LM76 Linear Bearings

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What do you do when your industrial buffing system is chewing-up linear ball bearings and spitting them out every 2 weeks? This is the situation one of customers found themselves in while for years accepting lost production and costly maintenance shutdowns. When LM76 got a call from a proactive new maintenance manager, we were eager to try a scraper seal design we had recently had success with on another application.

THE Application

- **Polishing Aluminum Truck Wheels**
- **36” Vertical Stroke Indexer**
- **2500 Pound Load @ 4” per Second**
- **Polishing Media Like Toothpaste with Glass in it - Extremely Abrasive and Sticky/Tacky**

THE Issues

Originally, these systems came with protective bellows which helped keep polishing media from contaminating the 2” linear ball bearing pillow blocks. According to our maintenance manager, once a bellow was damaged, it was removed and thrown away. Maintenance personnel so disliked having to take-off and reinstall bellows that they mysteriously disappeared. Even with protective bellows, aluminum dust mixed with polishing media formed what one mechanic termed, *“toothpaste with glass in it.”* This abrasive *“lapping compound”* would stick to shafting, dry and semi-harden. As a bearing rolled along, polishing media would penetrate it’s seals *“sliming”* balls and clogging ball tracks. This would quickly lead to bearing failure and shaft brinnelling (grooving). Needless to mention, routinely replacing linear ball bearings and more costly shafting was too much for our new maintenance manager so he called LM76.

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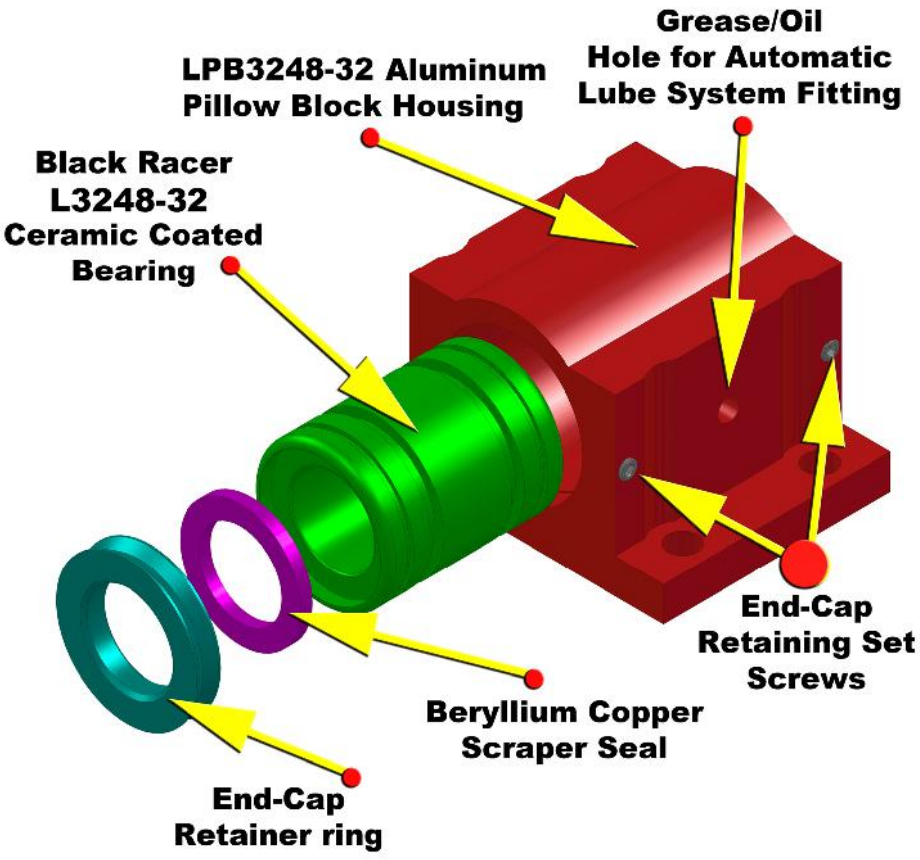
THE Solution

It's rare that we have 2 back-to-back issues dealing with seal/scraper applications. Last week's (Issue 7) subject was FDA/Caustic Washdown Scraper Seals. This week's issue is subject-similar but deals with a more demanding application. In this instance, company President John Tarbell specified a beryllium copper scraper seal. Beryllium copper is extremely hard and wear resistant. Admittedly, a heavy interference fit dramatically raised system friction but was mitigated because the system is hydraulically driven - driving force is not an issue. Seen below, the beryllium scraper seal is captured between the bearing counter-bored face and the machined steel end cap.



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THE Solution cont.

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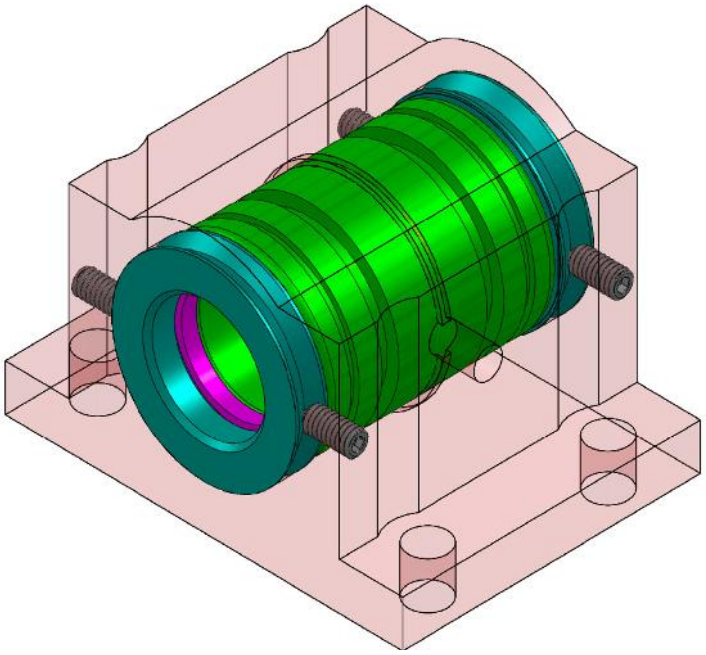
Step 1

For this application, we chose our Black Racer Ceramic Coated Linear Bearing. This bearing is extremely tough, is a one piece construction (no mechanical components, no catastrophic failure mode or shaft grooving) and has the longest life test we know of on record. Like linear ball bearings, Black Racer requires lubrication. Because the scraper seal is zero clearance and exceptionally rigid, we felt it would trap lubricant and distribute it as a fine, uniform film on the shaft. According to Mr. Tarbell, " A Zamboni doesn't lay down an inch of ice, it fills in the skate marks." This film reduces friction, disperses heat and wets shafting. The wetted shaft surface forms a barrier between media and steel - keeping polishing media from cleating into disparities on the shaft (remaining peaks and valleys). When the scraper passes-by, it easily lifts the media and moves it along to the end of the stroke. Unlike linear ball bearings, Black Racer has no balls so some residual "slime" is easily accommodated.

Step 2



Staying within the form factor of the original OEM design - standard roundway pillow block and shafting - we chose our direct drop-in 2" closed pillow block and Black Racer Ceramic Coated bearing coupled with our 2", Class L Rc60 Case Hardened Shafting. Mr. Tarbell then designed a steel end cap retainer ring that pinned the beryllium scraper seal against the bearing face. **NOTE:** The bearing leading and trailing faces have machined counter-bores to locate and capture the back of the scraper seal. To keep the retainer ring secured to the pillow block, set screws were positioned on both sides and driven into a slot machined into the OD surface.

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