

# Taking a Shot at Laser Cutting

The following interview is reprinted with permission from TRUMPF Inc. The article originally appeared in the “TRUMPF Express” magazine of Spring 2016. The author is Susan Grohs and the photography was taken by Steve Adams of Steve Adams Photography.

Peening Technologies in East Hartford, Connecticut has reason to celebrate. Not only is this family company preparing for its 50th anniversary, it also just received its first patent. We sat down with company president Thomas Beach and his brother, vice president Walter Beach, to learn more about this small business with a big presence in the shot peening industry.

Can you provide a short history of your company?

**Thomas:** Our father founded the shot peening job shop segment of our company in 1966. Eventually, customers expressed an interest in buying the equipment we had designed so rather than lose business, we began to offer machines as well. While the job shop is still the larger segment of our business, both aspects have grown steadily over the years. We have grown to a workforce of approximately eighty employees, including our facility near Atlanta, Georgia. We established an operation there in 2003 at the request of a local customer who required job shop services in the South.

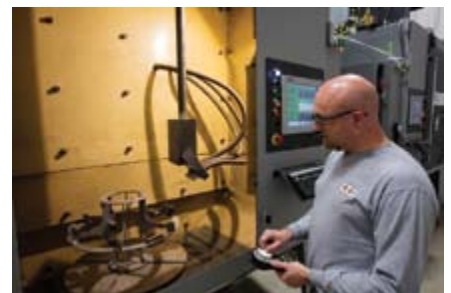
How is shot peening used across various industries?

**Thomas:** Shot peening is a finishing process used to make critical components stronger as well as to extend the life of less critical parts. Since it is relatively inexpensive compared to the cost of replacement or repair, it is an attractive solution for many industries. We commonly see aerospace, automotive, or power generation applications but also medical implants—for the patient, a longer-lasting implant is a real advantage. Other manufacturers are drawn to shot peening for reasons that have nothing to do with fatigue life. For example, shot peening is used to facilitate coating adhesion, such as nickel plating, or to produce a controlled and uniform look for architectural railings.

**Walter:** As technology advances, we see growing use in the automotive and aerospace sectors especially. In the past, it was simply understood that shot peening had a beneficial effect on materials. With computers, we are able to quantify this impact much more precisely. This enables engineers to work with thinner or different materials. This is a major attraction for automotive manufactures, for example, on a quest for lightweight designs. In addition, the parts are even less susceptible to fatigue failure.

What makes Peening Technologies unique?

**Thomas:** We make sophisticated automated equipment for shot peening and also supply shot peening as a job shop service. Our competitors typically do not offer both. Understanding both the machine and the process gives us a unique



understanding of our customers' needs and has enabled us to become a leader in shot peening technology and automation. When people think of shot peening, we want them to think of us.

**Walter:** We also understand the numerous approvals and quality requirements that go along with shot peening. In addition to our FAA and EASA approvals, we are proud to be the first shot peening facility to earn Nadcap accreditation. From the specifications for the media we use, to testing processes and quality control, there is a lot to know and this is often a barrier to entry for others.

*How has technology impacted growth of your business?*

**Thomas:** Quality requirements in the industry became much more stringent just as shot peening technology began to evolve. For a small company, I think we have done well to take advantage of technologies as they become available. One of the most influential was the early adoption of 3D CAD modeling software. At the time it was an expensive proposition but it really paid dividends.

**Walter:** We initially invested in 3D software in 2000 as a means to transition the customer's 3D models into 2D process sheets. Although we took to the software pretty quickly, it took time for the new programming capabilities to change our process. Eventually we transformed what was once a crude process into something much more specific and refined.

*Can you tell us more about the process of shot peening?*

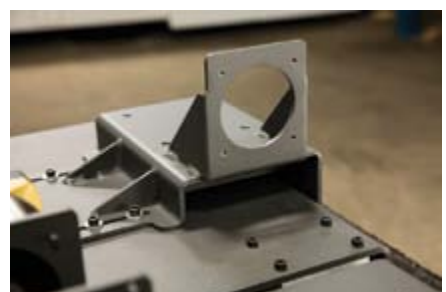
**Walter:** Shot peening is a surface enhancement process that works through the controlled application of media, usually steel, ceramics or glass. As the media strikes the metal part it creates a compressed layer in the material called a compressive stress. The compressive stress layer slows crack initiation or propagation through the part. While manufacturers typically only require this in key areas of the component, often the entire part or assembly is exposed to the media simply because it is faster and less costly than trying to protect it. At Peening Technologies, we process parts that range from those small enough to fit in your hand to parts that weigh thousands of pounds. Regardless of the size, a fixture must be developed to hold the part during processing. And that's where our patent comes in. (For more information about the shot peening process, visit our friends at [www.shotpeener.com](http://www.shotpeener.com))

*Your patent is titled: "Apparatus and Method for Quantifying Metal Surface Treatment." Can you describe it?*

**Thomas:** In shot peening, every fixture is attached to industry-mandated Almen strip holders. What most people don't realize is that designing these fixtures is very labor intensive. On rare occasion, we might acquire a scrap part in advance, but typically we had to wait for the customer to send the part and then machine a solution. Simulations were either extremely crude or so over the top that no one could justify paying for them. We developed a way to use 3D software to generate a highly accurate simulation of the part with the holders. This method became our patent.

*Why was this new method so important to your business?*

**Walter:** The method enabled us to fabricate our tooling ahead of time and it is accurate to within a few thousandths of an inch. Although there is certain testing required once the part is in hand, we are able to get to that point much faster while significantly reducing our costs.



**Thomas:** We developed the process out of necessity, really. The industry has an increasing need for shot peening and we take on increasingly complex work. We were struggling to find a way to shorten our development time. And we found one.

*What led you to patent this process?*

**Thomas:** It was actually a customer who encouraged us to seek out a patent. Shortly after we installed the TruLaser 1030, he was visiting our facility to witness and approve our process. He told us nobody else was doing anything like it and we should probably patent it. We thought he was most likely right and started the process. It took just over three years and was officially granted on June 23, 2015.

*Why was the addition of the TruLaser 1030 so important to your process?*

**Thomas:** While we don't run the laser ever day, it has become a crucial and integral part of our process. When we purchased the TruLaser 1030 in 2012, it significantly changed the way we looked at fixtures. In the past, we would job shop the fabrication out. We have good vendors, but at such a low quantity our jobs could end up on the backburner. The nature of our business, however, is speed so we felt compelled to bring this step in-house. We originally looked to invest in a plasma cutting machine but after visiting TRUMPF, we realized all the additional benefits a laser cutting system could afford. We could cut faster and more accurately as well as design parts in new ways and with difficult contours. The laser machine enabled us to be much more efficient and creative.

**Walter:** With the addition of the TruLaser, fixtures were no longer an expensive proposition. We have thousands of parts and fixtures in our database. Unavoidably, they are subject to wear due to the nature of the process. The new fixtures are so fast and easy to reproduce that we no longer need to keep fixtures in stock. This saves space and makes it easier to get exactly what you need, when you need it.

**Thomas:** The TruLaser 1030 also enabled us to manufacture parts for our shot peening equipment in-house. It takes approximately three months to design the enclosures, motion units, and media delivery in a way that will suit the customer's manufacturing needs and the environment where the machine will be placed. While we still machine parts, when we can cut parts for the robotic units and the enclosure with the TruLaser 1030, the entire assembly becomes more economical to produce and we are able to pass these savings on to the customer.

*Everything seems to be going so well at Peening Technologies. What is the most challenging part of your business?*

**Thomas:** Since shot peening is often applied to high dollar parts, even a small job for us is often a big concern for the customer. We frequently provide additional support long after the part or equipment has been delivered. This takes time and resources, but we understand how important it is to make sure everything is precisely right in processing. With such a large customer base this is both a blessing and a curse, but also a responsibility we take on willingly. ●



**About TRUMPF Inc.**

TRUMPF is the largest manufacturer of fabricating equipment and industrial lasers in North America. They offer their customers innovative, high-quality products and solutions in the areas of sheet metal processing, laser-based production processes and electronic applications. For more information, visit [www.us.trumpf.com](http://www.us.trumpf.com).