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Cell Control Management

By Kyle Plass, Applications Engineer

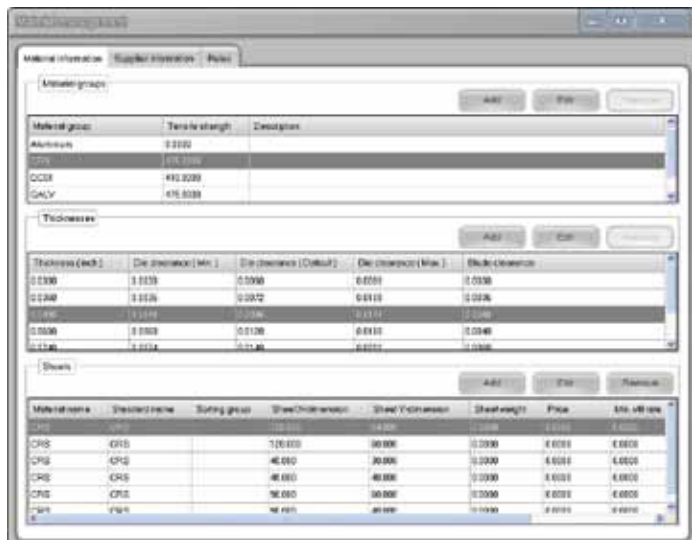


From the early days of Prima Power equipment, advanced user functions within the cell control software have been of utmost importance. Functions range from diagnostics, machine performance reporting, to production queuing. The latest generation of cell control software has created an even more powerful and user-friendly Windows-based machine management program named Tulus.

At Prima Power, machine management means more than simply setting the active NC program or defining tool punching depths. Complete management of the machine allows for less user interaction and more efficient machine productivity.

Material Based Rules

Tulus stores each individual material within a database similar to storing laser conditions for laser cutting machines. For each material stored there is the possibility to define rules of how the material will be processed on the machine.



Parameters that can be controlled include:

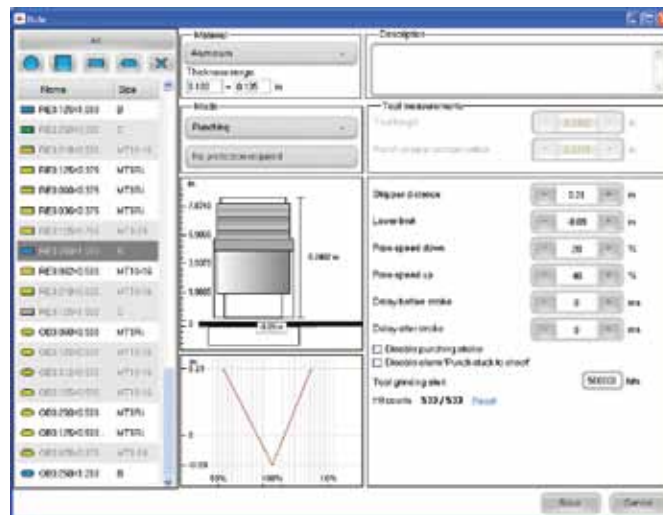
- Axis acceleration
- Ram speed (Punching)
- Shear speed up & down
- Shear stroke length
- Shear blade clearance (%)

Rules are defined by going to the Rules page and clicking "Add" under the Rules section. Select material type from drop down list and enter the thickness range. Double click on each of the parameter fields to define new values that will be used during production.



Tool Based Rules

Each tool that will be used is required to be defined within the Tulus tool library. The tool properties within the tool library are defined for general cases when tools are loaded within the turret of Tulus. If needed, rules can be applied per tool similar to material rules.



Tool rule is based on material type and thickness range and allows parameters to be adjusted based on the type of tool (i.e., punch speed, lower limit, stripper height, etc.).

Each type of rule is stored within the database and used automatically when a program is activated with respective material. Material and tool rules allow for repeated efficient processing for each shift of production allowing the operator to spend more time monitoring flow of production instead of setting up tooling.

Active program highlighting active tools within turret view. (see below)



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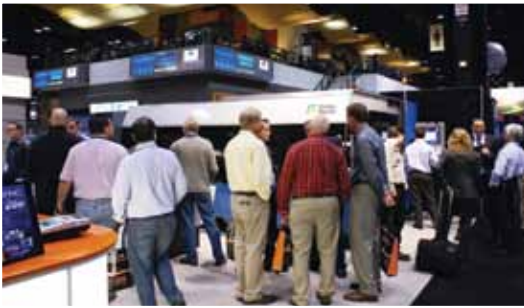
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Meeting the Challenge

By Gianfranco Carbonato, Chairman and CEO



While the world economy continues to remain somewhat volatile, there are encouraging signs that the laser and fabrication markets are gaining strength. The FABTECH 2011 trade show, held in Chicago, November 14-17, is considered North America's largest metal forming, fabricating, welding, and finishing event, and set new records for the number of exhibitors, the amount of exhibition space, and the number of attendees. Each day of the show the Prima Power booth was filled with curious fabricators to view the new Platino Fiber laser system, the eP servo-electric press brake, and the Fast Bend bender.



The past few years have found fabricators learning to adjust to the new realities of the current marketplace, which often involved deferring capital investment as long as possible. However, new equipment technology has always been the lifeline to growth for sheet metal fabricators. Today, a growing number of companies are reviewing their current equipment lists and asking the question: *Is our company equipment capable of meeting current and future challenges in the market?*

Our goal is, and always has been, to improve our customers' productivity and profitability by giving them a competitive edge. Our product range is by far the widest of any fabrication machine manufacturer in the world: 2D and 3D laser cutting and welding, laser drilling, punching, and integrated punching and laser cutting, integrated punching and shearing, bending, and Flexible Manufacturing Systems.

Modular Design

Prima Power flexibility provides modular design to allow its customers to add automation at any time. It provides the products and processes for lean-thinking and green-thinking fabricators to reduce direct labor and energy costs and manufacture with less floor space and less time to produce higher-quality products in any quantity. Prima Power flexibility streamlines operations and eliminates waste, while matching the right machine, cell, or system to the individual production need.

In the Words of Our Customers

This issue of the Power Line features several customer profile articles that highlight how Prima Power flexibility and technological advantages have helped our customers increase their quality, productivity, and profits:

Siemens Industry Automation Division, West Chicago, IL (see page 4) Siemens management did extensive research on the latest fabrication equipment prior to purchasing an automated system from Prima Power

- "The EBe is taking everything we throw at it and still has capacity. The accuracy, speed, and quality of the machine is something that I've never seen or experienced in this industry."



- "There has been a substantial labor savings with our new line. We've been able to utilize the equipment to eliminate outsourcing."

Ommec Moderna srl, Pozzolo, Italy (see page 9) Ommec Moderna srl, a firm specializing in the construction of portable and permanently installed rides for amusement parks, recently invested in a Sincrono Fiber laser machine to help entry into new markets.



- "Due to the integration of a high brilliance fiber laser, the new Sincrono Fiber is capable of achieving, on thin sheets, speeds and productivity as much as four times higher than the model equipped with a high power CO2 laser."

Precision Laser Processing, Sandy, UT (see page 18) Precision Laser Processing has earned the reputation as a leader in precision cutting services. The company has purchased two

Prima Power Platino laser systems, one with a 10-shelf Tower Server automated work handling system and the other with a compact server.

- "Once we bought the Prima Power lasers we never looked back. The most impressive feature is the incredible uptime of the Platino machines. They just work every time...all the time. They love to run."



- "We've gone from three shifts to two shifts, and we are making more parts with the two Platino lasers with loaders than we did with five stand-alone lasers."

HT Labor+Hospitaltechnik AG, Heideck, Germany (see page 20) HT Labor+Hospitaltechnik AG has evolved from a simple subcontractor that manufactured stainless steel and galvanized doors for small hospitals to a company with 200 employees that operates worldwide and builds complete systems for critical areas of hospitals. The company recently purchased a Prima Power PSBB line consisting of the Shear Genius punch/shear cell, EBe Express Bender and the Night Train material management system.

- "A similar production process that formerly required five work shifts and two employees is now achieved in 380 minutes using the line we purchased from Prima Power, with only one operator."



- "When we reorganized production, no one was fired, and in fact many of them improved their position in the company. Introduction of the Prima Power sheet metal processing line essentially allowed us to triple our production."

Advanced Automation Enhances Production Culture at Siemens



Siemens management did extensive research on the latest fabrication equipment prior to purchasing an automated system from Prima Power. The equipment included the Shear Genius integrated punch/shear, LPe laser punch, EBe Express Bender, servo-electric press brake; and the Night Train Material Management System that integrated the system.

Siemens Industry Automation Division, West Chicago, IL, is a leading manufacturer of motor control centers, enclosed controls, switch boards, and solar inverters. With two

“Prima Power has an integrated material handling system that other equipment manufacturers didn’t offer. With Prima Power we are able to utilize nesting and a Night Train material handling system that is integrated with the Shear Genius punch/shear, the LPe laser punch, and the EBe Express Bender.”

facilities spread over 210,000 square feet and 400 employees, the company recently decided to automate its sheet metal fabrication department.

“Prior to last year, our fabrication process was batch manufacturing,” explains John Hayden, manufacturing engineer. “We would cut blanks to length from coil, then walk them to a shear and cut to width, process the blanks in a stand alone turret punch press, followed by manual bending, welding, and painting operations. What drove our purchasing decision for a new automated line was the capability to manufacture just-in-time parts to meet our growing production demand.”

Siemens management did extensive research on the latest fabrication equipment prior to purchasing an automated system from Prima

Power (formerly Finn-Power). The equipment included:

- Shear Genius integrated punch/shear
- LPe laser punch
- EBe Express Bender
- Servo-electric press brake
- Night Train Material Management System that integrated the system

Prior to purchasing the new system, Siemens had an older Shear Genius with a storage tower and two older stand-alone turret punch presses.

According to Hayden, the linchpin for the final decision was his company’s previous experience with Finn-Power: “Prima Power has an integrated material handling system that other equipment manufacturers didn’t offer. With Prima Power we are able to utilize nesting and

“Today, the Shear Genius is the workhorse, fabricating 60% of the material we produce. The latest analysis shows a 20% scrap reduction compared to our old cut-to-length process.”

a Night Train material handling system that is integrated with the Shear Genius punch/shear, the LPe laser punch, and the EBe Express Bender. Driving the cost of production down was one of the key objectives, but being able to do our own analysis on what was our current performance and being able to justify new equipment was the key thing. The savings was there in order for us to justify the equipment.”

Shear Genius Flexibility

With the Shear Genius integrated punch/right angle shear combination concept, the objective is to provide one machine capable of transforming a full-sized sheet into punched parts. These parts can be moved to secondary operations utilizing the sorting and stacking automation and then on to bending operations without being touched by human hands. As loading, punching, and shearing of parts become automated, the result is finished parts with a dramatic reduction in scrap and manual labor while increasing profitability.

The Shear Genius eliminates wasteful skeletons and costly secondary operations such as deburring. Nibbled edges on the part exteriors are eliminated through the use of the integrated right angle shear. In fact, the same clamps that hold the sheet for punching also hold it for shearing. In essence, the Shear Genius allows the automated process to begin with a full-sized sheet of material and end with a punched part after automated loading, punching, forming, shearing, stacking and unloading – all in one operation. This allows true single-piece flow to be synchronized with a customer’s takt time.

“With the Night Train, we have just one source for material. There is no backup or wait for material. It’s always available and there are no bottlenecks.”



“In general, when we did all of our calculations, we were gaining a shift off the Shear Genius and Night Train. Sixty-six percent of these two pieces did what our old three machines did.”

According to Deron Jackson, plant manager, 85-90% of the manufacturing Siemens does is custom engineered to customer specifications. “These parts have to run through our turret,” says Jackson. “We need the flexibility to be able to utilize a multitude of materials without setups. Having the Shear Genius integrated

into the entire material handling system was a huge upgrade. Today, the Shear Genius is the workhorse, fabricating 60% of the material we produce. The latest analysis shows a 20% scrap reduction compared to our old cut-to-length process.”

Night Train

The centerpiece of the Prima Power automated sheet processing system is the Night Train Material Management System, which is the inventory and material transporting center. The Night Train FMS provides a total solution for unmanned operation for sheet metal fabricators by automating system control, as well as material flow within the system.

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This includes supplying raw material, as well as, removing and storing work in process.

“The Night Train takes the raw material from loading to punching to bending to final processing,” explains Hayden. “We have output stations at each of the press brakes and bender. With the old process, the turret punch press operator would have to go and find the blanks he was going to use. Now it is presented automatically. With the Night Train, we have just one source for material. There is no backup or wait for material. It’s always available and there are no bottlenecks. We used to do a weekly cycle count to know how much material we had on all the various types and thicknesses and styles. Now this information is available online. We know exactly what material we have, how much we have, and where it is located. The operators are doing more operating and less material handling. In general, when we did all of our calculations, we were gaining a shift off the Shear Genius and Night Train. Sixty-six percent of these two pieces did what our old three machines did.”

LPe Laser Punch

The Prima Power LPe laser/punch combination represents proven technology and intelligent

integration of punching, forming, tapping, and laser cutting in a single unit for the most varied sheet metal operations. Optimum use of the Prima Power LPe means that a fabricator can use the turret punch press where it is easier or faster and the laser where it is the most effective. The LP allows the user to look at the parts to determine the optimum process for every production.

Major energy savings are achieved in punching by Prima Power’s Ecopunch® concept which uses braking energy in the acceleration of the next movement. The same applies to the 2,500 watt CO2 laser with no moving parts. Stand-by power consumption, gas consumption, and maintenance requirements are low. As a result, the LPe combines low operating and maintenance cost with superior versatility, precision, ergonomics and compatibility with modern ecological thinking.

“We purchased the LPe for the odd-sized parts,” says Hayden. “Our standard run-of-the mill square type parts – doors, panels, etc. – are all right-angle type parts so they fit with the Shear Genius nicely. But a lot of thicker brackets and intricate smaller parts are ideal for the LPe. We’ve had excellent results with the

LPe, and the remaining 40% of our parts are run on this machine.”

“The servo-electric turret on the LPe is the wave of the future. The same is true in the bender and press brakes. The energy savings is there, the environment is cleaner, the accuracy is higher. It is the next step into the future.”

“This was our first laser, and I was really surprised how fast we brought this on line, and how quickly we were able to use the capabilities of the LPe,” says Jackson. “There is a learning curve for every piece of equipment, and it takes a little time to learn, but at the end of the day, it performs the way it is advertised and produces accurate parts with excellent edge quality. The servo-electric turret on the LPe is the wave of the future. The same is true in the bender and press brakes. The energy savings is there, the environment is cleaner, the accuracy is higher. It is the next step into the future.”

“We went from minutes on setups to seconds, and the EBe’s accuracy really caught my eye. Our goal is to challenge our equipment. The EBe is taking everything we throw at it and still has capacity. The accuracy, speed, and quality of the machine is something that I’ve never seen or experienced in this industry.”



The Prima Power LPe laser/punch combination represents proven technology and intelligent integration of punching, forming, tapping, and laser cutting in a single unit for the most varied sheet metal operations. Optimum use of the Finn-Power LPe means that a fabricator can use the turret punch press where it is easier or faster and the laser where it is the most effective. The LPe allows the user to look at the parts to determine the optimum process for every production.

EBe Express Bender

The EBe servo electric Express Bender is a bending solution that is designed specifically for each fabricator’s production requirements to achieve maximum productivity, quality, and repeatability. The bending operation is fully automated, from the loading of flat punched parts to unloading of the finished product.

The EBe bender has a maximum bending length of 100.39" (2550 mm) and a maximum opening height of 8" (200 mm). The new construction features actuations of the bending blade movements (vertical and horizontal) by NC servo axes instead of hydraulic cylinders. The upper tool movements are also made by another NC servo axis.



The EBe servo electric Express Bender is a bending solution that is designed specifically for each fabricator's production requirements to achieve maximum productivity, quality, and repeatability. The bending operation is fully automated, from the loading of flat punched parts to unloading of the finished product.

Prima Power EBe provides the high bending quality required in demanding applications. The quality is achieved through precise control of bending axes, fast and smooth bending motion, open programmability, and rigid construction that is immune to variation in thermal conditions.

"The EBe Express Bender was new technology for us," explains Hayden. "When we saw it in operation the first time we said: 'We need this'. Setup times eat so much of our press brake capacity. It boggles my mind how quick setups are with the EBe."

"There has been a substantial labor savings with our new line. We've been able to utilize the equipment to eliminate outsourcing. All of our sheet metal fabrication is now done in-house."

"We went from minutes on setups to seconds," adds Jackson. "And the EBe's accuracy really caught my eye. Our goal is to challenge our equipment. The EBe is taking everything we throw at it and still has capacity. The accuracy, speed, and quality of the machine is something that I've never seen or experienced in this industry. Engineers used to challenge production to make things. Now equipment like the EBe has the capability and functionality to challenge the engineers to come up with more complex solutions to assemble parts easier. As a result, we are redesigning many of our parts. We are using the design, functionality, and features of the EBe during the design process. It makes you step back and rethink the way you design. This piece of equipment is accurate within its tolerance ranges every time...all the time. The quality it presents is unmatched by human hands time and time again."

"This piece of equipment is accurate within its tolerance ranges every time...all the time. The quality it presents is unmatched by human hands time and time again."

Eliminating Outsourcing

"There has been a substantial labor savings with our new line," says Jackson. "We've been able to utilize the equipment to eliminate outsourcing. All of our sheet metal fabrication is now done in-house. Even the people on the floor know that our business is growing. They can see it...it is part of our culture. With the equipment that we had six months ago, we wouldn't be able to produce the output that we are doing today."

"I was impressed with how supportive the Prima Power management was during the installation and after. It was a very professional installation team. When we made a call when we needed help... we had support in a matter of hours...not days. We never heard the word 'No'...just 'what do you need'? This says a lot about the Prima Power people and their work ethic."

Prima Power Support & Service

"I was impressed with how supportive the Prima Power management was during the installation and after," says Jackson. "We were integrating the new system, and there was obviously a lot of pressure to have a seamless installation. In addition, our volume was increasing so we were able to implement this system into our every day production with very little interruption. It was a very professional installation team. When we made a call when we needed help...we had support in a matter of hours...not days. We never heard the word *No*...just *what do you need?* This says a lot about the Prima Power people and their work ethic. They have a good product and back it up with good people. As soon as the economy started going down, we executed plans for the new Prima Power automated line. We needed to put plans in place for future growth, rather than just staying flat with the economy. Prima Power was part of that vision."

Introducing EXP™ Punch Technology from Wilson Tool

By Jeff Paulson, Marketing Manager, Wilson Tool International

Wilson Tool International has a long, proud tradition of engineering innovative tooling solutions that change the way sheet metal fabricators operate for the better. With each new product they introduce, Wilson Tool strives to advance the state-of-the-art of tooling technology and continually raises the bar for reliability and performance.

For nearly a decade, Wilson High Performance™ thick turret tooling has been the standard against which all other punch press tooling was measured. It was groundbreaking...truly one of the most innovative products Wilson Tool ever designed. With its patented push button adjustment technology, quick release stripper plate and hardened steel construction, Wilson HP was the fastest, easiest and most durable thick turret tooling on the market.



Change is Here

Today, Wilson Tool continues its long tradition of innovation with the introduction of EXP™ punch technology, the first tooling in the industry to offer standard holders with truly universal punches. EXP punch technology for thick turret presses increases productivity, reduces manufacturing waste, saves storage space and delivers better performance, grind life and durability as Wilson Tool's ground-breaking HP punch press tooling at a lower cost.

"EXP punch technology is our most innovative punch press tooling yet. We've taken traditional punch press tooling and completely rethought the design," said Brian Robinson, Wilson Tool's chief executive officer. "The resulting tooling is faster, more durable and more affordable than any other thick turret tooling available."

Universal Punches

EXP punch holders are designed to fit in all styles of A and B station thick turret assemblies and are available for every major brand of thick turret tooling. This revolutionary design makes it possible to use the same holder with multiple punches. EXP punches are available in rounds or special shapes for virtually any need. For shops that run more than one type of thick turret tooling, EXP punch technology is fully compatible with all current guide assemblies, thus eliminating the need to buy punches from multiple manufacturers.

Faster Setups

EXP punch technology offers the fastest setups in the industry.



Switching between punches is up to four times faster than changing traditional punch press tooling.

Loading EXP punches is as easy as pushing a universal punch into the punch holder, then turning the key to lock it in place. To remove a punch, simply turn the key to unlock and pull the punch out of the holder. Switching from one punch to the next can be done in seconds, significantly reducing downtime.

Longer Tool Life

Every EXP punch is manufactured with Wilson Tool's exclusive Ultima™ premium tool steel to increase wear resistance. As a result, EXP punches have twice the tool life as most standard punches.

Less Storage Space

A fraction of the size of standard punches, EXP punches give shops the flexibility to stock more shapes, using less space for storage. With a smaller footprint required for storage, operators can increase productivity by keeping the punches they need close at hand.

Better Tooling for Less Money

Because EXP punches require significantly less material and produce less waste, manufacturing costs are reduced. Wilson Tool is able to pass those savings on. A lower punch price combined with faster setups, stronger tool steel and greater versatility makes EXP punch technology the best value for the money.



For more information about EXP punch technology, contact your Wilson Tool sales engineer or visit www.wilsontool.com/EXP.

Acquiring New Markets With Lasers

By Antonio Vendramini

We visited Ommec Moderna srl in Pozzolo, near the town of Villaga (in Vicenza province), a small community in the Belici mountains, surrounded by vineyards. This proactive and diverse company has maximized the use of laser technology to grow dramatically and open new markets in various sectors. We will now take a closer look at this interesting company.

Origins of the Company

We interviewed the owner of the company, Olinto Giacomuzzo, to learn that he was an employee of the Zamperla company, a Vicenza-based firm specializing in the construction of portable and permanently installed rides for amusement parks, which it also manages, as in the case of Coney Island (New York), one of the oldest amusement parks in the US. In 1973, he decided to go into business for himself, and founded OMMEC snc, while continuing to work full time at Zamperla. "Our workshop was located in a small garage," reflects Giacomuzzo. "We made motors for bumper cars, programmers for the so-called "punching meters" you encounter at every small-town fair, cylinders to elevate the people on revolving rides, etc. We always tried to operate with great professionalism, which led our company to gain a reputation for quality. This enabled us to expand gradually in the metal carpentry sector, and we started producing sub-assemblies. In this endeavor toward higher quality, we have managed to move from artisan work to certified work, using qualified materials, performing certified welding, etc. In a few years, we were known throughout the country for our production of high-quality parts, as well as for our great flexibility. And we were able to manage production from the prototype to mass production.

"Early in the 1980s, we began collaborating with the Bologna-based company Moderna srl, a producer of metal-washing machinery, dry cleaning and ironing equipment, as well as air and water treatment equipment. We started producing component parts for the company, and when it experienced economic difficulties that led it to bankruptcy, we took over the name and continued producing its vast range of products. We developed machines for washing bearings and engines for Trenitalia (the state railway company of Italy), engines for the Italian military, tramway parts for Milan and Turin, etc. Thus, in 2007 the company became Ommec Moderna srl, continuing to operate in the sector of amusement park rides, metal washing machinery, and marketing chemical products for these machines...until the laser was purchased, that same year."

Lasers

Olinto Giacomuzzo continues his story, "In 2007, we decided to purchase a laser system for cutting, and began to process the sheet metal parts of the systems we produced. However, we had two



FINISHED PRODUCTS FOR THE AMUSEMENT INDUSTRY

Structures developed by Ommec Moderna srl for the Antonio Zamperla Group, installed at the famous amusement park on Coney Island.



important limitations. The most serious one was our electrical power supply that was just 45 kW...and it would not have been economical for us to increase it. The other limitation was that we did not want to overextend the company financially. For these reasons, we decided to purchase a used laser, second (or perhaps third) hand, with a working range of 1250 x 2500 mm equipped with a 1500W CO2 source. This machine proved useful, although it limited us to the thicknesses we could cut, but the power supply problem had been decisive for us. We retrofitted the machine with a suction cup loading unit to facilitate positioning the sheet metal on the unit's two work tables. We could see the great advantages of laser cutting in terms of quality and precision.

"After our experience with the used laser, our goal was to acquire a more productive machine. It was clear that the laser was the technology of the future for processing sheet metal, and we wanted to move into that future through the front door. The new fiber laser sources were starting to dominate the market. The fiber laser would also enable us to solve our power supply problems, due to the greater efficiency of these generators. We analyzed our needs with the opportunities that were presented to us through the use of a 2 kW fiber laser. These lasers not only exceeded the performance we were used to getting with our CO2 source, but in thicknesses of about 3 mm or less, we actually increased performance in terms of speed. At that point, we were once again attracted by the opportunity of operating as a subcontractor. We were already clients of an

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important nearby Group that needed to cut very thin sheets at high speed and without burrs for the metal trim parts it produced."

Sincrono Fiber Laser

At this point, Giacomuzzo decided to consider the advantages of the Sincrono Fiber Laser from Prima Power, which had a proven track record of excellent performance in cutting thin sheets with CO₂ lasers. "With a single new purchase we would be able to satisfy a number of our needs," explains Giacomuzzo. "We would have an innovative solution

"With a single new purchase we would be able to satisfy a number of our needs."

of operating on a wider working area of 3000 x 1500 mm. We would not exceed our power limitations, and we would be able to enter the world of

"The Sincrono is a radically innovative machine for very high-speed and precise sheet metal cutting, even when the contours are extremely complex. Due to the integration of a high brilliance fiber laser on thin sheets, the new Sincrono Fiber is capable of achieving speeds and productivity as much as four times higher than the model equipped with a high power CO₂ laser. To achieve this performance, it is necessary to have a very high dynamic machine."

subcontracting, starting with an important, well-known client. With the introduction of fiber laser sources, we could create new possibilities to expand our own operating processes to include all materials, such as copper, brass, and aluminum alloys, that are difficult to cut with a CO₂ laser, due to their high reflectivity to the emission wavelength (10.6 μm) of these sources."



METAL CUTTING

The Sincrono Fiber system, produced by Prima Power, is equipped with a fiber laser and ensures high performance in cutting thin sheet metal materials.

THE LASER SYSTEM

View of the Sincrono Fiber system, using a 2 kW fiber laser, installed at the company.

According to Fabrizio Barberis, sales manager for Prima Power Italy, the Sincrono Fiber Laser was the best machine for this application. "The Sincrono is a radically innovative machine for very high-speed and precise sheet metal cutting, even when the contours are extremely complex," says Barberis. "Due to the integration of a high brilliance fiber laser on thin sheets, the new Sincrono Fiber is capable of achieving speeds and productivity as much as four times higher than the model equipped with a high power CO₂ laser. To achieve this performance, it is necessary to have a very high dynamic machine. With its revolutionary architecture and 6g of acceleration capability, the Sincrono can reach the dynamics permitted by the fiber technology for thin sheets. The Sincrono system is based on a unique solution. It is actually two perfectly synchronized machines in one – a small, lightweight head with very high dynamics and minimum weight in motion, and a larger machine with a larger work area (3000 x 1500 mm). The two machines are coordinated by patented algorithms, for the most advantageous distribution of the movements between the axes. An active compensation mechanism suppresses the vibrations deriving from the high dynamics. The use of the fiber sources also dramatically reduces energy consumption. It eliminates laser gases, optical alignment, high pressure compressors, and laser maintenance. Even the size of the footprint of the equipment is smaller."

According to Nevio Giacomuzzo, the owner's son, his company had confidence in choosing this new technology. "Even though we knew that our machine would be the first laser installation for 2D using fiber sources produced by Prima Power, we were extremely confident of the installation's success," says Nevio. "We were familiar with Prima Power's quality. We installed the system in April 2010 and immediately started

production. We kept our sheet metal loading unit and adapted it to the new system.

The Future

Nevio Giacomuzzo also claims that the Sincrono Fiber Laser helped increase their subcontracting work. "We started this new branch of the business by processing thin metal trim," says Nevio. "We were able to furnish excellent quality solutions in about 30% less time than we would have been able to do with the CO2 laser. We also aroused great interest with our ability to cut pieces in copper and other reflective materials which previously the company had been forced to cut with "water jet" equipment. This process necessitated subsequent cleaning of the edges by manual grinder. This was an important success for us. From this type of process we swiftly moved on to more diverse applications with thicker materials. We also received a great benefit from the lower maintenance costs inherent to the fiber laser technology. At the present time our shop operates at about 50% in the ride sector, about 30% in the production of our metal washing machines, and 20% in other metal carpentry work, including subcontracting work. In the near future we would like to maintain our position as subcontractors with the ability to process a wide range of materials with quick delivery. But above all, we would like to diversify the field of our main production sectors."

"We were able to furnish excellent quality solutions in about 30% less time than we would have been able to do with the CO2 laser. We also aroused great interest with our ability to cut pieces in copper and other reflective materials which previously the company had been forced to cut with 'water jet' equipment."



CARPENTRY WORK

Cutting metal trim pieces in different materials on commission, as well as parts for its own subassemblies.



PARTS CUT BY LASER

Examples of simple parts cut with the Sincrono Fiber laser system produced by Prima Power: highly reflecting thin metals and mild steel in thicknesses of 12 mm.



This is a translated and edited version of an article that appeared in Lamiera News, January 2011, Milan, Italy.

How to Optimize the Performance of CNC Punch-Press Tooling...in six easy steps.



Punching technology has developed dramatically during the last 10 years, including the introduction of linear drives, high-speed (up to 250 RPM) active synchronized AC drives for auto-index stations and turrets, precision 33-ton high-speed servo-electric punching and shearing machines, and the use of high-performance networked computer hardware and software built directly into the machines.

These new-generation presses provide for greater flexibility and performance by not only increasing hit rate but by also providing new features that allow fabricators to combine numerous operations inside one punching work center. Multiple 3.5-in. full extra-space tonnage indexing upform stations (10 or more in one machine) that combine a true upper and lower servo-electric punching ram allows for precision (0.001-in. increments) high forming and indexing simultaneously in the one station. This allows a fabricator to add more of these tools at any time, with an easy station changeout and reconfiguration procedure.

While CNC punching machines have become more capable and flexible, selection of tooling has become easier and less complicated, thanks to new 33-ton servo-electric punching machines. These machines feature controls and a standard software interface that provides improved tool control and integrated setup software. And, with servo-electric machines, the need to have mechanically adjustable form tools is eliminated, as the tool adjustment for form height is built directly into the machine's servo-electric control.

Six Steps to Optimized Tooling Performance

1 Match the tools to the machine's capabilities and the application

Correct tool selection for a new high-speed punching machine is akin to selecting the tires for a new automobile. Using the wrong tires (or continuing to ride on worn tires) will compromise performance and may even cause damage to the vehicle. So it is with tooling and presses.

To optimize machine performance, seek minimal tool changes by maximizing the number of tools that can be loaded into the machine, as well as the number of index stations and their size. For example, a fabricator can sleeve-down a 3.5-in. index station to a 0.5-in. station, but not the reverse, should it at some point require a larger station. Also, modern fully guided tooling in modern replaceable hardened guides and tool holders allows for a very high degree of tool alignment with minimal wear. This results in highly accurate nibbling with minimal tool wear, and can avoid the need for having a large number of fixed tools in a turret, rather than indexing. With quick-change dies and holders, and the use of large-capacity multi-tool cassettes that can be loaded offline, several tools can be changed quickly, with minimal downtime.

To form in the press, fabricators can use full-tonnage indexing and upforming turret stations. These can allow for forming with the lower



By Andrew McCarlie, Applications Engineer

ram to minimize marking of the underside of the parts. They retract after use so that the fabricator need not remove the high dies from the turret afterwards.

2 Consider high-speed tool steels

The quality of the material used to make punches and dies directly impacts the wear life of the tooling. With the high speeds punching machines now are capable of reaching, optimal tool life results when fabricators opt for tooling fabricated from high-speed tool steels such as M2 and M4. Combined with a fully guided punch assembly in a high-hit environment, use of high-speed tool steel will optimize performance.

Another advantage of these tool-steel grades: They have a relatively high hot hardness and can be coated using a vacuum process, further improving their wear characteristics. In addition, fabricators can run these tooling grades in their older machines and enjoy significant tool-life improvements.

3 Say no to slug pulling by carefully setting die clearance

With the latest generation of high-speed punching machines, the ability to minimize slug pulling is essential to maintaining productivity and producing good-quality parts. Die design has a great deal to do with this. Ideally, aim to have slugs exit the die on punching rather than pack into the die.

Tabbed dies use protrusions to grip or pinch each slug tightly and hold slugs in the die. This can very effectively prevent slugs from moving back into the die. However, the edges of the slug can become deformed when several slugs are packed into the die at one time.

Plain taper dies are less effective at retaining slugs at high punching speeds, although their performance improves with the addition of a slug-vacuum unit on the machine. Note: Fabricators should consider adding such a unit, regardless of the die design, on any new high-speed punching machine.

Adding a double taper (with a pinch point at the intersection of the two tapers) proves particularly effective at avoiding slug pulling. The slug enters the negative taper and is pushed to the pinch point of the positive taper, or slightly below, allowing it to fall out.

A note about die clearance: Significant damage can be done to a punching machine operating at high speed should the punch stick in the sheet due to inadequate die clearance. Excessive clearance can result in burring of the sheared edge, and poor hole quality. Correct die clearance becomes even more critical when punching thicker high-strength materials (Fig. 1).

4 Tool setup

With the latest generation of punching machines, tool setup has become a much simpler one-off operation. All of the tool data, such as overall length, shut height, die penetration and stroke

Recommended Die Clearance

Material Type (typical shear strength)	Material Thickness (T)	Piercing	Blanking
		Total Die Clearance (% of T)	Total Die Clearance (% of T)
Aluminum 25K psi (0.1724kN/mm ²)	Less than 0.098 in. (2.5 mm)	15%	15%
	0.098 in. (2.5 mm) through 0.197 in. (5.0 mm)	20%	15%
	Greater than 0.197 in. (5.0 mm)	25%	20%
Mild Steel 50K psi (0.3447kN/mm ²)	Less than 0.118 in. (3.0 mm)	20%	15%
	0.118 in. (3.0 mm) through 0.236 in. (6.0 mm)	25%	20%
	Greater than 0.236 in. (6.0 mm)	30%	20%
Stainless Steel 75K psi (0.5171kN/mm ²)	Less than 0.059 in. (1.5 mm)	20%	15%
	0.059 in. (1.5 mm) through 0.109 in. (2.8 mm)	25%	20%
	0.110 in. (2.8 mm) through 0.158 in. (4.0 mm)	30%	20%
	Greater than 0.158 in. (4.0 mm)	35%	25%

Fig. 1

length, is established in the machine control. The control uses these parameters to calculate optimal punch depth, whether for punching or forming. Further, the tool-control software parameters then can be set to different material types and thicknesses for individual tools (Fig. 2). This is only required to be set up once in the control, relieving the press operator from having to set tooling parameters for each material and tooling combination. Note: Accurate, consistent tool lengths are required to ensure success.

Also, saved turret layouts in the programming system minimize setup time by grouping jobs together by turret layout, so that multiple jobs can be run with the same tool setup. These turret layouts are identified on the program setup sheets. Minimizing setups will optimize tool performance.

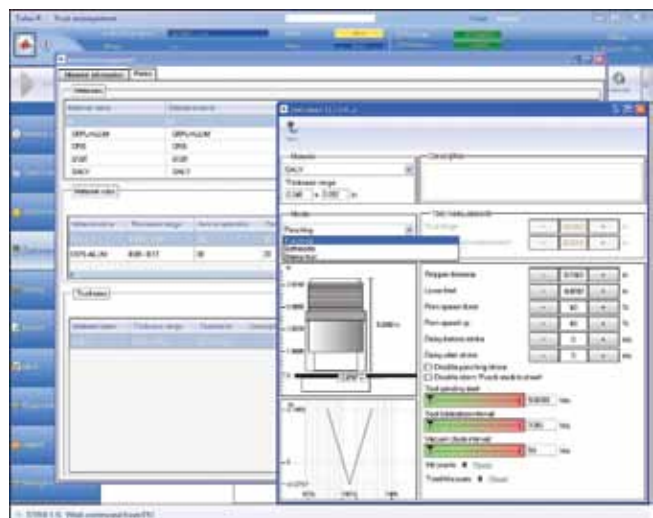


Fig. 2—Tool-control software parameters can be set to different material types and thicknesses for individual tools. This is only required to be set up once in the control, relieving the press operator from having to set tooling parameters for each combination of material and tooling.

Continued on back cover

More Creative Solutions For Fabricating Challenges

By John Galich, Marketing Manager, Mate Precision Tooling

Continuing our discussion from the last Power Line, fabricators rely on time-tested methods when challenges arise. There are ways to use the turret press more advantageously by using special applications. Doing so will help eliminate secondary operations and increase overall efficiency. Here are some examples of using your turret press.

Quick, Clean Parts Separation

Micro-joints (or “shake and break”) are an easy method fabricators use to separate multiple parts from a sheet of material. The method places small, interconnecting tabs between parts by programming spacing of the slitting punch. The tabs keep the sheet and parts intact during punching, but make it easy to separate off the press. There are times, such as nesting of really small parts, parts too big to be blanked or corners, when a micro joint is not possible. In these situations, fabricators often use a wire joint. While this works, wire joints leave spurs on the edge, which, unless removed, could interfere with other downstream operations such as bending.

Using a Square EasySnap™ tool solves these issues because it leaves a smooth edge and makes parts removal fast and simple.

Like EasySnap™, Square EasySnap is a scrapless part retention system that allows fabricators to simply snap punched components out of sheet metal. Square EasySnap features a V-line stencil machined onto the face of the upper and lower tools.

The sheet metal can then be snapped apart by bending the material along the snap-line.

Eliminate Many Press Brake Operations

Fabricating jobs often require the bending of parts. Typically, fabricators use press brakes for these operations. Sometimes, using a press brake seems like overkill, especially on smaller parts, and adds a secondary operation and cost to a job. Bending parts by hand could help lower manufacturing costs and speed time to delivery.

Mate's EasyBend™ is a tool that creates bend lines to make hand bending operations easy and convenient. It is ideal for intricate assemblies where conventional press brake forming techniques are inconvenient. EasyBend employs a linear V-line to create a stencil in the sheet metal. The tool penetrates the sheet metal, creating a crisp bend line, enabling it to be bent by hand. The angle of the stencil point is related to the angle of the

desired form, which must be specified when ordered. The actual depth of penetration is dependent on the ductility and thickness of the work piece. The continuous nature of the design allows the length of the bend-line to be a maximum suggested length of 12 inches (300mm).

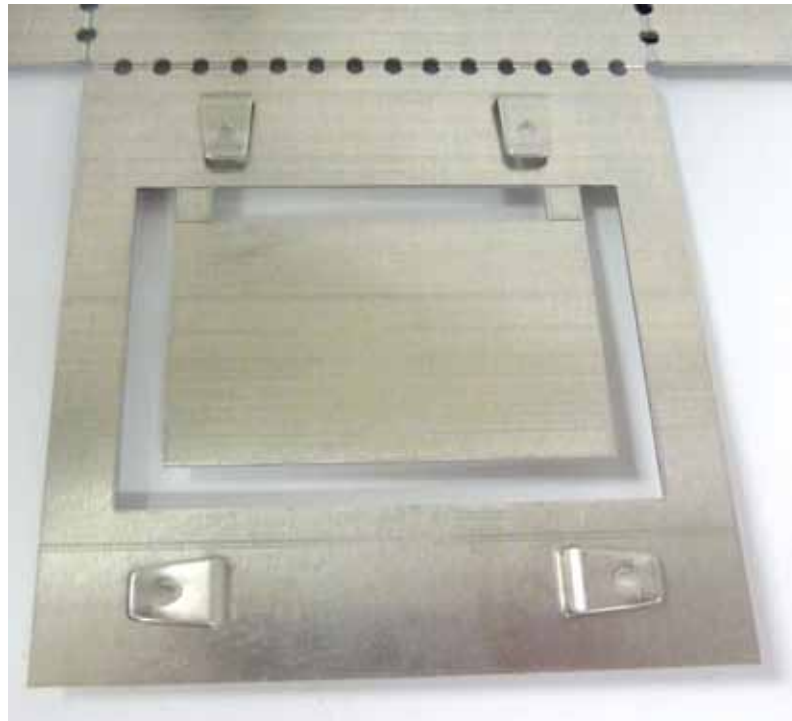
Economically Eliminate Burrs

The punching process frequently causes burrs on sheet metal parts. Handling parts with these sharp edges can be hazardous for both operator and end customer. Removing burrs typically requires a secondary operation such as a straight line sander that adds time and cost to the fabricating operation.

Further complicating matters are when the burrs are in tight corners, making removal even more time consuming. Mate can help you eliminate these secondary operations and improve safe material handling with a Straightline Deburr tool.

As its name implies, Mate's Straightline Deburr tool is designed to economically deburr metal in a straight line. It's easy to set-up and program, and perfect for tight corners. The Straightline Deburr tool uses a raised area on the die that is angled at 20 degrees and coins the burr back into the material's fracture area.

These are just a few of the ways fabricators can use their turret presses creatively and more efficiently to solve challenging situations. To learn more about these and other creative solutions, visit the Solutions Gallery at the all new mate.com. You can download Solutions Bulletins for these and other creative ideas and see what we've done for other customers like you.



Maximum Tooling Performance It's All In The Hardening Process!

By David Bishop, Business Development Manager, WILA USA

Due to improvements in quality and durability, press brake tooling is no longer a perishable commodity.

When properly cared for and used within the correct range of applications, today's precision ground and hardened press brake tooling can often provide a usable service life of ten years or more. That is not to say that it will simply last for ten years or more, but rather, it will provide performance that is the same, or nearly the same, as it did when it was brand new and right out of the box for that long or longer.

As such, when purchasing tooling for a new press brake, or updating an existing press brake with new tooling, today's press brake tooling buyer is now more than ever making a long term decision. As with any other long term business decision, you'll want to make the decision that will provide you with maximum productivity and the maximum return on your investment.

While hardened working surfaces are critical to the performance of today's press brake tooling, not all hardening processes are equal. At Wila, we understand that high performance brake tooling that provides maximum durability and maximum long term accuracy retention begins with the steel that the tooling is produced from. We utilize a proprietary alloy steel that we actually helped to develop. This steel is produced solely for and is available only to Wila. It provides exceptional strength, excellent ductility, extremely fine surface finishes, excellent machinability, and highly consistent deep hardening characteristics. It is used in the

production of all of our New Standard Premium and American Style Punches and Dies.

To maximize the performance of our proprietary steel, we invested over \$1-million dollars in the development of a patented hardening process that we refer to as CNC-DeePhardening®. This process provides tight tolerance CNC control over the heat up time, hold time, cooling time, and the depth of hardening. The combination of



Photograph shows the tip of a Wila Acute-Angle Punch being CNC-DeePhardened.

our proprietary steel and our patented CNC-DeePhardening process enables us to provide our New Standard Premium and American Tooling lines with working surfaces that are hardened to HRC 56-60 to a depth of .157" (4.0mm), making them the most durable lines of press brake tooling available.

While high performance press brake tooling depends on the optimum combination of steel and hardening process, these elements also serve critical roles in terms of the safety of the tooling when it is subjected to excessive force. Experience has taught us that to provide maximum performance and maximum safety, you must address both the hardness of the working surfaces of the tooling and the core hardness of the tooling. We do this by retaining a core hardness of HRC-30 on all of our punches and dies after the CNC-DeePhardening process has been applied. This prevents them from becoming brittle and potentially shattering when excessive force is applied. Anyone that has ever had the misfortune of having a press brake tool explode when it was exposed to excessive force sending fragments flying like a detonated grenade will fully understand the critical importance of this issue.

In the end, not all press brake tooling is created equal, and that most definitely includes the hardening process that gives it its durability. As you invest in a tooling system for a new press brake or an existing press brake, this is something that you'll definitely want to take into consideration.



Photograph shows the depth of hardening achieved by Wila's proprietary CNC-DeePhardening process on an Acute-Angle Die.

Prima Power Makes an Impact at FABTECH 2011

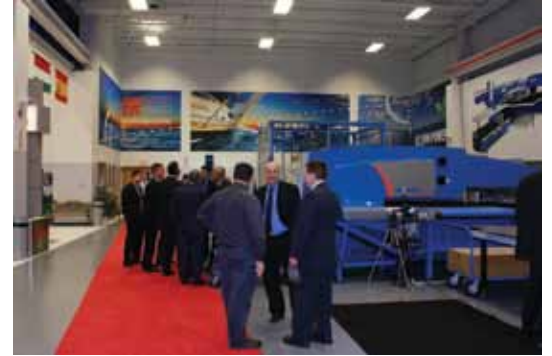
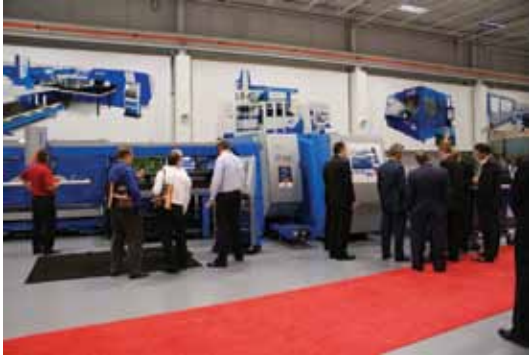
Prima Power made a strong impact on FABTECH 2011 held November 14-17 at McCormick Place, Chicago, IL. Record crowds throughout FABTECH filled the booth each day of the show. Visitors were enthusiastic when they were introduced to the Platino Fiber Laser, the Fast Bend, and new eP servo-electric press brake. This year, Prima Power Laserdyne shared a portion of the FABTECH booth.



Prima Power Hosts Open House During FABTECH

For three nights during FABTECH, Prima Power hosted an Open House after show hours at its showroom in Arlington Heights, IL. Visitors were able to get a close-up look at numerous laser and

fabricating machines, including: SGe6 – Servo-Electric SG with Combo Tower, Platino 2D Laser System, and the E5x Compact Express.



Italian Night @ FABTECH

FABTECH 2011 featured some of Italy's most advanced machinery manufacturers and suppliers for the metalworking and fabricating industries (40+ Italian companies). On the evening of Nov. 15th, the Chicago office of Italian Trade Commission (ITC) took this opportunity to host *Italian Night @ FABTECH 2011* to officially launch ITC's newest book in its series, *The Italian Edge*.



From left to right: Pasquale Bova, Trade Commissioner, Chicago Office of the Italian Trade Commission; Alessandro Motta, Consul General of Italy in Chicago (Italian Consulate); and Gianfranco Carbonato, Chairman & CEO, Prima Power and his daughter Giorgia.

Prima Power was a Gold Level Sponsor of the event. Gianfranco Carbonato, CEO and President of Prima Power, was a featured speaker and explained the numerous branding changes that have taken place within Prima Power this past year and to give his thoughts on the economic future of the Italy and the world.



Laser Systems Lower Labor Costs While Increasing Productivity

In 1994, Randy Hallman, president of Precision Laser Processing, Sandy, UT, bought his first laser machine. Seventeen years – and seven lasers – later, the company has earned the reputation as a leader in precision cutting services. “We have created a niche in the state of Utah,” Hallman explains. “We don’t weld or bend... laser cutting is all we do. A number of our customers are fabricators who don’t have lasers. From prototypes to production runs, we are dedicated to providing laser processing solutions for our customers.”

Precision Laser Processing has adjusted its customer list to the volatile economy. “We’ve adapted to the flow of the marketplace,” says Hallman. “Fluctuation in consumer discretionary spending has affected a number of our customers. As a result, today we have a very diverse customer list which includes OEMs in agriculture, automotive aftermarket, natural gas exploration, medical equipment, sign companies, etc.”

While Hallman has purchased several different models of lasers over the years, the two main lasers in use today are the Platino 2D Laser Systems from Prima Power. The Platino is equipped with lasers developed and produced at Prima Industrie in laser powers ranging from 3000 to 5000W. The laser cuts a broad range of materials and thicknesses with speed and precision without the need for manual adjustments. Platino’s laser cutting head gives users a choice of a 10-inch focal length in addition to the standard 5-inch and 7.5-inch lenses. The 10-inch lens enhances the application flexibility by increasing the depth of focus and enlarging the spot diameter for high and uniform cut quality of thick stainless (5/8 in), thick aluminum (1/2 in) and thick mild steel (1 in).

Offering a compact footprint along with a Cartesian Cantilever structure that provides three-sided access, Platino is a cost-effective machine that is easy to operate and quick to program. Its unique stonecast frame reduces vibration and increases stiffness by about 4 times compared to cast iron and about 6 times compared to welded frames. Its low heat conductivity results in much higher thermal stability compared to traditional cast or steel frames.



Randy Hallman, owner (left) and Steve Williams, quality assurance manager/ISO coordinator, inspect parts cut on the Platino 2D lasers from Prima Power.



Flexible Automation

Hallman purchased his first Platino 2D Laser System with the 10-shelf TowerServer automated work handling system in

2006. Prima’s 10-shelf TowerServer allows easy loading/unloading for blanks and processed sheets. It has an elevator for loading and unloading the pallets on and off the tower, and features single sheet separating, control systems, and sheet reference. “We were running three shifts and working around the clock, six or seven days a week,” reflects Hallman. “At first, I had to remind our operator to leave the Platino running when they went home. Finally the new mindset evolved. Today we run it 24/7.”

Precision Laser Processing bought its second Platino with a compact server about nine months later. The second Platino is used for thicker material and shorter run jobs.

“Once we bought the Prima Power lasers we never looked back. The most impressive feature is the incredible uptime of the Platino machines. The Platino takes a lot less operator input. They just work every time...all the time. They love to run.”

Prior to purchasing the Platino lasers from Prima Power, Precision Laser Processing had purchased five lasers from a competitor. “We’ve had excellent performance from the Platino lasers,” explains Hallman. “Once we bought the Prima Power lasers we never looked back. The most impressive feature is the incredible uptime of the Platino machines. The Platino takes a lot less operator input. They just work every time...all the time. They love to run. With the other laser machine we spent a lot of time tweaking the cutting parameters. The Prima laser machines are far more consistent. They always work the same every day. We’ve had the two machines for five years and they are just as consistent today as the day we bought them.”

“The Prima laser machines are far more consistent. They always work the same every day. We’ve had the two machines for five years and they are just as consistent today as the day we bought them.”

According to Steve Williams, quality assurance manager/ISO coordinator, the Platino laser and the TowerServer are both user friendly. “The tower is easy to program and run,” says Williams. “It took me less than three hours to learn how to operate it and requires very little maintenance. The maintenance intervals for the Platinos are longer than the other lasers we’ve purchased, resulting in higher productivity. And if we do need service, we can almost always expect it within a day.”

“When the laser beam is on we are making parts, and that’s how we generate our income. The Platino lasers allow us to make a lot more parts per day. The Compact Server and TowerServer have helped us be more competitive because we are making parts lights out.”

Precision Laser Processing uses the Platino lasers for all material from .001 to 1 inch mild steel plate. The Platino with the Compact Server is used for heavier material – stainless, aluminum, carbon steel – 3/16 & ¼ inch. The company also cuts acrylic, plastic, and ceramic tiles on the Platino. “The Platino lasers have helped us expand our business,” says Williams. “They have great dust collection systems that allows us to cut things we haven’t cut before because of the fumes. We have one plastic job that used to take about 20 hours on our old laser, that now

takes eight hours on the Platino with the automated load/unload.”

Reduced Labor

According to Hallman, the Platino lasers have helped simplify the cutting operation at his company. “The two Platinos have changed

the way we do things in the shop,” says Hallman. “The old lasers needed a lot more operator input. Today, most things are done off line because at one point both of my engineers were laser operators. We think that they make the best programmers because of their shop experience. With the Platinos, there is a much lower operator skill level



Precision Laser Processing uses the Platino lasers for all material from .001 to 1 inch mild steel plate.



Precision Laser Processing purchased its first Platino 2D Laser System with the 10-shelf TowerServer automated work handling system in 2006 (right) The company bought its second Platino with a compact server about nine months later.

that is required. It used to take a higher operator skill level with the older equipment because so much was in the hands of the operators. Now, the operators are spending less time operating the machine... and more time getting parts out the door.”

“We had 21 employees, we now have 11, and we are making more parts with the two Platino lasers with loaders than we did with five stand alone lasers.”

More Green Time = Higher Productivity

According to Hallman, his company is very pleased with the Platino lasers reliability. “When the laser beam is on we are making parts, and that’s how we generate our income,” concludes Hallman. “The Platino lasers allow us to make a lot more parts per day. The Compact Server and TowerServer have helped us be more competitive because we are making parts lights out. We’ve gone from three shifts to two shifts. And we often run parts on the weekend. This has raised our productivity. We had 21 employees, we now have 11, and we are making more parts with the two Platino lasers with loaders than we did with five stand alone lasers.”

In Pursuit of Productivity

by Antonio Vendramini



A visit to HT Labor+Hospitaltechnik AG, Heideck, Germany, gave us the opportunity to observe the operations of a Finn-Power (now Prima Power) automated fabrication and bending line for continuous processing of steel and stainless steel sheets, which are used to make modular walls, ceilings and doors for hospitals and bio-medical research laboratories.

HT Labor+Hospitaltechnik AG was established over 50 years ago, and has evolved from a simple subcontractor that manufactured stainless steel and galvanized sheet doors for small hospitals to a company with 200 employees that operates worldwide and builds complete systems for critical areas of hospitals, such as operating room blocks and intensive care rooms, and for research laboratories where sterile areas are required.

“Today, our company operates throughout the world,” explains Joseph Flierl, ceo and principal shareholder of the company. “For example, in Germany we’ve installed operating rooms at the Johannes-Wesling Clinic in Minden, the Schnarrenberg Clinic in Tübingen, and at the University of Frankfurt.

We have laboratory systems at Philipps University in Marburg. Around the world, our installations include walls and modular structures in Italy, Switzerland, Austria, Mexico, Kuwait, Russia, Bulgaria, Egypt, Thailand, Spain, Estonia, and many other countries. We can say that we’ve now become one of the most important producers in the world of modular walls and metallic structures for hospitals and research laboratories.”

The Need for Flexibility

Flierl explains that his company receives the designs for the buildings when they are still in the planning phase. “Within the layouts received, we subdivide the areas into operating theaters, with the preparation rooms, scrub facilities, and rooms for other necessary services,” Flierl continues. “About 40% of our personnel deal with the technical development of our designs. Also consider that, while we have modular

configurations for these structures, quite often they must be adapted to the specific functions required by each customer and to the regulations in effect in the various countries for which they are made.”

“To give you an idea of how slow the previous process was, suffice it to note that a similar production process that formerly required five work shifts and two employees is now achieved in 380 minutes using the line we purchased from Prima Power, with only one operator.”

Since 2001, these conditions have led HT Labor+Hospitaltechnik to search for an automated complete sheet metal fabrication system that was precise and flexible. “Our goal was to find a system that would make it possible to work on both small series and individual details in an extremely efficient manner. Analysis and research conducted early this decade did not produce the desired results. None of the suppliers we contacted had the system we sought, and above all, there were major gaps in the management software that did not guarantee the degree of automation required and the necessary flexibility. However, in 2007, we returned to the market in search of the *impossible dream*, and to make it come true, we brought on Gerd Salomon, an expert in managing sheet metal processing techniques.”

“When we reorganized production, no one was fired, and in fact many of them improved their position in the company. Introduction of the Prima Power sheet metal processing line essentially allowed us to triple our production.”

Selecting a Supplier

According to Salomon, the idea of what HT Labor+Hospitaltechnik wanted was quite clear: "We needed a single supplier that could guarantee automatic operation of a line that essentially consisted of a punching-cutting unit, and a bending unit for sheets that are generally no more than 2 millimeters thick, made of stainless steel, alternating with a buffer device that can be used to work even individual details, all supplied by a central double storage area, with 440 stations." HT Labor+Hospitaltechnik ultimately chose the Prima Power (formerly Finn-Power) PSBB line consisting of the Shear Genius (SG8) punch/shear cell, EBe6 Express Bender and the Night Train material management system.



Prima Power PSBB

HT Labor+Hospitaltechnik built a new manufacturing facility for the new production line. In the middle of this facility is the Prima Power Night Train material management system with 425 stations. It accommodates sheets up to 1,565 x 4,300 mm in size. The Night Train is remotely controlled by management software. Along one side of the building is the Prima Power automatic processing line. On the other side, the previously existing semi-automatic machines of various manufacturers are still connected and are used to process details. "During this transition period," explains Salomon, "we preferred to keep some older equipment so that we'll always be able to meet specific surplus requests."



The work process begins by removing the sheets from the storage cassette in the materials storage area and transferring them by means of a loading unit that sends them to the SG8 Shear Genius system for punching and angular shearing of the sheets. When the sheets exit this machine, which has three different lateral collection points for scrap sorting (handled by the program), the sheets move to an intermediate station, which is used to rotate the components 180° if necessary. These parts can be properly placed for secondary operations, such as deburring and bending, or as a buffer where the components can be collected and realigned for purposes of non-line processing. And in our opinion, this part is what's of most interest from the purely technological perspective, as the entire functionality of the line depends

on its operation. The last element of the line is the servo electric EBe6 Express Bender, used for parameterized and controlled bending of the sheet details worked.

"To give you an idea of how slow the previous process was," says Salomon, "suffice it to note that a similar production process that formerly required five work shifts and two employees is now achieved in 380 minutes using the line we purchased from Prima Power, with only one operator."

According to Salomon, a prerequisite was software that could be flexibly parameterized for the EB6 panel bender station. "With regard to the choice of supplier," says Salomon, "I should note that we chose the company that was best able to show us similar systems already in operation and was best able to meet our technical requirements, assuring us all the necessary assistance for complete operation of the system. The order was made in the summer of 2008 and the system was installed in that December. At present, we can say that we're still fine tuning not only the line, but also our production procedures, which were literally turned upside down with the arrival of the new system."

How have the employees reacted to the innovation? "Since they were involved from the start, I can say they even helped in choosing the system," emphasizes Flierl. "Many of our technicians were invited to get a close-up look at the operations of similar machines at the Prima Power showroom in Italy and in the facilities of a number of customers who were working with identical systems. I should also note that when we reorganized production, no one was fired, and in fact many of them improved their position in the company. "Introduction of the Prima Power sheet metal processing line essentially allowed us to triple our production."

This is an edited version of an article that appeared in m&a meccanica&automazione magazine no. 173 – October 2010, Milan, Italy

Refurbishing Turbine Engine Components with Prima Power Laserdyne

Turbine engine repair and refurbishing is a rapidly growing business requiring specialized equipment and experience. Leading engine manufacturers are more frequently outsourcing this activity, demanding the highest quality work from their suppliers. This requires a dedication to continually improving the laser processes and quality while providing fast turnaround time.

TL Precision Welding, Inc. of Houston, Texas, is a 12-person laser contract shop started in 1997 that serves this important and growing area of the turbine engine industry. Quang Tran originally founded the company to provide fabrication services to the Houston industrial market. Tran emigrated from Vietnam to the United States in 1978. He has lived and attended schools in the Houston area, graduating from Texas A & M with a Bachelor of Science degree in biochemistry and chemical engineering.



Quang Tran, president, and Son Dao, operations manager, of TL Precision Welding, Inc., stand adjacent to a refurbished gas turbine component laser processed with the company's LASERDYNE 790 BeamDirector system. The laser process is underway where cooling holes are "recreated" in the same position and of the same specification as the original new part.



The result – the company is attracting substantial new laser processing work.

Success at TL Precision's early engine refurbishing work has led to new opportunities in laser processing, company growth and a broadening of the company's laser capabilities. In an era of general economic decline, this is an industry niche with promising growth simply because of the sheer number of turbine engines, both land-based and aero engines, in operation and the constant need for engine maintenance. One leading turbine engine manufacturer for aircraft alone reports 25,000 engines in active service, all of which are continuously monitored for periodic maintenance.

The high value engine components, such as turbo combustors, nozzle guide vanes, blades and other transition parts, for both land and aerospace engines, are regularly refurbished and put back into service. To keep maintenance costs as low as possible and to extend time between overhaul, engine manufacturers are requiring suppliers like TL Precision to improve their processes.

TL Precision has met this challenge by becoming an expert at refurbishing these components but also positioning itself with new equipment and skills to handle new laser machining work as well. In 2008, TL Precision purchased their second system from LASERDYNE SYSTEMS (now Prima Power Laserdyne) maintaining a tradition commonplace for LASERDYNE SYSTEM users. TL Precision uses these systems for drilling difficult to machine materials such as Inconel 617, Titanium and Hastelloy X. These are the base materials used to make land based gas turbine engines.

Recreating Turbine Engine Holes

A significant amount of engine overhaul calls for the repair and refurbishing of engine components' air flow holes. Large combustor components have thousands of these small airflow holes of various sizes and shapes. The holes are designed to maximize engine thrust by selectively cooling critical components and are precision drilled using laser processes in carefully plotted, complex patterns over the part's contoured surfaces. The holes also are contoured and angled to the part surface to maximize air flow, reduce engine noise and minimize fuel requirements. Hole angles vary from 90° to just 20° to the surface and require a high degree of complex and agile positioning and dimensional precision.

According to Tran, the challenge with refurbishing air flow holes in these complex parts is that they must be "re-created" in the same position and with the identical precision size characteristics as the original part when new. "Recreating precision holes in a used part is often more difficult than generating precision holes in a new part," explains Tran. "In recreating the hole, there's no margin for error because most of these holes are positioned closely together and have diameters as small as .020 inches and require tolerance accuracies as tight as $\pm .002$ inches. To position and laser process each of these holes accurately - without damaging the part - requires the very best multi-axis laser machining technology and a high level of operator skill. We have both with the LASERDYNE 790 system, the LASERDYNE BeamDirector and the continuing support of LASERDYNE SYSTEMS."

Two LASERDYNE 790 P50 Laser Systems Re-Create Combustor Holes Accurately Without Part Damage

“Our LASERDYNE 790 BeamDirector systems are the keys to doing this work successfully,” reports Tran. “These systems are often the same models used by OEM’s to make the parts originally, so there are both hardware and software compatibility which helps facilitate the refurbishing process. Using the same programming coordinates as when the part was processed new, our operators employ LASERDYNE features to re-establish the hole location and align the laser beam to it. Our operators verify hole location and beam alignment so there is no chance of error using LASERDYNE’s “through-the-lens” viewing feature, which magnifies clearly all hole features (magnification is 45 times). Every hole is thereby processed and verified individually.”



Using LASERDYNE’S through-the-lens viewing system (45 times actual size), the system operator positions the laser nozzle and enters the commands for recreating each hole. TL Precision reports that it recreates thousands of these holes in a single part without damaging the part, most of which are valued at many thousands of dollars.

TL Precision utilizes percussion drilling and trepanning processes to recreate cooling holes. Percussion drilling, most frequently used, is a method that generates a hole with only the laser’s focused beam diameter. The beam is focused at the point where the hole is. A single pulse or a series of pulses remove the material in the beam path, with an assist of co-axial flowing gas until the hole is recreated. For existing holes, slag, exhaust refuse and other foreign material that have built up in the holes during engine operation, is removed cleanly and accurately.

Trepan drilling is a similar but less frequently used method in this engine refurbishing process. Trepanning does not rely on the laser beam size to give the final dimensions of the finished hole. With the part held stationary, the laser beam is moved with simultaneous multiple action motion to create the hole by cutting the periphery of the shape.

Tran reports that while this hole refurbishing process often requires a manual “point and shoot” technique, it is consistently accurate and faster than any other known method. “That, plus with our new LASERDYNE 790 system, we have current technology in our laser systems and trained operators that can easily process new parts when we get this kind of order. We are using all of LASERDYNE’s automatic and quality features that are designed into their systems.”

New Laser Processing Work At TL Precision Utilizes Full Potential Of LASERDYNE System Features

Tran and his laser system operators are fast becoming champions of the LASERDYNE multi-axis laser technology. Take for example, LASERDYNE’S Automatic Focus Control (AFC™) feature. “What we often must do manually to recreate a hole, we can do automatically to make new holes in new parts with AFC,” says Tran.

AFC guides the motion system, maintaining critical focus position and following the contour of the part regardless of slight surface irregularities. With AFC, all machine axes react to sensing of the part surface, creating unlimited R-axis correction with high speed

and unmatched sensitivity. AFC also allows top machine speeds so productivity is maximized without downtime or scrapped parts.

Another important capability of Tran’s laser systems is a variation of percussion drilling called “drill-on-the-fly”. This is a feature whereby laser beam pulses are delivered to the part by the stationary laser while the part is rotated. The hole placement is a function of rotational speed and laser pulse frequency. If multiple pulses are required, “drill-on-the-fly” software developed by Prima Power Laserdyne engineers is utilized to synchronize the movement of the part to the laser pulses, ensuring that multiple pulses are delivered to the exact location required. By changing the laser pulse energy, pulse count or lens focal length, the characteristics of the drilled hole size and taper can be controlled to meet the requirements of the part. Drill-on-the-fly software also allows changes of the pulse shape during the process to improve hole geometry.



“We continue to build on our laser processing knowledge with these LASERDYNE systems,” concludes Tran. “LASERDYNE engineers are always available for consultation and additional training if we need it. Our systems have tremendous capabilities and we continue to have nothing but positive results as we acquire more varied and difficult part projects.”

Operator shown programming the Optical Focus Control (OFC) feature of the LASERDYNE Beam Director System. Other features include Break Through Detection when laser drilling, Hole Diameter Compensation, SPC Data Acquisition and Shaped Hole Software.

For more information about Prima Power Laserdyne Systems, call 763-433-3700. www.primapower.com

5 Maintenance and setup

Tooling performance relates directly to the condition of the holders and their alignment in the turret. Look here first when noticing premature tool wear, chipping, sticky punches and saw-tooth cutting with auto-index stations. With improvements in computer hardware and software, along with closer integration of the programming systems, tool setup times are reduced, by having large, indexable, full-tonnage multi-tools to replace fixed tools at different angles in a turret, and by the ability to have a built-in electronic tool whiteboard on the control. This whiteboard automatically checks the NC program as it downloads into the machine, and changes it to match the tools in the control at the time. This also can reduce operation mistakes, as it alerts the setup operator should the tooling loaded in the turret not match that of the NC program. An easy-to-read screen on the control shows the turret layout, along with the tools being used (in green) for the current program (Fig. 3).



Fig. 3—An electronic tool whiteboard in the machine control alerts the setup operator should the tooling loaded in the turret not match that of the NC program. An easy-to-read screen on the control shows the turret layout along with the tools being used for the current program (in green).

6 A tooling-wellness program

Last, but by no means least, is investing in a well-planned and executed tooling-maintenance program. Lack of routine tooling maintenance is a primary cause of poor press productivity and excessive downtime, along with diminished part quality.

Correctly sharpened and lubricated tooling makes for consistently clean holes and minimal edge burr, along with reduced slug pull. With the punch speeds turret presses now are capable of, tooling should be sharpened when the radius at the cutting point reaches no more than 0.005 in. By sharpening tools at this point, fabricators can double the grind life of a tool and minimize machine downtime.

Some basic guidelines:

- Keep tools clean, and watch for wear – when punches dull too quickly, clearance may be too tight.
- Remove galling by rubbing with a fine stone, parallel to the direction of the punching motion.
- Watch for these possible signs of dull tools – excessive rollover, a noisy punch press and a press that begins to work too hard.
- Sharpen frequently, in small amounts – remove 0.001 to 0.002 in./pass and repeat until the tool is sufficiently sharp, typically 0.005 to 0.012 in. total.
- Apply coolant with as much force and as close to the tool and grinding wheel as is practical.
- Ensure use of the proper grinding wheel, and dress the wheel often by using a rigid single- or multi-point diamond.
- After sharpening the punch tooling, lightly stone the cutting edges to remove any grinding burrs, leaving a 0.001- to 0.002-in. radius.
- Provide the proper, recommended face geometry.
- Observe proper setup practices.
- Check press level and alignment and adjust as necessary.
- Examine (and repair as necessary) punch and die holders for wear, and turret bores and die-holder seats for damage. Fix damaged keyways.
- Extend tool life by ensuring proper tool and sheet lubrication.

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Happy Holidays

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