

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

High innovation plant for handling, quality control and palletization installed in Belgium

Since more than twenty-years, Penta Automazioni Industriali srl has gained experience in handling concrete products. Since handling systems are extremely flexible, tailored to meet all the customers needs and it is possible to adapt them to every type of product, very often these systems are required not only for concrete products but also for natural stone products.

Les Carrières de la Pierre Bleue Belge S.A. is a European market leader in the "Blue Stone" quarrying, with its cutting and secondary processing. The three mining sites are based in the Soignies region in Belgium where more than 50.000 m³ of "Pierre Bleue de Belgique"® are produced in a year. The experience and skills, together with the respect of the ethics and the creativity, ensure the products of Les Carrières de la Pierre Bleue Belge S.A. to be a worldwide excellence. The Belgian family who

owns the company found in Penta Automazioni Industriali S.r.l. over the last 10 years the ideal partner to whom they entrust the automation of the handling, selection, control and palletization of their products.

The particular requirement of Les Carrières de la Pierre Bleue Belge S.A. was to have an automatic plant able to handle different products both in size and in second processing, as well as to allow to carry out a

quality control by the operator and to finally palletize the products into 3 different categories: first quality, second quality and remains. The system described here is the result of Penta experience and flexibility in creating customized and reliable machines. Even if this is presented here for natural stone processing, similar machines are working also in concrete product plants and it is always interesting to see and to learn also from comparable industries.

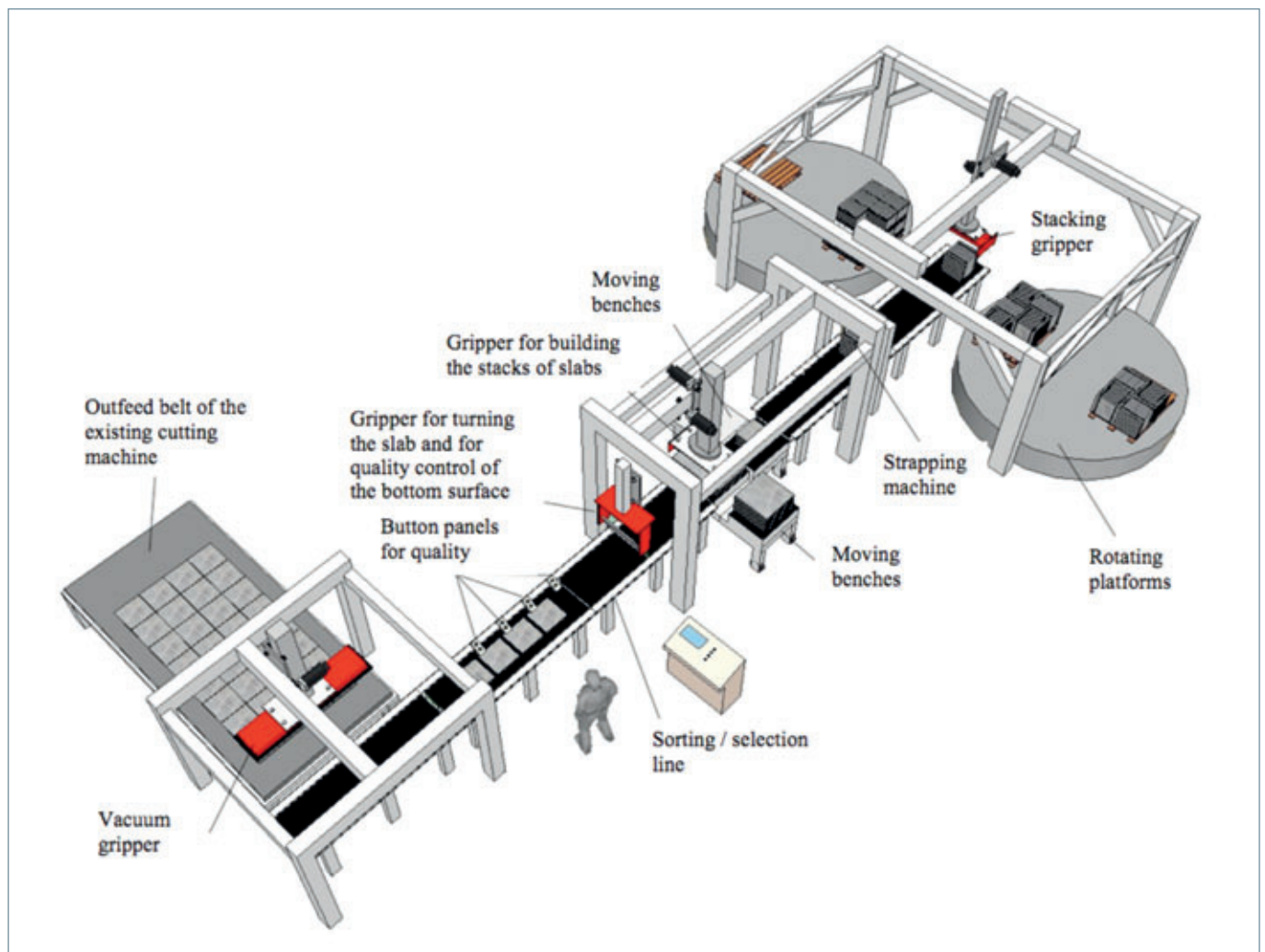


Fig. 1: Layout of the plant

Handling your future

- Handling equipment for production plants
- In-line and Off-line aging systems with quality check for every piece
- Secondary surface processing machines
- Custom designed equipment solutions



Fig. 2: Gripper with vacuum plate

Vacuum handling of the slabs

The material coming from the out-feed belt of the existing cutting machine is picked up by a vacuum gripper and is placed on the sorting / selection line.

For transferring the materials up to the selection line, Penta has developed an innovative high performing system composed by a vacuum plate (Fig. 2), that picks up all the products typologies with different thickness, different size and different surfaces. The vacuum plate maintains its reliability both picking up a whole layer or a single piece.

Once duly placed on the selection line the row of slabs (or two rows according to the size of the materials) is moved along the line to reach the station where the operator carries out the quality control thanks to the moving button panels.

Quality Control

The customer needed to optimize the production, but above all, to have a system for a reliable quality control that could work on both surfaces of the slabs, so Les Carrières de la Pierre Bleue Belge S.A. evoked Penta to design a plant with two different operating modes: a semi-automatic operation mode for all the small sized materials, and a complete automatic operating mode for all the medium and big sized pieces that cannot be handled manually for safety reason and for the weight.

Semi-automatic operating mode

The selection of the small sized products is carried out by the operator who can manually check, in safety, the bottom surface of the pieces rejecting those not complying with the company high quality standards. In this way the finish sales packs contain only products of the highest quality.

Automatic operating mode

The selection of the big sized pieces is carried out by means of movable button panels (Fig. 3) arranged according to the products to handle, that allow every single piece to be classified into: "first quality class", "second quality class", "waste" or "remains". The materi-



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Fig. 3: Movable button panels

al classified as “second quality” is then lifted up and rotated by 90° by the turning pieces gripper, so that the operator can check the lower surface and possibly re-classify the material as “first quality” using an additional fix button panel.

The turning pieces gripper allows to satisfy a further production requirement, that is to prepare and arrange all the slabs for the stacking so that the first quality surfaces could be superimposed one on the other. This can be reached by lifting and turning by 180° the slab when necessary.

The gripper is not used for the small sized piece, since they are handled manually by the operator.

After the quality control station, the material is moved toward the stacking station, or if it has been classified as a “waste” it will be automatically ejected on a waste belt.

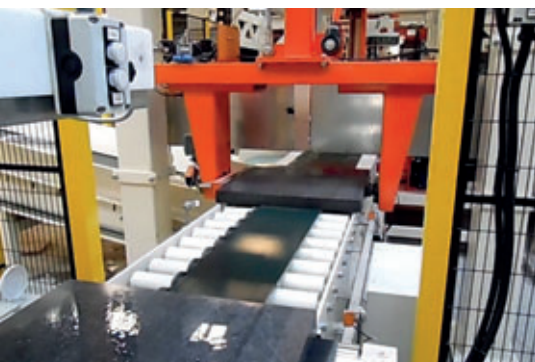


Fig. 4: Turning pieces gripper

Stacking of sales packs

The sales packs contain products of the same quality class only. The stacking is therefore carried out in three different positions that are foreseen for the first quality products, for the second quality products and for the remains.

A two axis gripper equipped with pneumatically driven jaws, picks up the single slab for placing it onto one of the three possible positions that are composed by a pail

of movable trolleys (Fig. 5), each one with two stations. These movable trolleys will move themselves so that the trolley related to the quality class of the piece picked up by the gripper, will be transferred under it. The three positions are dedicated to the stacking of the “first quality class”, the “second quality class” and the “remains”.

The fourth position remains free so once the stack of slabs has reached the set height it can be moved away from the moving trolleys zone and being transferred towards



Fig. 5: Movable trolleys



Fig. 6: Stacking gripper with 5 axis and 2 rotating platforms

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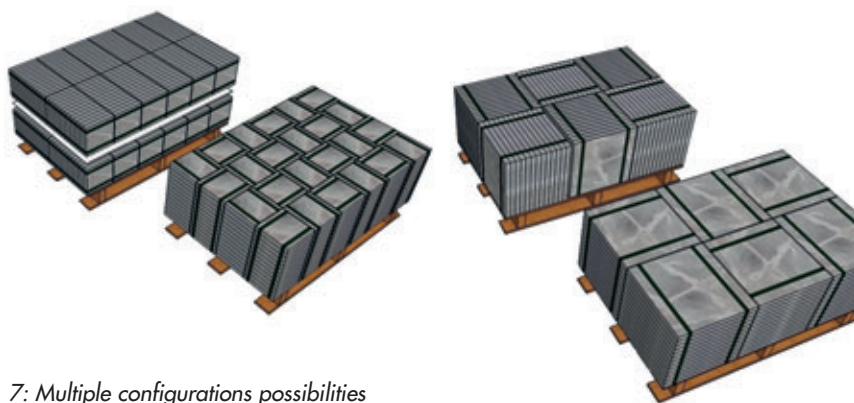


Fig. 7: Multiple configurations possibilities

the following station. The stacks now are strapped. The strap has a double function: to tighten and stabilize the stack of pieces and, once the stack has been placed on the sales pallet, to protect the edges of the slabs and so prevent any accidental breakage during the transport.

The strapped stacks are now ready to be placed onto the sales pallet. This operation is carried out by a 5 axis gripper equipped with pneumatic jaws, that builds the pack on the two rotating platforms each one with 2 packs stations (Fig. 6).

The installation of a 5 axis gripper allows multiple configuration of the final pack (Fig. 7) and beside this it always ensures the presence of the protecting straps between the stacks.

Depending on the quality class of the stack, the rotating platforms turn so to bring the right stacking station to the gripper considering that two of those are for the "first quality class" packs, while the second rotating platform is then occupied by the "second quality class" and the "remains".

The same gripper is equipped with suction cups that allow also to pick up a sheet of cardboard from a fixed position inside the working area for placing it on the layer of products, with protective function.

Once the pack has been completed, the platform rotates for reaching the position where the forklift can remove the pack and insert an empty pallet.

Summary

Les Carrières de la Pierre Bleue Belge S.A. found Penta Automazioni Industriali to be the ideal partner for designing and constructing their new packaging and handling machine. The twenty-year experience of Penta allowed the installation of a very innovative, reliable and efficient plant.

Penta's research and development department works continuously with customers in order to improve the performance of their machineries, to adapt them to the needs of the customers and to keep all the machineries up-to-date with the constantly changing

market. Continuous improvements and ambitious development of new technologies have helped Penta Automazioni Industriali S.r.l. to become an important partner for concrete product and the natural stone industry providing a mix of flexibility, product quality and reliability. The business tradition of designing custom made plants allows Penta machines to be extremely flexible, and to suit individual processing needs of the customers not only concerning the packaging and handling plants.

Penta's wide range of products includes also aging systems for concrete (see CPI February 2015). Aging plants as well as all other processing machines like shot-blasting plants, splitting and pitching plants, can be integrated with innovative robots, to complete the range of products and services offered by Penta. The core business of the stone processing machines includes the production of single machines or complete lines for the surface treatments of concrete building blocks and natural stone pavers. Whether the customer purchases a complete plant or a single unit, it always marks the start of a long lasting relationship with Penta that supports its customers with an after sale service for both spare parts and technical assistance and support. ■

FURTHER INFORMATION

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