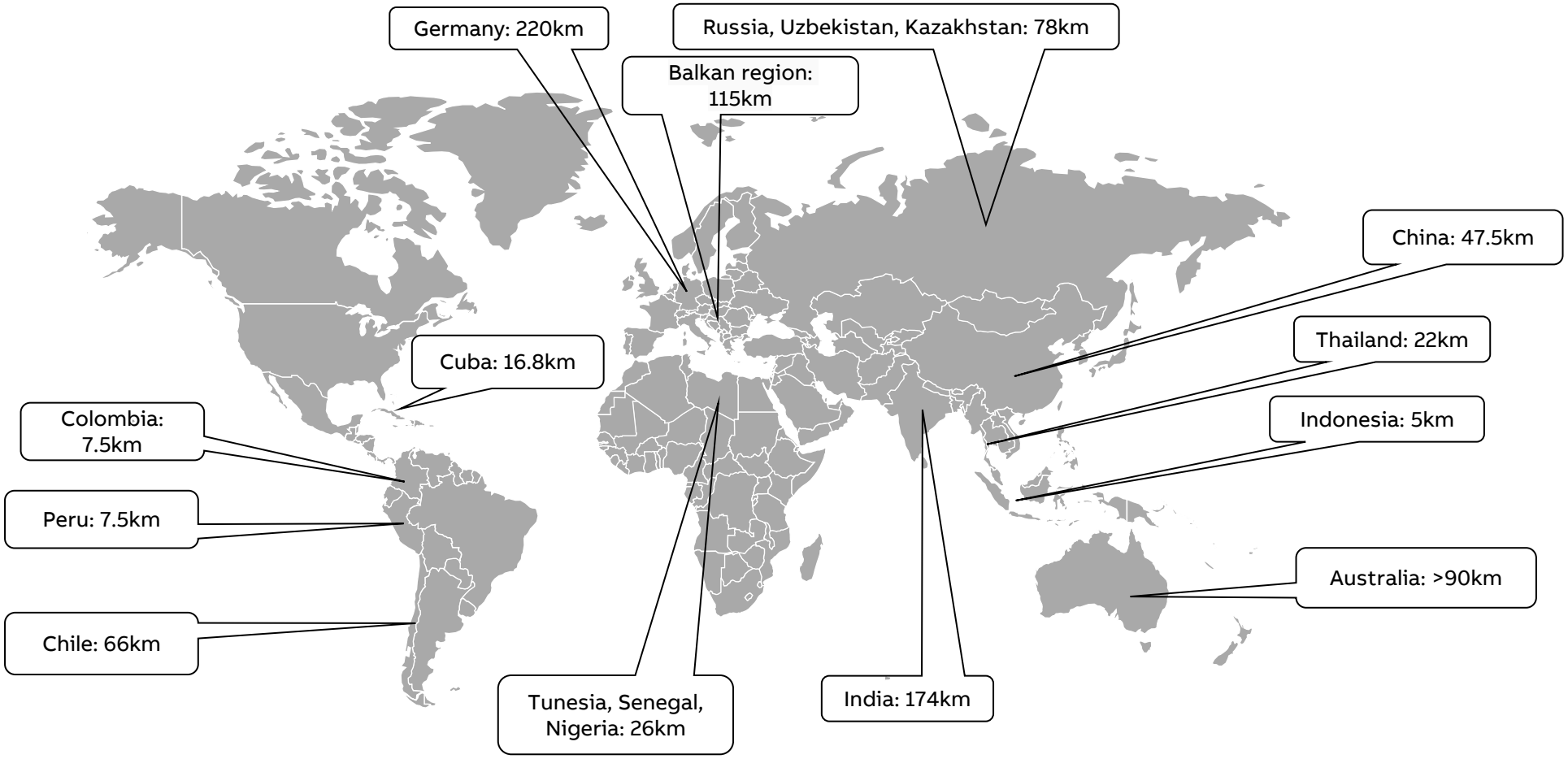
ABB AG, BL MINING

Selected Conveyor References

Mining Belt Conveyors

Installed base 2023

ABB AG, BL Mining



GCD References

Year	mine	Pcs.	Power	speed	Torque	Voltage	Motor	Frequency Converter	Belt speed
2013	El Teniente/ Chile	13	2500kW	56rpm	426kNm	2.900V	sync	ACS6000	6m/s
2017	Jänschwalde/ Germany	1	200kW	80rpm	23,8kNm	500V	Sync-PM	ACS880	6m/s
2020	Chuquicamata/ Chile	11	5000kW	53rpm	900kNm	2.800V	sync	ACS6000	7m/s
2021	Severoceske Doly/ Czech Republic	2	250kW	48rpm	49,7kNm	690V	Sync-PM	ACS880	3,25m/s

Reference project

Pilot project at LEAG/ Germany

“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

- 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**

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

8 x LV Switchgears (64 columns)

4 x AIS MV Switchgears (43 columns)

52 x Dry Transformers

5 x AC800M redundant Process Controllers

~7.000 Total I/Os (Physical and Virtuals)

8 x 800xA System Servers and Workstations

600 x Lighting fixtures

80 km MV, LV and control cables

Reference project
Chuquicamata subterranéa

“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 subterranéa

“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

13 km long

1,200m of altitude difference

55MW of GCD high power in total

120 less large haul trucks needed

130 Mio liters of gasoline consumption saved per year

70% reduction of carbon emissions

+40 years of mine operations

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

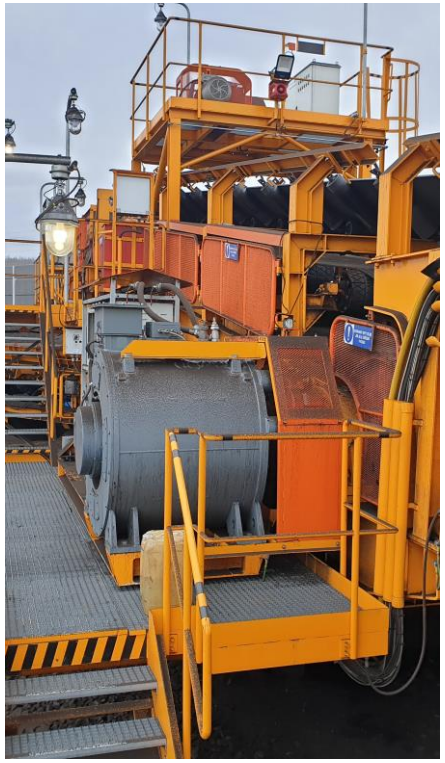
Lighting fixtures

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

…while simultaneously bring sustainable benefits to local communities and beyond

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 CO_2 footprint by 6–10%

Reduced dust pollution

Gearless conveyor drive at Bílina mine, Czech Republic

Improve reliability… …while simultaneously **bring sustainable benefits** to local communities and beyond.

No gearbox
Replaced with Permanent Magnet Motor technology

Reduced maintenance and risk of failure

+10 years
lifetime vs a geared drive

Preserve the use of resources

Reduced noise pollution
from more than 85dB(A) to
73dB(A)

Reduced energy consumption by an estimated
6–10%

Reduced CO_2 footprint by
6–10%

Reduced fire risk (no gearbox = no oil)

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

Semi Mobile Crusher - Sino Iron NT (AU)

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 lenght
- Motor power 3 x 710kW
- MCCP drive control


ABB