Laser longevity

by Glenn Binder, founder and president, Laspar LLC

Getting the most out of a laser investment requires knowing all the variables

Fabrication equipment, especially laser cutting machinery, represents a serious capital investment for any job shop, fab shop or steel service center. So it goes without saying that companies must make good buying choices and squeeze every drop of productivity possible out of their machines. Choosing the right machine and the right ancillary tools to extract that productivity, however, is sometimes easier said than done.

Over the years, I noticed that fabricators turn to any number of OEMs and vendors for equipment and software – then struggle to integrate these systems. So, in 2010, I launched Laspar as a one-stop fabricator's solutions provider. Today, I help fabricators boost productivity by providing my experience with fabrication equipment, material handling systems and related software.

I've worked in the engineering, manufacturing and metal fabrication industry since 1982 in nearly every capacity – from the shop floor through sales and management. More recently, I managed sales on a global scale with nesting software and fabrication productivity improvement. I've worked with the smallest job shops to huge companies such as Procter & Gamble to help improve production efficiency.

No matter the size of company or the work they undertake each and every day, my goal is to help those business owners get the most from their equipment investments. To do so, several factors come into play, including which software and automation to consider, the type and power level of the laser, and methods for reducing scrap.

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Common areas of waste

Time and material waste are the primary culprits when it comes to not getting the most out of a piece of equipment. When laser machines aren't cutting, whether from downtime or production bottlenecks, it's obviously lost revenue – the dreaded sound of silence. Preventive maintenance, including cutting head calibration, goes a long way in keeping machinery performing at peak levels.

Additionally, slow cutting time takes a toll on productivity. A few minutes here and there may not seem like a big deal, but when added up over the course of a week, month or year, it can be significant.

Material is another high-waste area for many fabricators. Every bit of metal in the scrap bin is money being thrown away. Fabricators, therefore, must be cognizant of part nesting and remnant management. It sounds simple, but it is surprising how often these areas are overlooked.

Assist gas is another opportunity to cut costs. Nitrogen is an efficient yet costly gas. If the laser cutting application doesn't call for the cleanest cut, consider a less expensive gas like oxygen or even compressed air. →

As shown in this image, there was a missed opportunity for material savings. Although fiber lasers are fast, material savings should still be a priority.

Software's the key

On average, about 5 to 10 percent of time spent on a job is related to the cutting process. Quoting, scheduling, setup, material ordering, offloading and other related operations can be very time consuming. Quoting software and MRP systems go a long way to streamline processes.

Similarly, robust NC nesting software impacts yield, remnant management and machine runtime. Leveraging more efficient nesting and cutting processes, such as common-line cutting, for example, reduces gas consumption and laser head wear while increasing cut time.

Nesting software is vital; without it machines simply won't run. For this reason, laser machines generally come preloaded with a nesting program. However, these OEM-provided programs are usually basic in functionality.

Companies using fabrication equipment sparingly may find this to be sufficient, but fabricators that make a living cutting metal should consider upgrading to a more robust software package. Today's costly fabrication equipment contains a number of advanced features that are best leveraged by more sophisticated nesting applications.

Additionally, quick response manufacturing (QRM) is gaining momentum. QRM is an approach designed to reduce lead time. It emphasizes time as the guiding management strategy especially for companies offering low-volume, custom-fabricated products.

Lights-out operations

While software is incredibly important, equipment and strategy play equal roles in terms of productivity. Today's high-speed fiber lasers are cutting at unprecedented speeds, and when loading and unloading can't keep pace, bottlenecks result, dramatically slowing production. Therefore, material handling equipment is becoming increasingly important in today's automated, fast-paced fabrication environments.

Automated material handling systems are important for all production shifts. Lasers, especially →

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fiber lasers, are cutting material at never-before seen rates. This leaves manual loading and offloading as insufficient where operators can't keep up to the pace of the laser cutting equipment. This creates unnecessary bottlenecks, offsetting the speed advantages of fiber.

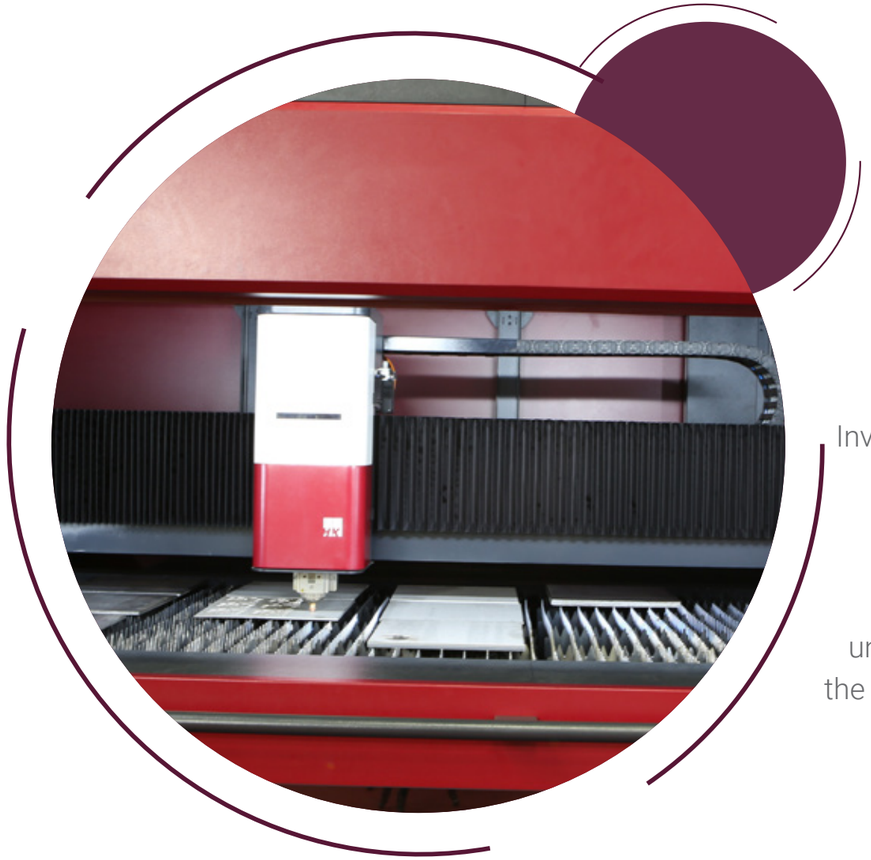
Automated material handling systems were designed to support rapid cutting. As for lights-out production, fabricators are leveraging unattended material handling systems to dramatically increase productivity and lower costs. For companies with lower material thickness and grade variety, fully automated material tower systems are ideal. For those with higher variety, it's recommended to look into a semi-automated system.

Laser considerations

Before discussing software and automation, however, fabricators have several considerations to factor into the purchase of a laser cutter. They should consider the volume, types and thickness of material they process; the importance of edge quality; and, of course, the budget. In recent years, the gap between top-tier and middle-tier laser cutting equipment has closed dramatically, and today, the difference is negligible. In fact, many times these machines utilize the same power supply. Simply put, one no longer needs to pay top dollar for tier-one results.

Examples of this include higher power lasers being introduced to help address cutting thick materials. All major OEMs seem to be moving in this direction. For example, MegaFab recently introduced a 12-kW laser cutter, and companies like Bystronic offer 8-kW machines. Still, for the majority of fab shops and job shops, a 4-kW laser seems to provide the best combination of performance and cost.

In addition to power level decisions that must be made, there is still the question of CO_2 versus fiber technology. And that decision comes down to the application and the tradeoffs that must be considered. For example, fiber lasers are significantly faster yet the investment can be significantly higher. And while fiber lasers are gaining momentum, CO_2



Investing in a laser cutter can give fabricators and manufacturers a competitive leg up, but that's only if they understand how to keep the machinery performing at peak levels.

remains the most widely used laser cutting option. Many smaller job shops serving a handful of customers will do just fine with their trusted CO_2. Similarly plastics, wood and some other materials cannot be cut with fiber lasers.

On the other hand, cutting stainless steel working in the medical, aerospace or other tight-tolerance industries requires fiber laser precision.

Because of their short wavelength and high beam quality, fiber lasers are significantly faster for high-volume and thick material applications. Also, because they contain no mirrors to adjust, fiber lasers are less expensive to maintain and generally more reliable.

The real difference is in cutting speed. Fiber lasers have been shown to cut anywhere from 5 percent to 500 percent faster and at a higher wall →

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efficiency, depending on material thickness. Regarding the world's first 12-kW fiber laser, reports say that it cuts 5/8-in. steel about 3 1/2 times faster than 6-kW machines. Additionally, it's said that the machine utilizes less nitrogen, reducing cutting costs by as much as 80 percent.

The retrofitting option

Linear motor CO_2 laser machines can certainly be considered for retrofitting for fiber laser cutting, and this is estimated to cost about a third of the cost of a new fiber laser. The process involves installing the necessary components, upgrading hardware and constructing a safety enclosure. Once the process is complete, the machine performs noticeably faster and requires less maintenance.

However, don't expect a retrofit to go toe-to-toe with a true fiber laser. Because of the difference in machine inertia, it will never fully match the cutting speed and power of an original. It's also important to note that lasers can easily be adapted to utilize different assist gases. As mentioned earlier, air can be substituted for nitrogen or oxygen and carries with it some very real cost-saving advantages.

While CO_2 laser machines continue to find a home on the shop floor, fiber lasers are filling a real void and delivering new levels of productivity. Direct-diode technology is also emerging, and we're beginning to see these machines on the market. This could well be the future of fiber laser cutting.

No matter the type of laser, the industry is making steady progress. Software systems are becoming more advanced and the entire operation – from the front office to the shop floor – more integrated. Needless to say, it's an exciting time to be a fabricator. ●

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