



Return on Investments

Achieving High-Powered Precision with Laser-Cutting Technology in Manufacturing

David Levine | Mar 01, 2017

What You Need To Know

Understand the benefits of laser cutting in metalworking.

Choosing between fiber optics versus CO2 and manual versus automation will depend on your materials, assembly and lot size.

Find out how this staple of metal fabricating can be of great value to your shop.

Metal laser-cutting technology uses high-energy beams of light to burn, melt and blow away flat sheet and other types of metals, offering increased efficiency and productivity. Using lasers can shave production setup and run times, reduce wasted materials and outsourcing costs, leave little to no cleanup, and produce higher-quality, beautiful and functional products in materials such as textiles, wood, plastics and leather.

Laser cutting has been around in metalworking for nearly 20 years and seems like an ideal choice, but the process hasn't necessarily caught on in popularity. For those unfamiliar with the technology compared with standard plasma or punch presses, here's an introduction to help you get started.

The Possibilities Are Endless

Chase Remley, a mechanical design engineer at Advanced Metal and Fabrication and Machine Inc., in Prescott, Arizona, thinks owners of small shops should consider upgrading to laser metal-cutting technology.

"Unlike punch presses, lasers have the ability to be programmed faster, with no special tooling required," says Remley. "Lasers can cut a wide range of materials, including thicker ones, and provide clean cuts. They come in very large footprints, so the table sizes have the ability to accommodate for large sheets of metals."

The type of laser-cutting machine you purchase depends in large part on the thickness of the materials

you plan to cut. "Both CO₂ and fiber optics [lasers] work great for thinner materials," says Jorge DeLeon, a metalworking specialist for MSC Industrial Supply Co. He thinks fiber-optic lasers, which run faster at higher speeds when cutting thin material, are the more economical selection because of their higher electrical efficiency. "However, when it comes to thicker materials, CO₂ is a better choice," says DeLeon, who points out that thicker materials need a slower cutting speed for a more even finish.

Deciding Between Tabbing and Nesting

Depending on the type of assembly you plan to employ after laser cutting, DeLeon suggests tabbing and nesting cutting techniques. Tabbing involves leaving a piece of the sheet metal as a tab or bridge to connect it to the part. Nesting uses computer software to cut as many pieces as possible out of a single sheet of metal to minimize waste. "Tabbing is great using the laser parts on a welding assembly because it reduces the fixturing required to weld," says DeLeon. "In some cases, you can use a common line when a small lead-in is not an issue, and this will reduce your scrap rate from the nest."

With nesting, the laser automatically creates a collage of part profiles to maximize the number of parts that will fit onto a sheet. "Another plus in using a laser for nesting is that the beam is only about 0.010 inch in diameter, which allows the parts to be nested closer together," says Remley. "For maximum material use, the software can remember the cut profiles, which are called the skeleton, and allows smaller profiles to be cut in the spaces that were not previously used."

Lasers also require less quality assurance and quality control time thanks to precise tolerances and little to no slag, which eliminates the deburring process. Compared with punch presses, water jets and plasma cutters, lasers have the biggest advantages for quality and the ability to hold tight tolerances. However, having a skilled technician who can monitor edge quality, environmental changes and chemical makeup in materials and can adjust parameters for specific applications is "a huge plus," says Remley.

Keeping It Flexible

Is automation better than manual? That depends on the mixture of parts that are being laser cut and the lot sizes when running. "Automation is great when your runs are a bit longer and you can run overnight and during the weekends," says DeLeon. Remley says another benefit of automating laser machine processes is eliminating the time it takes to load a metal sheet onto the table, especially with oversized tables 10 by 5 feet and larger.

"Material gets very heavy at those sizes, and pallet changers make a huge difference when running large production lines," he says.

Both experts agree that metal laser cutting can make a big difference and help most metalworking shop owners save time and waste. And that can have a big effect on your bottom line.

Key Takeaways

- Timesaving cutting techniques such as tabbing and nesting result in minimal scrap.
- Laser cutting introduces machinists to an elevated level of quality control.
- Transitioning to automated cutting is most efficient when working on longer runs or with larger pieces of sheet metal.

Would you be interested in laser-cutting training if it were available in your company?

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