

Penta Automazioni Industriali SRL, 40062 Molinella (Bologna), Italy

Extensive modernisation of the sorting and packaging plant at Müller Steinag AG in Rickenbach

■ Mark Küppers, CPi worldwide, Germany

As part of a comprehensive modernisation programme, an existing Vorning palletising system at Müller Steinag AG in Rickenbach, Switzerland, was replaced by a modern, highly automated Penta system. The aim of the project was to reliably package paving stones and bricks after edge processing in the Vorning drum and palletise them on Euro pallets - while significantly reducing personnel requirements, integrating quality control and optimally integrating the system into an existing open-sided hall. The new plant is designed to sort and palletise both split and unsplit bricks of different lengths into precisely defined packaging units. A central focus was on user-friendliness and good accessibility of all plant components without compromising the safety concept. Despite comprehensive protective devices, maintenance-friendly access points have been retained.

Müller-Steinag AG, Rickenbach

The Müller-Steinag Group, based in Rickenbach, is one of the established companies in the Swiss building materials industry. The company is involved in the extraction, processing and refinement of mineral raw materials and the manufacture of high-quality concrete and building materials, which are distributed throughout Switzerland by the sales organisation Creabeton AG. With its clear regional roots and focus on modern production standards, Müller-Steinag makes an important contribution to supplying construction projects in building construction, civil engineering and infrastructure construction.



View of Penta's sorting and packaging facility



In order to maintain product quality and appearance, the existing bunker, the first feed belt and the drum were retained.

A key feature of the company is its combination of tradition and innovation. Modern facilities, continuous investment in efficient production technologies and quality-assured processes form the basis for consistently high product standards. At the same time, Müller-Steinag attaches great importance to environmental protection and resource conservation. The responsible use of natural raw materials, optimised transport routes and recultivation measures characterise the sustainable orientation of the Rickenbach site.

As a reliable partner for construction companies, planners and public clients, Müller-Steinag stands for professional competence, adherence to deadlines and practical solutions. Close cooperation with customers and in-depth technical expertise enable the company to respond flexibly to project-related requirements and contribute to the long-term development of an efficient and sustainable construction industry in the region.

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The reinforced turntable directs the products centrifugally to the outer wall, where they are then transferred to the sorter via a conveyor belt.

Packaging plant of central importance

A Vorning palletising system was installed in Rickenbach in the winter of 2004/05. Due to increasing production volumes and the growing physical strain caused by manual stacking, Müller Steinag decided at that time to install an automatic packaging system based on the tumble process for the stones.

In the following years, the plant was continuously optimised and adapted to new requirements. The most important measures included the installation of an inlet brake with heavy chains in front of the drum, additional conveyor belts for direct delivery of Santuro® stones after the splitting process, a rubber lining for the drum instead of metal angles,

the change from a vibrating table to a roller table, and the integration of an Abus crane for stone formats with a height of 22.5 cm. These measures were supplemented by a Wild extraction system, an Octopus stretch wrapping machine and the conversion of the control system. The large number of these adjustments underlined the central importance of the plant for the production process.

Santuro - a timeless, natural wall system from Müller-Steinag

With the Santuro wall system, Müller-Steinag offers a technically sophisticated concrete product with a classic, rustic appearance. Santuro stands for a contemporary, natural aesthetic with a split appearance and broken edges.



The bricks are fed into the sorting system in strands and transferred by gripper robots.



After an automatic quality and size check with a laser scanner, the bricks are sent to up to five programmable lanes.

Santuro wall stones lend gardens and outdoor areas a special ambience while also fulfilling functional tasks such as providing privacy and noise protection or securing slopes. They combine an elegant sandstone look with high robustness and offer great creative freedom for terraces, retaining walls and freestanding garden walls. The range is complemented by other Santuro products such as country house wall systems, castle ruin walls, wedge and pillar stones, cover slabs, block steps and matching garden and paving stones. Thanks to their high-quality sandstone concrete, Santuro wall stones are more robust and fit more precisely than natural stone - and look almost identical. This allows you to create individual, stylish garden landscapes with lasting added value.

The wall stones are available in two versions: Split stone wall with a simple look and vineyard wall with a rustic character. Seven freely combinable stone lengths without a fixed system ensure a lively joint pattern and natural-looking walls in attractive colours.

And in order to sort these seven different stone lengths so that stone layers with exact external dimensions can be packaged, Müller Steinag has invested in the new Penta system.

Investment in a new packaging plant

After the existing plant had reached a certain age after many years of operation, the investment in a new packaging plant for tumbled stones was once again included in the budget planning. The choice fell on a plant from the Italian company Penta Automazioni in Molinella. The company already had experience from a previous project in the field of robot handling at the splitting plant.

The first project meeting was held under the project management of Roland Erni and with a project team consisting of Jörg Gautschi, Lorenz Hofstetter and Victor Janev. In close consultation with Alice Mainardi, Technical Sales Manager at Penta, around 14 different layout and process variants were developed before the final contract was awarded.

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From the programming tracks, the sorted rows of bricks are fed to a FANUC packaging robot. A specially developed gripper picks up the rows and places them on Euro pallets.

The project team focused on scheduling and installation planning, the integration of the new Penta plant including the safety concept, compressed air treatment, electrical supply and internal cabling, steel construction, masonry and concrete milling work, among other things. Other topics included the integration of the Octopus stretch wrapping machine, the partial reuse of existing Vorning plant components and adjustments to the extraction system.

Automated packaging and palletising line from Penta

Material flow and process sequence

In order to maintain product quality and appearance, the existing bunker, the first feed belt and the drum were retained. The bunker can be filled either by a forklift truck with a rotating fork or directly from a connected splitting plant (e.g. for split bricks).

The existing, integrated and height-adjustable Vorning drum with rubber lining gently tumbles the concrete products. After the drum, the blocks are transported via robust conveyor belts with heavy-duty rollers designed for individual weights of up to 80 kg.

The tumbled paving stones and bricks are transported via conveyor belts to a reinforced turntable, which directs the products centrifugally to the outer wall and transfers them to a conveyor belt that transports the stones to the fully automatic sorting process.

Fully automatic quality and dimensional control

The bricks are then fed into the sorter in strands and placed on a parallel track made of metal plates by gripper robots. Here, automatic quality and dimensional control is carried out

using a laser scanner. The strand is then pulled apart by the special design of the metal track, in which the individual segments of the metal track move from the inside to the outside. This separates the bricks from each other and allows them to be placed individually on up to five programmable tracks using the special gripping mechanism of the gripper robot.

Bricks that are not suitable for any of the defined brick rows at that moment due to their dimensions are automatically placed on a return conveyor belt and transported back to the turntable. From there, the bricks are then transported back to the sorter.

Bricks that do not meet the specified criteria during automatic quality control are not picked up by the gripper robot, but remain on the conveyor belt while the gripper places the other bricks on the programmed lines. The rejected material is then automatically tipped out and collected in a container via conveyor belts and later recycled.

In addition, the system detects split surfaces and can rotate the stones into a defined position if necessary. A sorting gripper then transfers the products to the programmed lines.

If necessary, bricks are rotated again fully automatically before robot handling to avoid misalignment or incorrect dimensions.

Palletising and packaging

From the programming tracks, the sorted rows of bricks are fed to a FANUC packaging robot. A specially developed gripper picks up the rows and places them on Euro pallets, which are also automatically removed from a pallet magazine. The finished packages are transported via roller conveyors to the Octopus stretch wrapping machine, where they are pack-



Everything in view: Control panel of the sorting and packaging system



The finished parcels are transported via roller conveyors to the Octopus stretch wrapping machine and then picked up by a forklift at the transfer point.

aged in weatherproof packaging, including a cover sheet and stretch wrapping, and then picked up by a forklift at the transfer point. The system is operated with a 5-tonne electric forklift with a rotating fork.

Transport and safety

From the removal conveyor, which has space for five Euro pallets, the packaged units are transported to the designated



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Interested parties can see for themselves the diversity and high quality of the products from Rickenbach in the show garden.



Roland Erni, Head of Research & Development at Sebastian Müller AG, a company of the Müller Steinag Group, together with Mark Küppers, CPI worldwide.

storage location under laser safety monitoring. The sophisticated safety concept ensures safe working during operation without restricting accessibility for service and maintenance work.

Conclusions

Replacing the old palletising system with the new Penta solution has resulted in a future-proof, high-performance and personnel-optimised system. It combines high flexibility for different block formats with integrated quality control, reduced staffing requirements and an ergonomic, maintenance-friendly design - all tailored to the requirements of modern concrete product manufacturing.

A significant economic advantage results from the aforementioned reduced staffing requirements and improved health and safety: While the previous palletising system required significantly more physical effort to operate, the new Penta system can be operated by just two employees during normal operation. However, for special products, up to three people may be required to ensure smooth operation. ■



FURTHER INFORMATION



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