



CWRM Holdings

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ROPE LIFE IMPROVEMENT USING OIL

This document highlights the rope life improvements achieved in the past and currently, through a structured wire rope maintenance programme, which includes the value attained through oil lubrication, the methods of application, rope cleaning with dry ice and compressed air, and the ultimate control and management of the programme.

For further information, the OIPEEC Paper “**Managing and Lubricating Ropes with Oil**” can be obtained by emailing your request to info@cwrmglobal.co.za.

Field Results

Some of the practical field results with various mining groups are detailed below.

1. Gold Fields – Libanon GM, No. 4 SV Shaft Koepe Winder Tail Ropes

The standard rope life for the previous 10 sets of tail ropes was on average 18½ months and these had to be replaced due to excessive corrosion. The ropes were lubricated for the first time with oil after being in service for 12 months, leaving 6½ months before they would normally be due for replacement.

Special spray applicators were manufactured that were used to lubricate the tail ropes with oil. This was done every month for 31 months and the ropes were eventually replaced after 43 months in service with an overall rope life improvement of 232%.

Number of Ropes	4
Diameter of Ropes	48mm (non-spin fibre core)
Length of Ropes	1,800m
Rope Construction	[17 RHO/LHO/LH] 11x19(9/9/1) 6x19(9/9/1)
Average Rope Life	18.5 months (for the past ten sets)
Achieved Life with lubrication	43.0 months
Ropes Lubricated with Oil	31 months
Rope Life Improvement	24.5 months (232%)

2. AngloGold Ashanti - Savuka Gold Mine - Koepe Winder Head Ropes

The Oil Lubrication Method was on display in 1998 at one of the Electra Mining Exhibitions. At that time, due to the short rope lives experienced, the Savuka Mine Engineer was interested in applying the recommended Wire Rope Lubricating Oil to the Koepe Winder Head Ropes.

The ropes were subsequently manually lubricated, one rope at a time one day apart, in the following sequence: - rope 1 - day 1, rope 2 – day 2, etc. (N.B. The Automatic Lubricating System for Koepe Winder Head Ropes has been based on this principle).

The standard rope life for the previous 5 sets of Koepe Head Ropes was on average 8-months and these were replaced due to excessive corrosion. The ropes were lubricated for the first time with oil after being in service for 4-months, leaving 4-months before they would normally be due for replacement. The ropes were replaced after 12 months in service, with an overall rope life improvement of 50%.

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Number of Ropes	4
Diameter of Ropes	44mm (non-spin)
Length of Ropes	2,000m
Rope Construction	15 strand fishback 9x10(8/2)16x14(8/6) WMC non-spin
Average Rope Life	8.0 months (for the past 5 sets)
Achieved Life with lubrication	12.0 months
Ropes Lubricated with Oil	4.0 months
Rope Life Improvement	4.0 months (50%)

3. Lonmin Platinum - Karee No. 3 Shaft – Double Drum Rock Winder

The standard rope life for the previous 7 sets of 54mm triangular strand ropes was on average 116,800 cycles. To date, Turboplast ropes have been lubricated with an ISO 200 cSt wire rope lubricating oil automatically. At time of writing, the rope life is at 335,700 cycles, a 2,87 times rope life improvement with only two broken wires detected during routine magnetic non-destructive testing.

The rope lubrication is applied by an automated system supported by an external rope maintenance programme.

Number of Ropes	2
Diameter of Ropes	54mm
Length of Ropes	1,100m
Average Rope Life (for the past 7 sets)	116,800 cycles [Triangular Strand Ropes]
Achieved Rope Life to date (with oil lubrication)	335,700 cycles [Turboplast Ropes]
Improvement to Date	218,900 cycles
Rope Life Improvement	2.88 x

Please Note: It is estimated that these ropes could last at least another 100,000 cycles.

3.1 Lonmin Platinum - Karee No. 3 Shaft (Prepared by Casar and Karee Engineer, 2007)

Karee No. 3 Shaft	TURBOPLAST	TSR
Rope life to discard, guaranteed and average (cycles)	250,000	116,800
Rope life to discard, guaranteed and average (months)	35.7	16.7
Total rock hoisted by rope set at discard (tonnes)	8,000,000	3,737,600
Back ends done every (cycles)	30,000	10,000
Number of back ends done in rope life	8	11
Direct cost of one backend (Euro)	5,000	5,000
Total cost of all back ends for rope life to discard (Euro)	40,000	55,000
Direct installation cost (Euro)	10,000	10,000
Direct lubrication material cost over rope life (Euro)	21,400	3,300
As delivered cost of one rope set, mid 2004 (Euro)	163,400	102,900
Total direct cost of one rope set (Euro)	234,800	171,200
Rope cost (Euro / 1,000 tonne hoisted)	29.35	45.80
Relative rope cost per 1,000 tonne hoisted	1.00	1.56
Saving per annum compared to TSR (Euro)	44,200	
Saving over life of rope set compared to TSR (Euro)	131,600	
Saving over life of rope set compared to TSR (% of rope cost)	81%	

Table 4: Cost benefit relationship for TURBOPLAST (Casar) compared to Triangular strand ropes (TSR).

Conclusion

The resultant savings speak for themselves. The return on investment of a CWRM structured wire rope maintenance programme using oil is probably one of the highest investments that can be made. Therefore, the overall cost of the lubrication system, the lubricant, the warranty and maintenance become extremely insignificant in the bigger picture.