



**SIEMAG  
TECBERG**

**TECHNICAL INFORMATION**

# **PRODUCTION, SERVICE, AND AUXILIARY HOISTING SYSTEM**

(PALABORA MINING COMPANY, PHALABORWA, SOUTH AFRICA)

## TECHNICAL INFORMATION

# SHAFT HOISTING SYSTEMS

In the past, Palabora Mining Company operated an opencast copper ore mine in South Africa which reached its ultimate depth in 2002. However, since the ore body extends to greater depths, a decision was taken in favour of a block caving underground mining with access via a twin shaft system going to a depth of about 1,400 m.

In addition to the production shaft with a daily capacity of 30,000 metric tons, provision is being made for a material and men-riding shaft. SIEMAG TECBERG provided the winding equipment for both shafts: two 4-rope winders with an integrated drive for the production shaft, a 6-rope winder for the service shaft, also with an integrated drive, and a 2-rope auxiliary winding engine for men-riding. The scope of work also included deflection sheaves, three clamping and lifting devices, as well as rope installation and changing equipment including a mobile friction winch.

With the experience of similar size hoisting installations in Germany, SIEMAG TECBERG was involved from the early planning phase. The high degree of operating experience and perceptible advantages convinced Palabora to select space-saving friction winders with integrated drives. It was thus possible to install both machines for the production shaft on one winding platform of the winding tower, thereby considerably reducing the construction volume:

### WINDERS

The three integrated winders all have a friction pulley diameter of 6.2 m, a payload of 32 and 35 tons, respectively, and an operating rope load of up to 1,700 kN. The RMS motor power of the production winder is 6,400 kW, making these the largest winding engines in

the world of this type. The service winder is equipped with an identical motor, which is utilized slightly less due to lower speed and unbalanced load. It operates a large cage of 35 tons payload that allows transport of equipment of approx. size 9 x 3 x 4.5 m.

### DEFLECTION SHEAVES

The deflection sheaves of diameter 6.2 m are built with a stationary axle and the sheaves turn on individual roller bearings. This design avoids the typical use of bushes thus offering longer maintenance intervals. The rope attachments are designed with electronic measuring devices in one compartment, and extended resetting range in the second one.

### CLAMPING AND LIFTING DEVICES

Both shafts are equipped with clamping and lifting devices to allow fast and safe handling of all ropes simultaneously, e.g. when ropes must be shortened. They are designed for the maximum service loads and can consequently be used for pulling longer distances by operating a number of consecutive working cycles.

### MOBILE FRICTION WINCH

The mobile friction winch is used for the simultaneous installation of all ropes such as the 6 ropes of the service winder. Furthermore, it will be used for fast and safe changing of all the winding ropes at Palabora, being designed for handling 1 to 6 ropes of different diameters and with a maximum traction force of 1,500 kN.

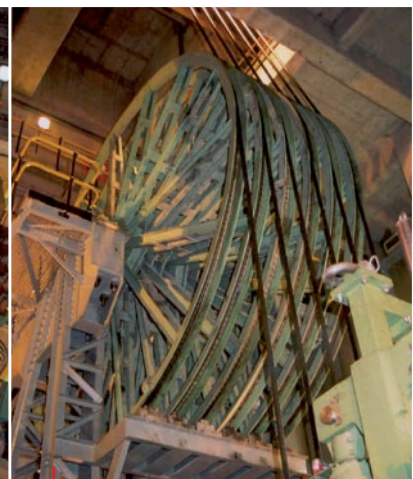
Separate *Technical Information* is available on Clamping and Lifting Devices and Friction Winches.



6-Rope Service Winder and 2-Rope Auxiliary Winder



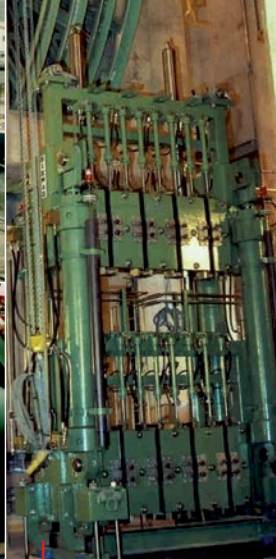
4-Rope Koepe Production Winders



6-Rope Deflection Sheaves



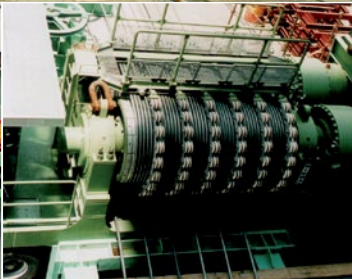
Multi-Rope Friction Winch



4-Rope Clamping and Lifting Device

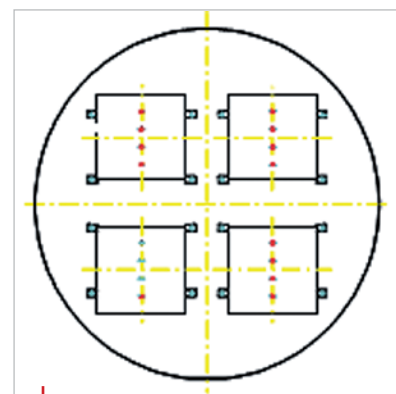


Simultaneous Rope Handling

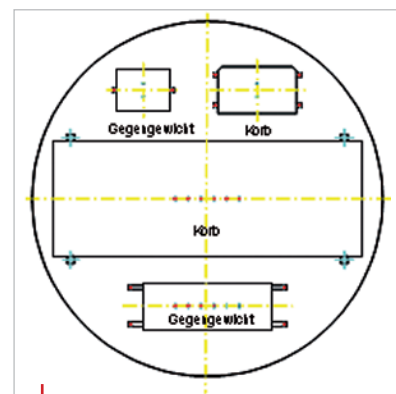


### TECHNICAL DATA (METRIC DIMENSIONS)

Type of Hoisting	Production/Service/Auxiliary
Production Capacity	2 x 980 t/h
Conveyances	2 x 2 skips, cages, and counterweights
Hoisting Distance	1,279/1,263/1,236 m
Payload	32/35/1.4 t
Hoisting Speed	18/12/8 m/s
Type of Winder	KW / 6200 / IM, KW / 6200 / IM, KW / 3350 / G
Drum Diameter	6.2/6.2/3.35 m
RMS Power	6,200/3,000/154 kW
Winder Speed	55/37/46 rpm
Suspended Rope Load	1,700/1,700/190 kN
Number of Ropes/Conveyance	4/6/2
Rope Diameter	48/48/19 mm
Rope Mass, each	13.0/13.0/1.92 kg/m
Rope Breaking Load	4 x 2,080/6 x 2,080/2 x 350 kN
Type of Brake	Disc brakes, 2/2/1 Disc(s)
Number of Brake Posts	3/4/2
Number and Type of Brake Calipers	14/14/ 2 BE 100
Type of Brake Control	ST N with 4/4/2 channels
Type of Emergency Braking	Fully closed-loop controlled brake force



Production shaft, diameter 7.4 m



Service shaft, diameter 9.9 m



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