ABB Hoisting Systems at Kemi Mine, Finland

The Kemi Mine

The Kemi Mine, situated close to the town of Kemi near the Gulf of Bothnia coast in northern Finland, is part of Outokumpu Chrome Oy. It produces chrome concentrates that are used as raw materials in the company's ferrochrome works in Tornio.

The chrome deposit was discovered in 1959 and the decision to start exploitation of the ore was made in 1964.

At the end of September 2003 the company inaugurated underground mining at the Kemi Mine. ABB has supplied two complete mine hoisting systems that are part of the project, where Kemi Mine will gradually switch over from open pit to underground mining in order to lower the production costs.

The central control room at Kemi Mine

Scope of delivery for friction type production hoist

Mechanical

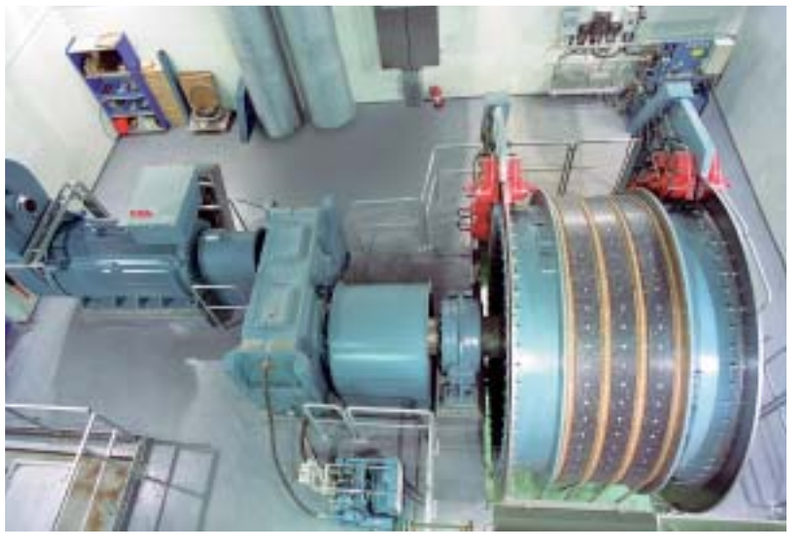
- Pulley, diameter 3.2 m, with friction linings, shaft, bearings, couplings and gearbox
- Deflection sheaves with one sheave fixed to the shaft and the other floating on the shaft
- Skip with integrated cage on one side and a counterweight on the other side
- Measuring pocket at loading station
- 4 head ropes with attachments including hydraulic adjuster links and rope tension measurement
- 3 tail ropes with attachments
- Top and bottom overwinding wedge-type arrestors
- Half-locked coil guide ropes, four for the skip/cage and two for the counterweight
- Hydraulic disc brake system with controlled retardation
- Groove turning device for trimming the diameters of the friction linings

Electrical

- HV/LV transformer
- 1,600 kW induction motor
- ACS600 fully digital frequency converter with DTC, Direct Torque Control with active front end that controls the power factor at unity, i.e. does not produce any reactive power. Further, the harmonic current generation in the converter is very low
- Advant controller AC110-based hoist control system for fully automatic control of both skip hoisting and men transportation from three levels in the shaft
- Operator control desk in the central control room and local operating unit in the headframe
- Low-voltage distribution including power supply for the control system and auxiliary motors
- Loading control box and cage shaft level control boxes for hoist operation
- Skip loading apparatus, hoist control shaft apparatus and cage boarding apparatus at the shaft levels
- AHM110 digital hoist monitor to provide back-up protection and supervision of the control system

Hydraulic station for the brake system

ACS600 drive for the production hoist



Production hoist with 1,600 kW induction motor

Scope of delivery for single drum service hoist

Mechanical

- Drum, diameter 1.16 m, with shaft, bearings, couplings and gearbox
- Head sheave
- Cage
- Head rope with attachments
- Hydraulic disc brake system with controlled retardation
- 4 half-locked coil guide ropes

Electrical

- HV/LV transformer
- 75 kW induction motor
- ACS600 fully digital frequency converter with DTC, Direct Torque Control
- Advant controller AC110-based hoist control system for fully automatic control of men transportation from four levels in the shaft
- Operator control desk in the central control room and local operating unit in the headframe
- Low-voltage distribution including power supply for the control system and auxiliary motors
- Control boxes for the service hoist levels
- Hoist control shaft apparatus and cage boarding apparatus at the shaft levels including moveable platforms
- AHM110 digital hoist monitor to provide back-up protection and supervision of the control system

Disc brake system for the production hoist

Rope attachments for the production hoist

Skip with lower inspection platform

General data of the hoisting systems at Kemi Mine

	Production hoist	Service hoist
Shaft diameter	5.2 m	5.2 m
Hoisting distance	574 m	538 m
Payload	26 tonnes	600 kg
Design speed	10 m/s	3 m/s
Cage capacity	20 persons	6 persons
Pulley/drum diameter	3.2 m	1.16 m
Drive system	ACS600	ACS600
Motor type	Induction motor	Induction motor
Motor output	1,600 kW	75 kW
Motor voltage	690 V	400 V
Motor frequency	52.2 Hz	50 Hz
Motor speed	1,041 rpm	992 rpm
Cooling form	IC 416	IC 411

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