Product Applications

PBC LINEAR MOTION SOLUTIONS

RST

CRT

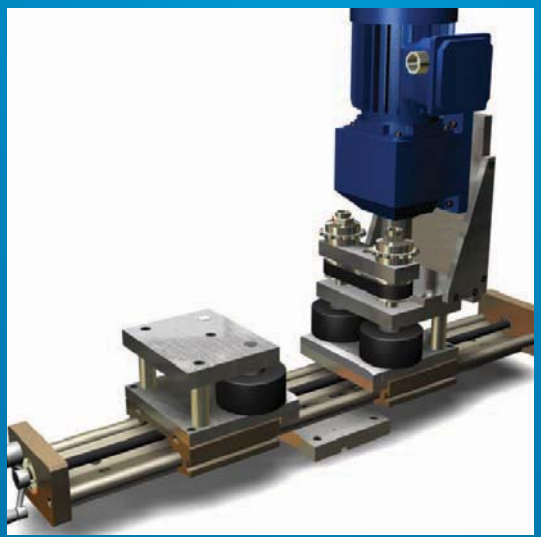
VT

LAT

GST

PRT

TGT



PBC LINEAR

A PACIFIC BEARING CO.

Pillow Blocks Supply Gentle Lift on CW Shaw Bed of Nails Exhibit

"How much do you trust your linear bearing technology?" That is the type of question PBC Linear asks design engineers on multiple different projects demanding reliable performance, long product life, and simple integration. On a bed-of-nails lift table application, the question becomes more to the point. For linear ball-bearings, any slight contamination of the bearing cages can lead to breakage, stalling or total machine failure; which results in a low rate of confidence when lying on a spiky table. CW Shaw Inc, a designer and fabrication firm that specializes in bringing interactive, fun and educational museum exhibits to life was posed with this problem. After considering the design, load, environment and necessary long-term operation, CW Shaw opted for Simplicity pillow block housings to guide the support rails on the bed-of-nails lift table.

To demonstrate the full effect of the exhibit, the lift table needed to be raised/lowered by 3", handle loads up to 1000 lbs (for safety) and move at a moderate speed of 5 ft/minute. Potential contamination was also a factor CW Shaw considered. Any trace of dust or particulate posed a risk of system failure; raising safety concerns. Therefore, CW Shaw sought a linear motion system that would not fail under contamination (dust and carpet fibers). Since most museums operate on fixed budgets, CW Shaw also held maintenance-free operation as a crucial design pre-requisite; which is why he turned to Simplicity linear plane bearings and pillow block assemblies.

Simplicity products are a proven solution when requiring maintenance-free, worry-free linear motion. Designed and refined for over 25 years, Simplicity technology has been successfully applied in some fo the most extreme environments: temperature extremes, high contamination and shock vibration. The bearings travel using a proprietary Frelon liner which transfers the load and glides over dust and other particulate without damaging the shaft. Also, since they are composed of no rolling elements, Simplicity pillow block housings will NOT catastrophically fail; allowing for reliable and safe linear guidance of the support rails.

Two Simplicity pillow block assemblies were installed at each end of the lift table to support load and guide the lift rails. CW Shaw noted no problems in performance and, over time, has implemented the design for several nail bed exhibits throughout the country—some of which have been running without fail for 5-10 years.

CW Shaw Inc has over two decades of experience in exhibit design and providing visitors with an exciting and informative way to view real world applications. Company owner Charlie Shaw is a self-taught designer who views his unique creations through the eyes of the visitor; allowing him to build engaging exhibit pieces that effectively speak the language of museum goers around the world. To see more examples of CW Shaw exhibits, please visit www.hofl.org.

Simplicity®: The Preferred Choice for ADI's New De-burring System

Advance Design Industries (ADI) in Sheffield Village, Ohio has designed and built innovative custom machine systems for industrial and defense applications for more than 50 years. Their latest problem-solving design, a de-burring system that removes burrs from hobbed gears, was constructed using a series of drive platforms, a robotic with grinding tool attachment and brushing stations. To accurately and repeatedly position the various stations, in a multitude of pre-programmed locations, ADI required a linear motion system that could endure the contaminated environment and heavy loads of the application. To accomplish this, they turned to PBC Linear products once again, due to their successful implementation of previous systems designed together.

The Application

For the de-burring system to succeed, ADI required a linear motion technology that could perform under 50,000 lbs of load in a dirty, industrial machine-tool work area. De-burring is the process of removing burrs, or excess protruding material, from large gears (70-120" in diameter). Eventually, these gears will be utilized as the driving mechanism for applications such as crane turn tables and energy efficient wind turbines.

The de-burring machine rotates the gear through the robotic grinding station, then through each brushing station for an assured, smooth end-product. Excess material not removed, could result in noise, binding and installation problems. Three drive platforms as well as the robot and brush stations, riding on PBC linear bearing system, adjust to the locations for various sizes of geared rings.

Size adjusting station on ADI Deburring System.

The Problem

An immense load (50,000 lbs) and harsh environment restricted what technology ADI could use for linear motion. Ball-bearing systems would deteriorate with vibration and spall shafting under the heavy load. Excess dirt, dust and particulate can collect in the ball cages, resulting in stalling and catastrophic failure. The drive platforms, though very important to adjust for different gear sizes, are seldom used for day-to-day functions; thus requiring a linear system that needs little lubrication, but still provides smooth and reliable performance when needed.

The Solution

For this application, ADI favored plane bearing technology due to its ability to thrive in contaminated environments and sustain even disbursement of forces versus the small point of contact provided by ball-bearings. Additionally, the bearings need to prevent stick-slip, a common problem to bearing systems which are not routinely in motion. As a result of previous application success, performance and cost efficiency, ADI decided to implement Simplicity® bearings as the linear motion system for all stations of the de-burring machine. Simplicity self-lubricating linear plane bearings require little to no upkeep maintenance, excel in harsh environments and handle heavy load applications. This is due to the bearings' design and FrelonGold® liner. Simplicity bearings can run for years under constant or intermittent use. The low friction, self-lubricating system requires no additional grease or oil (as long as application is within design criteria). FrelonGold® has also been shown to handle up to 20x the load of a traditional ball-bearing! The Simplicity® bearing wipes all dirt, dust and grime clean off the shaft—providing a reliable, smooth and long-lasting linear motion system.

The Result

Simplicity bearing/shafting assemblies were installed into the drive platforms, robot station and brushing station of the system. Testing was conducted over a period of two months with the bearings performing without failure. Now, ADI is looking into manufacturing additional gear de-burring systems guided by Simplicity® technology.

Doctor Bearings Provide Constant Linear Motion in Paper Mill Since 1992!

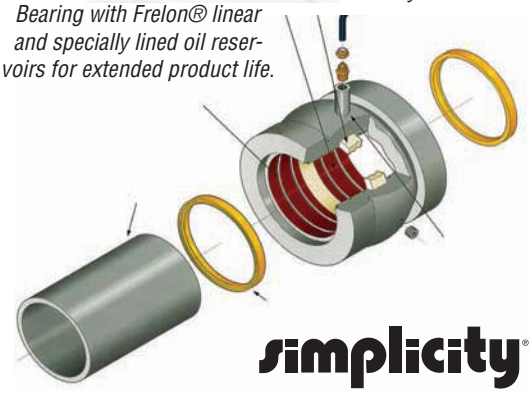
16 years and counting, what seemed like an impossible promise back in the early '90's has evolved into the new standard for doctor blade bearings. PBC Linear's doctor bearings are not a new product; however they show PBC Linear for what it is, providing long-lasting innovative solutions to the toughest linear motion applications. PBC Linear's doctor blade bearings have been running for over a decade in paper mills all over the country.

16 year life

Paper mills typically present a difficult environment for reliable linear motion. Corrosion, steam, water, dust, and vibration all play a part in interfering with the process and cause failure with rolling element doctor bearings. Traditionally used doctor ball bearings experience fretting corrosion due to the intense vibration caused by the large paper dryers in the mill—also causing unplanned downtime. PBC Linear's doctor ball bearings have no moving parts, thus fully preventing catastrophic failure. Their patented and time-tested Frelon liner dramatically reduces shock vibration and can withstand caustic chemicals, high loads, and intense heat. With no moving parts to seize up, and their protective liner, PBC Linear's doctor bearings are perfectly suited for long lasting life in the paper mill environment.

3 month life

Bearing with Frelon® linear and specially lined oil reservoirs for extended product life.



Applicable in both dry and wet end applications, PBC Linear's doctor bearings require minimal maintenance. Dry-end applications are provided with an air over oil lubricator and urethane double lip seals to keep the oil within the bearing.

This allows for constant lubrication and improved product life. In wet-end applications, PBC Linear's doctor bearings require no additional lubrication. The doctor bearings are composed of 316 stainless steel housing for enhanced chemical resistance for a prolonged life cycle that can last for over a decade!

PBC Linear doctor bearings eliminate unplanned downtime, paper web breaks, and increased profits. Paper plants around the country that have implemented PBC Linear's doctor bearings only need for maintenance or replacement is to send the original doctor bearings back to PBC Linear for refurbishment every ten years.

"We have found that rather than purchasing new doctor bearings that customers are so happy with the original ones we provided that they would rather we simply repair the doctor bearings they have already been using," says Regional Sales Manager, Ray Stojonic.

PBC Linear Doctor Bearing after 16 years of performance.

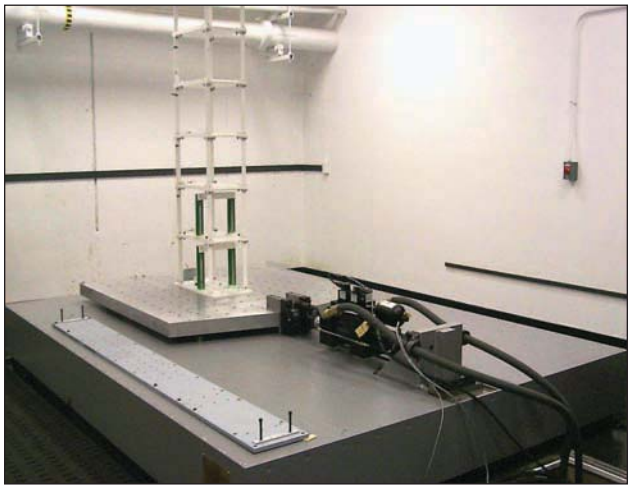
Simplicity® Products Do Not Fail When Conditions are Shaken Up!

Simplicity linear bearings have been installed in an earthquake simulation machine developed by the Washington University Structural Control and Earthquake Engineering Lab (WUSCEEL) in St. Louis, Missouri. Due to their ability to tolerate intense shock and vibration without fretting and require no added grease or oil, the PBC Linear plane bearings were perfectly suited to handle the job.

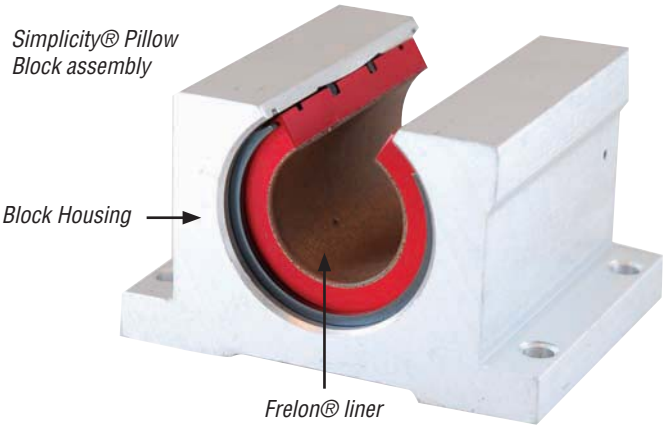
Intense shock vibration is an obvious pre-requisite to study the impact of earthquakes and structure analysis. To recapture the conditions of an earthquake, researchers construct what is typically referred to as a "shock table." A shock table is a machine that simulates the conditions of an earthquake. The entire structure weighs up to 850 lbs, and when vibrating can exert 3-4 g's of force on the bearings and shafting.

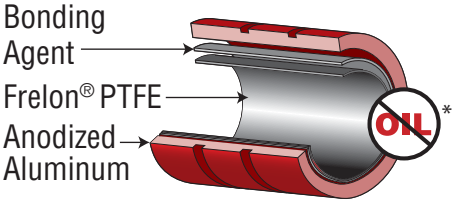
Simplicity® linear plane bearings are designed to last in the toughest environments; including heavy loads and short strokes. With no rolling elements, the linear plane bearings contain no moving parts to fret and seize up; this completely eliminates the potential for catastrophic failure. Their proprietary FrelonGold® liner also enhances load capacities and dampens shock vibration—making the Simplicity line an attractive candidate to anyone seeking to study earthquakes or other heavy load applications. Combined with PBC Linear ceramic coated shafting, the Simplicity plane bearings provided smooth, quiet and long-lasting linear motion even in the cruel environment created by the shock table.

The WUSCEEL shock table is used to test for a wide range of structural analysis: bridge and building stability research, fragility curves and vibration control of aero systems. Any structure or material that could be affected by an earthquake or other high vibration surroundings is put to the test on these tables. These experiments prompted the researches to discover new ways to build earthquake resistant bridges, more reliable air planes, and stronger buildings.



WUSCEEL shocktable used to measure effects of earthquakes on building structures.





simplicity®

Simplicity® Keeps Automotive Welding Line Running

The automotive production line centers around several machines all working together with production workers to ensure high production rates and quality. A kink in this chain can halt production and greatly increase costs to a staggering level. PBC Linear was recently called in to a major automotive manufacturer to devise a solution to crashing welding guns on the manufacturer's production line.

The Problem

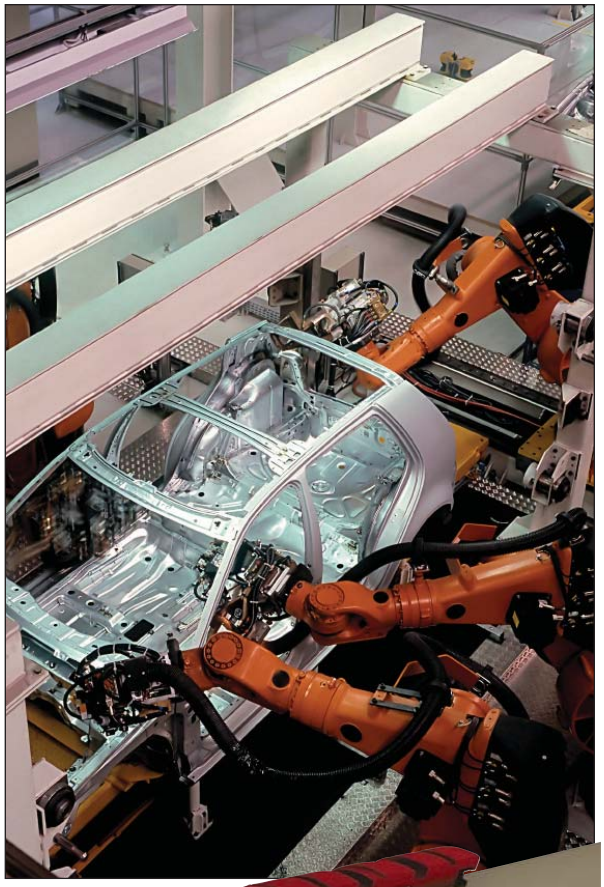
When the manufacturer contacted PBC Linear, the welding guns were running on conventional linear shafting and ball-bearing technology. Welding slag particulate collected along the shafting, causing the system to fall off track and machine inaccurately. The slag build-up also caused the bearings to stall, seize up, and catastrophically fail—resulting in unplanned downtime and skyrocketing production costs.

Solution

PBC Linear recommended their proven Simplicity® linear bearings and highly accurate shafting. Equipped with Frelon® GOLD iner to allow for a high tolerance against contamination, heat, and shock vibration, the self-lubricating Simplicity bearings were well-suited for the welding application. The automotive manufacturer recommended installing the parts in the two welding guns with the history of the highest slag accumulation. Eight months later, the manufacturer reported PBC Linear's shafting looks as it did the day it was installed! The Simplicity bearings harmlessly wiped the slag and other contaminants off the shaft—promoting smooth and long-lasting linear motion.

Results

With 150 other welding machines using the competitors failing ball bearings, PBC Linear was asked to install their replacement system on the remaining welding guns.



simplicity®

Simplicity® Bearings Put Stonework Manufacturer Back on Schedule!

Stonework machining has to be precise and productive. CNC multi-axis machines cut large bullets of stone into counter tops, floor covering, stone laminates, and many unique shapes used in the laboratory and as building façades. The cutting and routing through stone creates clouds of dust, coolant swarf and other industrial waste that is tough on linear motion way systems, particularly for rolling element linear motion. Coolant slurry and stone dust created by the machining process goes everywhere, washing out lubrication and jamming ball and roller bearings. Downtime and routine maintenance robs users of productivity! Continued operation also damages the machine further resulting in more costly repair. A prominent machine builder that designs and manufactures stone working/ cutting machinery recruited PBC Linear to devise a solution.

Cutting saw running with long lasting Simplicity® components.

The manufacturer's machinery has been used for every possible facet of stone-working from quarry-work to kitchen counter-top machining. These machines are designed to last in harsh surroundings; however their linear guiding system experienced repeated binding and stalling in the field. Stone dust, particulate and leaking coolant caused the systems original roller bearings to bind up and fail. Constantly replacing the failed components resulted in increased costs and production time. After enduring this cycle of replacing unfit components long enough, the stone-working manufacturer sought out another linear system and turned to PBC Linear.

Round shaft rail assembly

Example of cutting stonework.

PBC Linear recommended installing their round shaft Simplicity® linear plane bearings to replace the failing rolling element bearings. With no moving parts, self-wiping design, and round profile; contamination does not build up and stall the Simplicity® bearing's travel. PBC Linear's proprietary precision ground Frelon® liner riding on a coated hardened shaft is the key for low cost, maintenance free, linear motion. Simplicity plane bearings plow smoothly through contamination, dirt and dust. The bearing also dampens vibration, tolerates temperature extremes, and is chemical resistant—all while providing smooth, quiet and precise linear motion.

A few months after installation, the stone-working manufacturer noticed incredible improvement in the performance of their stone cutters. Unexpected downtime, production costs, and repair maintenance all decreased.

Custom Simplicity® Pushdown Foot Assembly Saves 95% on Scrap!

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.

Carpet tufting machine with Simplicity® assembly installed at the feet.

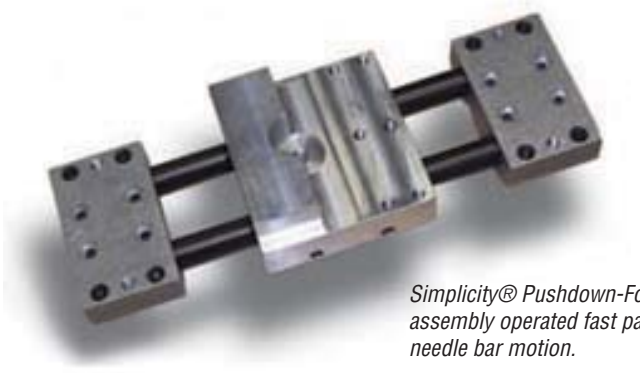
The Application

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 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.



Simplicity® Pushdown-Foot assembly operated fast paced needle bar motion.

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 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.

Simplicity Pushdown-Foot Assembly

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 self-lubricating 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 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!

Simplicity self-lubricating bearing/shafting assemblies were installed into the drive platforms, robot station and brushing station of the system. Testing was conducted over a period of two months with the bearings performing without failure. Now, ADI is looking into manufacturing additional gear de-burring systems guided by Simplicity technology.

Laser Etching System Simplified Bearing Assembly

A laser etching design firm was experiencing relentless failures with their lasers; specifically their targeting mirrors. The company used these mirrors to position light onto the etching surface to ensure maximum accuracy and etching quality. However, due to failing ball-bearing linear guides, the mirrors would stall; creating scrap product, increased production time and lost profits. To fix the linear motion problem, PBC Linear™ came in to recommend Simplicity® linear plane bearings and shafting as a solution.

Custom carriage with Simplicity® self-lubricating liner and ceramic coated shafting assembly.

Problem

These lasers were used to etch a range of material, both wooden and metallic. The linear motion system operated the subtle adjustment of the targeting mirrors. As etching persisted, debris, dust and fine particulate accumulated within the ball bearing cages along the linear guides. The particulate caused the ball-bearings to stall, completely restricting the linear guides' movement and stopping the entire system (catastrophic failure). The linear guides would then need to be swapped out until the process repeated itself. This cycle of swapping out damaged linear guides for new ones resulted in a short product life and massive production costs.

PBC Linear was faced with the challenge of creating a new system that not only endured the environment and provided high accuracy positioning for the targeting mirrors, but also came in under the cost of the ball-bearing linear guide assembly. A lightweight system was also important to the laser etching firm in order to ensure accurate positioning.

PBC Linear's solution provided subtle and precise adjustments at system's target mirrors.

Solution

With the particulate-heavy environment in mind, PBC Linear resolved to implement their Simplicity self-lubricating linear plane bearings and complimentary, light-weight ceramic coated shafting. Simplicity plane bearings contain no rolling elements; therefore particulate cannot obstruct their smooth and quiet linear motion. Using PBC Linear's proprietary self-lubricating Teflon® liner, contaminants are pushed off the shafting. Also, Simplicity plane bearings do not require the additional lubrication and periodic maintenance that ball-bearing products do; which further extends the life of the laser etching system.

Result

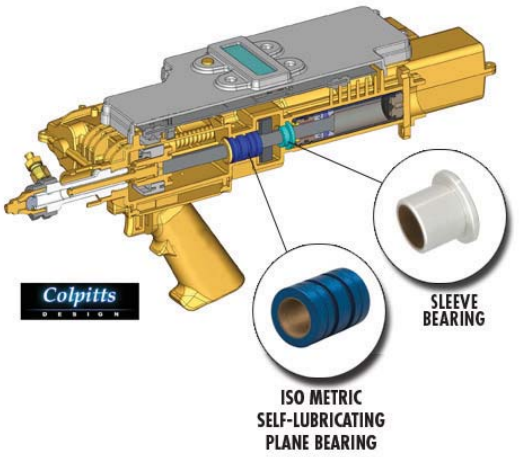
Once installed, the Simplicity bearings and shafting produced a lighter, longer-lasting and more cost efficient system for the aiming mirrors. Metal and wood particulate proved to be no issue for PBC Linear's bearings as they glided through the dust and debris for assured, accurate mirror positioning. Simplicity bearing/shafting assemblies were installed into the drive platforms, robot station and brushing station of the system. Testing was conducted over a period of two months with the bearings performing without failure. Now, ADI is looking into manufacturing additional gear de-burring systems guided by Simplicity technology.

Simplicity® Bearings Installed into Acushot's™ Needle-free Injection Gun

Healthy animals are necessary for efficient stockyard production. Disease and other bacterial conditions thrive in close quarters; making regular vaccination for all livestock a natural pre-requisite. However, implementing and documenting consistent injections for all animals is tedious, expensive and, in some cases, hazardous. To solve these problems, Acushot, an innovative veterinary design company, designed an automated, needle-free injection gun for mass livestock vaccination. The design required a linear bearing system to absorb recoil. Acushot™ turned to Colpitt Designs, who recommended PBC Linear's Simplicity® plane bearings for the task.

Acushot's Needlefree system provdes documented and safe medication dosages to livestock

Typically, hand-held needle injections were used for vaccinating the animals in the stockyards and barnyards; however, with thousands of animals coming through production at once, successfully and safely supervising the injections became an increasing concern. Acushot's™ new system eliminated needles, removing the possibility for an unsafe employee needle-slip. The unit also enhances sanitary conditions, the battery powered injection unit can be used hundreds of times without risk of cross contamination to the animals.



For a rapid prototype and possible added refinements to their design, Acushot™ turned to Colpitt Designs—a third party engineering firm. Colpitt worked to reduce components and assemble the triggering/injection system by using a varying degree of strength gas cylinder to provide up to 600 pounds of force. The system also automatically saves each dose with a time stamp for accurate vaccination records. The cylinders are designed to inject the vaccines to the same recommended depth as a typical needle that would have been used on a range of animals. The injector can be set to inject from 0.2cc and deposit it just in the skin of the animal and up to 2.5cc can be injected to the recommended depth into the muscle of the animal.

Colpitts immediately set to work. Using a simplified approach, they were able to reduce moving components and make the design more cost-effective; while still adhering to Acushot's™ criteria. The final product was a lightweight, compact and battery powered needle-less injection unit that packed up to 28,000 psi delivery pressures while concurrently documenting each injection.

One obstacle to overcome was finding a linear bearing assembly to support the force of the injection delivery. Throughout a cycle, 650 lbs of force act on the bearings; which would be under constant use in extreme temperatures and outdoor working conditions. To solve this, Colpitts Designs used Simplicity® plane bearings to withstand the system parameters and environment of the application.

Simplicity® bearings glide using a proprietary Teflon liner. This provides even disbursement of forces throughout the bearing and smooth, reliable travel. Bronze and linear ball bushings spall the shafting under the high forces and short stroke which accumulate and contaminate the system; resulting in catastrophic failure. Simplicity bearings self-lubricate to ensure smooth and quiet operation for constant or intermittent use. They also thrive in temperature extremes (from -400°F-400°F)! These design factors allowed Simplicity® to drive consistent and satisfactory performance of Acushot's™ injection gun.

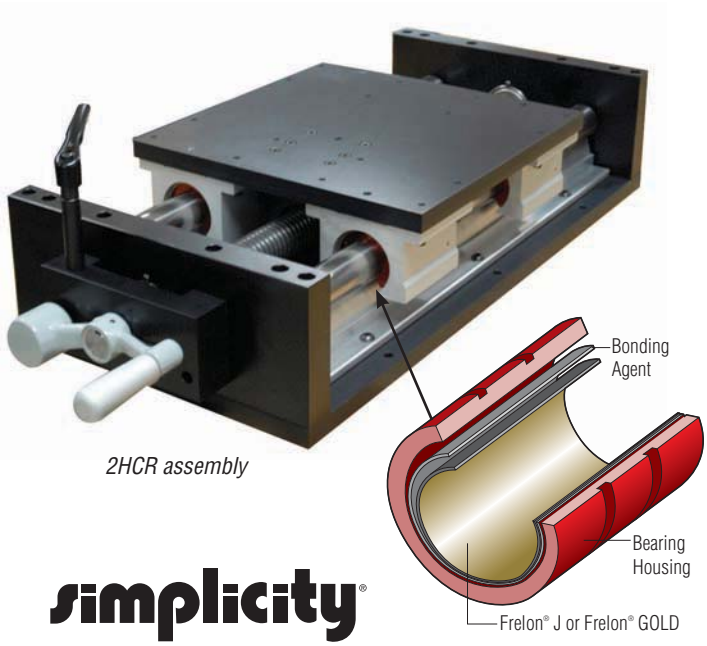
No needle trauma recovery was necessary for the animals; in fact the livestock does not even take notice when given their injection with Acushot's™ new injector. The new injection unit also reduced the diameter of the injection mark to about 1/8th the size. Easy to use with no extra vaccine containers the Acushot™ system improved productivity, safety and the overall health in stockyards and barnyards world wide.

Linear Slides from PBC Linear Assembled in Underwater Drill

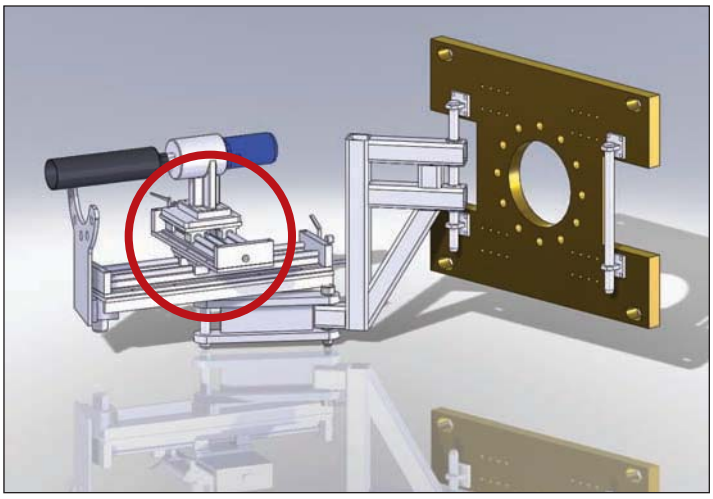
Deep underwater in the Gulf of Mexico, PBC Linear is providing smooth and precise linear motion for submarine oil pipeline maintenance and repair. Using their Linear Slide Technology (LST), which implements PBC Linear self-lubricating Simplicity® products and patented Frelon J® liner for long-lasting wear life, an engineering company who specializes in designing custom-need products crafted a drill supported by PBC Linear control and guidance. This newly designed underwater drill allows for highly accurate and targeted repair of submarine oil pipelines that funnel a wide assortment of fuels to the US.

Submarine oil pipelines lie on the waterbed in lakes, rivers, and—in this case—gulfs. They are utilized for transportation of fuels such as natural gas, kerosene, diesel fuel, and propane. These pipes periodically require maintenance and repair; however, since they are located on the bottom of the ocean floor, a special drill assembly is needed to complete the task. The entire repair operation necessitates the drill to be man-operated, since the drilling and repairing entails subtle and careful fine tuning. Designed with PBC Linear's 2HCR linear slide, the drill assembly could be easily adjusted and calibrated by hand, even underwater.

The 2HCR hand crank linear slide provides specialized linear motion and exceptional control. Outfitted with proprietary stainless steel Simplicity self-lubricating bearings, shafting, and Frelon J liner for enhanced corrosion resistance, the 2HCR linear slide is well-suited for the underwater environment, constant salt water immersion, and load capacities required for the application. The cast aluminum counterbalanced hand crank with ball screw lock puts the control solely in the operator's hands and facilitates easy modification and use. The end result was a highly accurate drill that could carefully bore through the concrete oil pipes for enhanced maintenance and repair.



2HCR assembly



Rendering of linear stage drill assembly and configuration.

Linear Motion Solutions

Self-Lubricating Linear Plane Bearing and Shafting

- Oil-free - maintenance free
- Tolerates extreme temperatures
- Dampens vibration & shock loads
- Engineered-to-match shafting, pillow blocks and support rails

simplicity®

Self-Lubricating Miniature Linear Guides

- No rolling elements
- Lengths up to 3600 mm (12 ft.)
- No lubrication required
- Tolerates extreme temperatures

mini® rail

Redi-Rail Linear Guides, Drawer Slides and V-Guide Systems

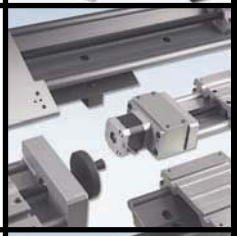
- Ideal for long travel and harsh environment applications
- Precision tolerances +/- .025 mm over entire rail length
- Simple design for fast, easy installation
- Lightweight, durable construction

redi-rail®

Modular Guides, Slides, Tables and Stage Assemblies

- Dampens vibration & shock loads
- Customize with ball or lead screws, belt drives & more
- No lubrication required
- Tolerates temperature extremes

Uni-guide®



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- Longer service life for bearings and profiles
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