the year 2000, this process controller was upgraded to a multi-tasking system, enabling simultaneous dosing and mixing which presented a significant improvement with regards to production capacity. At the same time PENKO connected a HSH management information system to the production control system.

This package allowed Molenaar a direct and immediate view of the dosing results resulting in an efficient production system and effective quality control. Furthermore this package allows for insight on the consumption of raw materials, allowing for raw material management. In the same year, the humidity measurement was improved as well. While at first the humidity was established inside the mixer, it is now determined by means of three sensors where sand, gravel and limestone were measured separately. The importance of the appropriate amount of water in a concrete mixture can be highly underestimated. Water is

essential for the hardening process of concrete. A lack of water renders insufficient hardening and an overdose of water will make the mixture to plastic causing the cement to rinse out.

Sand, gravel and limestone are typically stored outside and are subjected to weather conditions which influence the amount of moisture in the raw material. This in turn has a direct impact on the required amount of water needed for correct concrete constituency. More rainfall causes wetter sand, gravel and limestone resulting in water sagging out. The effect of this is twofold; a part of the dosed amount of sand, gravel and limestone will already include some water, so the actual raw material will be underweight. If one ignores this existing water content, and more water is added as per recipe, it result in an overdose of moisture. On the one hand it creates a mixture with too little sand, gravel and lime stone. So the mixture does not contain sufficient amounts of raw materials, while on the other hand the water content is too high.

Measuring the moisture content during dosing of the material directly into the discharge opening of the hopper has two distinct advantages. Firstly the controller can conduct two corrections per raw material. The water content already contained in the sand, gravel and limestone is detected and compensated by additional raw material to balance the ratio, while at the same time, the amount of water dosing is reduced by the appropriate amount. Secondly, the humidity content does not need to be taken into consideration during the actual

mixing process.

In 2008 a further upgrade was conducted to the installation whereby the dosing controller as well as the management information package was replaced. The new controller is characterized by its high speed – high accuracy reaction time which significantly improved the dosing accuracy and in so doing, also the reproducibility of the mixture recipes. In addition, the new BCS software package which replaced the HSH-system, offered batch monitoring with track and trace facilities. Thanks to this, Molenaar now knows exactly what happens where in the production process and the production process extension allows for reliable reproduction of product composition.

Conclusion

Over the years, the control system has proven to be a good choice fulfilling constantly changing demands. It gives Molenaar Betonindustrie the edge to customize high quality products fast and flexibly. In addition to this, the high accuracy of dosing, contributed to the sophisticated measuring system, and the guaranteed reliability of quality, forms a solid basis for a trouble-free efficient operation. The valuable cooperation with the system supplier, PENKO Engineering B.V., provides Molenaar with peace of mind and the certainty that any future changing circumstances can and will rapidly be adjusted.