

Laser Focus

Laser technology is hitting the mark as an easily integrated plug and play toolbox

BY NOELLE STAPINSKY

60 to 70 per cent of TRUMPF's TruMark laser marking systems are incorporated into automation lines, says TRUMPF's Thomas Burdel.



Recent advancements in marking and cutting systems are making laser markers a faster, smaller, more environmentally friendly solution at a substantially lower price than previous generation lasers. What's more, integrating such technology into existing automated manufacturing processes has never been easier. In fact, most laser marking systems hitting the market are designed specifically for that purpose.

Traditional mechanical markers and Dot Peen systems may be tried and true, but they have well-known limitations that directly affect overall manufacturing efficiencies.

DOT Peen, for example, only marks metals and is a lengthy process that requires the part to

be secured.

"DOT Peen is an inexpensive way to mark, but it's also extremely noisy and needs a lot of maintenance," says Thomas Burdel, national sales manager, TRUMPF, Farmington, CT. "The pins wear down and need to be re-sharpened or grinded. And sometimes what happens in automotive applications, if someone is not careful at maintaining it, the datamatrix [code] cannot be read and the part has to be scrapped or reworked."

Laser markers are non-contact systems that use a fine spot diameter to ablate, melt, remove or vaporize material to create a precise quality mark at extremely high speeds. And the variety of different wavelengths

and technologies available on the market has created limitless solutions for a broad range of applications. Infrared (IR) is ideal for metals, ultraviolet (UV) can make fast permanent marks on plastics, while green lasers are often used in semiconductor applications, as well as some uses on copper and brass.

Indeed, past generation laser systems also proved to pose some limitations, the largest being the initial investment. CO2 lasers weren't ideal for industries using highly reflective metals due to bounce back issues.

Geoff Shannon, manager, advanced technology for Amada Miyachi, Monrovia, CA, says the company entered the market with a vanadate laser marker. "They were really good at marking and functioned well, but they did have the cost of the diode replacement packs which were a burden on our customers."

BEAMING WITH OPPORTUNITIES

The laser marking industry seriously honed in on the technology to create maintenance free, faster solutions. And with the advent of fiber laser technology, and its evolution over the past five years, they were able to achieve just that and bring the cost down significantly.

"The advantage of the fiber laser over the vanadate is that there are purely no consumables," says Shannon, "it's more efficient because you don't need a chiller, the fiber lasers are air cooled. And they simply plug into a 110v plug,

which is fantastic."

Compared to CO2 laser technology, Ron Luhman, director of business development for Fonon Corp., Lake Mary, FL, says fiber



Amada Miyachi's LMWS laser marking workstation is a compact unit for benchtop operation.

lasers are directly competitive with CO2 and require considerably less power to do the same job.

To remedy any bounce back on reflective metals, Luhman says "with advancements in fiber lasers, we now have one that's fast, powerful and precise enough. One of the secret sauces our company has is a special understanding of the reflective and material properties

of different kinds of metals when they're in that transitional phase. We're able to control the power of the laser to avoid that reflection. It's an evolving science that's advancing all the time."

What is most interesting about the evolution of this technology is that it's morphed into more of a versatile complete toolbox, offering an array of applications for everyone from big industry to research and development centers, and even smaller job shops. "People always think aerospace and automotive, but that's just the tip of the iceberg," says Ben English, chief marketing officer for Fonon.

Gun manufacturers use lasers for sterilization, engraving and marking barrels and sights. The biomedical industry employs lasers for creating colour changes (annealing) on surgical instruments or sterile markings on surgical implants.

"We actually have a customer that's making pill bottles. They do a reverse mould with a laser that engraves the 'twist here' [instruction]. In just minutes, it creates that mould, they put it on a machine, and pour plastic into it to make an inverted cap for the medical industry," says Luhman.

One interesting application that Burdel notes is a client using a laser marker to prepare metal surfaces for welding. "Using it as a cleaning process, you can basically evaporate oils or oxidation layers," he says. "If you have an aluminum surface, which naturally oxidizes, a laser can give you a very consistent clean cycle and the part can be welded immediately."

EASY AUTOMATION

Along with the range of laser technologies developed for marking different materials, there are integrated solutions for almost all of them and a selection of platforms—handheld or benchtop units, standalone industrial workstations, and compact solutions that can be easily integrated into a manufacturing process or production line.

Amada Miyachi offers a complete range of semi-automated laser marking machines and systems using laser powers from ten to 100 watts, but will also engineer a customized solution to meet customer needs.

“Our fiber laser marker head is shoebox size or smaller and you can fit it into a lot of areas. They can be set up to run as a stand-alone unit as they have an internal memory. Users can download the program using a computer, unplug it and use the external IO to tell it to mark part X with mark Y, for example,” says Shannon. “Another great thing is if you have a vision system, you can automatically orientate the field [of the laser] according to where the part is. And you can position the part anyway you want. So if you want to mark upside down, sideways or on the bottom of a part, you can do that too.”

Shannon adds Amada Miyachi’s laser marking technology is flexible and the software that runs the markers can be programmed for a lot of functionality, such as sterilization, date coding, bar codes and logos. They can also be easily integrated into a manufacturer’s existing software. “You can use

API commands or control it by PLC. You do need the internal software to set it up and input the marks, but after that you can simply save it to a software control to tell it what to do. There’s a whole stack of API commands that can instruct the marker to do a lot of different things remotely in a stand-alone mode.”

For TRUMPF's TruMark, 60 to 70 per cent are sold to automation lines. “Every laser we have is designed to go into an automation



Amada Miyachi's newly updated LMF series fiber laser marking systems address a range of laser marking applications.

line or work station, says Burdel. “For automotive OEMs, every part that that goes into a car has been marked by a datamatrix or number and they’re using lasers to do that because it’s permanent and not easily removed.”

A Foton customer used one of its laser systems for an automated marking and removal process for a client working with automotive windshields. “They do an idium tin oxide (ITO) removal and use the laser to remove that protective film on the glass,” says Luhman. “They also use one of our robots to do a removal for a reflective speed limit that comes off the dashboard and

reflects onto the windshield.”

Any of Foton’s machines can be integrated into automation lines, adds Luhman. “We have automation that does single table, dual shuttle tables, and we also have skeleton removal and machine integration into towers that will pull finished material off and put it on pallets.”

But it’s not just heavy duty industrial applications, Foton’s SBM series—a multi-purpose fiber laser or CO2 cutting and engraving system—caters to the smaller job shops and those who traditionally haven’t had a lot of access to laser technology. This SBM series can be plugged into a PC and will work with any Windows-based imaging software such as Adobe, CorelDRAW or AutoCAD.

By simply connecting the system using a USB cable, the SBM series is capable of precise marking and creating high resolution images of up to 4000 dpi.

Laser marking technology has clearly gone beyond just marking, delving into welding, cutting and drilling and has transformed into a versatile laser processing toolkit that’s plug and play. With prices significantly dropped, it’s become an attractive ROI, and Shannon advises, “this is a mature technology now that is moving quickly. If it wasn’t what industry wanted it to be five years ago, take another look, because it probably is now.” SMT

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