

Motorized pulley drives prove their worth in coal handling applications



Seward Coal Terminal shiploader uses Rulmeca Model 630H 75 HP Motorized Pulley to move 42"-wide shuttle belt at 800fpm to transfer Alaskan coal into export ships at 2,000tph.

Motorized pulley belt conveyor drives made their debut in North America in the 1980s at major shiploading terminals and surface mines, handling commodities including coal¹, writes Mike Gawinski, President, Rulmeca Corporation. A motorized pulley encloses its motor and gearbox within an oil-filled hermetically sealed pulley shell. In the 1990s stone quarries, foundries, and recycling facilities took advantage of the product's compact size and reliability.

Then, in the early part of the 21st century, coal preparation plants as well as steel mills and power plants began installing motorized pulleys to replace old exposed drive systems in North America as well as in Europe². A very large percentage of the North American installations and all of the installations in the UK were in 'above ground' bulk materials handling plants. See picture above.



Two model 630H 75 HP Rulmeca Motorized Pulleys in 'nested dual' arrangement. Note the absence of external motor, gearbox, and pillow blocks. All mechanical components are hermetically sealed within the pulley's oil-filled shell.

The year 2010 marked what many believe to be a new day in motorized pulley acceptance and use. The product was finally installed and thoroughly tested in a major underground coal mine in the Illinois Coal Basin.

After a one-year test at its West Virginia and Illinois mines, Cline Resources added more 75 HP Rulmeca motorized pulleys, configured into a dual drive frame, to its inventory of conveyor drives. See picture bottom left.

Cline Resources tested the system by moving 1,200tph (tonnes per hour) of ROM coal at 600fpm (feet/minute) on an extendable 48"-wide conveyor belt with two 75 HP model 630H Rulmeca motorized pulleys, nested into a special 'EZMP' frame by Kerco, Inc. of Madisonville, KY.

As continuous miners advance into the coal seam, panel belts are extended from 800 to 1,200 feet. The drive system is light and compact because each motorized pulley has a 24.8" diameter and 55.12" face width and only weighs 2,200 lbs. This is a huge advantage when shifting conveyors underground where space is restricted.

Todd Leverton, Cline's Maryan Mine superintendent, first heard about the Rulmeca motorized pulleys several years ago, but didn't have a chance to try them until recently. He said, "I'm happy we incorporated these drives into our mine because their reliability and low maintenance requirements will help us maintain our aggressive production rate. We produce 9 tonnes of 11,000 btu coal per man-hour with two continuous miners. We're very proud of that."

In general, underground coal mines use numerous dual drive systems as booster drives to spread effective belt tension along the length of the conveyor instead of concentrating all tension at the discharge end of the conveyor (see picture top left of pxx). A belt's weight is significantly reduced by minimizing the amount of tension it must withstand. Light belt weight is essential to assembling and relocating conveyors underground efficiently.



Model 630H motorized pulley has narrow footprint (24.8" diameter and 55.12" face width.) Each drive only weighs 2,200 lbs. Drive compactness and light weight are advantageous when moving conveyor in restricted spaces underground.

Ideally, each underground booster drive should be as small and light as possible. As shown in the picture at the bottom of the page, the EZMP dual drive is built for underground coal mines and incorporates Rulmeca motorized pulleys in a 'nested dual' configuration. Each drive may be mounted to the mine floor or hung from the ceiling. Currently configured to provide 150 HP with two 24.80" diameter 75 HP motorized pulleys, the system is available up to 660 HP with two 40.16" diameter 330 HP motorized pulleys.

Produced in Europe since 1953, Rulmeca motorized pulleys offer underground mines an optimal alternative to exposed drive systems with diameters from 5.5" to 40", powers up to 330HP, and belt speeds up to 1,320fpm.

Motorized pulleys are lighter than exposed drive systems because exposed systems require that each motor and gearbox be protected within a separate cast iron enclosure (see picture right). Internally-powered pulleys enclose their motor and gearbox within the pulley shell, thus eliminating redundant parts. Furthermore, the internal drivetrain acts like a deep beam. It

resists deflection in a light weight package and eliminates the need for a heavy "through shaft."

Since they enclose all drive components within an oil-filled and hermetically-sealed pulley shell, Rulmeca motorized pulleys increase system reliability, lower maintenance expense, improve personnel safety, save space, and reduce power consumption.

REFERENCES:

1. Michael J. Gawinski, Wolfgang Gresch, *Motorized Pulleys Solve Harsh Environmental Problems at North American Ship Loading Terminals*, Proceedings of Bulk Europe 2006 Conference, Barcelona, Spain, October 2006
2. Steve Pringle, Mick Barry, Mike Gawinski, *Motorized Pulley Solves Dirt Conveyor Problem at UK Coal Colliery*, 23rd Annual International Coal Preparation & Aggregate Processing Exhibition & Conference, Lexington, KY, May 2006.



Exposed drive system for barge loading conveyor consists of motor, gearbox, chain & sprocket, all protected by cast iron and steel enclosures. Note steel enclosure built to protect personnel from rotating motor/gearbox coupling.



Built for underground coal mines, Kercó's 150 HP EZMP drive includes two model 630H 75 HP Rulmeca motorized pulleys and may be mounted to mine floor or ceiling. Optional boom converts system from booster to discharge end drive. EZMP drive systems up to 660HP are available.