MINING PILOT PROJECT

Retrofit of a 200 kW conveyor drive with medium power gearless PM motor in the open-pit lignite mine Jänschwalde

ABB’s new product innovation, the permanent magnet motor (PMM) for medium power gearless conveyor drives (Medium Power GCD) reduces production costs and increases competitiveness.

The technology fulfills eco design requirements and saves energy costs. It also reduces the failure rate and the maintenance costs.

In July 2017, after one year of planning, the pilot project “gearless conveyor drive with PM motor” has started in collaboration with Lausitz Energie Bergbau AG (LEAG) in the open-pit lignite mine Jänschwalde, located close to Cottbus, Germany.

The installation
The new gearless drive is installed and running in parallel to the existing geared drive on the discharge belt of a Bucket Chain Excavator ES3750. Both drives are connected to the same pulley shaft. This allows for exact performance benchmarking. The two drives are sized according to LEAG’s specifications and allow for 100% production with each drive independently.

The time frame for dismantling, installation and commissioning of the new drive was only two weeks.

Main benefits of the GCD
• Higher reliability (50% lower failure rate) and less maintenance
• Higher efficiency with lower energy consumption (according ISO 50001) and lower noise emission
• Extended lifecycle (expected motor lifetime of 25 years is 10 years longer than with gearbox)

Expected outcome of the pilot project
• Demonstrate the feasibility to install gearless conveyor drives on mobile mining machines and conveyors
• Demonstrate the suitability of PM torque motors as conveyor drive motor
• Demonstrate the potential for energy savings, reduction of failure rate and maintenance, etc.
• Prove the possibility to install gearless drives to fulfill eco design requirements according to ISO 50001 (energy efficiency) as an alternative to maintain environmental certification for mining companies

Main benefits of the PM GCD
• Low weight and compact size
• Foot or shaft mounting
• Air or liquid cooling
• Mining specific heavy duty design
• High degree of protection (up to IP66)
• Designed for rough ambient conditions
Conveyor type
The belt is an excavator discharge belt. It is located at the end of the discharge boom.
Belt width: 2.5m
Belt type: textile
Capacity: 15,400 tons per hour

Complete GCD drive package
• Permanent magnet motor
• Frequency converter
• Transformer

Measurement system for pilot project
High speed recording of:
• Mechanical sensors
• Torque at pulley shaft
• Speed and position of PM motor shaft
• Frequency converter
• Motor torques
• Motor speeds
• Speed and torque references
• Belt load

Ambient conditions
Rough conditions of open pit mine
Material: sand with, partially large rocks (ice age “foundlings”)
Design temperature: -25 °C to +40 °C
Relative humidity: 90 % at 20 °C
Shock: 2g/1ms
Vibration: 0.25g (1 … 100Hz)
Gradient: ± 5% (equals 1:20)
Wind: up to 100km/h once a year

The conditions display the worst case scenario.

For more information, please contact us.