Penko optimizes tile manufacturer dosing process

For an improvement in the production environment Royal Mosa took weighing specialist Penko Engineering BV in Ede by the elbow. The tile producer can now be sure that all the raw materials of a recipe are dosed correctly, while the flexibility of the production is increased.

Royal Mosa, the Maastricht tile manufacturer, carries an extensive portfolio of products, for which a range of raw materials is required. Using any of these raw materials determines its quality, and a storage location is assigned. For the production of a series of tiles, the various raw materials are retrieved according to the recipe, weighed and mixed until a homogeneous mixture. This material is pressed and a pattern foreseen. It can now be baked into tiles.

Old method

The correct amounts of raw materials are essential for the quality of the tiles to be produced. The old method was that a shovel removed the materials from the supply boxes, after which the load was are printed. The weighed load is then discharged into a loading bucket, which brings the material to the production process. The driver receives at the shovel, on a radio connected display, instructions for taking the raw materials, while the floor scale is also equipped with a display.

Improvement project

Improvement in this state of affairs is related to the large differences in batch sizes for different tile types, the growing number of raw materials and the need to exclude the accidental exchange of raw materials. Rejection of tiles not only means loss of raw materials, and pigments, but also to the detriment of the durability of the process, in particular because of the energy that is required for the milling and baking.

Royal Mosa took specialist Penko Engineering BV in Ede by the elbow, because of the experience they have there with automated processes and tracking and tracing.

Signal column

In the meantime, the process up to the mixer has been updated. All storage locations for the raw materials are provided with a signal column. The driver has a terminal with touch screen on the shovel in which he is given an overview of the recipe to be made, a list of all the raw materials with their locations and the required weights. On the floor scales, the driver determines the weight of the shovel and goes to retrieve the first raw material from its location. Upon arrival, the color of the signal column at this location changes to green. Should the driver accidentally choose a wrong location, then the signal column will show red and the driver receives a warning on his terminal. The driver will therefore go to the right location to fill the bucket.

Afb. 1 De voorraadvakken zijn aan de bovenzijde voorzien van signaalkolommen

Fig. 2 The lift truck on the floor scale to determine the tare waight

Fig. 3 De shovel with the operators-terminal

Liberty

Then, the driver drives the raw material back to the floor scale for weighing and then dumps the load in the loading bucket. Then he checks on the floor scale whether the bucket has been emptied entirely. If not, then a message follows. If so, then the weight of the load is subtracted from the total amount of raw material. The driver now has the liberty to choose the same, or a different raw material from the recipe. The last weighting of a raw material is decisive for the attainment of the desired weight, and is then also controlled on a per material adjustable tolerance. After this, the material disappears from the list on the driver's terminal. Only when all the raw materials of a recipe have been dosed, can a new recipe be made. This way of working has three advantages. In the first place, it provides the certainty that all the raw materials are dosed in the right quantities. Secondly, the system is flexible, both in terms of batch size, the selection order of the raw materials as well as the desired mass.

Thirdly, thanks to the weight control, the system is accurate (up to ± 2 kg).

Weighing controller

The Weighing controller type FLEX is selected for the process and signal columns control. This instrument is freely programmable, even for an individual recipe. The number of inputs and outputs, both digital and analog, can be adapted to the situation. The terminal in the shovel communicates via WiFi.

For the determination of the position of the shovel with respect to the storage location is an

RFID transmitter / receiver on the shovel. Each location has its own RFID tag.

Recipe management

The PENKO BCS package installed in a central computer, can manage 100 recipes, each with 31 raw materials. This package makes it possible to create production orders and establish tracking and tracing information. The latter is done on the basis of the data of the finished recipes:

- ·Driver's number
- ·Name and number of the recipe
- ·date, begin and end time
- ·destination

Fig. 4 The control panel with the weighing controller

- ·per raw material the time, the chosen and the actual dosed weight

Top layer

Prior to the application of the top layer on the tiles, Royal Mosa previously added ready-to-use mixtures. However, it increases the flexibility of the manufacturing process if one can make these mixtures themselves. Thanks to the dosing accuracy of the Penko systems these mixtures can now be manufactured in-house. The flexibility of the Penko systems makes it possible in the future to effortlessly incorporate changes in the production process, so Royal Mosa can move forward with this investment for the years to come **BULK**

Jos Verleg

Afb. 5 The Penko BCS package can manage 100 recipes