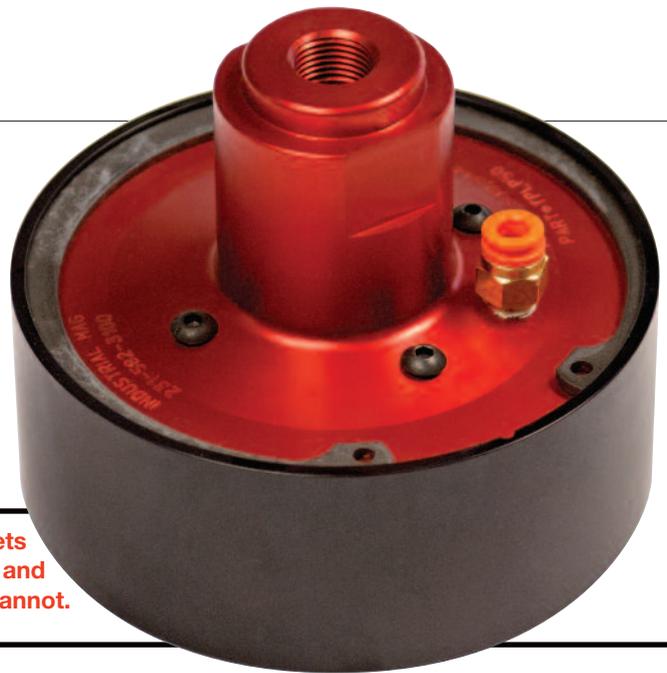


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A series of 5-inch-diameter magnets lifts material that suction cups and edge-clamping devices cannot.

MOVING with MAGNETS

Using a magnet to transport metal helps one material-handling company increase safety and speed

BY JULIE SAMMARCO

In many ways, magnets are one of the most reliable tools for moving metal. They're pure science at work. The magnetic field's lines of force exit the magnet from its north pole and enter its south pole, attracting metals like iron, nickel and cobalt. When it comes to strength, some of the world's strongest magnets can be two million times stronger than refrigerator magnets, according to *IEEE Spectrum* magazine. When companies can depend on tools like these, work runs smoothly.

General Sheet Metal Works, South Bend, Ind., used to have workers physically lift and maneuver heavy sheet metal parts. Customers in the lawn and garden and solar power industries required the company, which specializes in high-volume precision sheet metal manufacturing, to handle parts as heavy as 140 pounds by hand. At least two people were needed to lift a piece of diamond-plate sheet metal,

bring it to a press brake machine, rotate it, reinsert it to make additional bends, then carry it to a pallet. Using physical strength was proving to be a slow and tiring process.

To eliminate some of the cumbersome workload, General Sheet Metal Works invested in a lifting system made of 9 Transporter LP50 Double Acting magnets, a low-profile design from Industrial Magnetics Inc., Boyne City, Mich. Brought to market in 2008, they feature a 5-inch-diameter face and a double-acting air system. The magnet system is attached to a manipulator, which an operator controls from behind a set of handlebars, saving the company time and increasing productivity and safety.

"The magnet is positioned so that it's in the center of the part, which for us is sheet

metal," says Jeff Zelle, plant manager at General Sheet Metal Works. "The part would start out on a pallet as a laser-cut flat. The magnet engages and picks up the part. When it's lifted due to a counter balance, it has no weight so the operator can easily turn it, spin it and bend it at the press brake."

In General Sheet Metal Works' Tomah, Wis., facility, the magnet lifts the piece of material, then an operator uses the handle on the manipulator to guide the piece to a bending machine. Once inserted into the bending machine, the magnet rotates the piece of material to create the bend. The material is then removed and rotated for the next bend. When the piece is complete, the operator uses the magnet to guide the piece to a holding station for finished products. The magnet is attached to the material the entire time, resulting in little to no physical interaction with the material.

"It has definitely saved us time, money and has increased safety in our facility," says Zelle. "It's also very easy to implement and

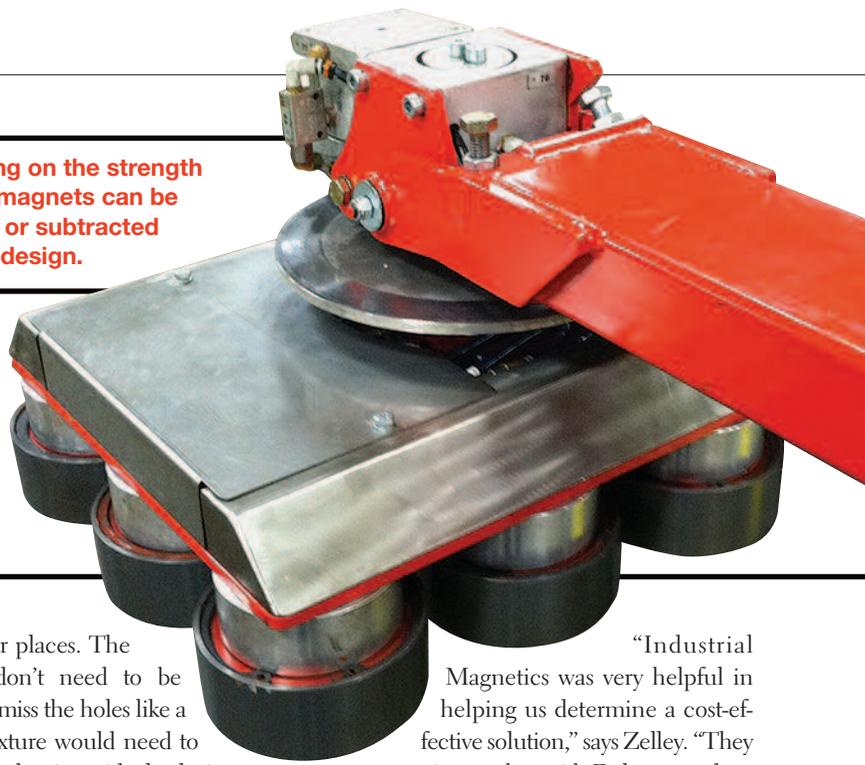
“IT HAS DEFINITELY SAVED US TIME, MONEY AND HAS INCREASED SAFETY IN OUR FACILITY.”

JEFF ZELLE, GENERAL SHEET METAL WORKS



The magnet system moves and transfers material, minimizing physical labor and risk of injury to employees.

Depending on the strength needed, magnets can be added to or subtracted from the design.



maintain. Once the operator learns how to use the manipulator, the magnet only has one button that turns it on and off. This makes it easy for me and easy for the team on the floor. In some cases, we can bend parts faster with one person and the magnet than we could with two people using brute strength, which is a significant improvement for us.”

Options and competition

Other material-lifting options were not a good fit for General Sheet Metal Works. Often the company needs to bend materials that have holes, so other devices available on the market were not ideal solutions.

Other options included edge clamping devices and suction cups to lift materials. “But we decided not to go that route because with our metal, many times there are holes drilled into it. If you’re using a clamping or suction device, the hole won’t allow it to grab the piece. With the magnet, holes make no difference. The magnet was more versatile and allowed us to use it for a variety of parts.”

The Transporter LP50 Double Acting is an air-actuated permanent magnet that quickly and easily grips steel while using 70 percent less air than comparable vacuum systems. It grips steel and eliminates dropped parts because of lost vacuum from cup tears, tubing leaks, mill oil or other unforeseen variables that plague vacuum lifting systems. “The permanent magnets are fail-safe, meaning they will not drop the sheet should there be any tubing, valving or air supply failure,” says Russell Landsly, regional sales manager for Industrial Magnetics. “Additionally, the magnets are used to grip steel parts that have slots and holes cut in them

in irregular places. The magnets don’t need to be aligned to miss the holes like a vacuum fixture would need to be. This makes it an ideal solution for use with contoured or perforated parts.”

When companies have less dropped parts, inevitably they will have less costs associated with damaged materials and injured workers.

“When you consider how much it costs to create, condition and supply air throughout a facility, the return on investment from this cost savings alone is worth it. Add to that the safety of knowing that intermittent air loss won’t cause dropped parts and it just makes sense,” Landsly says. “Plus these magnets are 1-million-cycle tested, proven reliable and used in some of the best in-practice facilities worldwide. As an example, in over three years of operation, these magnets have required no repair or replacement parts.”

General Sheet Metal Works has had similar experiences. During the two years it has had the Transporter LP50 Double Acting magnet, the company has not performed any maintenance on it. “There’s very minimal upkeep. It’s very reliable,” says Zellely.

Additional equipment

When purchasing a magnet, a manipulator also is needed to hold it in place and move the magnet. Industrial Magnetics worked with Dalmec Inc., Bloomington, Ill., to design an industrial manipulator specifically for General Sheet Metal Works’ needs. Designing the manipulator meant reaching the most effective and easy-to-use solution that met the company’s budget.

“Industrial Magnetics was very helpful in helping us determine a cost-effective solution,” says Zellely. “They came in together with Dalmec, and we went through the parts that we needed, and they put it all together, and the machine came to the plant turn-key. With some basic assembly, it was ready to go the day we got it.”

The magnet and manipulator system is designed to lift 1/8-inch to 1/4-inch-thick material up to 154 pounds and hold it through various orientations and angles as the sheet is bent multiple times in a press brake.

Perhaps the most-important benefit of the system is General Sheet Metal Works can bend parts faster and safer than previously attempted. “The parts formed in this work cell used to tax two operators due to the sheer size and weight of the sheets to be formed,” says Landsly. “Using this simple magnet fixture head on the end of a rigid arm manipulator allows one operator to complete all the bends without any physical lifting at a higher rate and with less risk of injury.”

Because Zellely needs fewer workers to bend parts, his facility is more efficient. “I can use those extra employees in other areas of the value stream. Our employees really like it, and I have to say, so do I. It’s a win-win all around,” he says. ■

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