

## Rare Earth Magnets Provide Needed Holding Power For Disk Brake Parts Maker

Gunn Metal Stamping is a Guelph, Ontario, Canada-based manufacturer of molded steel backing plates for disk brake assemblies. The company's brake parts are produced from steel coils fed by decoilers through eight mechanical, straight-sided and C-frame presses ranging in capacity from 250 to 1,000 tons.

Figure 2: Bunting's Incline Angled-Incline MagSlide Conveyor, located at the discharge chute of the 400-ton stamping press, handles abrasive brake parts in conventional conveyors.

Height constraints and the minimal space around the presses limit the use and size of conveying equipment. But at one 400-ton straight-sided press, Steve Light, production engineer, decided to see if conveyors could be shoehorned in and perform effectively.

Light had only 5 in. of clearance from floor level to catch the blanks and scrap metal as these elements dropped together from the shaker underneath the press. So a magnetic low-clearance conveyor was the natural choice. Light installed the unit below the shaker and used it to feed into a magnetic incline conveyor. The incline conveyor moved the slippery coolant-drenched parts and scrap up to a grid that separated the parts from the scrap. The scrap fell through the grid and the larger brake parts slid over the grid into collection bins.

"The setup worked fine," says Light, "except that small pieces of sharp, jagged scrap started collecting under the low-clearance conveyor and cut the belt apart. I would have liked to rig a chute under the press to keep the material funneled onto the conveyor and help prevent the scrap and slugs from getting under the belt, but I didn't have enough room."

Hampered by the slim clearance and minimal surrounding floor space, Light had few solutions. He rejected moving the press or building a raised foundation for it. Excavating the existing foundation to make room for a standard conveyor was possible, but he did not want the downtime or cost. In addition, the risk of having coolants and lubricants leak into the ground under his facility and potentially creating an environmental problem was too high.

Several months earlier Jim McCloskey, the regional representative for Bunting Magnetics Co. (BMC) visited Light and told him about the MagSlide conveyor. Bunting, based in Newton, KS, manufactures a broad line of magnetic conveyors and magnet-based industrial equipment. Its MagSlide chip and parts conveyors are beltless and use powerful chain-driven magnets beneath stainless steel slider beds to move ferrous material. With the exception of the drive motor, all moving parts are fully enclosed. The twin-roller drive chains that hold and move the magnets underneath the slider beds run in oil-impregnated channels machined from ultra-high-molecular-weight polyethylene for continuous lubrication and extended durability.

Light called Bunting, which recommended its Angled-Incline MagSlide. This model has an exceptionally low infeed height plus a compact frame and short distance between infeed and discharge that enables it to fit tight floor layouts. It is

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configured to move ferrous material from machining centers or stamping presses, like the Gunn Metal installation, up to workstations or into totes or bins. In effect, the Angled-Incline MagSlide combines in one unit the functions of the separate low-profile and inclined conveyors Light had been using.

The Angled-Incline MagSlide conveyor was available in a 60-degree incline model that fit Light's application and floor space restrictions. Samples of Light's press output were sent to Bunting headquarters in Kansas for a trial run. Tests run by Bunting's engineers concluded that some of Light's parts were too heavy to be reliably conveyed by a unit with a 60-degree incline, so the engineers recommended the 30-degree incline MagSlide. "Unfortunately, the floor space and equipment layout around the press could not accommodate the added length of the 30-degree unit," says Light. "But I was confident that Bunting would find a solution to the problem."

His optimism was justified when Bunting engineers replaced the standard ceramic magnets in the 60-degree incline MagSlide with more powerful Neodymium rare earth magnets. Bunting, also a supplier of rare earth magnets, uses them as options in its magnetic separation equipment and other magnet-based industrial products where extra magnetic energy is desired.

Figure 2: Rare earth magnets attached to a self-lubricating chain-drive mechanism just below the roller bed pull the slippery parts and puffed ferrous scrap up the incline and deposit them on a grid that sets the brake components aside into collection bins.

After the engineers completed the changeover, they found that the idea worked: Tests indicated that the modified MagSlide would have the extra magnetic holding power needed to handle the weight and volume of parts and scrap on the 60-degree incline.

"Within a few weeks I had what I needed," Light says. "The Neodymium-equipped MagSlide fit my limited space requirements, and it worked so reliably under actual press conditions here at Gunn Metal, that I may order additional units."

Bunting also decided to add rare earth magnets to its list of MagSlide options. Their use offered the added advantage of allowing smaller units to do work that would normally require larger conveyors with bulkier frames. So the higher cost of the magnets can be offset by savings in other materials.

Light subsequently put his other conveyors into service elsewhere at the Gunn Metal Stamping plant. The low-profile unit has been moved to another press where it handles other parts and scrap without problem. The standard-frame incline conveyor has become part of the new cleaning line. Light says that by allowing Bunting Magnetics time to work on his problem, he got the solution he wanted and the chance to increase overall plant productivity with a relatively small capital investment.

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