

Oaky North belt conveyors rely on Dodge CST drives

Xstrata's expanding Oaky North longwall complex uses Dodge Controlled Start Transmission (CST) drives, which are a patented design incorporating a planetary gear reducer and hydroviscous clutch.

The Oaky North mine located in Queensland's Bowen-Basin is currently delivering around five million tonnes per annum of high quality export coking coal for its joint venture operator Xstrata.

The modern longwall operation has undergone several expansion stages since its opening in the late 1990s under MIM ownership, with a further equipment expansion expected over the next 18 months as extraction travels further into the rich seam.

The current longwall extraction is over six and a half kilometres from the ramp stock pile, and coal is transferred along a series of four belt conveyors that are designed around Dodge CST (Controlled Start Transmission) technology.

The Dodge CST is a patented 2-in-1 drive that combines a planetary gear reducer and hydroviscous clutch specifically engineered to deliver and synchronize power and to control acceleration of high-inertia loads such as long-haul conveyors.

There are more than 2,000 CST units in operation around the world with about 180 of these in Australia.

According to distributor Baldor Australia, CSTs have a proven track record on conveyors up to 10kms in length in coal, gold, iron ore and copper mines, cement and power generation as well as port facilities. Clutch-only versions are also highly effective for braking in decline application.

Oaky North is currently operating 15 CST units, with four additional units available for pre-installation into the next longwall conveyor. Planning is in progress for the purchase of additional CST units for the installation of two new trunk conveyors for upcoming mine development.

Tim Strong, senior mechanical engineer at Oaky North since March 2007 speaks highly of the reliability and operational flexibility that the CST units have provided. He said: "I have worked with these CSTs since I joined Oaky in 2001, and I'm not aware of any serious reliability issues or lost production from these units, the first of which were installed back in 1998/99.

"We have all units reporting through our SCADA system, and maintenance generally comprises oil sampling and analysis on a regular monthly basis and oil and filter changes as and when required. We have duplex filter banks on each unit, allowing the maintenance crew to switch over on-site, which then enables simple replacement of off-line filters."

George Willet, outbye services coordinator for Oaky North said, "I just love the CSTs. They are so simple to look after. The trick is to look after the oil, which is critical to good longevity, and also translates into our up-time figures. The availability is extremely high with a figure like 99%, and if something goes wrong it is usually simple and quickly fixed ...which is what we like!"



Oaky North ramp conveyor with 3 x Dodge 1120K CSTs with 1MW motors.

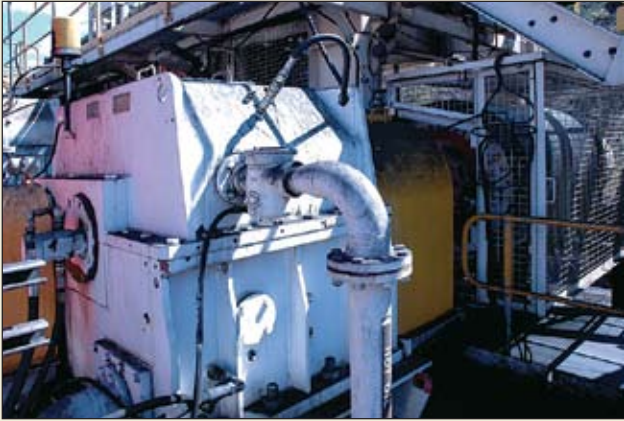
2 x Dodge 1120K CST Drives at Oaky North.



Rod McClure, Baldor Dodge Reliance national sales engineer – mining, delivered an overview of the CST's capabilities. "There are currently some 14 CST models, ranging in torque capacity from 280,000 in-lb to 2.5 million in-lb which are suitable for motors up to 3MW.

"The efficient incorporation of helical and planetary reduction gears and the hydro-viscous clutch (which is on the output side) results in a compact footprint, provides very high torque density and allows direct coupling of motor, CST and conveyor drum. Motors are started under no-load, reducing electrical delivery problems and mechanical stress on all components.

"A PLC controller (which can synchronize up to four drives) provides an appropriate S-curve start-up ramp via managed hydraulic pressure to the clutch pack. Mine-wide connectivity



Dodge 1120K CST drive.



Dodge 1950K CST.



Dodge 1120K CST drive.



Oaky North ramp conveyor with 3 x Dodge 1120K CSTs with 1MW motors.

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“To complete the unit, a pump and air-cooled heat exchanger recirculates, cools and filters the oil from the CST. The CST clutch technology has proven easier to balance than alternatives and is very forgiving on shock loads and surges, which are a major concern for conveyor failure.”

Tim Strong outlined the CST arrangements preferred at Oaky North. “Our conveyor system comprises a maingate conveyor (LC01), two trunk conveyors (TC01 and TC02), and our ramp conveyor (RC01).

“Our maingate is reasonably long at up to 4000 metres and a 90 metre climb. We can get up to 4000tph along this and start-up and shut-down is a fairly regular event in coordination with long-wall progress. We have 4 x 280KR CSTs (each 320kW) at the head and 2 x 280KR CSTs at each of two tripper locations. These units keep overall height down which is more suitable for our underground locations.

“Our trunk conveyors (TC01 and TC02) are 2600m and 1450m respectively with a total climb of 63m. These are each fitted with 2 x 1120K/1MW CST units mounted at the head. These conveyors are rated at up to 6500tph.

“Our ramp conveyor RC01 is 1376m long with a climb of 115m. This has 3 x 1120K/1MW drives, arranged in tripper configuration about mid station.

“The CSTs do a great job in catering for both fully laden and empty conveyor start-ups, smoothly ramping up to around 4.4m/sec operational speed and delivering and synchronizing nearly 10MW of power throughout our conveyor network.”

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