Multiple-Way System

To produce bakery products with a handicraft touch fully automatically is a special challenge for a line manufacturer. W&P Industrielle Backtechnik planned, installed and took such a multifunctional production line into operation at SPAR in Slovenia.

The dough preparation of the SPAR bakery in Ljubliana. Here, long bowl proofing and the use of pre-dough determine the production of the dough.

Three big food chains dominate the market in Slovenia. SPAR Slovenia advanced within few years to the second place in the country and for the second time in succession reached place one with regard to customer popularity - this is the result of an annual customer enquiry of the food retail trade monitor. In Slovenia the 59 SPAR supermarkets and the ten INTERSPAR hypermarkets achieved in 2007 a turnover of about 620 million euros - an increase of 11.3 percent compared to the previous year. With this rapid growth it was a logical step also to take over the production of the local bakery products. A new production for bakery products and confectionary articles has been put into operation in August 2007 in the SPAR distribution centre in the capital Ljubliana.

For more than ten years SPAR has had a bakery deliver the bakery products, before they started to plan their own production in 2006. They also intended to gain more influence on quality, control and own design possibilities of the bakery products by the production of the bakery products in the own company. The bakery products in Slovenia have a high share of wheat and often have a big volume. Breads rather have a soft, thin crust, as softness is considered to be a sign of freshness by the customer. The quality of the bakery product range in the SPAR markets

Photos: Backtechnik

should be comparable to that of a handicraft bakery. Another challenge: For the different shop types INTERSPAR and SPAR supermarket the products have to be made available frozen as unproofed or pre-proofed dough pieces as well as in completely or partly baked form.
The order for the planning of this complex project was given to W&P Industrielle Backtechnik in Tamm who designed the complete complex from the kneader to the cooling in coordination with the construction department of the SPAR group.

More Possibilities

Target of the planning was to produce as far as possible fully automatically about 20 different sorts of bread (directly proofed, proofed in baskets as well as products in tins) and more than 20 sorts of small products on a surface as small as possible. W&P therefore installed a bread

By means of a lift tipper with scraping device the dough is transported into the dough divider.

and a bread rolls line connected together to a multi-deck continuous oven with subsequent cooling spiral. Robots in front of and after the proofer make it possible for the multi-way system to produce the bakery products as desired proofed frozen, unproofed frozen, half and completely baked. The complete line is controlled by a superset interconnected control. This means that the bread rolls line communicates with the bread line beyond the occupation of the resources. The system even makes possible a preplanning allowing the different opreating modes and an offest production of different bakery products.

Bread Rolls Line

According to the indication of the recipe management the person responsible for the preparation of the dough starts to prepare the dough. Styrische (pressed bread rolls), coiled and long moulded products, stamped Kaisersemmeln (bread rolls with star incision) in different sizes each

Photos: Backtechnik

The multifunctional bread rolls line of W&P Kemper can stamp, press and round mould dough pieces.

Production of Kaiserbrötchen (bread rolls with star incision): Before stamping the dough pieces are turned and aligned in one row.

Uniformly the dough pieces leave the bread rolls line.

The final proofer for small products. Before the end of the proofing time there is the possibility to turn the dough pieces.

form part of the main products of the bakery. The traditional small wheat products are produced with a high share of pre-dough and are characterised by soft dough.

By means of a lift tipper the dough is transported into the Softstar head machine that at SPAR's can be adjusted from five to three rows according to the weight of the bread rolls to be produced. The high-capacity dough dividing and moulding machine processes dough with a water absorption of between 50 and 65 %.

After dividing a drum round moulder moulds the dough pieces to a uniform round piece with smooth surface and transfers them to the spreading belts of the make-up line where they are shaped, stamped and aligned. In front of the final proofer there is a robot able to handle moulded trays as well as trays without edges putting them into rack wagons. It serves to remove the unproofed dough pieces for the baking stations in the big INTERSPAR markets. Moreover at this position a manual removal of dough pieces onto peelboards or trays would be possible. An option available, but not used at the moment.

When the dough pieces enter into the final proofer, there is the possibility to turn the products before the end of the proofing time. For example the stamped Kaiserbrötchen (bread rolls with star incision) are proofed on the face (the stamped side) and before the end of the proofing time are turned back onto their base. This is how for all bakery products the characteristics of the split can be determined.

Also behind the proofer there is a robot able to deposit the proofed products into rack wagons. The transport of the rack wagons into the freezer is still carried out by hand. In the future the dough pieces proofed to a rate of 75% could be directly transferred into a spiral freezer actually being planned via a conveyor belt and after the freezing they could be directly transported into the freezer stock for consignment.

For the smaller SPAR supermarkets however, the proofed bread rolls are directly half baked in the upper decks of the Megador continuous oven.

Completely proofed, the big volume dough pieces leave the proofer and are deposited onto the infeed belt of the oven loader by means of a crosswise retracting belt.

Photos: Backtechnik

Oven Technique

The seven hearths Megador thermo-oil oven is fed by both lines. Five of the seven hearths have a hinged steel plate belt, the upper two hearths are equipped with wire mesh belts. Thermo-oil has been chosen as heating medium due to the higher flexibility and the differentiated temperature control between the individual hearths.
The half-baked products are carefully baked on the wire mesh belts as they have a reduced heat storing capacity. The wire mesh belt colours the bottom less than the hinged steel plate belt and thus assures a uniform crust formation all around the product and a clearer coloration of the bottom of the product. The hearths with hinged plate belt are mainly reserved for the breads.

For the baking of the half- or partly baked bread rolls the upper two hearths of the oven are equipped with wire mesh belts in order to assure a uniform browning.

Bread Line

At least as flexible as the bread rolls line also works the bread processing line. A V700 hydraulic dough divider has a capacity of up

The seven hearths Megador thermo-oil oven is fed by the bread rolls line and the bread line. Thermo-oil has been chosen as heating medium due to the higher flexibility and the differentiated temperature control between the individual hearths.

After baking the Kaiserbrötchen (bread rolls with star incision) have a uniform pale coloration all around and a product stability without marks of collapsing.

In the cooling spiral the bread rolls are cooled down to room temperature and afterward consigned in the shipment department.

The exactly air-conditioned multi-deck belt proofer has own loaders and unloaders.

The robot for the automatic removal of unproofed dough pieces onto baking trays.

to 1.8 tons per hour or 2,500 pieces per hour in continuous two or four chamber operation. After dividing, all dough pieces first of all pass a conical round moulder and afterwards a weight check.

After that the line offers two possibilities: Direct transfer by means of an intermediate belt into a long roller or the normal way the transfer into the pre-proofer. After about 15 minutes of dough rest the dough piece can stay round and via a second cone is reshaped in order to bring product stability into the dough or to take the way via a long moulder. Basically the way of the dough is exactly pre-determined by the control also the direction the breads take on the proofer pre-transport. To the left for free products that a loader puts onto the belts in the final proofer or to the right to the workers who put the breads into round or longitudinal baskets of different sizes or into tins.

The proofer is exactly air-conditioned. Poor air movement and an indirect air chilling avoid the creation of a skin on the dough surface. The multi-deck proofer has a loader and an unloader each transferring the proofed products onto the belts in steps of 120 centimetres each. Behind the proofer there is a station for manual incision, decoration or tilting off the baskets.

To do so the bakers are between two conveyor belts that after the transfer of a step are separated by about 80 centimetres. The step is now separated on the left and on the right on the belts and can easily be handled. After the work the bakers leave the zone between the belts and push a button. Both belts move together and the step is transferred onto the infeed belt in front of the oven loader.

According to the recipe an exact cycle time is set for the individual steps, that also defines the time for the manual work per step. The time is indicated to the bakers by an acoustic signal in order to assure a perfect and timely exact course of the production.

After baking the baked products arrive in the shipment department via a cooling spiral cooling them down to ambient temperature and via a metal detector.

Thanks to this combined complete line SPAR can offer their customers bakery products on a high quality level, can copy the variety of the product range of a Slovenian handicraft bakery and at the same time can cope with a minimum of production staff. The characteristic of the nearly fully automated production line is the flexibility distinguishing

The bread line with V700 hydraulic divider and conical round moulder. The multiple-way system allows the production of tin products, directly proofed breads or breads proofed in baskets in different shapes.

it from many other systems. The superset intelligent cross-linking leads despite handicraft variety to a high degree of quality safety and makes less depend on manual influence possibilities.

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