NEWS RELEASE

Carpet Manufacturer Cuts 95% of Scrap Losses with Simplicity Self-lubricating Bearing Solution

Rockford, IL – March 8, 2010

Carpet tufting creates a tough environment for linear motion products. Processing synthetic fibers into carpet backing using a high speed, reciprocating short stroke machining system, a carpet manufacturer was experiencing unplanned downtime due to linear bearing failure and massive profit loss due to thousands of yards in scrapped end-product. Poor quality and damaged carpeting were sited as the main reason the manufacturer lost up to 54,000 yards of carpet to scrap. When PBC Linear came in to examine the application, they discovered the root of the problem was the machine's ball bushings within push down foot assembly.

The Application

Each carpet tufting machine uses 36 ball bushing bearings and steel shafting assembled into a pushdown foot system (4 bearings and 2 rods of steel shafting per pushdown foot, an average of 9 pushdown feet per machine). This system is utilized within the application to operate the needle bar in quick, reciprocating up to 1600

Carpet tufting system.

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cycles/minute short strokes. The needle bar holds 4000 tufting needles that conduct the crucial processing of the fibers. Precise and repeatable linear motion is necessary for optimum manufacturing and the minimization of scrap. The manufacturer also employs non-stain oil along the pushdown foot assembly to ensure smooth linear motion and reduced friction.

The environment of the application is typical for industrial machining. Dust, dirt, grease and carpet fiber particles pose risk for contamination, but no adverse or caustic chemicals are present. The carpet tufting machine is designed to run for continuous, long cycles; therefore the performance is measured by the life of the system and linear feet ran between replacement systems.

The Problem

High speed reciprocating short stroke (.5''-.625'') created high impact loads on the system; resulting wearing ball bushings and shafting. This represented the bulk of the shutdown scenarios where maintenance and product replacement were necessary. 1600 cycles/minute raised high reverse inertia, prompting almost immediate wear of the ball bushings and steel shafting. As operation continued, the ball bushings spall fine metal particulate from the shafting, which accumulate within the assembly, wear the seals, and allow lubricants to contaminate the pushdown foot assembly and ball bushings. This mixed with metal particulate created by the ball bushings and shafting to create “black spots” on the finished carpeting. These black spots cannot be washed out, resulting in scrap carpet.

The performance quality of the ball bushing system also posed problems and created scores of scrap carpet. The inaccurate tolerances (.005/.007'') of the ball bushing system allowed for rocking motion

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along the needle bar. This phenomenon, known as needle wander/loss motion, results in loss of positioning and missed tufts—leading to poor quality carpeting. This occurred almost immediately after the initial installation, and grew more prevalent as the system wore under use. Throughout operation, loss motion and contaminated carpet resulted in 34,000-54,000 yards of scrap material and lost profit.

A Simple Solution

To solve the problem of wear and progressive wander/loss needle bar motion, PBC Linear outfitted their Simplicity® self-lubricating bearing into the specified pushdown foot assembly for the carpet tufting machine. Simplicity's close tolerance ID bearing (.6240''-.6245'') and close running clearance (.0015''-.0018'') held the needle bar in tight position for precise and repeatable operation. The bearing's proprietary FrelonGold® liner ran smoothly along steel shafting and eliminates wear by evenly disbursing the load throughout the bearing; rather than the small point of contact ball bushing products make with shafting. Simplicity® bearings contain no rolling elements, thrive in heavy load applications, and push contaminants such as dirt, carpet fiber particulate and grease to the end of the stroke. In short, they were designed to exceed expectations in applications like this.

The Result

Before PBC Linear's Simplicity® pushdown foot system and undercarriage were installed, the carpet tufting machines were in a state of constant unplanned downtime due to high maintenance costs and upkeep. After the Simplicity systems were installed in the carpet tufting systems, they became the most productive machines in the plant! Linear footage between maintenance rebuilds of the machine were

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increased from one million linear feet to over three million. The carpet manufacturer was also pleased to report a significant 95% reduction in scrapped product, eliminating millions of dollars in scrap every year that was previously thought of as “an acceptable loss.” Now, they have turned these losses into pure profit! For more information on PBC Linear or Simplicity® technology, please email us at marketing@pbclinear.com. You can also contact us by phone at 1.800.729.9085, or visit us on the web at our RST dedicated webpage: RST.pbclinear.com.

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