TRUMPF

Vol. 2/14

Express

Magazine for Sheet Metal Processing in North America

Special Section
FABTECH Buyers' Guide

Creative thinking
Designed for quality and competitive manufacturing

Forward progression
Lean practices, broad customers, and healthy growth

Safe and secure
For Roger Emperley, preserving treasures is all in a day's work

Transformation

From natural gas appliances to sheet metal fabrication, GH Metal Solutions has found its calling.

EXPRESS VOL. 2/14

Special Section
FABTECH Buyers Guide Page 17

FEATURE

TOPICS

REGULAR FEATURES

RESHORING: BRINGING NEW LIFE TO MANUFACTURING IN AMERICA

Diversity runs deep in the veins of this country, as it does in me. Born in Switzerland to German parents, growing up and receiving my education in the U.S., and working throughout Europe and Asia for twenty-four of the past twenty-five years, I have gained a deep appreciation for the rich value of cultural differences. My family and I are very excited to have recently come back 'home' and to join TRUMPF Inc.

I am pleased to see that we are part of a larger trend. In the past, the quest for progress and a competitive edge led companies to seek out new manufacturing concepts, different supply chains and other advantages found overseas. As with me, however, a period of reshoring has commenced. Fabricators have taken the experience gained overseas and have begun to make mature and more informed decisions of what work is best achieved on American soil and what can be done elsewhere.

Miller Metal Fabrication, a customer featured in this issue of TRUMPF Express, conveys that the need for high quality and high precision manufacturing has led companies to reconsider fabrication in the U.S. Recent shifts in the relative costs of manufacturing, as reported by the Boston Consulting Group and shared in the Panorama section of this issue, support the revitalization of our manufacturing landscape. The relative cost of labor is no longer a primary concern. The new focus is to achieve lean production, quick throughput, and to exceed the customer's expectations. For this, sheet metal fabricators have found there is great value in staying close to the customer, to R&D, and to the factory floor.

The resurgence is driven by new technologies and innovative processes which have enabled manufacturing to evolve. At FABTECH, TRUMPF will introduce new choices, such as the highest powered solid-state laser available on a 2D laser cutting machine, and new products, including the TruLaser 2030 fiber, TruBend 3100, and TruPunch 2000, to the North American market. Each new machine is a piece of the sheet metal process chain designed to enhance our customers' performance in flexible, short run, and high-tech sheet metal fabrication. It is an exciting time to be a manufacturer in the United States and for me, an exciting time for a homecoming of my own.

Peter Hoecklin,
President and CEO

Building a stronger workforce

Support for women in manufacturing

The 4th annual Women in Manufacturing™ (WiM) Summit was held Sept. 29-Oct. 1 in Schaumburg, Illinois. The two-day national conference, that has demonstrated year over year growth, drew 262 women with job titles ranging from production to CEO. The conference offered participants numerous personal and professional development opportunities with highlighted content featuring leadership engagement, project management, negotiation skills, risk management, lean manufacturing, and product liability. Featured speakers included Ms. Chandra Brown, Deputy Assistant Secretary for Manufacturing – U.S. Dept. of Commerce International Trade Administration and Mr. David Roszmann, Chief Operating Officer, Chicken of the Sea who presented WiM with a $10,000 donation.

WiM is a national organization dedicated to the attraction, retention and advancement of women who have chosen or are pursuing a career in manufacturing. The group encourages women to share perspectives, build knowledge, improve leadership and communication skills, and network with industry peers. Members benefit from monthly professional development webinars, mentoring programs, online discussion communities, employment tools, an online directory, and access to regional and national programming.

> **Additional information:** www.womeninmanufacturing.org

Christie Fleming (R), senior vice president, Chicken of the Sea, and her colleagues present Allison Grealis (L), executive director of WiM, with its donation.

TRUMPF's new office in Queretaro, Mexico

TRUMPF expands in Mexico

Queretaro location increases local support

TRUMPF recently opened a facility in Queretaro, Mexico dedicated to supplying spare parts and user support to its laser customers in the area. Sofia Cardenas, facility supervisor of the new warehouse explains, "As an extension of TRUMPF Mexico in Apodaca, N.L., it will stock more than 1000 different part numbers, including spare parts for TRUMPF laser resonators, TruMark marking lasers, and the TruLaser Cell multi-axis laser systems." She continues, "Its location supports courier services for early morning deliveries, and its stock will be continuously evaluated and optimized to best support the needs of TRUMPF's customers." The facility also provides 24/7 customer service support in English and Spanish.

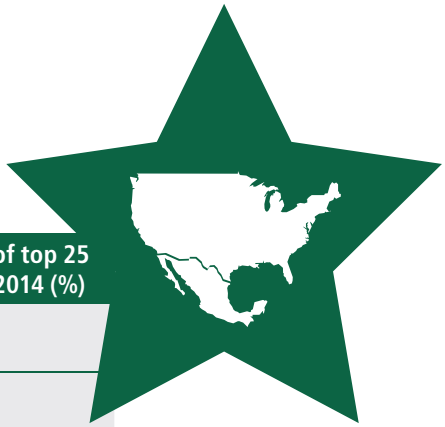
Michael Nuessler, regional sales manager for TRUMPF lasers in Mexico explains, "TRUMPF is committed to providing local support for customers in the growing Mexican market, including faster delivery of spare parts, as well as local and Spanish speaking support."

> **Additional information:** oemspareparts@mx.trumpf.com

> **Facility contact information:** Email: oemspareparts@mx.trumpf.com, Phone: +52 (81) 8131-2150 (24/7 operators), Fax: +52 442 221 5346

Manufacturing's rising stars

BCG finds the U.S. and Mexico well-poised for the future



	U.S., 2004-2014 (%)	Mexico, 2004-2014 (%)	Average change of top 25 countries, 2004-2014 (%)
Wages	+27	+67	+71
Absolute productivity	+19	+53	+27
Currency	Flat	-11	+7
Natural-gas cost	-25	-37	+98
Electricity cost	+30	+55	+75

Sources: U.S. Economic Census; U.S. Bureau of Labor Statistics; U.S. Bureau of Economic Analysis; International Labour Organization; Euromonitor; Economist Intelligence Unit; BCG analysis.
Note: The index covers four direct costs only. No difference is assumed for other costs (for example, raw-material inputs and machine and tool depreciation); the cost structure is calculated as a weighted average across all industries.

The Boston Consulting Group recently released the Global Manufacturing Cost-Competitiveness Index and with it their findings on the recent shifts in the relative costs of manufacturing world wide. According to the report, "Cost structures in Mexico and the U.S. improved more than in all of the other 25 largest exporting economies. Because of low wage growth, sustained productivity gains, stable exchange rates, and a big energy-cost advantage, these two nations are the current rising stars of global manufacturing." Labor and energy costs were found to have had the greatest impact for these countries.

In response to these findings, BCG partner Michael Zinser stated, "These changes should drive companies to rethink their sourcing strategies, as well as where to build future capacity." As the pendulum swings, manufacturing in the U.S. and Mexico becomes a more attractive and realistic endeavor. "Many will opt to manufacture in competitive countries closer to where goods are consumed," Zinser projected.

> **Additional information:** www.bcgperspectives.com

"Ask the Expert"

TRUMPF Q&A now on social media

TRUMPF recently launched a monthly feature called "Ask the Expert" which enables the company's followers on social media to submit questions about manufacturing techniques, TRUMPF products and services, or tricks of the trade in precision fabrication. On the last Thursday of each month, one question is answered via video response and posted on TRUMPF's social media channels. In the first episode of "Ask the Expert," TruBend Product Manager, Tom Bailey answered the question: "What should we be doing to ensure that our press brake tooling lasts as long as possible?"

Find the answer to this and other "Ask the Expert" features on the video tab of the TRUMPF Inc. YouTube channel: www.youtube.com/TRUMPFInc or submit your own questions to Robert.Caprilozzi@us.trumpf.com

> **Additional information:** robert.caprilozzi@us.trumpf.com

Nicholas Nanfito (left) and Matt King (right) complete a programming class as part of the Machine Tool Service Apprentice Program.

Holistic learning

TRUMPF's apprenticeship program is underway

The Machine Tool Service Apprentice Program, which was designed to develop well-rounded and highly skilled service technicians, is now underway at TRUMPF Inc. The two candidates selected, Matt King and Nicholas Nanfito, began their training in May.

Over the next two years, Matt and Nicholas will receive technical training while completing courses at local colleges or technical institutions for college credit. These credits also enable apprentices to work toward an associate degree as part of their training. The men will gain TRUMPF product knowledge in classroom training at TRUMPF's IACET certified training center and will complete assignments across various departments at TRUMPF including those which contribute to continuous improvement. The program will also include off-site training at customer locations and other TRUMPF facilities. After successful completion of the program, Matt and Nicholas will apply the knowledge and skills gained by joining the field service team.

> **Additional information:** Christine.Benz@us.trumpf.com

MustangMedic

Muscle cars on the mend

William Wieting and his crew, better known to the YouTube community as MustangMedic, use TRUMPF power tools to restore specialty Mustangs from around the world. The MustangMedic YouTube channel enables customers and other Ford Mustang enthusiasts involved in the restoration process. They keep day-by-day and step-by-step video accounts of every project, creating an entertaining and educational online resource for their fans.

Since MustangMedic's first YouTube upload in 2011, they have gained a strong following. The channel boasts approximately 6,500 unique video views a day, and a total count of over 3.2 million views. William and his crew always demonstrate the latest methods of repair including precision metal work with the TruTool N 200. With over 4,600 videos, MustangMedic fans can find countless tips, tricks, and tools to inspire their very own restorations.

> **Additional information:** www.mustangmedic.com

The car doctor is in! William Wieting and the MustangMedic crew.

TRUMPF's 2014 sales awards

Mid Atlantic Machinery secures top spot

TRUMPF Inc. was pleased to present the 2014 sales achievement awards at its annual sales meeting at the TRUMPF Inc. headquarters in Farmington, Conn. The awards were presented by Burke Doar, Senior Vice President of TRUMPF Inc.

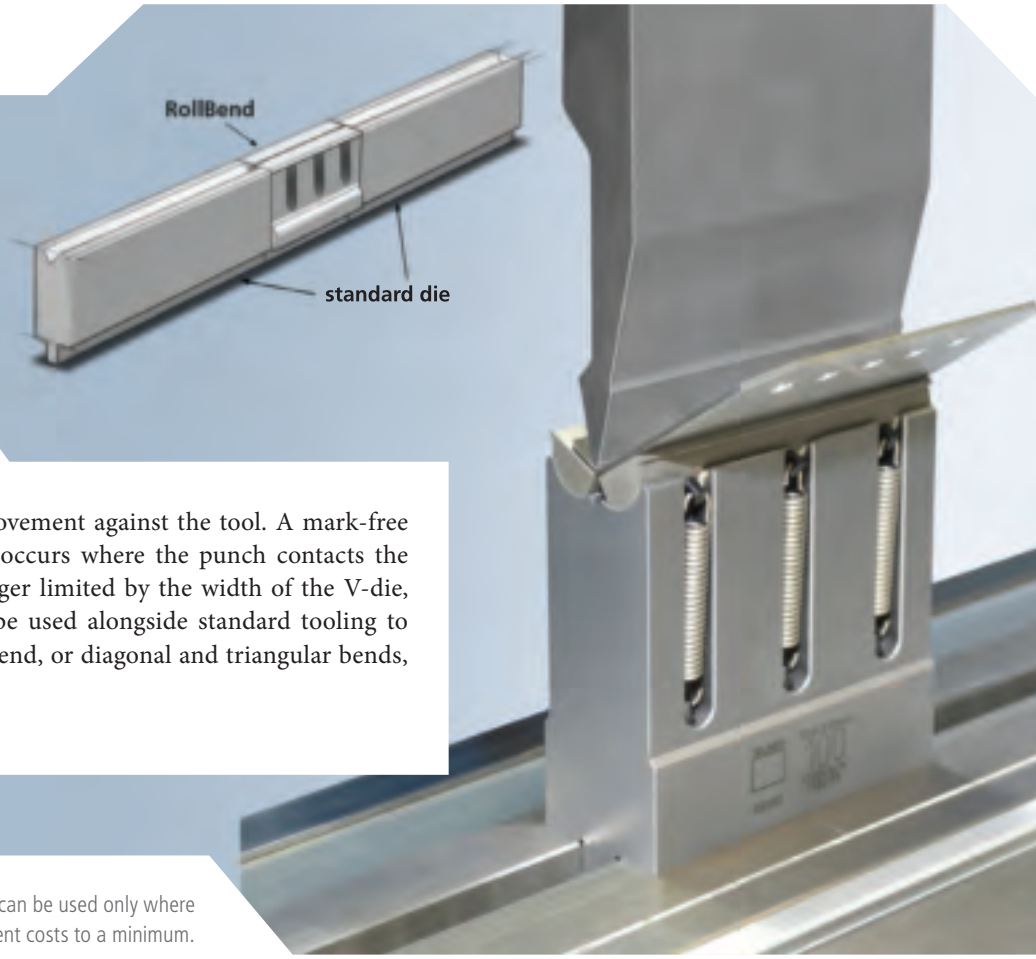
Mid Atlantic Machinery, Inc. (Harrisburg, PA) received the Outstanding Representative Performance Award in recognition of the company's exceptional performance in selling TRUMPF products during the past fiscal year.

The Sustained Excellence Award was presented to ICON Machine Tool Inc. (St. Louis, MO) in recognition of their consistent performance selling TRUMPF products. In recognition of its successful efforts to increasing sales and its support of TRUMPF products during the past fiscal year, FabMore Machinery (Carmel, IN) was presented with the Most Improved Performance Award.

> **Additional information:** www.us.trumpf.com

Mid Atlantic Machinery received the Outstanding Representative Performance Award from Burke Doar of TRUMPF.

Tooling Tip



Bending with RollBend

Traditional bending can leave marks on the sheet when material is dragged down into the V-shaped die while creating a bend. The RollBend die provides uniform support to the sheet resulting in little to no movement against the tool. A mark-free bend is achieved. Since support for the piece occurs where the punch contacts the surface of the RollBend die, flanges are no longer limited by the width of the V-die, enabling shorter flange heights. The tool can be used alongside standard tooling to support holes and notches placed close to the bend, or diagonal and triangular bends, with minimal invest costs.

> **Additional information:** www.us.trumpf.com

The RollBend die offers full support and can be used only where needed to keep investment costs to a minimum.


TRUMPF

Edwin Stanley (L) and members of the GH Metal Solutions team.

Fueled by fabrication

From The Gas House to GH Metal Solutions, the evolution of this Alabama company was far greater than a name change.

Nestled in a narrow valley on the northeastern border of Alabama is a small town with a big presence in manufacturing. In 1958, as Fort Payne began to dominate hosiery production, three men decided to form a business of their own. The Gas House, as it was named, filled the growing need for natural gas appliances and furnaces in the south. As the 1970s transpired, Don Stout, son of one of the original proprietors, worked hard to bring in new partners and new customers. In 1979, he expanded the company's offerings to include attic vents which warranted the purchase of a stamping press. This was soon followed by additional fabricating technologies, and ultimately, to a metamorphosis of the company's core offerings. In just a few years, the focus shifted away from home heating and cooling solutions to contract manufacturing. In 2010, nearly thirty years after this impressive transformation, The Gas House changed its name to GH Metal Solutions to better reflect its services in manufacturing.

Building a fleet of fabricating equipment

When Edwin Stanley, vice president of operations, first joined the company in 1999, GH Metal Solutions was looking to add laser cutting capabilities to its repertoire. "One of our larger customers was in need of laser-cut quality and offered us the work if we could supply it," says Stanley. It was the company's largest capital investment up to that point and the decision called for careful deliberation. "After about a year of research we decided TRUMPF had the better machine, even though it cost a little more." A TRUMATIC L4030 (TruLaser 3040) was delivered in 2000, just as business started to boom.

Since then, adding the right equipment at the right time has facilitated growth. The company added CNC press brakes when more precision was needed, but when offline setup capabilities became more critical, it was time again to upgrade. He explains, "By 2005, we had several laser cutting machines and appreciated the way TRUMPF had treated us. Service is very important and after disappointments with the technical support other companies provided, we made the switch to

TRUMPF." The company now has eleven press brakes – a mix of hydraulic and electric designs – and every one stays busy. "We introduce between sixty and eighty new parts each week – half of which require new press brake programs, so programming offline without tying up the machine has been essential in terms of productivity."

Stanley estimates 90% of the material processed at GH Metal Solutions is carbon steel at a maximum thickness of one inch, but the need for aluminum and stainless steel fabrication has grown. This drove the company to be an early adopter of solid-state laser technology and the benefits are apparent. Stanley confirms, "Operators come up to speed a bit faster on the TruLaser fiber machines. They are more stable, the beam requires less tinkering to find its optimum cutting performance, and unlike a CO_2 machine, there aren't any optics to keep clean." He continues, "The lasers cut today the same as yesterday, and the same as tomorrow." The new technology also allows GH Metal Solutions to match the job to the machine that will generate the best results.

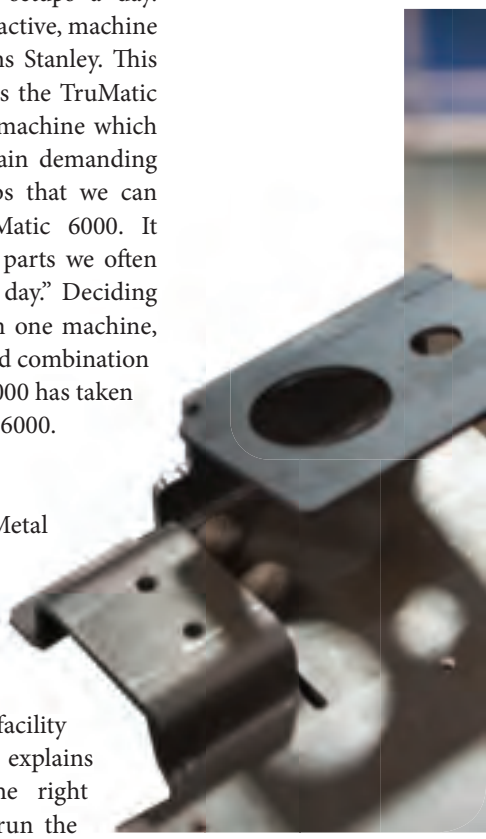
> "Operators come up to speed a bit faster on the TruLaser fiber machines."

Busy as a bee

To say the machines at GH Metal Solutions are busy may be an understatement: the bending and laser cutting machines operate three shifts and average 200 unique part setups a day. "Since we keep our machines so active, machine versatility is important," explains Stanley. This machine versatility also includes the TruMatic 6000 punch laser combination machine which the company relies on for certain demanding parts. "We have developed jobs that we can really only run on the TruMatic 6000. It performs great, but with those parts we often run the machine three shifts a day." Deciding the company was too reliant on one machine, they recently invested in a second combination machine. Their new TruMatic 7000 has taken its place alongside the TruMatic 6000.

The intangibles

While the machines enable GH Metal Solutions to stay productive and efficient, Stanley recognizes there is more to running a highly successful business. "We have competitors who want to see our manufacturing facility and I don't mind if they do," explains Stanley. "Anyone can buy the right equipment, but it is how you run the



With 200 unique part set ups a day, GH Metal Solutions is always bustling with activity.

equipment, how your train and treat your employees, and how you care for your customers that is important." He continues, "Walking the shop floor you can feel a difference, but you can't take a picture and bring it home to copy because the true difference is in the way we respond and treat our customers."

This mentality keeps GH Metal Solution's customers coming back. "We have a lot of repeat business," says Stanley. He admits this might seem contradictory considering the number of new parts they run each week, but the average lifecycle of a part is just 3-5 years. "We partner with our customers, take on the hard stuff, provide a quick turnaround, and work with them on delivery," says Stanley. "We teach new employees to work with the customer, whether they need laser cut blanks or complete parts that have been cut, bent, welded, machined, and painted." In doing so, GH Metal Solutions has built a strong reputation and given Stanley and his coworkers the opportunity to work on many interesting projects. "I remember laser cutting a small but important piece for a fire suppression system inside military vehicles to protect the soldiers. It was a simple stainless steel screen but it went all over the world and we were proud to supply it."

> "Walking the shop floor you can feel a difference."

Things have certainly changed for Fort Payne and GH Metal Solutions since 1958. The town is no longer known as the sock capital of the world, and GH Metal Solutions has evolved far from its beginnings. "From 1999 to the present day, we've grown eight-fold," says Stanley. "We have a new name and are publicly held since joining Reliance Steel & Aluminum Co., but our company culture and all the folks who work here have stayed the same." □

GH Metal Solutions

Who: GH Metal Solutions, Fort Payne, AL. Founded 1958. www.ghmetalsolutions.com

What: A full service fabrication company

How: 3 x TruLaser 5040 fiber, TRUMATIC L 3050 (TruLaser 5030), 5 x TruLaser 3030, 3 x TRUMATIC L 6030 (TruLaser 3060), TRUMATIC L 4030 (TruLaser 3040), TruMatic 6000, TruMatic 7000, TUBEMATIC (TruLaser Tube 5000), 3 x TruBend 7036, 3 x TruBend 5085, 3 x TruBend 5130, TruBend 5170, TruBend 5320

TruServices: Laser consumables

To achieve the highest level of productivity, performance and profitability, it's essential to have the right tools for the job. When you decide to invest in high-quality equipment from TRUMPF, you take the first step. Next, it is critical to maintain your investment with the highest quality consumables. Laser consumables from TRUMPF are engineered specifically for your machine and its unique capabilities. When you buy consumables from TRUMPF, you are guaranteed the best fit and the best performance, enabling you to reach the full potential of your machine.

RF Tubes

Power output amplification is achieved by RF tubes. With TRUMPF as your original supplier you can be confident that the RF tubes have been fine-tuned to interact with your TRUMPF laser machine's generator to deliver the best possible performance. You can thus eliminate expensive calibrations of the generator, as well as the risk of damage to the driver stage, generator, or machine. Your laser is too valuable to risk downtime due to an unapproved RF tube.

Water chemicals

EasyKits ensure the integrity of the resonator and the optics in your TRUMPF machine. While recent studies have shown competitive products may even encourage bacteria growth, TRUMPF water chemicals have been specially selected and tested for TRUMPF resonators and water circuits to prevent contamination and the irreparable damage that results. Designed for the machine's annual water exchange, the bottle provides a single water replacement, eliminating the need for measurement and storage after opening.

Steve Renne

Maintenance Supervisor, Simonds International Corporation

When I buy TRUMPF RF tubes and other consumables, I know the parts will fit right and be a better quality, but it's the technical support that keeps me coming back. While most equipment manufacturers are hesitant to share information, the people at TRUMPF are professional, knowledgeable, and get you the information you need. My call is answered and my questions are resolved –usually within minutes. There is no added cost for this Grade A support and I appreciate that so when it is time to buy consumables, I support TRUMPF the way they have supported us at Simonds.

Dewey Lockwood

Owner, Fabricating Solutions

At Fabricating Solutions, we tend to push the limits of what our machines can do. By using TRUMPF lenses and ceramics we eliminate variables, enabling us to cut difficult materials faster. TRUMPF ceramics are also more durable and dependable than the competition, and the laser lenses last longer. While we attain 300+ hours from our TRUMPF lenses, through experience we know that the competition can only perform for 180 hours. With TRUMPF consumables, we see fewer cutting issues, higher reliability, and longer lens life.

Nozzles

Designed to be perfectly aligned with your TRUMPF CO_2 or fiber laser cutting machine, our nozzles undergo a unique production procedure to ensure the center of the nozzle is concentric to the threads, so the exact focal position is always guaranteed. This leads to superior cutting results, faster nozzle changes, and less cutting gas consumption. Third party nozzles are not made to the same high standards and can lead to substandard cutting results.

CO_2 laser lenses

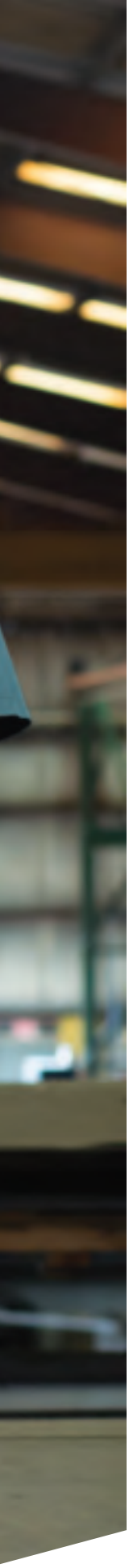
The best CO_2 laser cutting results are achieved when the machine, the lens, and the technology tables are perfectly aligned. With lenses from TRUMPF, insertion is simple and precise, reducing the need for beam centering after replacement or cleaning. The LensLine and PieceLine functions are optimized, and with TRUMPF's unique RFID chip, its status is precisely monitored to reduce the frequency of cleaning as well as the risk of damaging the cutting head.

Dave Siiss

General Manager, North Eastern Water Jet

TRUMPF consumables give us peace of mind in two ways: we know what we're getting and when they will arrive. The overwhelming majority of consumables we've purchased have shipped same day, and they always work correctly, right out of the box. There is no point in using inferior quality consumables with a superior TRUMPF laser. This value was evident a few years ago when we tried a competitor's TRUMPF-style nozzles. Through several attempts, there was slag on the part. We even tried to change the tech table parameters, but to achieve acceptable edge quality we had to cut at 95% of the speed. That performance confirmed that quality consumables from TRUMPF keep our investment operating at its best.

Dave Morris, vice president of manufacturing (L) with Martin Miller, president of Miller Metal Fabrication.



Redesigning manufacturing

By taking a thoughtful approach, Martin Miller created a small business that redefines world-class.

For Martin Miller, president of Miller Metal Fabrication, the decision to start a business was a simple one. "I was pretty talented, mechanically, and just decided to give it a try." From his backyard shop, Miller built custom machines primarily for the food industry, and added equipment as he could. As he became more serious about the business, Miller built the operational foundations necessary for future growth. He focused on fine tuning his basic business skills while also adopting lean manufacturing concepts. "As a small manufacturer, it was easy to embrace just-in-time and lean manufacturing. We created that atmosphere, cross trained workers and encouraged employee development. That's when the company started to take off," explains Miller.

> "At our facility, fabrication is more than pushing buttons."

Embracing technology

In the beginning, Miller Metal could not afford top-of-the-line equipment so it invested in used machines. "As business grew, we knew we couldn't afford not to buy the latest technology," explains Dave Morris, vice president of manufacturing. "We started to embrace it and connected with TRUMPF to buy our first laser cutting machine." A strong commitment to technology can now be seen in all areas of the Miller Metal business.

Miller Metal uses its TruTops software to operate its fabrication machines in conjunction with a proprietary software system developed internally to maintain control of the shop floor. The company was able to rid itself of inefficiencies and paperwork and establish a fully integrated ERP control system. "It is far beyond the standard scanning and bar code systems," says Morris. "Our customers typically receive quotes within twenty-four hours. This order goes directly into our system and we can manufacture within their production schedule." He continues, "We have touch screen systems at each work cell so workers can access the schedule, check in and out of jobs, and retrieve SolidWorks drawings. This allows real time visibility on the shop floor." Operators can also nest parts while on the shop floor. "When running a large stainless steel part, for example, our system easily enables us to reduce scrap by using the recovered material for a different part."

Almost every person in a manufacturing role at Miller Metal has been to training at TRUMPF. Many have had advanced training. "At our facility, fabrication is more than pushing buttons. Our employees gain useful knowledge ranging from press brake operation and SolidWorks, to production control and safety," explains Miller. "We do this so people are able to make decisions on the shop floor." It also empowers employees to improve processes and work flow. They have even toyed with adding wheels to its TruBend press brakes to bring bending capabilities directly to the TruLaser cutting machines.

Miller Metal trains employees to be experts on the shop floor.

"The TRUMPF equipment affords us certain capabilities."

A creative approach to fabrication

This unique approach to business does not begin – nor end –on the manufacturing floor. The partnership Miller Metal has with engineering company O.A. Newton is proof of this. Once one of the largest fabrication providers on the east coast, it had fallen behind on technology. The company decided to focus on engineering services and asked Miller Metal to take on its manufacturing needs.

Success was evident right from the start. Redesigning an existing product to run on Miller Metal's state-of-the-art equipment increased part quality and removed sixty percent of the cost of manufacturing. Morris explains, "Using our TRUMPF precision bending technology we reengineered the product and eliminated ninety-nine percent of the welding – approximately eighty linear feet, to just six inches." In addition, the final product no longer requires special tools for installation or maintenance and is more aesthetically pleasing.

Miller Metal prides itself on its ability to design parts for manufacturing. "Our equipment requires almost no set-up so we are almost as efficient at producing one or two parts as we are making hundreds," explains Morris. "When working through part design or redesign it is a huge advantage to bring a tangible part, not just a blueprint, back to the discussion table."

Miller Metal excels at redesigning parts for manufacturing.

Quality manufacturing in America

Miller Metal's manufacturing facility feeds many industries. Prominent companies such as O.A. Newton, Maryland State Highway Administration, Nestle, Chesapeake Ship Building, Arrow South Penn, Hanover Foods, Oceaneering, and NASA have all benefitted from the Miller commitment. Although each only accounts for a small part of the business, the concept is a big indicator of the company's unique style. The investment in technology has increased the flexibility and quality of its fabrication services and has even enabled the company to earn business that was once sent overseas.

For one large project, Miller Metal worked in conjunction with O.A. Newton to produce computerized equipment used to dispense precise quantities of resins and powders for the medical industry. The system had previously been manufactured in China but quality was a concern. "The process is delicate and the customers needed a turnkey solution they just couldn't achieve overseas," explains Morris. With its precision machinery, Miller Metal provided the quality and precision needed. "The TRUMPF equipment affords us certain capabilities which enable us to reduce the cost of manufacturing while providing the highest quality parts," Miller asserts. It also allows Miller Metal to be competitive on a global scale.

With its commitment to lean practices, new technology, and comprehensive training, it is no surprise Miller Metal was recently presented with the mid-Atlantic Small Business Administration Success Award. The company's approach to efficient manufacturing and technological leadership in addition to its creative partnerships and practices, is sure to keep the company successful for years to come. □

Miller Metal Fabrication

Who: Miller Metal Fabrication, Bridgeville, Delaware Established 1983. www.millermetal.com

What: A sheet metal fabrication company focused on lean manufacturing techniques and just-in-time concepts.

How: 2 x TruLaser 3030, TruLaser 2030 Classic, TruPunch 3000, TrumaBend V130 (TruBend 5130), TruBend 5170

SPECIAL SECTION: FABTECH BUYERS' GUIDE

To achieve peak performance, power is essential. For decades, TRUMPF has found innovative ways to provide customers with the power they need to consistently manufacture at the highest level. Our robust laser cutting machines, punching machines and press brakes perform where the competition lacks and all are backed by the most comprehensive training, technical support and spare parts in the industry. Let TRUMPF supply you with the power to perform – now and in the future.

Visit TRUMPF in booth B1903 at FABTECH to experience the highest power solid-state laser cutting machine in the industry.

SPECIAL SECTION: FABTECH BUYERS GUIDE

Featured Demonstration: Production Cell

At FABTECH, TRUMPF will demonstrate a complete production cell by turning flat sheet metal into finished parts. Visitors to the TRUMPF booth will watch as parts are cut on the new TruLaser 2030 fiber 2D laser cutting machine, bent by the new TruBend 3100 precision press brake, and finally, without any pre- or post-processing, laser welded with the TruLaser Robot 5020. A TruMark 5020 will be used to laser mark the finished parts. The TruLaser 2030 fiber and TruLaser Robot will share a 4kW TruDisk laser through TRUMPF's LaserNetwork capabilities, exhibiting the unique flexibility of the TruDisk laser design. The cell operates hourly and demonstrates how TRUMPF machines are expertly designed and coordinated to maximize production with the highest degree of efficiency and precision.

TruLaser 2030 fiber

Developed and manufactured in Farmington, Connecticut, the TruLaser 2030 fiber with a 4kW TruDisk 4001 laser, is the most economical solution for productive thin gauge and reflective material processing. The machine was designed for optimum energy efficiency while requiring minimal floor space in an industrial environment.

WORLD PREMIERE

TruBend 3100

The TruBend 3100 precision press brake features high accuracy and flexibility with a minimal investment, giving fabricators an economical entry into high-precision bending. The easy-to-use, next generation control with multi-touch interface facilitates quick and straightforward part programming. The machine's compact design features the latest advancements to increase productivity and safety, while offering easy access for routine maintenance.

NORTH AMERICAN PREMIERE

TruLaser Robot 5020

From simple sheet metal parts to bent profiles, the TruLaser Robot 5020's innovative modular system clamps components of different sizes and shapes, and quickly begins the welding process. For conduction or deep penetration welding, long seams or corner connections, several components can be joined in a single process step depending on the size of the part. An automatic rotational turntable provides the ability to set up the next part while the laser is active and an additional boost to productivity.

TruLaser 5030 fiber

With an 8kW fiber-guided TruDisk 8001 laser and the revolutionary BrightLine fiber technology, the TruLaser 5030 fiber is the highest powered solid-state 2D laser cutting machine on the market. Capable of processing up to 1 inch mild steel, stainless steel, and aluminum with impressive speed and quality, this high-performance laser is the most productive and universal laser cutting solution in the industry. Increased edge quality, impressive cutting speeds, and a highly dynamic machine design grants fabricators the power to perform.

NORTH AMERICAN PREMIERE

TruLaser 3030 fiber

Powered by TRUMPF's fiber-guided TruDisk 4001 laser, the TruLaser 3030 fiber laser cutting machine is highly flexible and productive for a wide variety of applications, material types and thicknesses. The 4kW of laser power and a one micron wavelength enables the machine to process up to 0.800 inch steel and non-ferrous materials, such as copper and brass, at a material thickness up to 0.325 inch. Designed to be simple and self-explanatory, the machine is operated from an ergonomic console, and is available with a wide variety of automation solutions to further increase productivity.

NORTH AMERICAN PREMIERE

TruLaser Cell 3000

With the highly flexible TruLaser Cell 3000, it is possible to switch between two- and three-dimensional laser cutting and welding without changing the focusing optics. The integrated electrical control and cooling units make this machine compact as well as versatile. Available with up to 8kW of solid-state laser power, the machine processes nonferrous metals with ease. Multiple options for laser sources, machining processes, and innovative optical configurations combined with the ability to process a wide range of materials make the TruLaser Cell 3000 extremely valuable to manufacturers.

TruPunch 2000 with SheetMaster Compact

With on-demand drive technology, the hydraulic system of the TruPunch 2000 only runs when the punch head is active, minimizing energy consumption and the load on the system. Able to process material up to 0.250 inch thick and available with a 50 inch x 100 inch working range, its impressive stroke rates, short setup time, 360° tool rotation and tabbed sheet automation capabilities make it the ideal choice for fabricators in need of productivity and process reliability as well as competitive investment and operating costs. The small footprint of the SheetMaster Compact enables automated processing, even when floor space is limited.

NORTH AMERICAN PREMIERE

TruBend 5130

The TruBend 5130 is the ultimate solution for precision and flexibility. With a press force of 141 tons and a six-axis backgauge, this hydraulic press brake easily bends small or large parts, up to 127 inches long. No matter their complexity, ACB, TRUMPF's patented measuring technique, guarantees each bend is perfect. In addition, programming with TruTops Bend software can be performed offline or at the machine control. LED positioning aids and quick change tooling provide for quick set-up and bend sequencing. The 4-cylinder ram drive technology enables the machine to achieve higher working speeds and precision, while reducing the operating temperature of the hydraulic system.

TruBend 7036

As the most ergonomic press brake on the market, the compact TruBend 7036 is ideal for producing small bent parts up to 40 inches. The electric press brake features impressive working speeds and accelerations, a 6-axis lightweight carbon fiber backgauge, BendGuard safety system and hydraulic upper and lower tool clamping. Programming can be performed offline using TruTops Bend or at the machine control for maximum productivity.

TruMark 5010 Mobile Marker

The TruMark 5010 Mobile Marker is an innovative portable laser marking unit. Its compact and handheld processing unit is easily moved to any work piece, providing a faster and more flexible solution for laser marking large or heavy components. It can also handle simple cleaning tasks or prepare small areas for processing. While the TruMark Series 5000 laser guarantees durable marks of consistent quality, intelligent sensors make sure the entire process is completed safely, meeting Class 1 laser safety standards.

TruMark 5020

This fiber laser is the ideal tool for marking metal or plastic components where high speed and superior edge quality are required. The TruMark 5020's high pulse frequencies, superior pulse-to-pulse stability, and a highly dynamic scanner module guarantee high speed marking with impressive results. Pulse duration can be precisely adjusted and the laser's focus point can also be fine-tuned to different component heights.

Power Tools

TRUMPF's portable power tools for sheet metal processing will be on display in booth B1903. The innovative TruTool family of power tools, for cutting, fastening, beveling and deburring sheet metal, is available with a range of capabilities and options to match your fabrication needs. Easy to guide and operate, each TruTool product line was designed with productivity, safety, and operator comfort in mind.

TruTool TSC 100

TRUMPF will feature the TruTool TSC 100 slat cleaner at FABTECH 2014. This unique tool removes slag build-up on support slats without interrupting production. It can be operated by a single person and automatically adapts to the thickness of the slag to maintain its impressive working speed as it travels. Unlike any other tool on the market, the TruTool TSC 100 is a simple and cost-efficient alternative to manual slag removal or complete slat replacement.

TruServices

TRUMPF offers the most extensive after-sales support of any machine tool manufacturer. Representatives from our consumables, tooling, training, TruTops software and finance departments will be at FABTECH and on hand to discuss the many services we offer to support your business.

Consumables

TRUMPF original spare parts and consumables are of the highest quality and are perfectly designed to complement your TRUMPF machines. By using consumables manufactured by TRUMPF, your fabricating machinery is guaranteed to operate at its peak performance and keep your investment protected from damage caused by lower quality third-party options.

Tooling

TRUMPF provides flexible and high quality tools and accessories for punching machines and press brakes. In addition to providing high quality solutions for tool set up, storage and maintenance, TRUMPF technical experts are available for personalized consultation. Whether you have a unique job or requirement, or simply need assistance ordering standard tooling, our tooling and tool design professionals are ready to assist.

Training

As an International Association for Continuing Education and Training (IACET) accredited training program, TRUMPF provides quality training in machine programming, operation, and maintenance. In the United States and Mexico, classes are taught by experienced instructors in one of TRUMPF's high-tech training facilities. With a blend of classroom instruction and hands-on training, fabricators of all levels benefit from personalized instruction.

TruTops

Sheet metal design solutions, specialized programming systems, and complete production control are just a few of the ways TruTops software helps fabricators get the most from their machines. TRUMPF supplies software to grow with your needs, maximize material usage and develop process solutions from design to production control.

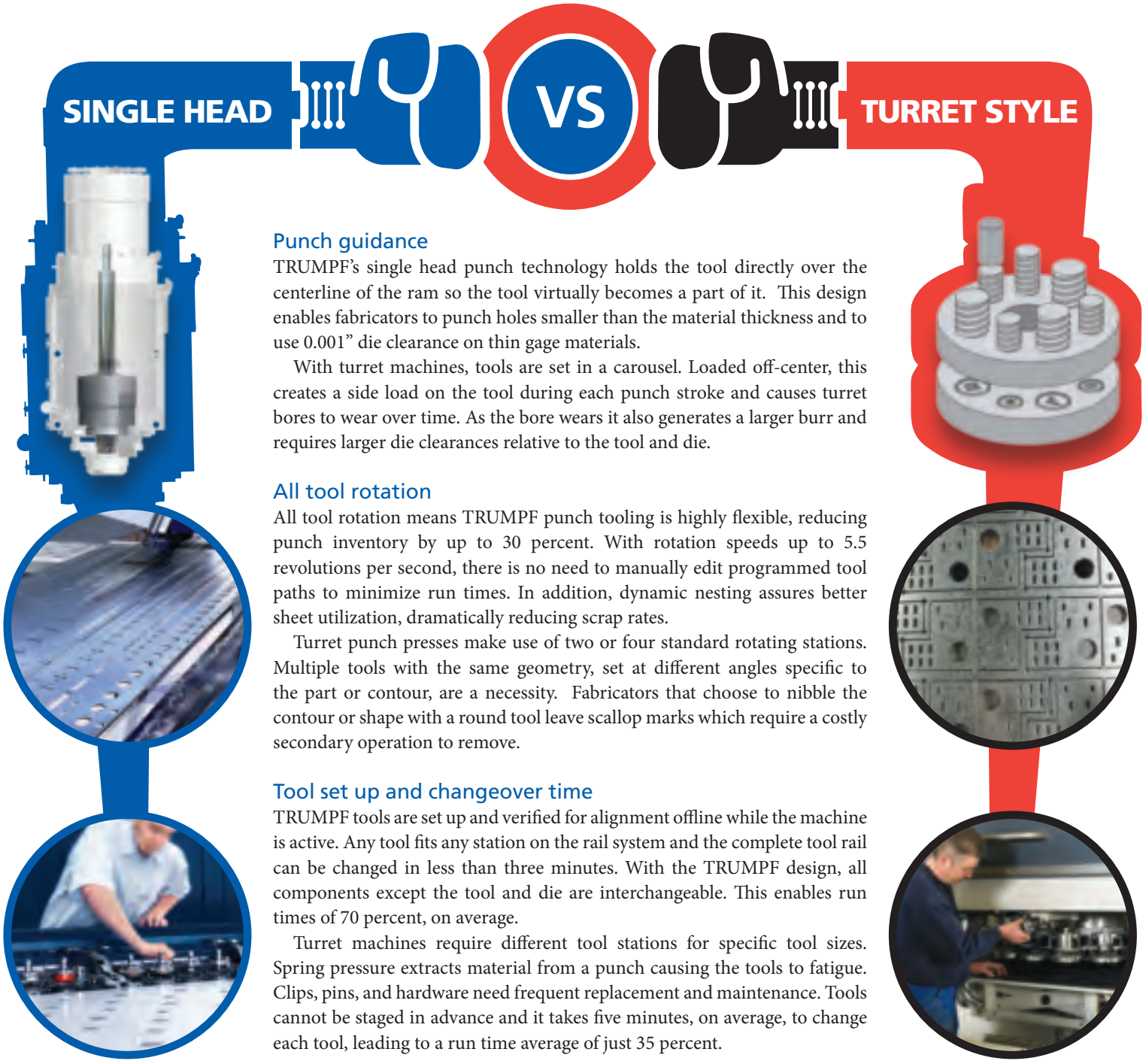
Finance

Simple and uncomplicated programs tailored to your needs, attractive payment options, and full support from machine purchase through the end of financing enable manufactures to finance new, state-of-the-art equipment while still reserving cash for further investment in the business. Through personal consultation with TRUMPF Finance representatives, you receive the individualized support necessary to increase company worth and grow your business.

Head to head

TRUMPF single punching head design vs. turret technology

From tooling or turret bore wear to the time required to change tooling, it is time to evaluate the way you punch. When limits are placed on production capacity, money is lost. Take a look inside TRUMPF's punching technology versus the turret punching head design to determine the impact it will have on your production.



Punch guidance

TRUMPF's single head punch technology holds the tool directly over the centerline of the ram so the tool virtually becomes a part of it. This design enables fabricators to punch holes smaller than the material thickness and to use 0.001" die clearance on thin gage materials.

With turret machines, tools are set in a carousel. Loaded off-center, this creates a side load on the tool during each punch stroke and causes turret bores to wear over time. As the bore wears it also generates a larger burr and requires larger die clearances relative to the tool and die.

All tool rotation

All tool rotation means TRUMPF punch tooling is highly flexible, reducing punch inventory by up to 30 percent. With rotation speeds up to 5.5 revolutions per second, there is no need to manually edit programmed tool paths to minimize run times. In addition, dynamic nesting assures better sheet utilization, dramatically reducing scrap rates.

Turret punch presses make use of two or four standard rotating stations. Multiple tools with the same geometry, set at different angles specific to the part or contour, are a necessity. Fabricators that choose to nibble the contour or shape with a round tool leave scallop marks which require a costly secondary operation to remove.

Tool set up and changeover time

TRUMPF tools are set up and verified for alignment offline while the machine is active. Any tool fits any station on the rail system and the complete tool rail can be changed in less than three minutes. With the TRUMPF design, all components except the tool and die are interchangeable. This enables run times of 70 percent, on average.

Turret machines require different tool stations for specific tool sizes. Spring pressure extracts material from a punch causing the tools to fatigue. Clips, pins, and hardware need frequent replacement and maintenance. Tools cannot be staged in advance and it takes five minutes, on average, to change each tool, leading to a run time average of just 35 percent.

A solid stance is important to Achim Dittrich. He achieves this by producing high quality parts. To ensure this, he separates the operations where stainless steel and mild steel are processed.

"Our firm has a broad stance"

B+D Laserworking demonstrates how healthy growth works. General manager Achim Dittrich tells us about the strategy behind that growth and about his visions for the future.

Constant growth brings about opportunities. But it also harbors risks. How do you deal with that?
The risks can be mastered, even in a turbulent market environment, by finely tuned risk management. In the early years of our company's history, we adopted the premise that the largest customer was to account for a maximum of 15 percent of total sales. Whenever a single client contributes more than that share, it is time to grow. And grow we did: from nearly 4,000 square feet and five employees in 1991 to more than 106,000 square feet of production floor space and a staff of 220 today.

How can job shops distinguish themselves from the competition? B+D has been very successful at that…
The most important decision was the one to realign the company. After founding the firm as a laser cutting operation, we expanded by adding welding and bending work. Today, delivering completed assemblies is in the foreground. We begin assisting our customers in the engineering phase. We then continue, not only to materials scheduling, but also to supplying complete groups. This is also reflected in our motto: "So that ideas become products".

Does a broad customer structure make for healthy growth?
I'd say so. We serve 220 customers, but about 50 to 60 clients account for the majority of sales. We are also broadly based in regards to products and industries. The range starts with large forklift trucks and construction machinery and continues on to delicate components used in medical technology.

Continuity is of prime importance to us. We strive to make products that are called for repeatedly instead of one-off jobs. The parts vary widely in terms of their complexity and we manufacture more than 12,000 unique products each year. These could be simple brackets or even complete hydraulic tanks for wheeled loaders or preassembled housings for laboratory technology. In regard to pure laser cutting operations, we turn out up to 700,000 items a year. That is a very important part of our business, but not our mainstay.

"Lean management is of central importance to us."

How is this variety in the parts reflected in your technological orientation?
We cut blanks in a very classic fashion with the laser and always use TruLaser machines for this purpose. That is followed by straightening and then bending using TRUMPF press brakes in a number of different sizes. To achieve greater flexibility and smaller batch sizes, we have quite consciously decided on a modest automation level. The subsequent welding operations are carried out manually by 75 tested and licensed welders. Long production runs are turned out in parallel by three robots located at a manufacturing island.

What challenges are you confronted with at present?
We are working on making the procedures within the organization better and more transparent. Expanding our production floor space by 50 percent while adding new machines and 60 new employees in the past two years has made that necessary. The topic of lean management is of great significance. With the "B+D way," worked out together with our staff, and our "SystOp" production optimization system, we are infusing the entire company with the idea of lean management.

Do you underscore your quality claim with the physical isolation of the areas where stainless steel and mild steel are processed?
That's right. We process construction steel in a separate shop. From storing the material to shipping it to the customer, we are absolutely accurate in segregating these types and produce on separate machines in order to prevent contamination. You will never find a "black" component in the shop devoted to stainless steel and aluminum. This is one way in which we satisfy the stringent expectations of the medical and foods industries.

What does that mean for your investment strategy?
It is important that we use modern machine tools built by TRUMPF, and that includes both the CO_2 models and those with solid-state lasers. Owing to the high degree of machine utilization and since we strive to always use the latest technology, we replace all our machines after four to five years to achieve an edge in productivity. Just as we do with our customers, we attempt to build long-term relationships with our own suppliers, based on mutual trust.

At B+D, modern machines from TRUMPF ensure high-quality parts, including those which are laser welded.

For that very reason, only TRUMPF can be considered as a systems supplier. We fully rely on innovative technologies devised by TRUMPF whenever we replace machines or buy new ones. There the entire package is true to the mark — technology, service and financing concepts. That is why, at the close of 2012, we also invested in a TruMark laser. We use this machine to mark components and apply customer logos to them. That's true not only for sheet metal. Ceramics can also be readily processed with the laser. In regard to laser welding, we put our full faith in the TruLaser Robot 5020 — once again a product made by TRUMPF.

Many people shy away from making the entry into laser welding…

We were encouraged by requests put forth by customers — and of course by our own interest in new technologies. When making the change to robot-assisted laser welding, the construction of jigs is important. Working with TRUMPF, we staged a workshop event right here on our own premises. There, customers received information about the possibilities the technology offers. We are already envisioning products that we will be able to weld with the laser in the future.

So this means that — as a job shop — you are taking on an ever wider range of services. Are there any other fields where this is the case?

Logistics — warehousing and shipping — have indeed become important pillars of the business. Our customers find themselves faced with severely fluctuating demand and small batch sizes. This naturally also has significant effects on upstream links in the supply chain, and that includes job shops. That is why we just commissioned our new logistics center with its 4,100 storage spaces. That gives us a competitive advantage. We can store products for our customers and then dispatch them as needed. In combination with dynamic optimization for the minimum reserve level or reorder point, we can respond to our customers' needs even though the frequency of the calls varies.

This is complemented by our own delivery fleet. In this way, we can establish the most complex make-and-call delivery systems and set up uninterrupted supply chains. We also offer our customers a further service by supporting them in the development of intelligent transportation equipment and when optimizing supply chains.

What do you see as the future for B+D?

Right now, we are undertaking efforts to expand our geographic reach. We concentrate on the German-speaking regions at present, along with a few customers in eastern Europe and the USA. We are also sending out feelers toward Scandinavia. Our first step there will be to establish a foothold in Denmark. We already have a local partner there.

So you have decided on a long-term strategy?

Our plans extend on to the fifth expansion phase, in 2025. We are striving for sales of 70 to 86 million euros (90 to 115 US dollars) and a staffing level between 650 and 750 employees. More than 48,000 square feet of property have been earmarked for expansion at the Garbsen site. A plan for succession is already in place. My son has joined the company and will continue and further develop the business. When he told my about his decision, I asked: "Why?" His answer was simple: "Because I want to assume social responsibility." That is a statement that you can build upon because, in my view, a sense of responsibility for society is one of an entrepreneur's most important qualities. □

B+D Laserworking GmbH

Who: B+D Laserworking GmbH, Garbsen, Germany. Founded in 1991, 220 employees. www.laserworking.com

What: From the initial idea to processing, and the dispatch of laser-cut blanks and complete assembly groups to the customer's manufacturing line — this job shop takes responsibility for all steps of the process

How: 5 x TruLaser 5030, TruLaser 5030 fiber, TruMatic 3000 fiber, TruLaser Robot 5020, TruBend 7036, 3 x TruBend 5230, TruBend 5170, TruBend 5085, TruBend 5050, TruMark Station 5000

Roger Emperley (L) and Bob McMurdo of Steel Fixture Manufacturing.

Preserving the past for the future

A Kansas company uses modern punching and bending technology to protect treasures of the past and present for future generations.

Behind the scenes at one of the world's most famous art museums, a curator is showing rare antiquities to Roger Emperley, president and head of sales of Topeka, Kansas-based Steel Fixture Manufacturing Company. Emperley's company manufactures the specialized steel containers that store the priceless treasures. Emperley feels the weight of the museum's trust when the curator tells him that the two-foot long, jewel encrusted horn he's holding was recently purchased for seven million dollars and will be stored indefinitely in one of his company's cases.

History of innovative changes

For more than 100 years, the Steel Fixture Manufacturing Company has manufactured steel storage units for customers such as museums, court houses, libraries, schools and public buildings. The company was founded in 1907 by G.W. Brooks, an innovative thinker looking to branch out from heavy steel work into the field of light-gauge sheet metal. Among the company's first jobs were storage lockers for the Atchison, Topeka and Santa Fe Railway, whose tracks run just ten feet away from the facility.

When Emperley first joined Steel Fixture Manufacturing in 1990 as shop superintendent, the company still used full-size patterns and mechanical punches converted to electrical power from turnstiles originally connected to belts pulled by horses outside the building. "Each notch and hole was handmade and every piece was handled five to six times before it went to the press brake," tells Emperley. "It was unreal."

> "We delivered a quality product, but it was increasingly harder to do."

In 1998, Emperley, current vice president and head of design Duff Tuell, and two former employees, purchased the company. Applying lifetime careers of metal manufacturing experience, Emperley and Tuell made significant improvements to the products, increased predictability on the floor, and reduced production costs.

Making quality products profitably

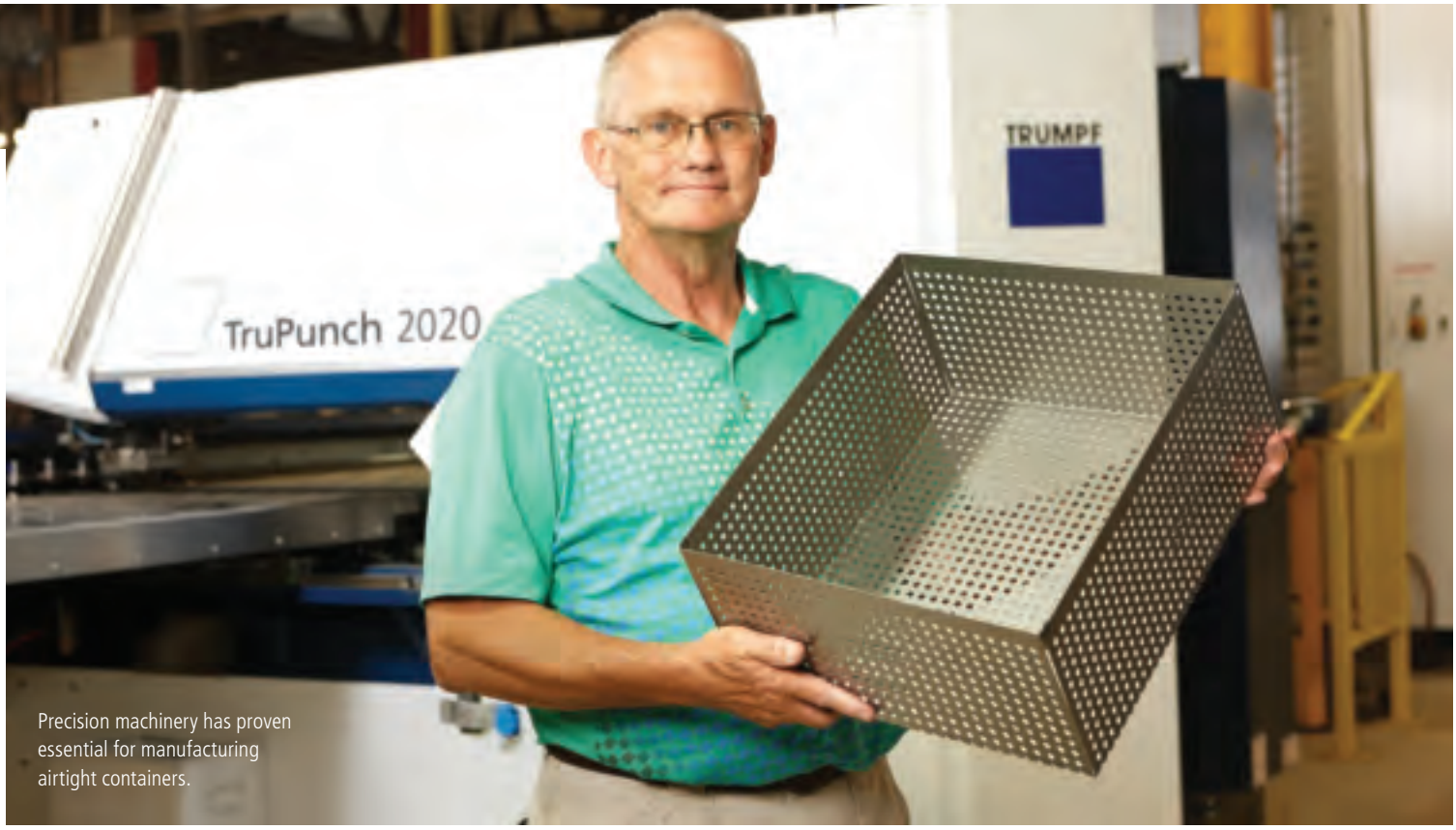
Steel Fixture Manufacturing faced a dire situation before purchasing a TruPunch 2020 in 2011. "We were running some old turret punches as best we could, but sales were dropping and we couldn't stay competitive," Emperley recalls. "We delivered a quality product, but it was increasingly harder to do."

Emperley considered purchasing laser technology, but felt the punching machine was a better choice for the company's 14 to 20 gauge cold rolled steel parts with their many holes and slots. TRUMPF's single head punch design and tool life were notable factors for Emperley, who, based on thirty-five years of experience, ruled out turret punches. "We had one guy at the turret and another guy constantly sharpening tools," he describes," It wasn't efficient."

The TruPunch 2020 increased production speed by 800 percent. "We punch all the holes and everything lines up perfectly," declares Emperley. Additionally, the punching machine's nesting capabilities and TruTops software save the company material costs by fitting more parts on each sheet. The company estimates it has cut its scrap by nearly half.

Better fit for better work

Bending was another area where TRUMPF generated greater efficiency and quality. Before buying a TRUMPF press brake in 2012, the company had two full-time press



Precision machinery has proven essential for manufacturing airtight containers.

brake operators continually making adjustments to keep variations from affecting cabinet drawers. In 2013, the company upgraded to a TruBend 5130. Now, one operator runs as many parts in six hours as used to require 16 hours of work, and Emperley adds, "every part comes out perfect."

Precision punched and bent parts produce better fits and tighter seals, which result in superior products. Emperley emphasizes the importance of making containers as airtight as possible. Adhesives can "off-gas" over time, he explains. He recounts how off-gassing altered one museum piece, a hairbrush from the 1800s, giving it a plastic appearance, and eating through two metal drawers above it.

"Our products don't off-gas," says Emperley proudly, "We're the only ones in the business that offer a seven-year product warranty. TRUMPF equipment helps keep that promise." He notes that since the company has owned TRUMPF machinery, the service department doesn't receive many calls about warranty issues anymore.

Emperley is grateful the company's products help to better preserve treasures for the next generation. "It's priceless to see the expressions of wonder on children's faces when they go to a museum," says Emperley, a grandfather of ten. Steel Fixture Manufacturing supports many museums and associations nationwide.

Custom benefits

Clients often require special cases in varying sizes, drawer configurations, and quantities from Steel Fixture Manufacturing. Recently, the company completed twenty-two different custom cabinets shipped in nine semi-trailers to the state of Alaska. Emperley jokes that the job's largest cabinet – ninety-six inches wide, ninety inches tall and ninety inches deep – was large enough to drive his Smart car into.

"Everyone's artifacts – whether it's rainforest plant samples or courthouse ledgers – are different sizes, but only a few companies build special-sized products," says Emperley. "Custom work is thirty-five to forty percent of our business. When you can do custom work like that, it eliminates your competition."

The flexible capabilities, precision and efficiency of the new machines give Steel Fixture Manufacturing the confidence to offer competitive pricing on custom cabinets and take on bigger jobs. As it looks to the future, the company is broadening its customer base and reinstated a file cabinet product line that had become unprofitable using older equipment. "Thanks to TRUMPF," says Emperley, "We're able to build better products, quicker, and considerably more profitably, all of which makes us more competitive in the overall market now and in years to come." □

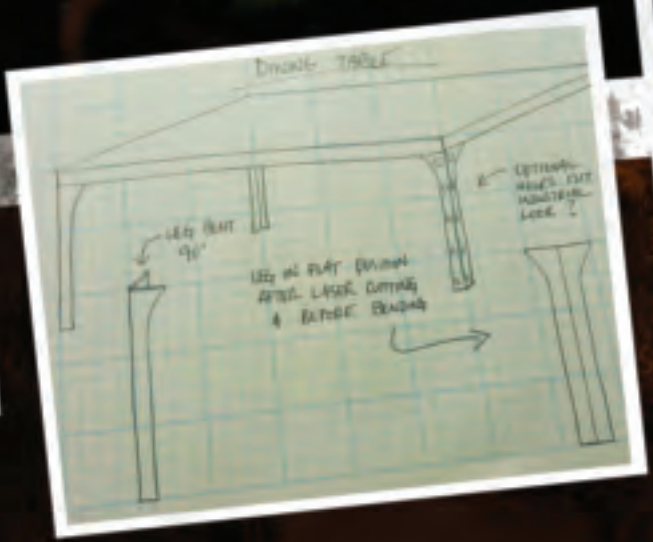
Steel Fixture Manufacturing Company

Who: Steel Fixture Manufacturing Company, Topeka, Kansas
Established 1907. www.steelfixture.com

What: Manufacturer of steel storage units for museums, courthouses, libraries, schools, public buildings and more

How: TruPunch 2020, TruBend 5130

Welder Joel Hester turns one man's trash into another's treasure.



The house that cars built

Joel Hester finds inspiration along the highway of life

When Joel Hester built himself a modern bed frame made of steel, he didn't think much of it at first. "But then I started getting compliments," he remembers. "People would tell me, 'You oughta do this for a living.' So, that's exactly what he did.

For the past eight years, Joel Hester has been building furniture out of reclaimed sheet metal, most notably the hoods, trunks, and roofs of antique cars. "It started out as a hobby," Joel explains. "At my day job, I was spending a lot of time on the computer. I made a New Year's resolution to do something more creative, more physical." His first makeshift studio was a garage space off of his apartment building. "My landlord would have flipped out if he knew I was welding in there," he laughs.

Within three years, Joel was able to leave his job in commercial printing and transition to building furniture full time. He called his new business venture The Weld House. "My first priority is to build modern furniture that also works as an art piece," Joel says. "The old, worn metal gives each item its own story."

Joel is entirely self-taught, though he didn't start until he was in his thirties. "Growing up, I was not mechanical at all," he says. "Looking back, it would have been nice to have gained experience or been an apprentice." Instead, he was introduced to metal fabrication as an adult, at a job shop where he sought welding services for a race car he owned at the time. "I used to hang out there with the guys and just notice all the different materials and tubes," Joel says. "It planted the seed for what I do now."

These days, Joel, a Texas native, creates his modern industrial furniture in a 1200 sq. ft. studio in Tempe, Arizona. His most popular creations are both commercial and residential: coffee tables, conference tables and desks. Right now, every piece he makes is custom to order, and none look exactly the same. "Clients usually refer to something I've created in the past," he says. "I can't predict the outcome exactly, so I just promise them, 'Yours will look cool too.'"

One of Joel's favorite steps in creating a new piece is the hunt for materials. "It's a part of the process I have very little control over. It can be hard, but it's also the most fun," he says with a smile. He ventures to various junkyards for the bulk of his materials, but has found great pieces in places one might not expect. "Once I stopped a guy at a gas station and offered him a couple hundred bucks for his hood," Joel remembers. "He accepted!"

All of his findings are transformed into furniture with the same pattern of wear as when they were found, never with any kind of faux finish. The base of his tables and other pieces are MIG and TIG welded mild steel tubing: 99% of which are recycled materials, right down to the hardware. In fact, the same bolts that once held the hood on its hinges are used to secure the legs to the frame of the table.

The popularity of Joel's reclaimed steel furniture is more than he ever initially imagined. "I've been busy since day one," he says. "Nowadays I have about thirty ongoing projects at once." Being a one-man operation, Joel can't keep up with demand. He plans to change his business model from fabricating custom pieces to selling ready-to-ship items from an inventory. "I'd like to put it all together as a collection," he explains, "and expand to an international market." But before his product line ventures overseas, he, his wife and two small children are making a big move of their own — to Sedona, Arizona, where Joel dreams of building his own shop in the picturesque Sonoran Desert: the Weld House of his wildest imagination. □

Spanning the globe

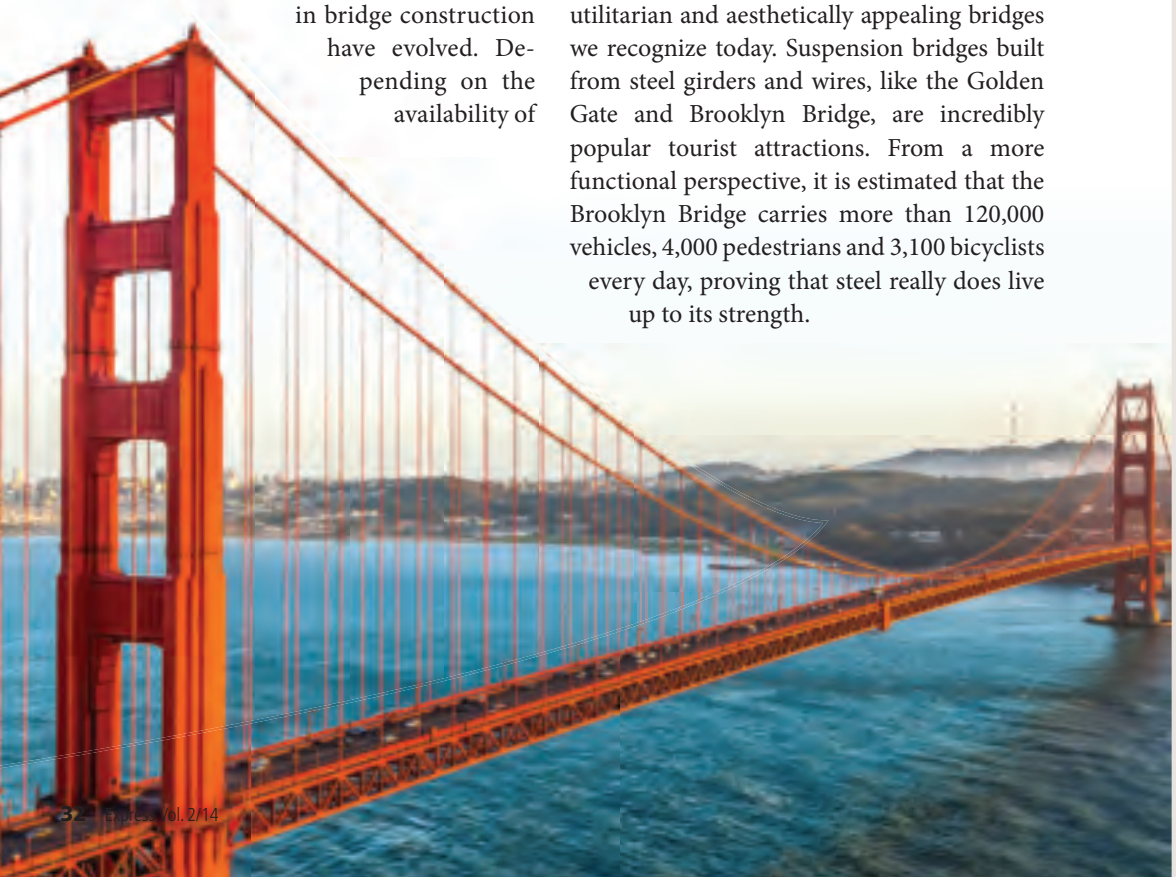
Skyscrapers aren't the only steel giants to define the world's most beautiful skylines.

What do the Brooklyn Bridge, Golden Gate Bridge, Tower Bridge, and Sydney Harbor Bridge have in common besides their contribution to some of the most iconic skylines around the world? They are all made of steel. These statuesque structures may seem commonplace now, but they came from very humble beginnings.

Bridges are built everyday by nature: fallen trees and rocks create natural pathways across obstacles such as rivers and valleys. The mechanics of natural bridges inspired the creation of many of the earliest man-made structures. The ancient Greeks and Romans mimicked fallen rock structures by building stone arches across rivers. The arch was such a strong and resilient design that many ancient bridges are still standing today.

Since ancient times, the types of materials used in bridge construction have evolved. Depending on the availability of material and the intended use of the bridge, stone, wood, rope, and various metals are used to build bridges all over the world. The first metals for building bridges were cast and wrought iron. These metals were used until the mid 19th century, mainly in the construction of early railway bridges. While the materials were functional, wrought and cast iron were not without their issues. The difficult production process meant it was a challenge to produce consistent strength and ductility in the material. In the mid 1800's, British industrialist Henry Bessemer patented his "Bessemer converter," and revolutionized the process of producing steel. As a viable material for mass production, steel soon propelled ahead of iron as the material of choice in the construction of bridges.

Steel proved to be transformative. The high ductility and strength of steel allowed engineers and architects to create the both utilitarian and aesthetically appealing bridges we recognize today. Suspension bridges built from steel girders and wires, like the Golden Gate and Brooklyn Bridge, are incredibly popular tourist attractions. From a more functional perspective, it is estimated that the Brooklyn Bridge carries more than 120,000 vehicles, 4,000 pedestrians and 3,100 bicyclists every day, proving that steel really does live up to its strength.



CREDITS

TRUMPF Express 2/14
Magazine for Sheet Metal Processing

Published by
TRUMPF Inc.
Farmington, CT. 06032
www.us.trumpf.com

Responsible for the content
Sheila LaMothe

Editor-in-Chief
Susan Grohs
Susan.grohs@us.trumpf.com

Editorial Staff
Mike Gordon
Sheila LaMothe
Susan Grohs
Taryn Murphy

Design and Production
SwiftCricket Marketing

Printing and Assembly
Paladin Commercial Printers, LLC

Contributors
Flynn Ink
Amy Leblanc
Boston Consulting Group
Flynn Ink
pr + co GmbH, Stuttgart, Germany
Taryn Murphy

Photographs
Anderson Group
Boston Consulting Group
Danny Fulgencio Photography
Gary Rohman Photography
J. Hanshaw Photography
Michael Beard Photography
MustangMedic
pr + co GmbH, Stuttgart, Germany
Robert Levy Photography
Steve Adams Photography
The Weld House
Women in Manufacturing

TRUMPF

Cultivating innovation

Through the rain or abundant sunshine, frostbitten mornings and hot summer days, farmers around the world work hard to provide for others. Many rely on the latest equipment and technologies for abundant growth, hearty harvests, and efficient production. Anderson Group assists farmers and foresters in their tasks by constantly delivering new solutions with the help of their TRUMPF laser cutting machines and bending equipment. With the latest innovations, the company is anything but a standard garden-variety equipment manufacturer. And with its ear to the ground, Anderson remains always in season. *www.grpanderson.com*