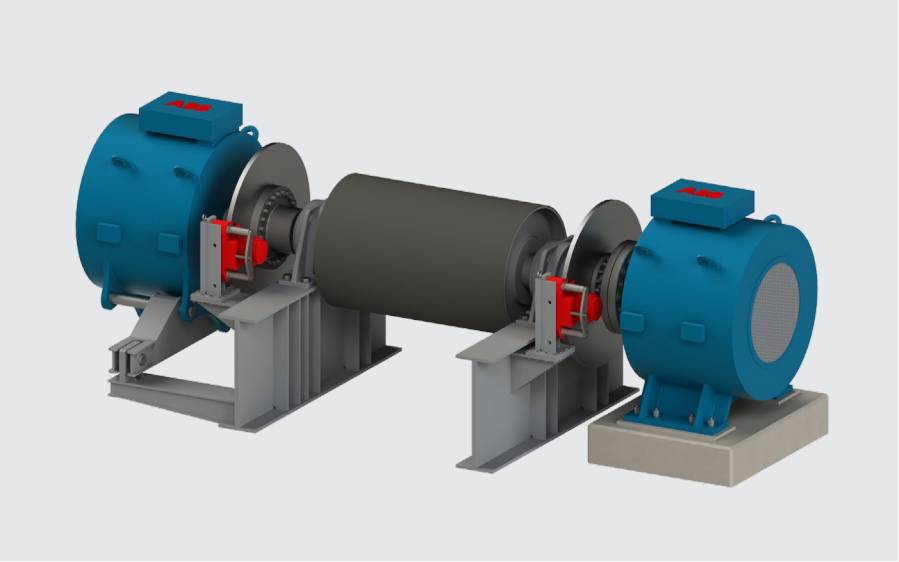
MINING

Gearless conveyor drive for medium power conveyors

Superior performance with permanent magnet motors



ABB's gearless conveyor drive, rated from 1 to 3 MW motor power, removes the need for a gearbox, thereby lowering maintenance costs while improving overall reliability leading to greater uptime.

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01 ABB's gearless conveyor drive

ABB's gearless conveyor drive for medium power applications
Improved reliability, fast installation, simple embedding and lower operational costs are the benefits of a new gearless conveyor drive (GCD) from ABB that combines permanent magnet (PM) technology with an innovative motor design.

This pioneering GCD is advanced lightweight and compact so that it can be shaft or foot-mounted and used with air- or liquid-cooling methods. Its heavy duty design is robust enough to deal with the shocks and vibrations associated with mining conveyor applications and its IP65 rating means it is totally protected from dust and water contamination.

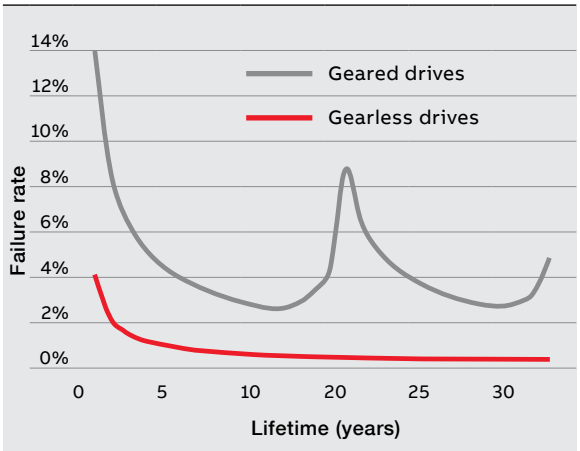
Benefits
ABB's permanent magnet motor GCD package offers all the advantages of a frequency converter using voltage source inverter topology combined with advanced PM technology, providing high flexibility and additional functionality specifically developed and customized for overland conveyors. Superior ABB products have been perfectly engineered to form a system package which meets highest performance and safety requirements.

Among the challenges faced by conventional belt conveyors is the vast array of drive constructions; from mobile units, where motors are housed within the drive station's steel enclosure to stationary structures where the motor is foot-mounted on concrete foundations. Until today all of them use a gearbox which typically needs to be completely replaced latest after some 15 years.

Gearless drives offer an industry-standard method of speed control. Apart from a simpler design, eliminating a conveyor's gearbox reduces maintenance costs while increasing reliability. Other benefits are lower energy consumption and noise levels.

01 Typical failure rate gearless vs. geared drives

02 Typical savings with MP-GCD compared to geared



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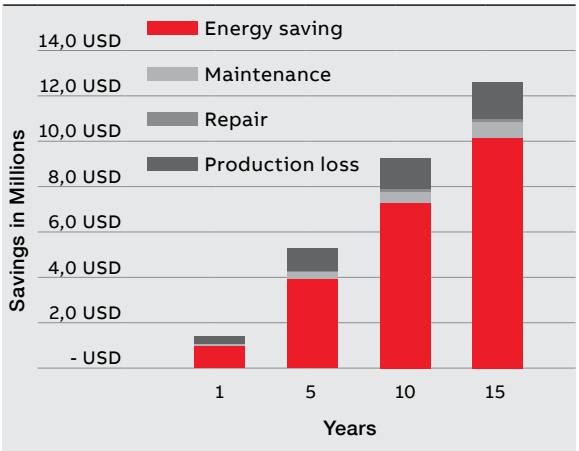

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Furthermore, ABB's GCD addresses other challenges by:

- Being lightweight and compact to overcome weight restrictions and limited space
- Enabling the motors to be shaft mounted for easy alignment and quick installation
- Avoiding the need for a concrete foundation
- Offering air- or liquid-cooled options
- Handling shock and vibrations
- Lowering noise levels

Compared to geared options, a negligible extra investment produces significant advantages:

- Operational cost savings (OPEX)
- Energy losses reduced by over 30%
- No monitoring and testing of gearboxes
- Over 50% reduced failure rate and improved equipment utilization leading to lower production losses
- Faster return on investment

The solution with convincing cost benefits

The following example demonstrates how the GCD reduces operational costs.

A commercial trade off was simulated for the conveyor system with the following figures:

Conveyor line:	4 flights
Drives:	12 drives in total
Power:	1,000 kW
	1,340 hp
Tonnage:	8,800 tph
Energy cost:	10 ct/kWh
Gearbox efficiency:	96%
Annual operation time:	6,900 hours p.a.

The result is presented in Figure 2. It shows the cumulated cost savings (includes investment) after 1, 5, 10 and 15 years of a conveyor system equipped with GCD compared to the same system with geared drives.

Major cost factors are electric energy, system maintenance, repair and loss of production. The four pillars show the saved cost for each time frame (1, 5, 10, 15 years). It is obvious that savings in electric energy and lower loss of production are biggest.

After 15 years, a mine would have saved about 12 Mio US$ by using GCD. A return on investment can be expected after less than one year.

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