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TB Wood's

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Marland Clutch

Industrial Clutch

Nuttall Gear

Warner Linear

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## Advanced Braking Technology for Grinding Mills



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Mining Journal**  
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An Altra Industrial Motion Company

# Advanced Braking Technology for Grinding Mills

Twiflex Ltd./Hilliard Corp. (USA) have recently supplied their largest grinding mill braking system to Metso Minerals Industries, Inc. for installation on the Boliden Mineral AB, Autogenous (AG) gearless driven mills.

Discovered in the 1930's, the Aitik mine in Northern Sweden is the largest open pit copper mine in Europe. Mining predominately copper the recent expansion (Aitik 36) will see production capacity double from 18 million tons to 36 million tons per year.



Twiflex Ltd. supplied eight VMS-DP brake calipers (with pedestals) plus a hydraulic power pack for each of the two primary mills.

Two of the largest grinding mills commercially available and supplied by Metso have replaced the existing five mills. These 22.5 MW primary mills with wrap around motors measure 11.6m (38 ft.) diameter x 13.7m (45 ft.) long and will mean the two milling lines now have a capacity of 2025 t/h.

The grinding technique used in the Boliden concentrator is two stage fully autogenous grinding where the crushed ore constitutes the only grinding media in the primary mills. Pebbles (25-70mm) are extracted from the primary mills to make up the grinding media in the secondary 'pebble' mills.

The last five years have seen an increasing trend towards fewer comminution machines per grinding line with the result that units have increased considerably in capacity. Today, 38 ft. mills with motor powers of more than 20 MW and ball mills with diameters in excess of 24 ft. (motor power of 11MW) are common place with operators looking for even larger equipment for greater economy of scale.

Mills with these drive capacities are exclusively driven by a 'wrap around' ring motor (Gearless Mill Drive) and it is due to this development that braking systems have been necessary.

The Twiflex braking system is designed specifically for mine grinding mill installations giving both static and dynamic braking functions. In static operation the braking system is used to hold the mill during liner replacement and general mill maintenance. For dynamic operation the system can operate in two modes, stopping the mill from full speed in an emergency or providing inching/creeping functions in the event of bearing lubrication problems or power failures. For the first, a controlled application of the brakes is required and for the second, the brakes are operated quickly to give accurate stops needed by the mill operator.

The scope of supply for this project was eight Twiflex VMS-DP brake calipers with pedestals plus a hydraulic power pack for each primary mill.

The Twiflex VMS-DP caliper has an adjustable braking force from 590 to 737 kN and is a floating spring-applied, hydraulically-retracted brake suitable for disc/flange thicknesses from 117mm to 130mm. The brake can be used on installations with a braking path of at least 7.6m outside diameter (there is no upper limit) and 7m inside diameter. The hydraulic powerpack offers an advanced and versatile brake control as it allows both local and remote operation for inching and creeping duties through a control panel. The braking system at Boliden can generate up to 38 MNm braking torque for each mill acting on a 12.97m mill flange diameter. The VMS-DP calipers weigh 1.85 tons each and are able to deliver 940 kN clamping force.

With a full process charge of 1375 Mg the braking system is able to stop a mill in less than 2 seconds.



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## Customer Service

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For a list of our AP sales offices:

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