Efficient automation

A RAW MATERIALS MANAGEMENT SYSTEM MADE BY THE ZEPPELIN-REIMELT GMBH COMPANY, RÖDERMARK, GERMANY, PREVIOUSLY USED ONLY IN THE PLASTICS AND PHARMACEUTICALS INDUSTRY, IS NOW IN SERVICE, FOR THE FIRST TIME, IN A BAKERY IN THE NETHERLANDS. ITS AIM: FLEXIBILITY AND EFFICIENCY

++ figure 1

For more in-depth information, visit: www.bakingbiscuit.com

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++ figure 1
The automatic guided vehicle brings the mixing bowl under the platform with the collection containers for the minor components

The company, which we have promised not to name, bakes mainly biscuits, chiefly for private label customers from many countries that have differing requirements concerning recipe, texture, taste, packing and labelling. The worldwide market for such products is a tough business, and anyone who wants to survive in this business is constantly on the lookout for competitive advantages.

The competitive advantage here in the Netherlands is in a business management style that seeks and finds its head start in technical and technological advances, and does so before the competition on every possible occasion. The use of robots or cameras for quality assurance and to control production lines, which is still being tested in other places, has been standard practice here for many years.

According to the proprietor, "We are a family business and we don't compete with the major players in this industry who bake identical products on mono-lines 24/7 and then maybe put them into different packages. We are the professionals for smaller customised batches that provide assured quality but which are nonetheless attractively priced and so can supply large volumes."

Production runs on six large lines, round the clock on four of them. A dough stocking system, developed in-house, upstream of the lines ensures that there are no prolonged breaks in spite of the batch production.

The company hopes for a marked increase in flexibility and efficiency from the latest big investment in a completely new raw materials management and dough production system from the Zeppelin-Reimelt Company, Rödermark, Germany, which bears the beautiful name ReciPure. Behind it lies a storage, dispensing and mixing system based on mobile batch containers, which makes conventional storage and dispensing tied to pipe-work obsolete.

ReciPure's main strength is that it allows the almost overwhelming multiplicity of different small ingredients, flavourings and decorations that can be used to produce biscuits to be managed and used elegantly and efficiently. There are separate container stores for small

ingredients and decorations, consisting of interchangeable containers of the same size for each group, which can be filled directly from the can, sack or big bag, depending on how the raw material is delivered.

Dispensing is mobile, both for the small ingredients and for the decorations. An automatic guided vehicle (AGV) carrying a collection container drives under the appropriate storage container and takes out the amount specified by the central controller. The collection containers are made ready for the production operation, the small ingredients between flour dispensing and the mixer stations, and the decorations above the mixer stations, since the latter will only be added and mixed in towards the end of the dough manufacturing process.

When a dough batch is ready for mixing, the whole process runs fully automatically, including transfer to the lines. The first step is the collection of the flavourings with an RFID-labelled mixing bowl on an AGV. Glucose and fats are also metered in directly – with one exception: butter is currently still being added manually. Then an AGV readies a mixing bowl under the flour/sugar dispensing station. Large silos situated outside the production building then supply the required flours and sugar. Next the flavourings flow into the mixing bowl from above.

The next task for an automatic guided vehicle is to drive the mixing bowl under a platform on which a prepared collection container with the small ingredients needed for the recipe ▶

++ figure 2

++ figure 2
Weighing frame on an AGV

++ figure 3

++ figure 4

++ figure 3
Warehouse loading station

++ figure 4
Cranes can exchange the containers

is waiting in position at the defined location. It is also identified by RFID tags, so only ingredients from the correct container can flow in. The AGV with the bowl immediately moves forward to one of the six double helix mixers, while the collection container is cleaned and sent back to its next job.

The mixers knead the dough, and just before completion a collection container with the decorations already set down above the station opens and allows them to run into the mix. The finished dough is carried to the line by the AGV and transferred into the dough stocking system. When they are moving, the AGVs are guided by reference points in the floor and by measurements made during the movement. Scanners at the AGV avoid collisions during the outward and return trip. If necessary, the bowls and collection containers can also be moved manually and the respective dispensing steps initiated by pushing a button.

Each of the collection containers and bowls in use is identified by an RFID tag that stores and saves information about its content and destination. As a result, incorrect additions are said to be ancient history since the start-up of the plant just over six months ago. The storage and dispensing equipment is almost infinitely flexible. The storage containers can be interchanged or switched over, and additional ones added. The collection container finds them at their defined positions and takes out the amount of raw material needed. The spatial arrangement of the raw materials storage containers is flexible, as is also the choice of mixer.

The increased safety and security created by this new system were at least as important when deciding to make this not insignificant investment. Externally towards customers, as well as for internal purposes, every last crumb of raw material can be traced back completely and with absolute certainty. At least, it has also considerably reduced dough wastage and returns.

The system is best prepared to avoid cross-contamination. It cannot happen, except when intended, because nothing runs through pipes that have already been in contact with other raw materials. In view of the various raw materials that have the potential to cause allergies, and the increasing rate of allergic illnesses among consumers, it is a result whose importance can not be overvalued and one which customers also greatly appreciate.

Last but not least, since it was introduced the system has eliminated the tasks of six employees per shift, who weighed the ingredients by hand and brought them to the mixers. **+++**