

Application Success Story



Photo courtesy of FLSmidth



HIGHLIGHTS

- Spring-applied, hydraulically-released stopping and parking brake
- VR models feature large pads (174700 mm² each pad) for higher rubbing speeds and greater thermal capacity
- 240 kN braking force each, 12.2 MNm combined braking torque
- Unique 'parked-off' feature

PROBLEM

FLSmidth, a leading global mine hoist OEM, required a new brake solution for use on a hoist at the Mopani Copper Mines' Nkana site in Zambia. The copper and cobalt mine is one of the largest in Africa with four underground mines as well as an open pit.

The Blair multi-rope (BMR) double-drum hoist, with a payload of 47.5 tons, operates at speeds up to 17.6 m/s in a 1,278 m deep shaft. The brakes are used for parking/holding each time the mine winder stops as well as in an emergency (eg: power failure). The brakes bring the load to rest while controlling the deceleration to a maximum of 2.3 m/s².

SOLUTION

Based on many past successful collaborations, FLSmidth chose to work with Twiflex and their distribution partner, Tritec Sintered Products. To meet the hoist's higher rubbing speeds and provide a higher thermal capacity for the emergency stop, Twiflex engineers designed a new large pad version (174700 mm² each pad) of its popular VMS3-SPS spring-applied, hydraulically-released brake which is widely used on mine hoists around the world.

Twiflex supplied 16 off VMS3-VR spring-applied, hydraulically-released brakes, 8 off for the fixed drum and 8 off for the clutched drum. The brakes operate on two 6800 mm dia discs (70 mm thick) to produce a total braking torque of 12.2 MNm. For this application, each VMS3-VR is rated at 240 kN braking force with a 2 mm air gap which provides a fatigue life of over 2 million braking cycles. The VMS3-VR can produce up to 285 kN braking force at this air gap but with a reduced cycle life.

The VMS3 design incorporates a unique 'parked-off' feature which allows the brake to be adjusted under hydraulic pressure so that when it is removed there is no stored energy making it completely safe for maintenance. The VMS3 design incorporates a unique 'parked-off' feature which allows the brake to be adjusted under hydraulic pressure so that when it is removed there is no stored energy making it completely safe for maintenance.

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