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New Production System for Manhole Components at CRP, France

■ Sophie Joan-Grangé, Schlüsselbauer Technology, Austria

Round or square, rapid high-quality manufacturing: by using a new manufacturing and palletizing system from Schlüsselbauer Technology, CRP (Canalisations Regards Préfabrication) has overcome the challenge associated with producing leak-proof concrete manhole elements. As CRP was going through a major expansion phase in the French market for manhole components, the managing director was very aware from the start that his future production system would have to be capable of an incredibly high rate of productivity. However, production quantity was not the only objective. Since 2018, after succeeding his father as managing director a few years earlier, Jean-Marc Bessières has been thinking about the major role played by other aspects: quality, product versatility, automation, ergonomics, and safety. And just to make the challenge even greater, CRP was also aiming to produce the same amount of square and round elements in line with the same quality and profitability objectives.

From Regional Medium-Sized Company to One of France's Market Leaders

Over the past few years CRP, a family-owned company, has managed to turn what might be considered a rather tricky rural location, far from major cities and economic centres, into a benefit. The small regional town of Brive is at the intersection of two freeways that cross the country from north to south and from east to west. CRP has set up a logistics hub there and distributes its products in France and to parts of Belgium. This means that, unlike many other concrete product producers, CRP does not supply construction companies directly, but rather supplies a network of approximately 600 retailer warehouses, enabling it to "become the third largest French manufacturer of concrete products for public road construction and civil engineering in record time," according to Jean-Marc Bessières.



View of the new production hall in Malemort sur Corrèze

CRP currently has four production plants, including two new locations developed in 2018 and 2019. "A fifth mega-plant will go into operation at the start of 2022, increasing annual production capacity to 400,000 tons," the proud company director says. The CRP product range is broken down into four business areas: rainwater sewage systems, wastewater sewage systems, dry channels, and communal road construction.

Need for Extensive Investments in Industry

At the start of 2018, before the need for increased production had even arisen, the question of how to manufacture a complete and versatile range of high-quality concrete manhole components in an even safer and entirely automated way was the subject of intense debate at CRP. Jean-Marc Bessières advocated for operating safety and workplace ergonomics, and his first aim was to automate a range of manual or barely automated steps at CRP, such as positioning step rungs and anchors, depalletizing product, cleaning, oiling and stacking bottom pallets, palletizing, or product labelling. In terms of quality, the CRP objective was to, "only bring leak-proof products to the wastewater and rainwater markets, having tested and documented the tightness of seals for each product." Another major objective for CRP was to be able to manufacture an extremely wide range of round and square manhole components in four sizes on the same machine, measuring from 800 to 1500 mm and with product heights of 200 mm to 1500 mm. In order to continue and support the company's major expansion strategy, production capacity for manhole components (not including manhole bases) needed to increase "by up to 800 pieces a day, in addition to the current production capacity of 400 pieces a day," according to management.

Versatility of New Production System

The new production machine manufactures DN 800 and DN 1000 manhole risers in four product heights, with optional anchors and/or step rungs that are compacted directly into the product during production. DN 800 and DN 1000 cover plates are also manufactured on the same machine. Square manhole components are produced with dimensions of 800x800, 1000x1000, 1200x1200, and 1500x1500 mm – each available in three product heights. The products are ejected onto an automatic conveyor belt in front of the machine and are transported to the curing area using an electric pipe transporter. This pipe transporter was customized specifically for CRP's comprehensive product range and is equipped with a hydraulically adjustable holding device and a device for removing the set rings at the hardening location.

In France, safety is increasingly becoming an important maxim in plants and on construction sites, which is why transport anchors are now standard for all concrete products in France. It was therefore vitally important to CRP that the new system could automatically insert anchors during production, but without slowing down the rhythm of production. Additionally, dimensions of the concrete products are so varied such that multiple and different types of anchors are needed. Schlüsselbauer Technology reacted to this specific requirement by further developing their automatic anchor robot for



The Magic production system from Schlüsselbauer Technology in daily use

Magic manhole riser systems. The only task for operators to do now is fill the anchor magazine about once an hour.

Step rungs are also automatically fed into the process, and they are compacted into the product during production. All the machinist has to do is insert the right number of step rungs into a specially designed holder according to the product height. This process does not increase cycle time and it is carried out ergonomically, at the same working height as the machine's operating panel.

Anchors and step rungs are fed in automatically in line with the working cycle of the production machine without slowing it down, contributing to the high productivity characteristic of Schlüsselbauer Magic systems.

Short Cycle Times Despite Diversity

The Magic production system is designed to be operated by only one operator, who carries out all the necessary work. The operator monitors the proper flow of the automatic production cycle from the control panel, supplies the Stepmaster robot with step rungs and anchor magazines, and places a reinforcement ring in the mould when necessary.



CRP uses the Magic1501 to manufacture both square and round manhole components in a range of product heights

Given the wide range of mould equipment, discussions about this system not only involved the production cycle time, but also a requirement for optimized mould changing. Cutting-edge technical developments were therefore taken into consideration in order to make mould changing as quick and as smooth as possible, particularly using a quick change mould cassette for preparing the next mould, as well as using quick hydraulic couplings. Product heights can now be changed in less than two hours and it does not take much longer to change the entire mould, e.g., switching over from round to square products.

Palletizing System Supports Efficient Production

An extremely high productivity rate of a wide product range is incompatible if the space for products and bottom pallets is not also optimized, since the plant would otherwise be at risk of surpassing its capacity. And it would be incompatible for rapid production if, for example, bottom pallets are not automatically demoulded, cleaned, oiled, and promptly made available again for the next production shift.



Like the anchors, the step rungs are automatically transferred to the machine and compacted into the respective component directly in fresh concrete



Products are transported to the hardening area and on to the palletizing system using an electric pipe transporter



The palletizing system carries out multiple work steps on a fully automated basis, both for bottom pallets and for concrete products

The palletizing system, specially developed by Schlüsselbauer Technology for CRP's specific requirements, enables bottom pallets to automatically be knocked off, followed by vacuum testing of the concrete products, labelling of the product, and finally the palletizing of the products in their curing area. Each product is optimally positioned in this plant: some components are standing, some are laid on their side, and some are individually palletized or stacked and moved out of the hall with or without wooden pallets. There is a huge range of variants.

The other side of the palletizing system is devoted to bottom pallets, which can be either round or square with dimensions ranging from 800 mm to 1500 mm. Reprocessing pallets into production consists of a bottom pallet cleaning station, and oiling and stacking stations so bottom pallets can easily be placed in storage or immediately loaded back into the Magic bottom pallet magazine. All these processes can and must be quickly carried out in line with the production cycle.

The handling of products with different geometries is a particular challenge here. A suitable tool for securing the concrete component is required in each case and the time required for changing tools must not stop the production flow. The palletizing system therefore carries out a completely automatic tool change. The various dimensions of the bottom pallets can naturally be manipulated without problem. The entire palletizing system is compact and enables you to combine the various processes in an existing building in a small footprint. For CRP, a carousel turned out to be the ideal solution, where the concrete product released from the bottom pallet moves quickly from one station to another. Lastly, the question of wooden pallets needed to be clarified, as CRP needed to use two types instead of the usual one standardized wooden pallet, given the wide range of dimensions. Again, Schlüsselbauer was able to adapt its existing technology and meet the customer's requirements.

Choosing an Industry Partner for Long-Term Commitment

Naturally, Jean-Marc Bessières' thoughts and questions about which strategy best suited his needs covered a number of different scenarios and his commitment to the process was incredibly demanding. The CRP management team made a targeted selection of multiple well-known manufacturers and visited about 20 production plants throughout Europe. "At the end of our plant visits," Jean-Marc Bessières said, "It was very clear to us that Schlüsselbauer Technology was the company who could provide solutions to our challenges."

"The world-renowned Austrian manufacturer, based in a charming village with an unpronounceable name, was not only quickly able to meet all our criteria in terms of safety, quality, productivity, and versatility," Bessières said, "But they also showed us both cutting-edge and well-automated systems and machines that are decades old and still manufacture large quantities of high-quality products," he continued. "Faith in Schlüsselbauer and the long service life of their systems convinced us that our hunt for a reliable and long-term industry partner was over."

One of the particular features of the technical solution offered by Schlüsselbauer was the division into multiple modules, with Magic production lines and a fully automatic palletizing system. "The start-up of the first Magic at the beginning of 2020 allowed us to implement step-by-step training of our production and maintenance personnel for this incredibly comprehensive system," Jean-Marc Bessières said. "The plant was constructed around the machine and equipped with a new fully automatic concrete mixing plant. Team training continued at the start of 2021 with the start-up of the palletizing system and automatic processing of bottom pallets. Today, we have decided to incorporate a second Magic into the project, which will also be located in a new industrial hall."



View of the palletizing carousel with corresponding testing station

Product conveyor leading to the outside



Bessières said. “We believe CRP will be able to make even better use of peripheral equipment such as moulds and bottom pallets with two Magic systems and we will be able to change production from one machine to another, allowing us to react quickly to changing demand on the markets.”

Looking Back at Experiences Before Overall Project Completion

Mr. Jean-Marc Bessières is happy to share his impressions so far: “Alongside assembly in strict compliance with deadlines, Schlüsselbauer has ensured that our production and maintenance personnel have received full training in the use of their facilities.

The Schlüsselbauer team seamlessly carried out the start-up process on site for the Magic system for production and palletizing, with all its fine technical details. The productivity objectives of around 400 products per day in two shifts on one machine and an average cycle time of 120 seconds have been achieved gradually. The palletizing system, customized to our specific requirements, has facilitated an extremely efficient management of the entire finishing process.

There have been considerable improvements for us in terms of safety, work ergonomics, quality, and productivity, thanks to these new systems, and this is very much appreciated by everyone, from production workers to CRP customers.”

Global Pandemic also Affects Industrial Sector

The Covid-19 pandemic initially caused great uncertainty for CRP, as it did for so many others, and the company shut down for two months in spring 2020. It is only in retrospect that this time can be viewed as a plus rather than a minus for the young management team (with an average age of 32), because the enforced break gave them the freedom to calmly “refine our corporate strategy”, as Jean-Marc Bessières puts it. “Diversification, innovation, and patents to protect new production steps are now on the CRP agenda.” Jean-Marc Bessières continued. “This break gave us the opportunity to quietly think about how we could shape the future of our profession as a concrete products manufacturer, the future of our customers—the civil engineering companies that install our products—and the future of communal operators. The positive side of this pandemic is the growing awareness of the general public and public decision-makers about the effects of certain processes and products on the environment and the dependency of our European economies on supplies from distant countries that are often less environmentally friendly. These are very positive indicators for the concrete industry, which traditionally consists of local and sustainable manufacturers. CRP stopped its investment program in the first few days of the pandemic. After a period of reflection and the resumption of business activities, the company then picked up speed again as the months went on and it will achieve total productive investments of almost EUR 25 million be-



Jean-Marc Bessières and his two managers T. Goudal and T. Lafon in front of the palletizing system, along with S. Joan-Grangé from Schlüsselbauer.



Warehouse for square products at the factory in Malemort

tween 2019 and 2022. I would like to take this opportunity to highlight and praise the major support from the European and French stimulus programs."

Development of Market for Concrete Products for Wastewater Sector in France and Europe

Jean-Marc Bessières: "Unfortunately, there has been increasing use of plastic manholes in France in recent years, as there has been in many other European countries. General awareness of the negative effects of these carbon products on our environment should gradually reduce the sales of these products and benefit concrete products in particular." Concrete is made from endlessly recyclable components such as gravel, sand, cement and water. "I am convinced that, in the long term, general awareness of the need for soil and groundwater protection will steer the market towards products that are proven to be leak-proof. Leaks in wastewater systems will soon no longer be tolerated, in the same way as the loss of rainwater that could be collected and reused. Concrete manhole component manufacturers who are capable of testing their products for leaks to the max and guaranteeing that they are leak-proof will be the winners. They have fantastic future prospects for the years to come, particularly compared to the manufacturers of plastic manholes." ■



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