Oil Shear Technology Keeps Reading Rockin’

Reading Rock

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Cincinnati, OH — Reading Rock manufactures concrete blocks — the kind that were probably used to build the schools that you attended. Operating around the clock, with three shifts working 6 to 7 days a week, they make plenty of them.

In fact, Production Manager Phil Thacker figures that they’ve manufactured about 22 million of the industry-standard 8-inch blocks in the past 4 years (when they replaced an aging Besser block machine with their newest version).

That's enough blocks, if placed end-to-end, to reach from their suburban Cincinnati factory all the way to the Golden Gate Bridge and back and still build a few large schools with the leftovers.

One reason for this productivity is that Thacker and the Reading Rock team goes to great lengths to maximize their "uptime." Brakes and clutch-brakes utilizing oil shear technology have played a major role in eliminating Reading's downtime.

"Pretty much everything that has a motor on it is equipped with a Force Control clutch-brake or brake," says Thacker. "I never worry about them going down."

A Single Production Line Means No Room for Error

Reading Rock, like many of the cement block plants across the country, has a single production line. This means that from the time dry materials enter the mixer until pallets of formed and dried concrete blocks exit the facility, everything follows a single pathway.

This also means that a problem with any component used along the way will bring the entire production floor to a halt.

Let's follow the path and see specifically where and how oil shear technology is making a difference — and keeping the plant operational rather than idled.

Dry raw materials are weighed and fed into a mixer and blended for several minutes (along with admixtures like coloring agents and water repellants) before water is added. When optimal consistency of the mixture is attained, the material is discharged into a block machine and fed into a mold.

Once in the mold, the concrete is compacted with a combination of pressure and vibration to ensure strength and uniformity. The main drive is equipped with a Posidyne clutch-brake which controls the indexing of the machine — bringing pallets in, bringing molds in, and dropping the concrete into the molds. After the mix is poured, vibrators run to shake the forms — ensuring proper density of the blocks. Once this is complete, the main drive indexes again, and the cycle repeats.

Oil-shear technology plays a major role in ensuring that the cycle repeats flawlessly. Force Control clutch-brakes and brakes employ oil shear technology which transmits torque between lubricated surfaces. The circulating fluid provides both cooling and lubrication of the friction surfaces — eliminating wear and dissipating heat. Because there is no direct contact between the friction surfaces during acceleration or deceleration, there is no wear — and thus no need for adjustment or replacement of discs.

Normal dry clutch brakes and brakes, on the other hand, employ a sacrificial surface — the brake disc or pad — to engage the load. Having no good way to remove the heat caused from engagement between the disk and plate, this material must absorb the heat. These extremely high temperatures will eventually degrade the friction material. As the friction surface wears away and begins to glaze, the

ensuing torque fade causes positioning errors which require adjustment or replacement of the friction surface.

The Posidyne clutch brakes in service at Reading Rock utilize Oil Shear Technology. Here a fluid film flows between the friction surfaces. As the brake is engaged, and the fluid is compressed, the automatic transmission fluid particles shear — thus transmitting torque to the other side.

This torque transmission causes the stationary surface to turn, bringing it up to the same relative speed as the moving surface. Since most of the work is done by the fluid particles in shear, by the time the surfaces actually meet or "lock up" wear is virtually eliminated.

In addition to transmitting torque, the ATF also helps to dissipate heat, due to a patented fluid recirculation system.

Along with torque transmission and heat removal, the fluid also serves to continually lubricate all components — thus extending their service life. Additionally, this provides a "cushioned" stop that reduces shock to the drive system. Unlike dry clutch brakes, the totally enclosed oil shear system is impervious to external elements such as wet, dusty or dirty environments, as are found in a large percentage of concrete block plants.

Since the layer of oil eliminates wear, the Posidyne clutch brake provides a long service life with virtually no need for adjustments. That is in marked contrast to dry braking systems which have a sacrificial surface which abrades away during contact, and requires eventual replacement and frequent adjustment to maintain proper parameters.

With elimination of wear comes elimination of adjustment — and increased "uptime" for Reading Rock.

In addition, the clutch-brake cycles faster than most prime movers, which means that the block machine speeds can be increased. And that means that more blocks are produced per shift.

Lower inrush currents are seen using a Posidyne clutch-brake — which reduces power factor imbalance and can reduce energy costs. Torque on the Posidyne clutch-brakes can be adjusted by the actuation system, to provide the proper acceleration and deceleration as opposed to some dry clutch-brake systems where adjustment is not available.

The formed and uncured or "green" concrete blocks are ejected from the mold onto a metal pallet. The pallet is conveyed across horizontally a span to a loading system with a vertical elevator. The elevator carried the blocks vertically and then feeds a finger car which loads stacks of block into drying racks.

A Whole Lotta Shakin' Going On

Posidyne oil shear clutch-brakes are also employed on the vibrator drive to quickly "settle" the contents in the concrete block mold.

Vibrator shafts can be fixed or variable — and are driven by the clutch-brake or motor with a motor-brake. The motor on a clutch-brake driven assembly runs constantly, thus eliminating the starting and stopping of the motor. The constant operation is smoother, allowing the motor to last longer than one that is subject to constant starts/stops.

This also decreases the cycle time and speeds the production of blocks. A built-in neutral position is another benefit of the Posidyne clutch-brake driven assembly. At the completion of the vibration cycle, the brake is released and the weights can drop into the bottom position.

This allows both weights to remain in synch during start-up, imparting vibration of

predetermined amplitude into the shaft - as opposed to starting the cycle with weights in varying positions and imparting more (or less) severe amplitude — which would cause shock to the system and shorten life of components, not to mention the effect it would have on the density of the blocks being formed.

Motor brakes, on the other hand, are used to stop the motor at the end of each cycle. PosiStop air actuated brakes feature a multi-disk stack which provides a high torque capacity in a small package. The increased torque capacity is achieved with a minimum increase in inertia. Dry brake designs, on the other hand, feature a single surface with lower torque and higher inertia.

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Each motor on the horizontal conveyor, the vertical elevator and the finger cars are equipped with MagnaShear oil shear brakes, on motors from ¾ to 5 HP. The totally enclosed oil shear design dissipates heat and is impervious to dust and dirt.

MagnaShear brakes, which combine oil shear durability with electric actuation, simple control logic and spring-set load holding, are used on virtually all areas of green and cured block handling.

Once a curing rack is filled with steel pallets of "green" blocks, the entire rack is transported to the curing kiln. Here the blocks are cured at 120 to 180 degrees F (as opposed to the 500-plus degrees for traditional kilns) for 24 hours.

Cured concrete blocks are removed from the kiln and moved via similar equipment to a processing area for "cubing" or palletizing before they are placed in storage.

Conveyors transport the now empty steel pallets back along a similar pathway back to an area opposite the loading conveyor, called an unloading conveyor. Again, all conveyor motors are equipped with MagnaShear oil shear brakes for optimal performance with virtually no downtime.

Half-Blocks Garner Full Attention

Perhaps the most impressive recent improvement is in filling half-block forms. Reading Rock was using SmartPac vibrator shafts to introduce vibration to achieve the half-block height molds. This technology was actuated directly from the motor which meant that the vibrator was either "on" or "off" with no variability.

For several years, however, Reading has been using a variation that allows Reading personnel to change the amplitude and frequency. In addition to flexibility never before seen in this application, the technology offers a service life that is fully twice the number of cycles of prior designs.

Additionally, the rapid compaction and quicker finish times allows these special block designs to be completed quickly and economically. Maintenance is simple too — just grease a bearing every eight hours and tighten mounting bolts periodically.

Reading Rock has benefitted substantially from the increased uptime that three primary Force Control Oil Shear products provide — namely Posidyne clutch-brakes, MagnaShear brakes and SmartPac vibrator systems.

These are also branded under the Besser Company trade names BescoDyne, BescoShear and SmartPac. Each of these products was selected due to the particular requirements and parameters of the applications they serve in.

Service Programs to Support Critical Production

Reading Rock and virtually all concrete block plants employ a single production line — which means that keeping that line operating is a prime concern. In addition to robust designs which eliminate adjustment and wear, Force Control also provides a 24-hour service line which is important to production manager Thacker.

"I never worry about the Force Control products going down," says Thacker, who has relied on them for years. "But if there ever is a problem, I know that I can call them anytime — night or day — for an immediate resolution to the problem."

Being located in the same city as Force Control is an advantage that every block plant would like, but few enjoy. So Force Control developed their Emergency Response Service program to give companies with critical production lines like this some peace of mind.

With this program, Force Control has popular models of its Posidyne clutch-brakes and Posistop brakes are staged around the country for immediate shipment.

Currently, factory rebuilt models (in "just like new" condition) are strategically located in Ohio, Florida and California. This allows fast response and may mean that same-day or next day delivery is possible. A return-goods-authorization number is also issued to simplify the return of the replaced unit.

The reliability and durability of oil shear technology — coupled with the Emergency Response Service — helps plants with a single production line to maintain high production. It has made a huge difference for concrete block plants in general and for Reading in particular. In short, oil shear technology keeps Reading Rockin.