WOOD digest

LINE LASERS AND 2-D CPS HELP MAINTAIN THE COMPETITIVE EDGE

Implementing a line laser system in your facility can help you increase your operating efficiency without increasing your costs.

Lasers aren't just elements of science fiction anymore and they're not for the "big boys" with deep pockets either. The success of line lasers and 2-D computer projection systems has hinged upon manufacturers' desire and need to increase their efficiency. According to Terry Camp, vice president and head engineer of the laser systems at Carter Products Company, Inc., "lasers and 2-D computer projection systems (CPS) are an extension of your manufacturing line. No matter how complex your system is, 2-D computer projection systems can help you maintain the competitive edge in today's manufacturing environment."

Light-based positioning aids have been used in a variety of industrial manufacturing settings as far back as the 1950s. Beginning in saw mill applications, the ability to use a visual alignment tool in order to achieve an efficient operation has long been a tool of the trade. Since that time, the technology has evolved into more efficient and brighter laser lights and to systems capable of projecting complex patterns by controlling the scanning dot through computer-controlled mirrors with a single light source.

The Grand Rapids, Mich.-based Carter Products Company, Inc. has been in the business of producing guideline lights for over 50 years and offers a complete line selection of short straight-line lasers, and full capability pattern projection systems. Beginning with the older technology of incandescent light systems in the mid-'50s to the laser products of the mid-'70s, recent years have seen the gradual evolution of the diode laser products and the growth of a much more complex 2-D pattern generating system.

Camp says the advantages of visual alignment systems are many. From improving the quality of your finished product to saving setup time, eliminating waste, and speeding up your turnaround time, visual alignment systems are based on the idea of increasing your operations efficiency without increasing costs.

There are other benefits as well. Seeing the outline of the entire part before cutting begins allows the operator to assess the impact of imperfections in the material on the final part's appearance and functionality. Slabs with irregularly shaped edges can be positioned precisely to provide the minimum cut depth required to ensure a clean edge on the finished part. Precise cutting preserves expensive material. In addition, these systems are also used to reposition components for subsequent machining steps or for locating parts within assembly operations.

"The 2-D visual alignment system gives assurances that you know exactly where the tool will be cutting which prevents you from putting hold-down fixtures in the wrong place, and it adds to safety in that the user doesn't have to run the router while positioning things," says Camp.

"It's a matter of less potential damage, faster setups, and better efficiency on the machine, particularly if the manufacturer is using odd shape part blanks. Visual alignment systems have been shown to reduce nonproductive fixing of parts by 40 to 50 percent," he says.

But what exactly is a laser computer pattern projection system?

To put it simply, it's a system that produces a pencil thin beam of light which is then directed onto two small movable mirrors set at right angles from each other. These mirrors are attached to galvanometers driven by electronics under computer control. By sweeping the mirrors through angular movements, which are exactly timed with one another, it is possible to move the laser dot along the contours of a pattern dictated by a computer program. If the dot is moved quickly enough, the pattern appears to exist over its entirety even though the dot is continuously moving.

No longer is it necessary to plot drawings to paper and then manually translate those drawings onto the work surface. The system simply "floats" the image onto the surface instantly. Using a visual laser will allow the manufacturer to outline multiple parts on large blanks before the cutting begins to facilitate the placement of part numbers or bar code stickers for easy identification and sorting after production.

Modern 2-D laser projectors typically include Windows-based control software for easy operation and intuitive control of all laser functions. Thanks to recent refinements in software, setup and calibration of these units can be done quickly and easily. The laser projectors typically accept industry standard HPGL and DXF data formats from commonly used CAD programs. Optional software allows direct interpretation of many types of G-code files used as input by CNC machine controllers.

The evolution continues

Advancements in the technology have also continued to allow the product to gain a greater acceptance. From a general standpoint, the costs of the system have decreased as greater production volumes have increased, a factor that is common in most electronic products.

One of the main benefits of a 2-D laser technology is the level of accuracy it can provide to manufacturers, and Camp says systems continue to improve in this area as the underlying technology continues to improve.

"The technology itself is very accurate to begin with and this, combined with the elimination of human errors in measuring, means you'll be working more precisely than ever," says Camp. "We're continuing to develop the product to have the ability to handle more diverse data, different types of file formats and adapting it to work with a wider variety of equipment."

Common amongst most forms of electronics is the question of maintenance. However, Camp says maintaining the lasers shouldn't be too much of a concern. The system itself was designed to be used in heavily industrial environments and the units are sealed against dust. "They are at heart, a computer-based device and there are few moving parts inside," he says. "While it does use a motor to move each mirror independently, the galvanometers may at some point require some service. With that said, however, the lifetime of these devices is proven to be very good."

Increased usage

Laser pattern projectors continue to gain usage in a variety of markets. From the automotive to the steel industry to aerospace and every industry segment in between, the technology has been created to service all industries. In fact, in the last several years new customers are approaching Carter and asking how to best implement a visual alignment system.

"While these systems have been for sale for the last eight to nine years, it was an uphill battle to explain to the market what the product does, what it could do for manufacturing and why it was needed," he says. "As costs have come down due to greater production volumes, we've had customers come to us with new applications and ask how to best implement this technology."

It boils down to educating the industry on the benefits of laser systems. "It builds upon itself," says Camp. "With more users out there, potential new customers may have already seen the systems in action in related industries. By the time they come to us, they already understand the basic principles and want to focus on the specifics of their application."

For CNC machining, the system determines the placement of hold-down fixtures and projects the initial cut pattern on the material. It offers similar advantages to manufacturers working with solid surface, stone or wood surfaces.

With the continued rapid advancement of woodworking and stone fabricating equipment, CNC routers can now take the CAD drawings and create finished parts of complex shapes. With this advancement, however, the question has been raised on how to position the material properly and where to position hold-down fixtures so they're guaranteed not to interfere with the cutting tool path.

Solution: Laser guideline lights that provide a reference for material positioning allow the operator to visualize the path of the saw blade before cutting.

The same CAD data which directs the CNC machining also produces a visual pattern for the part along with the hold-down fixture locations prior to beginning the cycle. This makes it easy to quickly locate fixtures and clamps with assurance they won't interfere with or damage router heads and cutting tools.

The current nature of the manufacturing environment seems to hail, faster, cheaper and more efficient. Laser light technology will not only answer the call of these demands, but because of the increased quality of your product, your customers will thank you as well. While the technology may have gradually progressed, remember, it's available to help you and your manufacturing process. After all, this isn't science fiction, but reality.

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