



**SIEMAG
TECBERG**



TECHNICAL INFORMATION

BLAIR MULTI-ROPE DOUBLE-DRUM WINDER

(GOLD FIELDS, SOUTH DEEP GOLD MINES, JOHANNESBURG, SOUTH AFRICA)

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BLAIR MULTI-ROPE DOUBLE-DRUM WINDER

By order of Placer Dome/Western Areas Joint Venture, SIEMAG TECBERG built a large Blair multi-rope double-drum winder for production at South Deep Gold Mines (Westonaria/South Africa). (Since December 2006 this mine is owned by Gold Fields, Johannesburg/ South Africa.) With a space requirement of 33 meters in length, a width of 11 meters and a total machine weight of about 1,050 tons (incl. motor, without foundation), this machine is likely to be the largest winder in the world.

The machine operates as a production winder for the rock hoisting shaft of the South Deep Gold Mines. The shaft has a depth of 3,000 metres, resulting in the machine carrying a total of 4 x 3,350 metres of rope. The supply of installations and machinery for shafts of this depth has been made possible by the new guideline SANS 10294, which requires special measures to be taken to allow hoisting from such depths. Now increased attention is paid to compliance with admissible and common dynamic loads applied on the ropes, while at the same time higher static load is allowed.

In order to minimize the stress on the ropes, a large winder drum diameter of 7.1 m was selected for achieving a rope pressure below 3 MPa. Each of the two skips in the shaft is suspended on two ropes, which are coiled up on separate drum compartments. Due to the length of each drum and the maximum allowable obliquity of the ropes, the two double-rope drums have been arranged at an angle of 4.5° to one another, thus necessitating the installation of a Hooke's joint (cardan) between the two drums. The driving power of almost 13,000 kW is supplied by two directly coupled AC motors, which are located at the free ends of the machine in an overhung configuration. Owing to the use of a Hooke's joint, the motor torque required is reduced as a result of the compensating torque of the second drum. This system differs from an „electrically coupled Blair winder“ which, from a mechanical point of view, consists of two completely separate machines.

Each of the drums is fitted with a clutch, thus assuring the positioning of the two skips independently in the shaft, at any time and in any position.



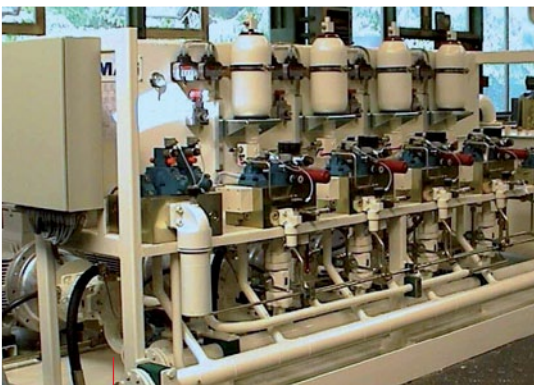
Hooke's Joint

Brake Post with BE 200

A total of 32 brake calipers of the new SIEMAG TECBERG type BE 200 act on the two brake discs of each drum. They exert a force of 12,800 kN which brings the machine safely to a halt under any normal load condition. The brake system has the 4-channel closed-loop design, where each channel acts on both drums. Therefore, in the clutching mode too, all the channels are available. With the safety brake, the braking force is controlled in such a way that the machine comes to a standstill with a set retardation. Even in the event of an entire brake-circuit failure, this design ensures that the machine is stopped in a controlled way. At all times, gentle acceleration transitions (“jerk limitation”) are provided which are important for limiting the dynamic stress value on the ropes.

The machine was essentially manufactured in South Africa, while the design and major components, such as the main shafts, the Hooke’s joint, and in particular the entire brake system were supplied from Germany.

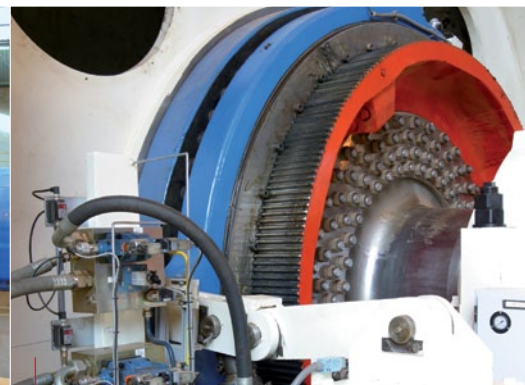
In this project, SIEMAG TECBERG has, for the first time, executed a contract for a Blair multi-rope double-drum winder for the South African market. Constructing this exceptional machine was a special challenge, which SIEMAG TECBERG was successfully able to meet thanks to its experience with Blair winders previously installed in Europe and Asia.



4-Channel Hydraulic Brake Control System



General Overview



Three-Parted Clutch

TECHNICAL DATA (METRIC DIMENSIONS)

Type of Hoisting	Production
Hoisting Capacity	255,000 t/month
Conveyances	2 Skips in balance
Hoisting Distance	3,000 m
Payload	31 t
Hoisting Speed	18 m/s
Type of Winder	DDBW / 7100 / D (Blair Multi-Rope Double-Drum)
Drum Diameter	7.1 m
Coiling Width	1.9 m
Number of Rope Layers	4
Load per Compartment	1,050 kN

Number of Ropes/ Conveyance	2
Rope Diameter	49 mm
Rope Mass	10.18 kg/m
Rope Breaking Load	1,878 kN
Type of Brake	Disc Brakes, 2 Discs per Drum
Number of Brake Posts	8 in total
Number and Type of Brake Calipers	32 Pairs BE 200
Type of Brake Control	4 Independent Channels
Type of Emergency Braking	Fully Closed-Loop Controlled Brake



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