Selected Conveyor References

Mining Belt Conveyors
Installed base 2023
ABB AG, BL Mining

- Chile: 66km
- Russia, Uzbekistan, Kazakhstan: 78km
- Peru: 7.5km
- China: 47.5km
- Thailand: 22km
- India: 174km
- Australia: >90km
- Cuba: 16.8km
- Germany: 220km
- Balkan region: 115km
- Colombia: 7.5km
- Tunisia, Senegal, Nigeria: 26km
- Indonesia: 5km
- Tunisia, Senegal, Nigeria: 26km
- Egypt, Sudan: 135km
- Afghanistan, Pakistan: 20km
- Malawi, Mozambique, South Africa: 40km
- Algeria: 180km
- Mozambique: 50km
## GCD References

<table>
<thead>
<tr>
<th>Year</th>
<th>mine</th>
<th>Pcs.</th>
<th>Power</th>
<th>speed</th>
<th>Torque</th>
<th>Voltage</th>
<th>Motor</th>
<th>Converter</th>
<th>Belt speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>El Teniente/ Chile</td>
<td>13</td>
<td>2500kW</td>
<td>56rpm</td>
<td>426kNm</td>
<td>2.900V</td>
<td>sync</td>
<td>ACS6000</td>
<td>6m/s</td>
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<tr>
<td>2017</td>
<td>Jänschwalde/ Germany</td>
<td>1</td>
<td>200kW</td>
<td>80rpm</td>
<td>23,8kNm</td>
<td>500V</td>
<td>Sync-PM</td>
<td>ACS880</td>
<td>6m/s</td>
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<tr>
<td>2020</td>
<td>Chuquicamata/ Chile</td>
<td>11</td>
<td>5000kW</td>
<td>53rpm</td>
<td>900kNm</td>
<td>2.800V</td>
<td>sync</td>
<td>ACS6000</td>
<td>7m/s</td>
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<td>2021</td>
<td>Severoceske Doly/ Czech Republic</td>
<td>2</td>
<td>250kW</td>
<td>48rpm</td>
<td>49,7kNm</td>
<td>690V</td>
<td>Sync-PM</td>
<td>ACS880</td>
<td>3,25m/s</td>
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</tbody>
</table>
“The interest of LEAG in this pilot project mainly lies in the expectations related to higher efficiency, lower wear and hence less expenses for repairs and maintenance, ... Since commissioning has taken place [in July 2017], the drive has been running smoothly.”

PETER SCHOLZE [2021]
HEAD OF SERVICES
OPEN PIT MINES, LEAG
Reference Project
Chuquicamata subterranéa – Codelco, Chile

- 12 x 5 MW 3KV gearless motors
- 10 x 0.5 MW VFD motors
- 05 x E-Houses / 20 modules / 820m² foodprint
- 4 x 5 MW double drives ACS6000
- 1 x 1 MW single drive ACS6000
- 10x LV drive ACS800
- 52 x Dry Transformers
- 4 x AIS MV Switchgears (43 columns)
- 8 x LV Switchgears (64 columns)
- 8 x 800xA System Servers and Workstations
- 5 x AC800M redundant Process Controllers
- ~7,000 Total I/Os (Physical and Virtuals)
- 80 km MV, LV and control cables
- 600 x Lighting fixtures
- 12 x 5 MW 3KV gearless motors
- 10 x 0.5 MW VFD motors
- 05 x E-Houses / 20 modules / 820m² foodprint
- 4 x 5 MW double drives ACS6000
- 1 x 1 MW single drive ACS6000
- 10x LV drive ACS800
- 52 x Dry Transformers
- 4 x AIS MV Switchgears (43 columns)
- 8 x LV Switchgears (64 columns)
- 8 x 800xA System Servers and Workstations
- 5 x AC800M redundant Process Controllers
- ~7,000 Total I/Os (Physical and Virtuals)
- 80 km MV, LV and control cables
- 600 x Lighting fixtures

- 60 MW total power installed
- max. 20 MW total at one gearless conveyor
- 100 partial deliveries, >3,500 tons
- >1,300 packing lots total foodprint similar to a soccer field >4,200m²

- 2022 – Intermediate Conveyors Extension
“Despite many years of experience in the construction of conveyor systems this is the first time for us to carry out a project with this new drive technology in particular. This means not conventional drive pulleys with gears and motors but 5 MW motors directly coupled to a drive pulley and in addition implemented in the conveyor system partly with four, five MW motors, in total 20 MW, but a conveyor system is of course a special challenge.”

Georg Paulick, ABB AG, Head of Commissioning [2019]
Reference project
Chuquicamata subterranea

“This solution is a long-term solution; it has to guarantee the correct operation of this infrastructure for more than 50 years. It is not a project that takes place every day. This is a world-class project.”

Carlos Gonzáles Arrojo, TAKRAF Construction Manager [2019]
Replacing diesel-trucks by conveyors - Chuquicamata

Customer Codelco (Chile) saves ~ 340,000 t CO2 p.a. in comparison to the Mining Truck fleet
Reference Project
Overland Conveyors El Teniente – CODELCO, Chile

- 30 MW total power installed
- max. 10 MW total at one gearless conveyor

- 12 x 2.5 MW 3KV gearless motors
- 4 x E-Houses
- 4 x 5 MW double drives ACS6000
- NEMA MCCs, LV Switchgears
- 33kV AIS MV Switchgears
- 19 x Dry Transformers

- AC800M redundant Process Controllers
- ~5,000 Total I/Os (Physical and Virtuals)
- 800xA System Servers and Workstations
- Lighting fixtures
- MV, LV and control cables
Reference project

2x 48kNm drive at Bílina Mine

Shaft mounted drive
Low-speed gearless conveyor drives at Bílina mine, Czech Republic
A collaboration between ABB and PRODECO

333m-long

OUR SOLUTION
No gearbox
Replaced with Permanent Magnet Motor technology

FEATURES

- Fewer components, lightweight and compact
- 30 years lifetime vs 15–17 years for gearbox
- No oil needed
- Drive unit placed at the bottom of the steel structure
- More precise bearings
- Damped idlers
- Motor turning at 48rpm, vs 1,000rpm with drives containing gearboxes
- Produce the same torque/power with 20–25% less motor current
- Complete covering of the top, equipping the top at the return station of the downstream conveyor with a shock bed

Improve reliability...
Reduced maintenance and risk of failure
Preserve the use of resources
Reduced noise pollution from more than 85dB(A) to 73dB(A) (A-weighted decibels)
Reduced energy consumption by an estimated 6–10%
Reduced CO₂ footprint by 6–10%
Reduced dust pollution

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Gearless conveyor drive at Bílina mine, Czech Republic

- **Reduced maintenance and risk of failure**
- **Preserve the use of resources**
- **Reduced energy consumption** by an estimated 6–10% (no gearbox = no oil)
- **Reduced fire risk**
- **+10 years lifetime** vs a geared drive
- **Reduced noise pollution** from more than 85dB(A) to 73dB(A)
- **Reduced CO₂ footprint** by 6–10%

*Improve reliability...*  
...while simultaneously bring sustainable benefits to local communities and beyond.*
Overburden Conveyor Tamnava West/ Serbia
ACS800 LV drives and process control

Central control room
Conveyor drive station
Scope and features

Contractor: FAM GmbH, Germany
End user: EPS, Republic of Serbia

Mechanical performance data:
• 5 pcs 2000mm belt drive stations with return station
• 1 tripper car, 2 hopper cars

Scope of ABB:
• Medium voltage switchgears, Low voltage switchgears
• Transformers, Control system, Frequency converters
• Motors 1000kW, Field devices, Cables
• Containers, Communication system (WLAN, Radio)
• Engineering, Supervision, Erection
• Commissioning and tests

Key features:
• ABB AC 800F controller system
• ABB ACS 800 technology
• Central control room (CCR) with 800xA for > 7,500 I/O’s
• 4 Operator workplaces, 2 Service workplaces
• Optimized belt speed regulation (OBS)
• WLAN data communication
High altitude conveyor at Collahuasi / Chile
Extreme conditions – since 2003
High altitude conveyor at Collahuasi / Chile

Extreme conditions – since 2003
High altitude conveyor at Collahuasi / Chile
Extreme conditions – since 2003
Collahuasi / Chile
High altitude: 4500masl

Site information:
- Copper mine, Chile, 4,500 m above MSL
- OEM: ThyssenKrupp Robins Inc. Canada / TAKRAF GmbH, Germany (crusher)
- End user: Doña Ines de Collahuasi SCM (CMDIC)
- Commissioning in 2003/2004; 2014 2 new conveyors

Mechanical performance data:
- more than 8.5 km total length, 10,000 t/h
- gyratory crusher 750 kW / 3.3 kV

Scope of ABB:
- 5 up- and down-hill belt conveyors
- redundant ABB AC 800 M control and MCCP conveyor control
- conveyor drives: 5 pcs. ACS 6000 (VFD) for 14 x 2000 kW motors
- eHouses, MV- and LV- switchgears
- frequent support and service
Advanced process control
Coal Conveyor Welzow South/ Germany - 60y+ experience

- Upgrade of 9 flights (>9km in total)
- MCCP drive control for n x 1250kW motors VFD controlled
- ABB LV drives (ACS600, ACS800, ACS880)
- Optimized Conveyor Load function
- Constantly upgraded and service until today
- Service contract
- 98% Availability
Tianjin Coke/ China – Overland Conveyor (7.6km),
Head/ Tail synchronization with MCCP
Cadia East/ Australia – underground gold mine (2010)
Electronic Compact Resistor Starter (ECOSS)
Overburden Bridge F60 Reichwalde/ Germany

- Since 2009/2010
- 23 ECOSS drives at overburden conveyor bridge F60 Reichwalde/Germany
- 400kW up to 1500kW
Binary resistor starter
El Abra/ Chile

- Since 1996
- Stepped rotor resistance
- DC injection braking
- 8 conveyors, 32km in total
- Longest single flight = 9.6km; downhill conveyor
- Motor power 4 x 1800kW (WRIM)
Tobene / Senegal

- ACS800 VFD
- 6.9km length
- Motor power 3 x 710kW
- MCCP drive control