

MINING | CEMENT

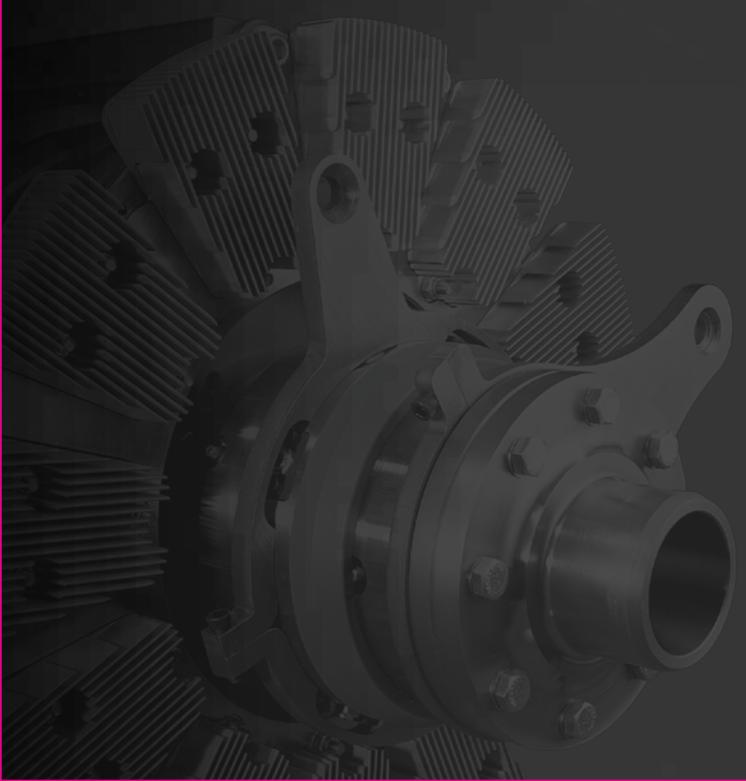


## Breakthrough Technology for Process Control

...that helps deliver more tonnage,  
safely and economically

**MagnaDrive**<sup>™</sup>

RELIABLE › EFFICIENT › SUSTAINABLE › SAFE



# More than just a coupler



## MagnaDrive couplings and adjustable speed drives (ASDs) are unsurpassed in extreme conditions that demand the highest equipment availability

Mining and cement operations are characterized by the harshest, most extreme conditions imaginable for both man and machine. Performance is measured by how many tons of material can be extracted, moved and processed in the shortest amount of time. At the same time, increasingly stringent safety and environmental standards place enormous emphasis on optimizing operations.

That means moving and processing huge amounts of material safely, and without breakdowns. Disruptions in production caused by accidents and equipment failures no longer need to be tolerated.

MagnaDrive ASDs and couplings are unequalled operating in the toughest duties. Innovative, reliable and earth friendly, MagnaDrive disconnected torque-transfer technology is virtually maintenance free and efficient. It also assures equipment availability and extends the life expectancy of the driven equipment.

MagnaDrive eliminates the physical connection between motor and load, alignment problems such as side loading and vibrations are reduced or eliminated. Reducing vibration from misalignment significantly reduces wear and tear on the equipment during normal operation. If load jamming or seizing have been an issue we are able protect the hard to replace, long lead time motor and gear box. During load seizure or over-torque conditions, the load may be disconnected from the motor. The disconnected, cushioned start is ideal for starting and accelerating huge masses of material softly, resulting in significant maintenance and energy savings.

The result is minimized life cycle costs of all the equipment, maximized safety and uptime, and the greatest possible return on investment.

**MagnaDrive disconnected torque-transfer technology for adjustable speed drives and couplings is the right solution for many of the industry's most unique and demanding process control requirements.**



# MagnaDrive rugged couplings and adjustable speed drives are the ideal solution for process control in the world's toughest industry

MagnaDrive couplings for constant or variable torque applications, and ASDs for variable-torque applications, are simple, rugged mechanical devices. Because they operate virtually maintenance free years at a time, they assure process availability and energy savings 24/7 over a 20+ year lifetime. Completely reliable in the harshest environments and toughest duties, in short, there simply is no better solution for the tough requirements of mines and cement plants.

Here are just a few MagnaDrive applications in the mining & cement industries:

## Pumps

Slurry  
Tailing  
Dewatering  
Cooling

## Fans

Bag House  
Induced Draft  
Forced Draft  
Ventilation  
Cooling Tower  
Supply

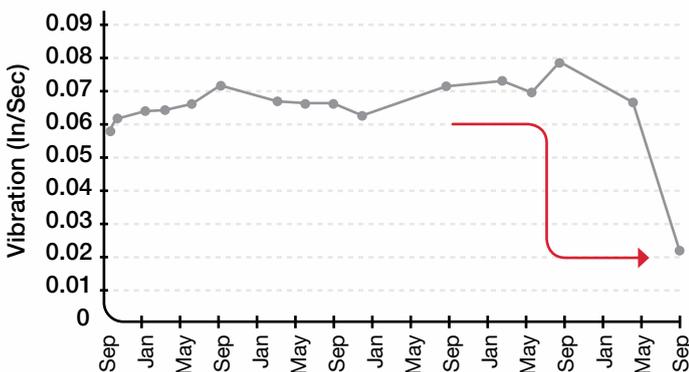
## Bulk Handling

Conveyor  
Bucket Elevators

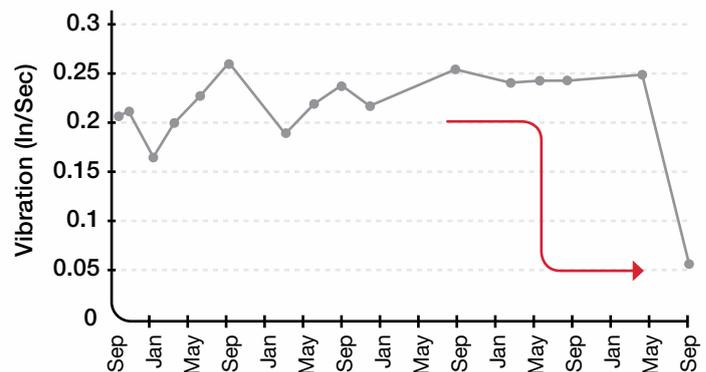
## Other Equipment

Compressor  
Clarifier  
Mixer  
Crusher  
Long Wall  
Hammer Mill  
Ball Mill  
Sizers  
Excavators  
Stackers

## Vertical Axis Vibration Measurement 75% reduction\*



## Horizontal Axis Vibration Measurement 80% reduction\*



\* In a real application after the May installation of the MagnaDrive couplings, system vibration readings show a 75% reduction in vibration vertically and an 80% reduction horizontally: The MagnaDrive couplings eliminate the need for precision alignment, a process that is critical for hydraulic couplings. The MagnaDrive couplings also eliminate the risk of environmental contamination from the hydraulic fluid. Even without taking into account the significant savings from reduced downtime due to the lower vibration levels with the MagnaDrive couplings most customers report an ROI of less than 6 months.

# Yesterday's obsolete drives and couplings are simply not affordable in today's production intense mining operations

## Codelco Chuquicamata – Chile

### Challenge

#### Reduce failure rate in the stockpile conveyor belt.

Codelco Chile is the world's largest copper mine. Part of its process involves stockpiling materials for treatment with acid, requiring complex, self governing conveyor belts guided by a GPS system. Changes in topography and even minute anomalies in belt positioning caused dangerous overloads to the hydraulic coupling. Reset operations resulted in major loss of production time, and carried significant risk of accidents.

### Result

#### Replacing the hydraulic coupling with a MagnaDrive MGD coupling increased production by 51% measured as transported tons over two years, with zero equipment failures.

The MagnaDrive MGD coupling reduced failures from at least one per month, to zero. Most importantly it has eliminated the risk of injuries. In the two year period since MGD installation, production has increased by over 16 million tons.

## Nickel Mine – Botswana

### Challenge

#### Reduce maintenance costs, cost of spare parts and downtime due to failure of hydraulic couplings.

This mine situated in Botswana, Southern Africa needed to greatly reduce the high cost of maintenance, spare holding and production downtime due to breakdowns and oil leaks on their conveyor drives that were fitted with hydraulic fluid couplings. Misalignment of the drives and vibration caused failure to the hydraulic fluid coupling bearings and seals, and oil contamination became an environmental hazard. The shut-down time to replace a hydraulic fluid coupling, with limited skilled technicians available resulted in long production delays and cost.

### Result

#### 100% reduction in operating costs relating to conveyor drives, zero holding of spare parts and complete elimination of associated production loss.

Retrofitting MagnaDrive MGD couplings to replace the hydraulic fluid couplings that were previously installed resulted in huge savings across the board, estimated at \$100,000.00 per year for maintenance and spare holding. Production improved by close to 10%, and the environmental issue of oil contamination was completely eliminated. The MagnaDrive couplings are ZERO maintenance components, and DO NOT require skilled technicians attendance. Resulting out of this success, the mine has since standardized on MagnaDrive couplings as the only preferred conveyor coupling on the plant.

### A Few of the Ideal Applications:

- Vibration Issues
- Periodic Load Seizure
- Pulsating Loads
- Thermal Expansion
- Shock Loading
- Tight Space Constraints
- Fluid Coupling Problems

### Just Some of the Features and Benefits:

- Substantial Energy Savings
- "Green" Technology
- No Physical Connection Between Motor and Load
- No Lubrication Required
- Lowest Total Cost of Ownership
- Efficient Torque Transfer
- Accepts Misalignment
- Cushioned Start
- Eliminates Vibration Between Motor and Load
- Low Maintenance
- Simple Installation & Operation
- Increases Seal & Bearing Life

# Unrivaled value for the mining & cement Industry



**MagnaDrive rugged couplings and adjustable speed drives deliver safe, reliable performance 24/7, superior process availability, lowest maintenance requirements, and unrivaled value year after year.**

- Delivers savings in maintenance and operating costs that are not possible with other technologies
- Rugged with a 20+ year lifetime
- No requirement for protection from harsh, humid or dusty environments
- Maximizes uptime for continuous duty operations
- Minimizes vibration
- Tolerates misalignment, increasing equipment life
- Does not require special cooling environments, associated wiring and additional power control equipment
- Requires minimal infrastructure, simple mechanical installation
- Limited spare parts to inventory
- Virtually no ongoing maintenance
- Does not generate harmonic interference that can reduce system efficiencies and interfere with other electronic equipment
- Tolerates "dirty" power and is not affected by electrical storms, surges or drops
- Earth friendly, requiring no oil or lubrication and produces no contaminants
- No longer need to interlock load disconnect with control system
- Unlike VFDs there is no limit on number of ASDs that can be installed

## Green Disconnected Torque Technology

MagnaDrive products continually demonstrate a significant reduction in energy consumption when connected to variable torque equipment. Most of the fans and pumps installed worldwide are oversized by 10%-15%; no engineer wants to run the risk of under sizing equipment! However, when this equipment is oversized, flow must be reduced to reach desired operating capacity. That's why most valves and dampers are always partially closed. This is like running your car with one foot on the gas pedal and the other on the brake; a great deal of energy is completely thrown away. Some operators create a bypass system where the excess flow is returned to circulation; this is also inefficient and consumes even more energy. Another way to reduce flow is to trim the pumps impeller but this reduces the pumps efficiency, can be expensive, and is a permanent change. VFDs (Variable Frequency Drives) are also an option to reduce flow by reducing speed. This can be an expensive proposition, especially since many processes have a fixed load and the VFD ends up operating at one fixed speed; VFD's also do not provide the misalignment tolerance or other mechanical benefits. MagnaDrive's standard couplings can be adjusted to reduce the load speed and flow without the expense or waste of other solutions. Where you do have a variable load, the MagnaDrive ASD is available. The resulting savings in power can be substantial.



## "Green" Energy Saving Product

**MagnaDrive Corporation | U.S.**  
14660 NE North Woodinville Way, Suite 100  
Woodinville, WA 98072  
425.463.4700

**MagnaDrive Corporation | China**  
89 Jianguo Rd. Huamao Gongyu  
Bldg. 4, STE 1506  
Chaoyang Dist. Beijing, China 100025

**MagnaDrive**





**MagnaDrive™**

RELIABLE › EFFICIENT › SUSTAINABLE › SAFE



**MagnaDrive™**

RELIABLE › EFFICIENT › SUSTAINABLE › SAFE