Granny's Kitchens strives for flexible, low-cost manufacturing by adding line, freezer and power capacity ahead of demand.

BY LAURIE GORTON

DONUT POWER

Startup of its fourth production line turned Granny's Kitchens Ltd. into the largest producer of donuts under one roof, according to company managers. The Frankfort, N.Y., bakery now makes more than 1.5 million pieces a day for frozen distribution, with output set to rise again when a fifth line comes on-stream later this year.

But when expansion ideas were raised in 1993, the bakery had to plan carefully to lay all the necessary groundwork. Fortunately, planning ahead is something that Granny's management team does well ... and successfully. In fact, it's a way of life at this independent bakery.

"As a smaller company, we have to make changes on a timely, planned basis," said Alan Rosenblum, president and owner. "It's a matter of doing the work before we need the capacity. And it's far better to do this on your own schedule than under the pressure of demand."

With the luxury of time and the freedom of independent ownership, Granny's Kitchens has been able to make its changes in stages. To raise capacity — and gain important processing flexibility — Granny's drew up a multi-phase plan that takes it to the year 2000 and beyond. The company invested in additional plant and warehouse space, its own electrical power substation, more cooling and freezing equipment and a fourth production line.

During the same period, it switched to ammonia freezing and glycol cooling. Equally important, Granny's invested in its staff, now numbering 110, through extensive training in communications, team building and job cross-tasking.

"You have to plan in order to achieve manufacturing flexibility," Mr. Rosenblum said. "To get ready to put in the fourth line, we had to have the other equipment, the building modifications and the personnel training in place. We now make more cake and yeast donuts than any other company in the world."

ONLY DONUTS. Frozen donuts are a hot market. And donuts are all that Granny's Kitchens makes.

"Amazing" was how Mr. Rosenblum

In recent years Granny's Kitchens managers — [from left] Barry Thaler, vice president, operations; Chris Duffy, distribution manager; Alan Rosenblum, president; and Don Hagadorn, assistant controller — have worked hard to improve internal communications skills and reporting methods, vital to flexible, just-in-time manufacturing.

described current demand for cake donuts. He attributed this to the trend among supermarket in-store bakery operators to move away from mixes and into pre-fried items. It's a big market. Yeast-raised and cake donuts account for 14% of in-store baking's $10 billion annual sales, he said.

"The future is thaw-and-sell," he continued and predicted that this style will dominate the frozen market into the next century. "Already we sell three times as much in that category and in thaw-and-finish as we do frozen dough."

This trend leverages the cost and quality advantages of wholesale production. It also challenges the wholesaler. "Our customers buy not only our donuts but also our knowledge of the donut business," the donut baker continued. That means constant new product development and market research as well as flexible production.

From the start, Granny's Kitchens set itself up for high-volume donut production. The company is run by the third generation of Rosenblums to direct a baking business. Both Alan's grandfather, Benjamin Rosenblum, and his father, Jerry Rosenblum, operated retail bakeries and shops. In 1981, Alan launched Granny's in a rented production facility in Yorkville, N.Y., about eight miles from the current Frankfort plant and its 15-acre site where it moved in 1989 (see May 1990 *Baking & Snack*, page 6).

That set the stage for growth during the early 1990s, with the supermarket in-store business the company's primary market. It also has strong sales to convenience stores and food service operations. Recently, it started a separate venture to produce and market frozen donut specialties through the retail freezer case.

In 1991, the company added more warehouse capacity and, in 1993, doubled the size of the bakery's production shop. Granny's corporate plan, the Year 2000 Project, includes a fifth fryer line in 1996. It will be supported by a freezer installed in 1994 and a cooler put in during 1995. By the year 2000, the bakery plans to start up another two processing lines.

Also crucial to the Year 2000 Project is Granny's investment in its personnel. The company cross-trains its production staff, thus improving manufacturing flexibility. The company recently adopted a team approach to management. Department heads — Barry Thaler, vice president, operations; Fran Kauth, production superintendent; Chris Duffy, distribution manager; Charlotte Culver, quality control; Jerry Volucano, sanitation; Don Hagedorn, assistant controller; Jeff Patzer, maintenance, plant engineer; and Ron Lovett, vice-president, sales — meet weekly with Mr. Rosenblum, who focuses his time on product development and engineering.

Granny's engineers created a series of fixed and mobile conveyors to rapidly switch donut streams to different finishing operations, an important element in the bakery's flexible manufacturing scheme.

THREE PHASES. Granny's followed a detailed, three-phase plan to enlarge its processing capacity between 1993 and 1995. Phase 1 added 35,000 sq ft of new plant and warehouse space. Included in the expansion was 3,500 sq ft of extra freezer support slab for future use. Granny's put a glycol system under this flooring and that of the other new freezer space to prevent floor heaves.

During construction, the bakery's blast freezing and bowl chilling systems were switched from carbon dioxide (CO_2) and Freon to ammonia and glycol. A grant from the New York State Energy Department assisted the bakery to make the switch because the state has a mandate to reduce CO_2 emissions. On a per-pound basis for finished goods, blast freezing proved to be far more economical than cryogenic CO_2.

Two Frick 300-hp screw compressors supply the ammonia system. The closed-loop system delivers refrigerant at temperatures to -10°F (-23°C). The ammonia system not only supplies refrigerant to the blast and storage freezers, but it also chills the glycol coolant used by the jacketed mixers. There's floor space in the engine room for future addition of a 500-hp system to supply three more processing lines. The bakery's Howe glycol compressor system can handle two more large horizontal mixers yet to be installed.

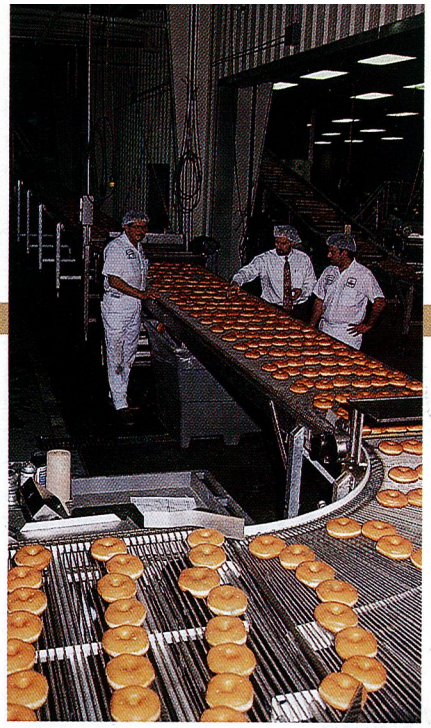
"It was a big change for us to go from Freon and carbon dioxide to ammonia," Mr. Rosenblum said. The investment in the new engine room ran to nearly $750,000.

That brought Granny's to Phase 2: a new 46,000-kilovolt power station.

"The bigger refrigeration system moved us to a different level of energy costs," Mr. Rosenblum said. "We have to be competitive with our production costs, and power is a big part of the cost of making product. So now it made sense for us to go to the power company and put in our own utility substation."

Previously, Granny's Kitchens bought its electrical power from the local utility company in the form of secondary power. Unfortunately, power rates in western New York are higher than in many other parts of the country. By operating its own transformer substation, the bakery could buy primary power directly from the state hydroelectric authority at a lower cost than conditioned, secondary power.

"It cost $250,000, but our engineering



study showed a return-on-investment of two years," Mr. Rosenblum said. Phase 2 was completed in 1994.

Phase 3 involved processing equipment. The bakery added its fourth processing line, a Moline combination cake and yeast line with automated sheeting and cutting, automatic proofer loading, a self-regulating proof box and a temperature-controlled 22-ft fryer. At the same time, the bakery lengthened one of its older 22-ft fryers into a 26-ft system.

State of the art, the new computerized line significantly changed the way this bakery runs all its donut lines.

"When we saw how beautifully the new Moline line operated," Mr. Rosenblum said, "we took all the controls out of our older Moline systems and duplicated the 1995 controls in them."

The company then upgraded its existing yeast-raised line to match the new system in yeast-raised output. Both proof boxes are now the same size, and each is operated by computer.

Another lesson from the new fryer prompted Granny's engineers to alter placement of temperature sensors. Heat probes, previously located under the heating tubes, are now put outside them. Other probes are stationed at the top of the oil, where the donuts actually fry. Digital control assures accurate temperature maintenance.

Also during Phase 3, the bakery installed two double-tier mechanical blast freezers. "This allows us to go into our next phase and installation of our fifth line," Mr. Rosenblum said. "And we'll add that new fryer without having to put in more freezing capacity."

INGREDIENTS AND METHODS. Just before the current series of expansions, the bakery installed a Pfening computerized bulk flour system for its yeast-raised donuts. "It's probably the only one in the country for this product," the bakery president said. A 120,000-lb bulk shortening system and 60,000-lb soy oil tank handle the bulk liquid ingredients.

All major and minor ingredients, including water, are scaled by computer on the Pfening system and pneumatically transferred to the proper mixer. Micro ingredients, scaled manually, also move automatically to the mixer after the operator dumps the batch into a pneumatic staging station. Cake donut flour and mixes, from DCA and Pillsbury, are handled in bags because of the high shortening content. During construction, Granny's extended the flour system to supply the two Peerless mixers installed in the new section.

The fourth production line at Granny's Kitchens, a completely automated combination yeast and cake production system, raised plant output to 1.5 million donuts a day.

By placing temperature probes at the oil's surface, the bakery measures critical fat temperatures right at the point where donuts fry.

Doughs mixed for the new fourth line enter the system through an automatic Moline table. Here, the bakery produces rings, fingers and shells, averaging 1,600 doz per hour, depending on size. Honeybuns, fritters and the new donut croissants are made on the original yeast line.

On the automatic makeup line, yeast-raised donut dough is sheeted, dusted, docked, cut and trimmed, with excess dusting flour removed by vacuum. The system produces evenly-relaxed donuts with smooth, silky dough surfaces. Computer controls synchronize the speed of the line with the proofer.

Yeast-raised donuts are cut four-across but enter the proofer eight-across. Spread lanes carry four pieces forward slowly enough to allow the next row of four pieces to catch up. The row of eight is then released to a reciprocating conveyor that automatically feeds the proofer trays.

By keeping the proof box full—difficult to achieve with older, manually loaded systems — Granny's earned an 18% increase in pounds per hour. Consistency of the finished product improved, too.

"These are the types of technical advantages a baker must have to stay competitive in the market," Mr. Rosenblum said.

Granny's "dry" proofs its yeast-raised items. "Wetter proofing creates a skin on donuts that absorbs more oil," Mr. Rosenblum explained. "Bread likes a wet proof, but donuts don't."

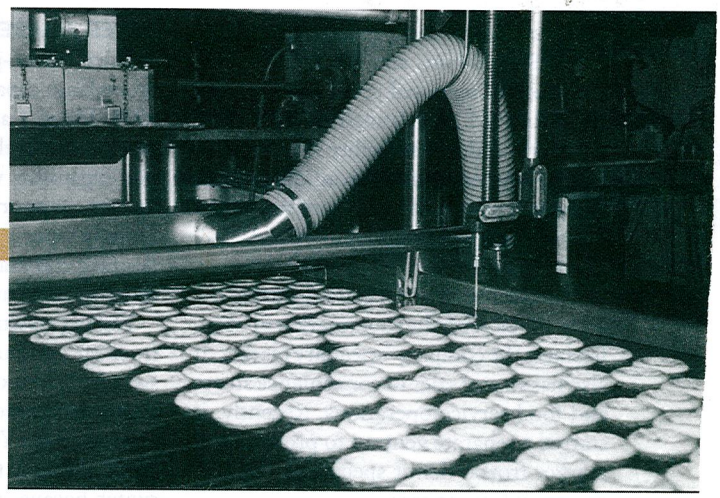
Thus, computer controls provide important advantages to proofing operations. When humidity within the chamber changes, the system automatically compensates by adjusting damper settings and air flow.

Yeast-raised donuts fried at Granny's Kitchen have a very thin skin and very little oil pickup. "If you want fat in the donut, it should be in the formula. Don't rely on pick-up during frying," Mr. Rosenblum said.

The need for accurate control also led the bakery to adopt Belshaw MSPF technology for its cake donut systems last year. The computer-run system monitors and adjusts weights on all heads, across the depositor, automatically.

"This takes the guesswork out of controlling the weight of cake donuts, making consistent, uniform products," Mr. Rosenblum said.

The bakery also markets a line of frozen donut doughs and recently added to its production capability. Two new Peerless



1,200-lb mixers make a dough every 12 minutes. Like the other Peerless mixers in this plant, these use glycol chilling for their bowls and patented Cold Bar systems. Bowl design for these horizontal mixers differs from that of bread mixers in the positioning of the bar, among other things. Frozen dough must be stretched and folded over the chilled bar in order to achieve optimum dough characteristics.

FLEXIBLE MANUFACTURING. This bakery routes donuts coming out of fryers to a maze of filling, topping, finishing and packaging systems. To facilitate this movement, engineers at Granny's Kitchens designed and installed both fixed and mobile conveyor lines that link fryers and coolers to many different downstream operations. The bakery can also split the flow of donuts to make different items during the same day in the same hours — important to Granny's just-in-time (JIT) approach to manufacturing.

"Production flexibility means the ability to make different products on demand," Mr. Rosenblum said.

With the addition of the fourth line, the bakery moved to three shifts daily on a five-day weekly schedule. Maintenance takes place Saturday and Sunday or during the third shift in slower months.

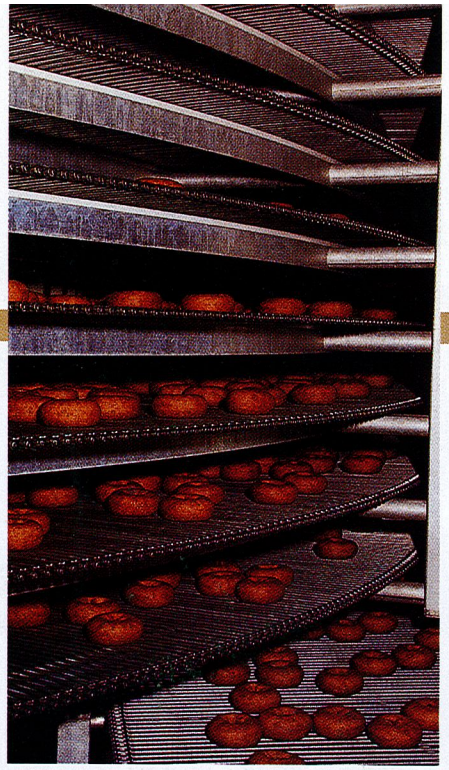
"It's better to schedule a line down for maintenance," Mr. Rosenblum said, "than risk a breakdown during production."

The bakery set up its cooling and freezing system to boost flexibility as well. Double-tier systems allow two different streams of product to cool — or freeze — in the same spiral housing, thus optimizing floor space. The bakery employs both I.J. White spirals and Northfield Freezing System spirals. Of the five spiral systems in the plant, all but one are configured as double-deck systems.

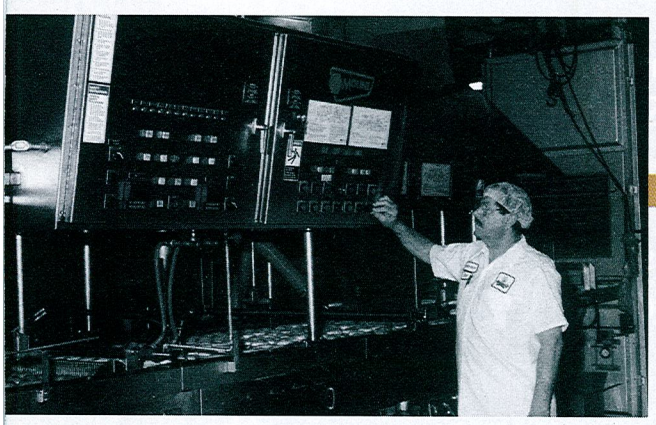
Coolers and freezers are operated by computer. Typical temperatures for the blast freezers is -12°F (-24°C), with holding freezers maintained at 16°F (-9°C).

Inside the blast freezer, fans drive air through refrigerated coils, reaching speeds of 150 mph. Plenums and shrouding inside the freezer diffuse the movement of the cold air, directing it onto the product and away from the spiral's non-product zones. As the cold air blasts over the warm products, it picks up heat and moves it away from the donuts. The air then recirculates through the coils to continue the freezing process.

Changes in packaging have helped Granny's Kitchens increase speeds here, too. For example, a SureLock Packaging in-line product feeding system sends frozen donuts to the Fuji FW3400 horizontal form/fill/seal wrapper at 300 units per minute (five per second) and faster. During *Baking & Snack*'s visit to Granny's Kitchens, this line was wrapping portion-packed donuts, a popular food service item, at 315 individual pieces per minute. Peak rates for previous manual feeding methods seldom exceeded 200 units per minute. Electric eye sensors monitor the donut stream to feed each item into spaces between lugs on the wrapper's in-feed conveyor.



Ambient cooling precedes finishing and freezing. The double-tier configuration common to most of the spirals at Granny's Kitchens saves valuable floor space and maximizes productivity.



Computerized controls and digital readouts give maximum precision to production with minimal human supervision.

Granny's prefers to standardize on selected vendors and same model systems when it comes to choosing equipment for production, packaging and freezing. This gives the bakery interchangeability on parts for vital systems and optimizes training efforts.

The flexibility offered by this manufacturing approach helps Granny's Kitchens serve its diverse customer base. "We do business in three basic areas — supermarkets and convenience stores, food service and retail grocery," Mr. Rosenblum said. "Each requires its own sizes, packages, distribution patterns and formulations. The bakery is designed to allow us to focus its various asset resources on the immediate needs of our customers."

Granny's Kitchens pursues a strategy of constant innovation when it comes to new products — customers expect it.

While treats such as new peach and raspberry flavors broaden cake styles, the most innovative in the yeast-raised line is a new donut croissant, introduced just this spring. Granny's employs croissant technology to produce the new style donut, the first of its kind to be made with true donut dough. It offers a coiled layer structure and light texture and is sold pre-fried, with optional glaze.

"In order to develop this whole line, everything has to be designed to work together — donut, icing, filling — to get through freeze/thaw properly," Mr. Rosenblum said.

Many new product ideas come from Granny's customers. Increasingly, requests are for more pre-finished and pre-packed varieties. And responding to consumer trends, the bakery developed its reduced-fat donut holes. A special formulation cuts fat by 46%, resulting in just 1 g of fat per donut hole.

"Our company philosophy," Mr. Rosenblum said, "is to make a lot with a little. All our efforts and resources go into making donuts and only donuts and making them constantly better."

He summarized the Granny's Kitchens approach: "By cross-training our people, by developing effective communications and reporting systems, by operating computerized technology, we're able to be flexible to changeover on demand, to make what the market demands." That's true now and well beyond the year 2000. ■