

Mechanical Power Transmission

Breath mint feeder redesign overcomes jamming problems

Visual Packaging International of St. Laurent, QC, manufactures a wide range of packaging equipment, from heat sealers, RF sealers and die cutters to thermoformers and skin packagers. Each equipment line ranges from small manual to fully automatic systems that can easily integrate into an existing automated packaging line.

One customer – a breath mints supplier – was encountering performance problems and production downtime with the product feeder on its heat sealer. Various parts were mis-feeding and jamming in the product chute. The problem became so severe the customer was manually loading the product into the machine.

Exasperated by the continuing production interruptions, the customer contacted Visual Packaging (visualpackaging.com), who in turn called JRTECH, the local automated equipment designer that designed the product feeder, as well as the heat sealer (and other equipment for Visual Packaging).

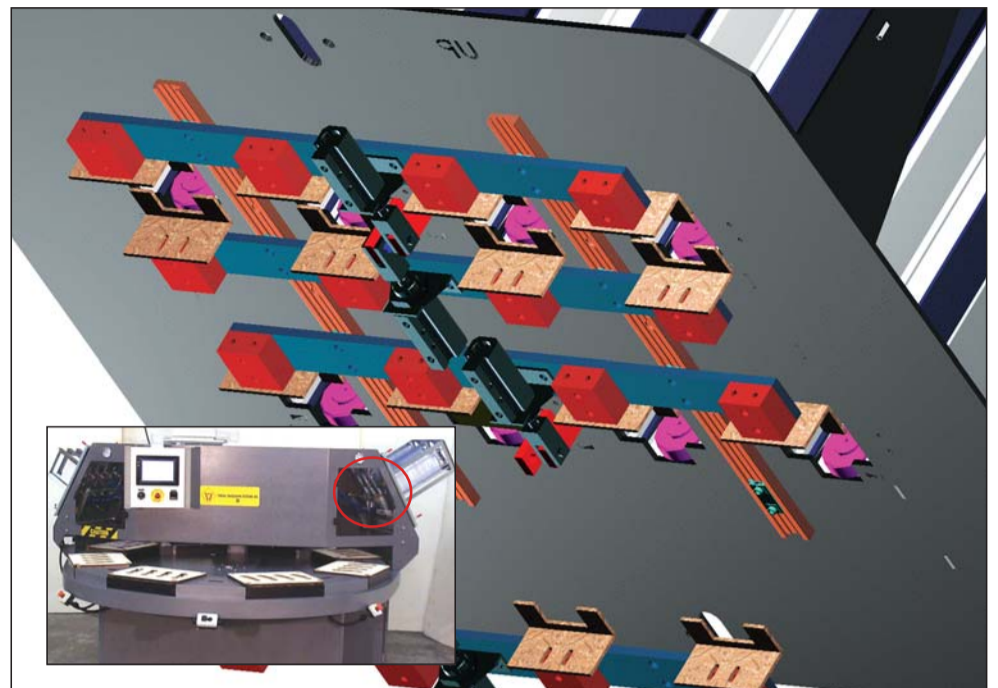
The problem source was immediately clear. The thickness and weight of the product caused it to stick in the chute, creating a back-up and halting production. The machine, a fully automatic, eight sta-

tion blister sealer for heat sealing of plastic blisters to display cards, performs 20 cycles per minute, through three shifts per day. The feeding of product, blisters and cards, as well as discharge of the finished product, is all automated. Each feeder is custom designed to suit a customer's particular product.

The solution in this case required installing two gates on the product chute, one to let product through to the heat sealer and the other to hold the rest of the product back. In order to implement the gates, a linear guide system was required. A ball bearing solution was expensive and would require grease and lubrication; not an option for a food and drug application.

In the past, Jody D'Amico, president of JRTECH, used bearings from igus Inc. a manufacturer of plastic bearings, linear guides, cable carrier and continuous-flex cables. The DryLin N linear guide system from igus fit the size and parameters of the Visual Packaging application. With plastic glide carriages, the system is lubrication-free, maintenance-free and completely resistant to corrosion. Its lubrication-free property also made it acceptable for a food and drug environment.

The feeder is attached to the blister seal-



The feeder (red circle) is attached to the blister sealing machine (inset) at a 45° angle. It has 8 lanes of product being fed into the machine, in 2 rows of 4 lanes each. Each lane holds a magazine of 80 mints.

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Each lane holds a magazine of 80 mints. Two opposing gates were added for each lane. Two DryLin N rails spaced 8 in. centre-to-centre run perpendicular to the two rows of lanes. The gates are mounted on plastic glide carriages at 3-1/4 in. intervals on the DryLin rails.

DryLin N was chosen especially for its compact size and low profile, to ensure the gates stay below the suction cups that grab the product. Otherwise, they would interfere with the process. The gate opens, and while the suction cups grab the product the stopper cylinders in the chute hold back the rest. The eight mints are then fed into a product nest in the heat sealer where the rest of the packaging takes place.

Precision bearings ease motion challenges

By Randy Burchell and Dave Roth

Today's motion control equipment faces tougher challenges than ever before. Conveyors, and packing, sorting, and other positioning equipment often operate 24 hours a day, seven days a week. To meet product demand, manufacturers have also turned up running speeds. These operational changes means hardware wears faster, loses positional accuracies, and increases the noise levels in most factories, warehouses, and distribution centers, conflicting with health and safety requirements for quieter environments. In the U.S., OSHA (Occupational Safety and Health Administration) may lower decibel levels from 80 to 70 in the next few years.

On top of this, managers face a shortage of qualified engineers and maintenance staff to properly support and maintain equipment. Consequently, engineers face multiple challenges when designing rugged, reliable, and quiet machines that meet these new motion control demands.

One way to meet these challenges is with components that the motion control industry refers to as precision bearings. Although no one type of bearing is specifically labeled "precision," some bearings require little maintenance and offer features that deliver low noise and long life at high operational speeds. These features may add about ten percent to the cost of such a bearing, but the return on that investment is longer life.

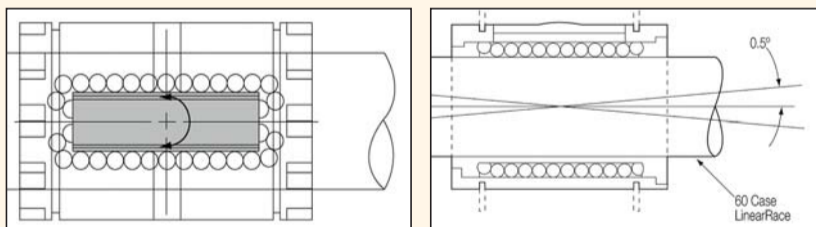
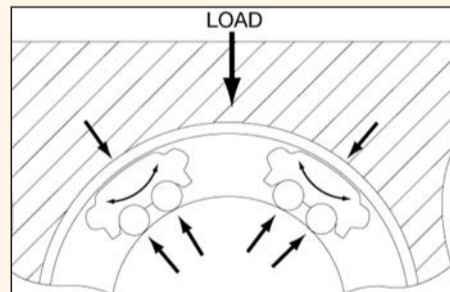
Whether precision or standard, a rolling element bearing consists of an inner ring, an outer ring, balls, and a retainer or separator, along with various housings and sealing mechanisms. One factor that categorizes bearings as "precision" is the tolerances held throughout the manufacturing process. Close tolerances result in a higher quality product, one that can withstand greater speeds and stresses, and other operational requirements.

The proper bearing can greatly reduce noise problems. Ordinarily, bearings aren't thought of as silent components,

but newer designs have features that lessen noise. These designs also handle high speeds, usually between five to ten feet per second, high accelerations to 450 ft/s/s, have a coefficient of friction of 0.001 to 0.002, and they tend to eliminate bearing binding or chatter.

Most precision-type bearings use smaller ball elements because it reduces the contact area and space among the balls, which cuts chatter and lowers noise levels. Much of the steel that's not used for transfer of load is replaced with a plastic.

Proper alignment of all elements is crucial to bearing life, noise, and capacity.



With self-alignment, bearings can handle three common types of alignment challenges. When the bearing's outer race can yaw (bottom right) in the direction of the shaft, it can stay in contact with the entire length of the shaft. Pitch self-alignment (left) prevents binding due to misalignments from shaft deflection, housing bore alignment, and machine deflection. Reducing wear due to uneven load is the function of roll self-alignment (top).

Hardened steel bearing components react like elastic bodies under load – they flex as load-bearing balls move through them. Over time, material fatigue can set in, eventually producing bearing failure. Precision-type bearings have inner tolerances that eliminate misalignment and reduce play among their components, prolonging bearing life.

Bearings installed on equipment often have to accommodate dynamic or static misalignment, such as a warped roller shaft or a conveyor. Chatter usually signals misalignment in a system. For these situations, precision bearings' self-alignment features compensate for misalign-

ment that results from imperfections in housing-bore roundness and parallelism, deviations in flatness of mounting surfaces, imperfect system assembly, or deflection at load.

Manufacturers can predict, with high accuracy, how long a bearing will last in a given application, which is a real aid for equipment manufacturers who offer extended life and warranties on their equipment.

Maintenance is a huge issue with motion equipment. Usually, it's just not done. Once installed and turned on, equipment tends to run until it fails. Most bearing failures are due to improper installation, lack of lubrication, and contamination. Under such rigorous conditions, the smart design choice is to use precision type bearings.

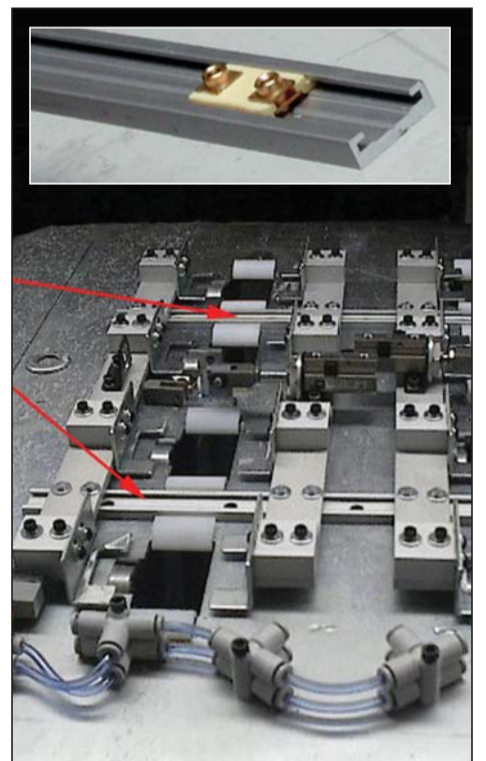
Proper lubrication will reduce contamination. Many precision type bearings offer a well thought-out seal design where one lip retains lubrication while the other lip acts as a scraper to eliminate contaminants. In high-speed applications, oil is recommended. In high load, low speed-applications, from three to five feet per second, grease is generally used.

Proper installation can keep maintenance needs low. Do-it-yourself customers should pay attention to tight mountings and alignment, and eliminate vibration. All bearing manufacturers have written procedures and recommendations that should be followed to ensure correct shaft seating, mounting tightness, and unit alignment.

Alternatively, the bearing manufacturer can be brought in at the beginning of equipment design. Tolerances can be better, there will be less play among components, and therefore more system accuracy and reliability.

Randy Burchell is OEM Account Manager and Dave Roth is Marketing Manager at Danaher Motion in Port Washington, NY (danahermotion.com).

Circle DPN 347



Location, location, location: Red arrows point to plastic bearing guide locations (inset detail) in the feeder assembly under construction.

"We needed to solve this problem fast," said D'Amico.

"The customer was losing valuable production time. Igus responded immediately to our request and provided detailed technical input with a very short turnaround time on delivery.

"DryLin N was a perfect fit in the tight space restriction of the feeder. It was a low cost solution that kept right in line with Visual's reputation of delivering easy-to-justify solutions. The system has been installed at the customer plant and is working flawlessly."

This article was supplied by igus Inc. of East Providence, RI (igus.com).

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