**Problem:**

Premature gear wear

Cause:

Excessive side loading applied to shafting by timing belt mechanism

Solution:

Additional mounting support added to shafting, elevates side loading effects on gears

In applications that employ timing belts, proper support for shafting is key in obtaining optimal performance life of Slide-Rite® right-angle gearboxes

When designing any type of motion equipment, be sure to consider the effects that applied torque can cause to integral machine components and accommodate for the results.

MINNEAPOLIS, MINNESOTA, USA— Tolomatic's Slide-Rite gearboxes are used the world over and have a reputation for being reliable, durable components that just keep on working. When premature gear wear surfaced on a bank of units that were in an installed packaging application, there needed to be a good reason why. After reviewing the situation, it was determined that side loads being applied to the shafts were causing the problem.

For this particular application, the machinery moves packing lids from one conveyor line to another. A series of Slide-Rite gearboxes were mounted on horizontal and vertical shafting, placed on both sides of a series of lid stacking machinery. The gearboxes provide the 45 degree motion for a flying knife process that selects a lid from the stack and drops them onto a conveyor.

A housing, containing a 1:1 ratio timing belt mechanism run by an AC motor, was mounted at one end of the horizontal shafting. The timing belt housing was mounted next to the machine enclosure and supported by one pillow block mount.



This illustration shows the mounting configuration of the existing timing belt mechanism, pillow block, and their relation to the first Slide-Rite gearbox on the shaft line.

A closer look at the gear wear of the Slide-Rite units revealed a distinct pattern. The closer the units were to the timing belt mechanism, the greater the gear wear as shown in the photo below.

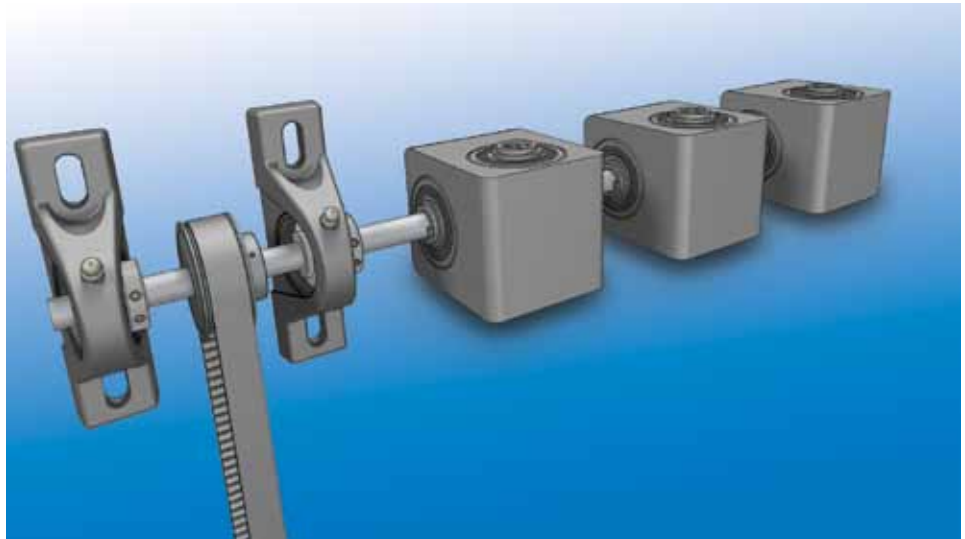


This photo shows the results of the side loading placed on the gears of the Slide-Rite unit closest to the timing belt case. Units that showed the least amount of gear wear were farthest from the timing belt mechanism.

In this application, the timing belt mechanism required a considerable amount of tension to keep it operating efficiently and the unit was under constant tensioning and tightening. Although the shaft end was supported by the pillow block mount, no support was being supplied to the length of the shafting running between the tensioning unit and the series of Slide-Rite gearboxes.

As tension increased on the timing belt, it created a pivot point between the timing belt housing and the shaft, resulting in a downwards pull. As a result, the gearboxes themselves were acting as bearings, (a function they are not designed to do) and the gears were taking the brunt of the side loading stress resulting in excess gear wear.

The solution? Place another pillow block mount between the first gearbox and timing belt housing to support the length of shafting. The additional pillow



This illustration shows the placement of the additional pillow block mount on the shafting, eliminating the side loading effects to the gears of the Slide-Rite gearboxes.

block removes the pivot point effect taking place, alleviates the side load, and the resulting stress placed on the gears of the Slide-Rite units.

Fortunately for this application, this was a simple solution that could be easily retrofitted with little modification to the installed machinery footprint, and provided the durable performance that was expected from the gearbox units.

When designing any type of motion equipment, be sure to consider the effects that applied torque can cause to integral machine components and accommodate for the results.

Have questions? Give us a call. Our technical experts will be happy to answer any questions and assist you in implementing the best solution for your motion control application.

Tolomatic has been a leading supplier of electric linear motion and pneumatic actuators for more than 50 years. Its product line includes electric linear and pneumatic actuators, servo-driven high-thrust actuators, servo and stepper motors, stepper drives and configured linear motion systems. Tolomatic also manufactures right-angle gear drives, caliper disc brakes and clutches. Industries served include packaging, material handling, medical, food processing, automotive, semiconductor and general automation.



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