

APPLICATION FOCUS



Pan Indexer for a Bread Line

In an industrial bakery, bread is made in the same step as in your own kitchen. In the industrial process, the dough is first mixed in a large mixer and then transferred to a machine called a divider, which is made up of two operations. The first is the developer where the dough is kneaded, and the second is the extruder where the dough is extruded through an orifice and cut in specific lengths. The cut dough then falls on a conveyor, called a rounder bed, where the dough is rolled into a shape. At the end of the rounder bed conveyor the dough pieces are put into pans, sent through the proofer to rise, and then to the oven for baking.

Challenge

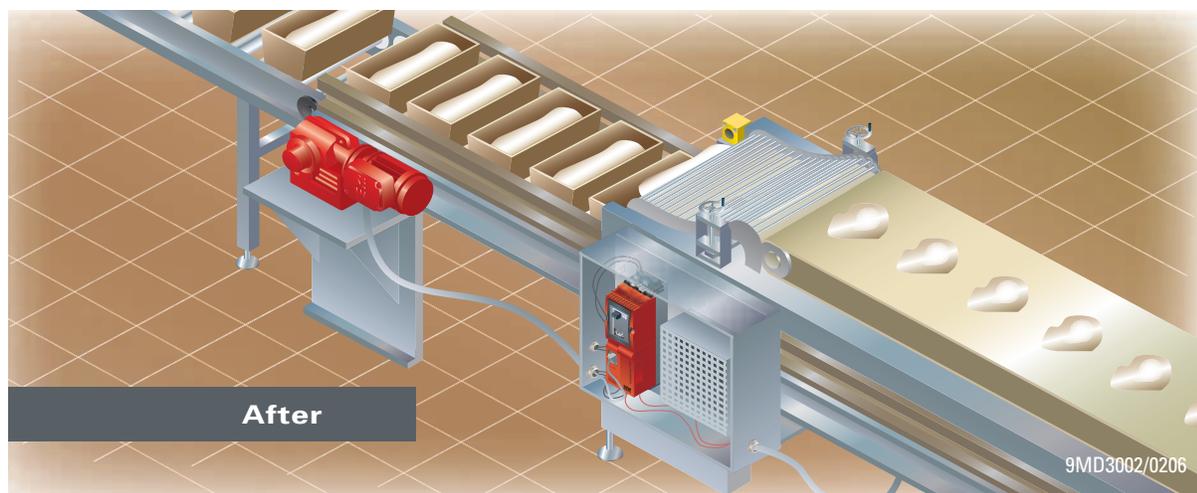
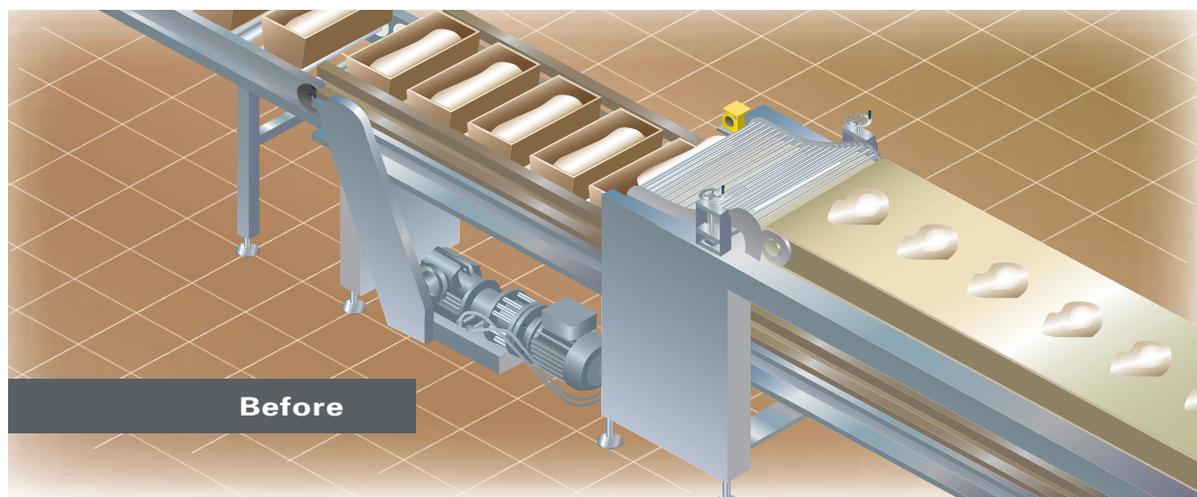
The challenge is to quickly and automatically put the dough pieces into the pan. The rounder bed conveyor carries the extruded dough above the pan conveyor and drops the dough into the pan at its end. The dough is made in batches and runs continuously when loaded into the divider. Because of the batching process, the rounder bed conveyor runs continuously and the pan conveyor waits for the dough to land in the waiting pan and then indexes the next pan into place.

The existing application uses a "C" face motor and right angle reducer with an air operated brake clutch sandwiched in between. A chain drive couples the reducer below the conveyor to the head pulley above. With a brake clutch, the motor runs

continuously and the brake clutch cycles the pan conveyor as needed. Two photo eyes detect the pan position and the falling dough. A PLC program monitors the sensors and signals the brake clutch at the appropriate time to index the next pan into place.

This arrangement has several problems, the greatest of which is the frequency required to replace a failed clutch mechanism and the cost of the replacement. This is compounded by the location of the drive underneath the conveyor, which often causes many hours of downtime to remove and service. Finally, the customer needs a higher production rate of 90 indexes/minute.

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9MD3002/0206



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Solution

To address the serviceability issues, SEW replaced the brake clutch and roller chain drive with a right angle helical bevel servo gearmotor with TorqLOC®, mounted directly to the head pulley of the pan indexing conveyor shaft. Not only will the unit be more accessible than before, the TorqLOC® hollow shaft technology ensures that the gearmotor can be easily removed from the customer shaft without fear of seizing. What previously took hours can now be done in minutes. Furthermore, removing the brake clutch and indexing the motor itself eliminates the frequent maintenance associated with the clutch. The servo gearmotor requires minimal service for long life.

To address the controls aspect of this application SEW included a Movidrive® servo controller equipped with the standard IPOS^{plus}® onboard motion control software. Functions previously performed with the PLC are now processed directly by the motor controller. Using the same two sensors, the Movidrive® senses the arrival of the first pan and stops the pan conveyor until the upper eye detects the falling dough. An adjustable timer in IPOS^{plus}® is used to delay the pan index until the dough is in the pan. The indexer then moves the next pan into position with high precision and repeatability. Because the controller positions to the pan sensor each time, there is no risk of accumulating error. The system runs independent of the PLC and is self-monitoring. The pan conveyor will run continually until a pan passes by the lower sensor, and the pan will wait until a piece of dough is deposited in the pan.

Results

The customer's expectations were met and exceeded using this solution. The indexer has been running at 90 pans/min for over 6 months with no down time, maintenance or additional setup. SEW was able to supply a single source electro-mechanical solution using off-the-shelf components. The inherent smooth body of the servomotor met clean-up requirements and the keyless bushing system of the TorqLOC® reducer eliminated the chain drive, was easy to retrofit and is better suited for cycling applications.



SEW-Eurodrive's patented keyless hollow shaft design TorqLOC®, adds advantages to the F-Series (the SNUGLER®), K-Series (helical-bevel) and S-Series (helical-worm) reducers, resulting in benefits for users and OEM's.



Available in sensorless vector, flux vector and AC brushless servo, MOVIDRIVE® can solve a multitude of drive challenges.

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