Braking for Underground Locomotives in Australia

Twiflex® Limited

An Altra Industrial Motion Company

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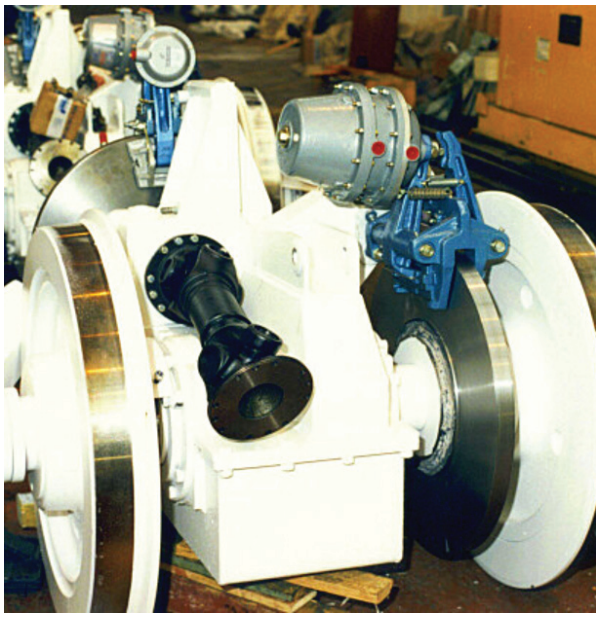

Twiflex disc brakes installed on the locomotive wheel axle and gearbox input shaft

Clayton Equipment (a UK based, Rolls Royce Company) have recently supplied the Western Mining Corporation in South Australia four Twiflex disc brakes for the underground locomotives in the Olympic Dam Expansion Project.

Expanding the mines from 3 to 9 million tonnes per annum required extensive investment, part of which was the introduction to a fully integrated underground rail haulage system.

Only the second of its type in the world, it is designed to automatically control haulage cars to their required destination covering some 5000 metres of track and providing continual unmanned operation.

Transporting copper, uranium and other precious ores at depths of 300 to 700 metres requires locomotives designed to a high level of toughness and reliability.

The two locomotives move the ore between the load shutes and dump stations through a master and slave arrangement driving up to 18 cars, each weighing 25 tonnes and driven by two 90kW D/C traction motors. The cars transport 300 tonnes at a speed of 28 KPH.

The Locomotive Motor Control (LMC) can respond to signals from a joy stick in the control cabin or from the Main Train System Control. It controls the D/C traction motors, brakes, lights and pantograph.

A 600 volt motor driven compressor provides air to feed the locomotives and mine cars, whilst maximum safety is ensured by three independent braking systems acting on both axles.

D/C Traction Motor Control

The motor speeds are controlled by transistors regulating the voltage across the motor armatures.

Air Operated Service Disc Brakes

Two Twiflex type GMX disc brakes are installed on the gearbox input shafts of each locomotive.

Spring Applied / Air Released Disc Brakes for Emergency Stopping and Parking

Two Twiflex type GMRSD disc brakes are installed on two 700 mm diameter discs mounted on each axle. They require 3.5 bar to “hold off” the spring force and when applied in an emergency, the total of four calipers will exert a torque of 33000Nm. This will safely halt the train of two locomotives and 14 fully loaded cars.

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