Warner Electric

Boston Gear

TB Wood's

Formsprag Clutch

Wichita Clutch

Marland Clutch

Industrial Clutch

Bauer Gear Motor

Svendborg Brakes

Nuttall Gear

Warner Linear

Delroyd Worm Gear

Stieber Clutch

Ameridrives Couplings

Inertia Dynamics

Matrix International

Huco Dynatork

Bibby Turboflex

Twiflex Limited

Kilian Manufacturing

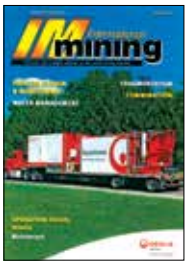
Lamiflex Couplings

Ameridrives Power Transmission

Excerpted From

Effective (Ore) Liberation

As seen in
International Mining
March 2014



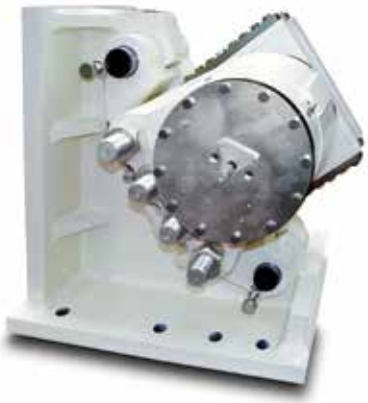
Twiflex® Limited

An Altra Industrial Motion Company

Excerpted From

Effective (Ore) Liberation

by Robert Pell
Assistant Editor, International Mining



The VMS-FL has a braking force rating of 460 kN which assumes a coefficient of friction of 0.4 and 2 mm pad air gap.

Brakes and Maintenance

Twiflex, which is part of the Heavy-Duty Overrunning Clutch and Brake division of Altra Industrial Motion, supplies braking systems for both geared and gearless grinding mills. Twiflex told IM that their main focus over the last 12 months has been the development of a large mono spring (floating) spring applied, hydraulic release disc brake for the dual pinion direct drive geared mills. The result has been the introduction of the VMS-FL which is based on Twiflex's popular VMS range commonly used on mine hoists. The VMS-FL has a braking force rating of 460 kN which assumes a coefficient of friction of 0.4 and 2 mm pad air gap, and the design incorporates Twiflex's unique safety 'park-off' feature meaning the brake can be adjusted so when depressurized there is zero stored energy for maximum safety.

The VMS-FL is used in conjunction with a torque limiter fitted between the motor and gearbox. During maintenance when the motor is shut down and the torque limiter is disengaged, the brake is activated to hold the mill drive stationary and prevent the mill from moving due to the unbalanced load. The requirement of the brakes is to hold the mill charge at an angle of up to 45°.

In normal operation, after the mill controller receives the stop command from the customer's DCS it starts to ramp down the speed. When reaching zero speed the drive system slowly starts in the reverse direction to roll back the mill until zero torque is remaining in the system and the motor creates a positive torque to just hold the mill with the charge unbalanced. By slightly reducing the torque the direction of rotation is changes and the mill is gently rolled back until the charge is balanced.

During a power failure the motors are disabled so the mill slows to a rocking mode due to the unbalanced charge. This is a critical condition whereby lubrication to the mill pad bearings is limited by the number of accumulators in the system. To prevent equipment damage the brake is used to provide a controlled stop (between 10 and 30 seconds).

Twiflex and US distributors Hilliard have recently completed the installation on both geared and gearless mills at the Mount Milligan mine

in British Columbia, Canada. The scope of supply for the 40 ft. gearless SAG mill included two brake stations each with 3-off VMS-DP brakes and a hydraulic power unit to provide controlled braking functions. For the two 24 ft dual pinion direct drive geared mills, Twiflex provided VKSD-FL (floating) brakes on each mill to provide 454 kNm on the high speed shaft. The brakes act on a 1.778 m diameter disc fitted to a torque limiter.

Steve Powell, Product Manager at Twiflex said: "The increase in the size of grinding mills has become a major challenge to the suppliers of drive chain components but particularly to brake manufacturers. A good example is Twiflex's braking system on the 11.6 m gearless grinding mill at the Boliden Aitik copper mine in Northern Sweden which is required to produce a massive 38 MNm torque. The 8-off VMS-DP dual piston spring applied hydraulic released brakes each weighing 1,850 kg act on a 13 m diameter flange and can stop the mill with a full process charge of 1,375 kg in less than two seconds."

Whilst the number of brakes and their size have increased to cope with the bigger mills the limiting factor is still the friction material. Twiflex have installed a dedicated test facility at their Bedford facility to investigate materials both for static and dynamic duty with this development in mind.

Powell concluded by saying "Twiflex focus is on developing and introducing new products to the mining industry and the company have recently launched new spring applied, hydraulically released brakes (VBS, VCSD and VKSD large pad) for this market. We are currently working on low temperature versions of these brakes in addition to on-going product development and improvements. Our intention is to develop a larger VMS-DP for gearless mills."

One of two VMS-DP brake stations supplied for the 12.2 m diameter gearless SAG mill.

VKSD-FL brake stations utilized on two geared ball mills.

About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AIMC) is a leading multi-national designer, producer and marketer of a wide range of electromechanical power transmission products. The company brings together strong brands covering over 40 product lines with production facilities in nine countries.

Altra's leading brands include Boston Gear, Warner Electric, TB Wood's, Formsprag Clutch, Wichita Clutch, Industrial Clutch, Ameridrives Couplings, Kilian Manufacturing, Marland Clutch, Nuttall Gear, Bauer Gear Motor, Svendborg Brakes, Stieber Clutch, Twiflex Limited, Bibby Turboflex, Matrix International, Inertia Dynamics, Huco Dynatork, Lamiflex Couplings, Ameridrives Power Transmission, Delroyd Worm Gear and Warner Linear.
For information on any of these technology leaders, visit www.AltraMotion.com or call 815-389-3771.

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P-7649-TF 5/14 Printed in USA