by Abbe Miller, editor-in-chief

TECH EXPECTATIONS

Choosing a fiber laser cutting system can be a complex process, but once it's on a shop floor, it needs to be turnkey

Purchasing a fiber laser cutting machine is perhaps one of the most pivotal investments that a metal fabricator or OEM will make. With the right machine, a company can improve its overall productivity while consistently delivering the high-quality products its customers demand.

Expecting these results from a cookie cutter solution, however, isn't realistic. Customers must understand that sophisticated equipment comes with choices – advanced technologies, various power levels and automation options that they may or may not need. It can be a lot for a company to parse through.

Pinpointing the right machine with the right features, therefore, is a process that should be facilitated by a laser technology expert. To better understand the considerations involved, Michael Bloss, a laser product manager at AMADA America Inc., explains what customers should expect.

Proof positive

Most fabricators have an easier time articulating the results they expect from a new machine versus the specific technologies or features they need to achieve those results. It's like ordering a steak; it doesn't matter how they cook it – sous vide or reverse seared – as long as it's the temperature the customer ordered. In the world of metal fabrication, it comes down to whether the machine can deliver on the needs the customer specifies.

"It's all about the quality of the parts – what they look like, how smooth the edges are, whether they can be welded or painted, and how fast they were cut," Bloss says. "When it comes to how those results were achieved, customers don't always care. They just want to know how many parts they can cut and what quality they can get."

To help customers achieve the highest quality cuts possible, AMADA's Locus Beam Control (LBC) technology delivers on those needs. An integral component to the company's VENTIS AJe-series fiber laser machine, LBC has been described as a technology that can manipulate the laser beam to create an infinite number of locus patterns for creating superior edge quality at high cutting rates. →

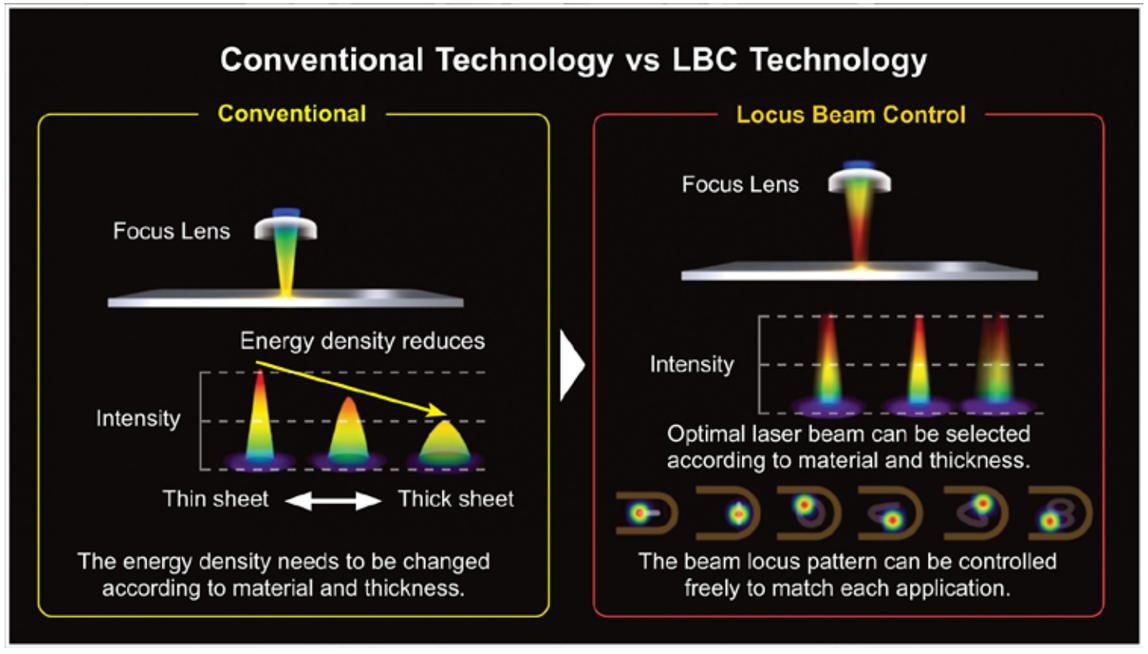
"It's all about the quality of the parts – what they look like, how smooth the edges are, whether they can be welded or painted, and how fast they were cut."

Michael Bloss, laser product manager, AMADA America Inc.

Depending on the material being cut, the beam can be modified into the optimal shape to create the highest quality cut possible. For the average customer, however, a phrase like "infinite number of locus patterns" might stop them in their tracks.

"There are essentially an infinite number of ways we can spin the beam – in a figure eight, sawtooth and so on – there's virtually no limit on the different shapes," Bloss says. "But on the user side, that's not going to work; it makes life too complicated. Fortunately, the engineers in Japan understood that and developed the machine to be easy to use.

"I've been working for AMADA since 1995 when cutting conditions weren't as developed as they are now," he adds. "But today, it's mostly turnkey setups – as in, throw the material on the table, call up the program and push start."



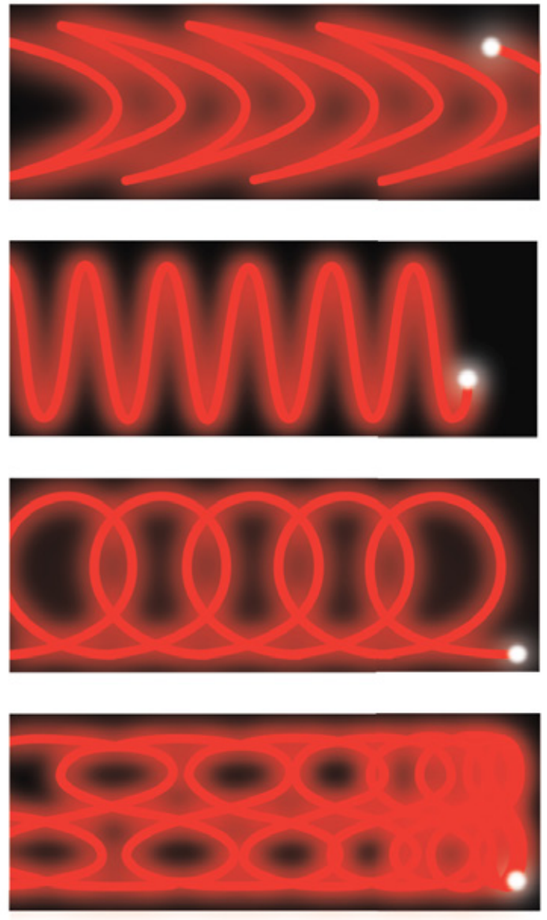
AMADA's Locus Beam Control technology achieves cutting speeds up to three times faster than conventional lasers that often experience energy density reductions in thicker materials, leading to reductions in overall efficiency.

And Bloss's casual description doesn't gloss over anything, either. LBC only requires operators to select their material type and thickness and then choose a mode, be it productivity mode, quality mode or kerf control mode. With just those few selections, the machine will cut with the best beam shape allowable. Choosing the mode is simple, as well.

Productivity mode. Users will see significant productivity increases, especially with stainless steel and aluminum. As an example, cutting speeds can be doubled for nitrogen non-oxidizing cutting of medium-thick stainless steel and aluminum when compared to a conventional machine.

Quality mode. Users will see significant quality increases, specifically in improved surface roughness and elimination of dross.

Kerf control mode. This mode is often enabled for lights-out and automated processing. Here, the kerf width can be controlled to 2.5 times wider than conventional models, making part →



Locus pattern samples

AMADA's LBC technology allows users to manipulate the laser beam to create an infinite number of locus patterns that enhance cutting performance.



Beyond software-based features, automation must be a major consideration when investing in a fiber laser cutting system. AMADA offers modular options that can be configured to accommodate specific customer needs.

removal easier for automated take-out equipment.

To take advantage of LBC, Bloss says that one of the biggest considerations when considering a VENTIS is the primary material being cut. If it's stainless steel or aluminum in mid-range thicknesses, that is where the machine will "really shine," he says. Conversely, he describes AMADA's ENSIS as the workhorse of the company's offerings, handling the full range of materials, thin to thick.

What's at play

While AMADA's LBC technology is truly a revolutionary addition to the fabrication tools available to the industry, Bloss cautions readers to consider it or any other technology or feature in a silo. After all, increasing edge quality won't get a customer very far if other needs are overlooked. And that's why the AMADA team is dedicated to helping customers look at the bigger picture, including important variables such as the frequency in which the machine will be used, amount of floor space available, average material thicknesses being processed and how fast parts need to be shipped out to customers.

"There's a lot at play for each customer," Bloss says. "Is it a job shop or OEM? What material are they going to use as a primary? From there, we can help the customer decide if the VENTIS is the right machine for them or if it's the ENSIS series, for example."

The process of determining which machine best fits a potential customer's needs is, of course, different every time. While the process might start by going through the materials and thicknesses that are typical of the customer's cut list, the process goes much deeper. Is automation necessary? Is part picking needed? How fast is the part needed?

"Some shops will use a tower and cut and restack material all night long," →



With a SolidWorks 3-D file, AMADA's VPSS 4ie software can unfold and separate individual pieces into flat files for nesting by material thickness and type. The software can also generate bending programs. For AMADA ATC (automatic tool changer) users, the bend sequence and tooling setup can be ready within 4 min.

Bloss says. “The next morning, they have a whole stack of finished product, and that’s great. But what if they don’t want that because they need the parts to be shipped out as soon as they’re cut?”

And then there’s the discussion of power considerations. Comparing the VENTIS and the ENSIS further illustrates the multiple variables that can play off one another when deciding on the final purchase.

“The ENSIS has its own beam technology to manipulate the cutting mode, which allows us to cut thin material very quickly and then switch to 1-in. by simply changing the cutting conditions,” Bloss says. “Because a 3-kW ENSIS can cut up to 1-in.-thick material, why would I need a 12-kW machine? At the end of the day, a 3-kW machine can cut that thicker material at 20 ipm, but for some customers, that might not be fast enough. It’s one of many variables, and it’s why we really have to understand our customers.”

Additional considerations include gas generation, where parts need to go after they’re cut as well as the experience level of operators. But fortunately, none of this complex web is lost on the team at AMADA.

“Our job is to help customers navigate that complex path,” Bloss says. “And it’s not just one salesman. Sure, there’s one customer-facing salesman, but he has a full team behind him to support the entire process. The whole family of AMADA comes together to analyze the customer’s needs to provide guidance toward the exact vehicle that will get them to their desired end goal.”

Off to the races

Once the machine has been chosen and it’s on the shop floor, what’s the experience like for an operator in 2024? Can they really just load the material and select a program, and wham-bam, they’re off to the races? With technologies like LBC and AMADA’s new 4ie control, the answer is a resounding yes.

“The 4ie is a very exciting and new control,” Bloss says. “We don’t even offer a keyboard anymore. It’s a touchscreen control that’s very adjustable and user-friendly. It has facial recognition, so as you walk up to your machine, it logs into your profile, language and access level. A manager, for example, has access to the entire machine, but for a new user, we’re going to limit some of the features, so they can’t make a mistake and mess up the machine.”

Once the operator is facially logged in, the part program is loaded with a barcode scanner, which already has the cutting conditions included. From there, all the operator has to do is place the material on the bed, load it and push start. If it’s a VENTIS machine, operators do have the →



As an official machine partner of the King of the Hammers off-road race, AMADA brought an ENSIS fiber laser cutting machine to the California desert to showcase its robust design and to produce parts for vehicles in need of repair.

preference of cutting mode, but that, as explained, is quite straightforward.

These days, life is easier for the programmer, too. Many programs are going to be repeat cutting jobs where the programmer simply enters the number of parts required in a specific type or thickness of material, but for rush jobs, that, too, has been simplified.

"For a typical job, the programmer tells the software, 'I need X pieces of job A, X pieces of job B and all in the same material thickness,'" Bloss says. "With just that information, the machine will run sheet after sheet until the job is complete. Using the example of a rush job, though, it will free-nest any parts you need per your request for just-in-time processing."

Another programmer perk comes into play when customers aren't able to submit individual part programs. If a 3-D file of a full assembly is properly designed in SolidWorks where all the individual pieces are pre-assembled, the customer can submit just that.

"Let's say you get a SolidWorks 3-D drawing of a barbecue from a vendor, but nothing else," Bloss explains. "You can take this 3-D model and drop it into AMADA's VPSS 4ie software, which will unfold the model and separate out all of the individual pieces into flat files, which can all be automatically nested into different sheets according to the thickness or type of material needed."

Basically, if customers all designed their products properly in SolidWorks, there would be almost nothing for programmers to do other than upload the files. And, with the press brake as the next step in the flow, the software will generate the bending programs, too. Better yet, if an AMADA ATC (automatic tool changer) is employed, a bend sequence and tooling setup can be ready to go within 3 or 4 min.

But what if the customer doesn't have a SolidWorks 3-D drawing or even a CAD file? What if they just submit a broken part? To illustrate the ease in which files can be generated, AMADA loaded an ENSIS machine onto a tractor trailer and took it to Johnson Valley, a remote location in southern California, for the King of Hammers off-road race. Once there, the team plugged it into a generator and started cutting right in the middle of the desert.

"We were cutting everything from 3/4-in. material down to paper-thin material," Bloss recalls. "While we were there, a shock bracket got ripped off a vehicle in the middle of the race. Considering the speeds and the terrain, things frequently break out there. So, this driver shows up with the damaged bracket and asks, 'hey, can you cut me a new one?'

"Obviously, we're not dealing with SolidWorks or CAD drawings out →



The AMADA ENSIS fiber laser cutting machine featured at the King of the Hammers off-road race is equipped with continuous variable beam control to offer users high-quality cutting in every thickness of sheet material.

> “The whole family of AMADA comes together to analyze the customer’s needs to provide guidance toward the exact vehicle that will get them to their desired end goal.”
>
> *Michael Bloss, laser product manager, AMADA America Inc.*

there,” he continues. “We’d just get broken parts or templates drawn on a Coors-Lite cardboard box because the broken parts were still attached to the cars. So, we simply redrew the parts, generated the G-code and cut them right there on the fly.”

Bloss says these scenarios would happen during a race when time was of the essence, but within minutes, the parts would be ready to be welded back onto the cars. Maybe they didn’t win the race, but they certainly finished it.

The event also proved to be a true test of the robustness of the AMADA machine. Even with the extreme weather changes from snow flurries, rain and dust storms to rising temperatures up to 80 degrees F over a four-day period, the ENSIS machine had no issues.

While the team at AMADA provides the utmost in assistance when choosing a laser system, the understanding is that once it’s been delivered and installed, it has to be turnkey and easy to use with minimal intervention. Because in the end, whether the final choice is an ENSIS or VENTIS or any other machine, “at some point it really doesn’t matter to the customer,” Bloss concludes, “as long as they get the quality parts they need.”

AMADA America Inc. →