By Fiona Lawler

Continuous Wave Laser Technology Improves In-House Mold Maintenance Capabilities

International Inc. integrated American Laser Distributors' 2,000-Watt Laser Cleaner for in-house mold cleaning, resulting in time and cost savings.

Pictured alongside Titan International Inc.'s giant agricultural tires are Vincent Galiardi, managing partner of American Laser Distributors (left) and Marc Wilson, senior process engineer at Titan (right). Source (all images) | American Laser Distributors.

Headquartered in Quincy, Illinois, Titan International Inc. (Titan) offers a full line of wheels, tires and undercarriage products for a wide variety of off-road equipment. With various locations and a global network, Titan offers equipment that manufacturers and operators can count on for durable products as well as quality service.

Titan is largely rooted in the agricultural industry. The company utilizes giant steel molds to make large rubber tires for tractors and other vehicles of this nature. Additionally, the company provides products for industries such as construction, forestry and mining equipment. Titan International serves as the leader for both Titan and Goodyear Farm Tire brands.

In order to make such enormous tires — the largest averaging 13 feet tall and weighing in at 13,000 pounds — molds serve as the key element for the production process. Even more critical to this process is the mold maintenance work which occurs behind the scenes. Historically, the company had always cleaned its molds. However, about a year ago, Titan ran into a situation where this practice was no longer sustainable.

The company didn't have the equipment needed to clean its molds in-house, rather it had to ship its molds to other plants.

A close-up shot of one of Titan's large molds for agricultural tires (prior to laser cleaning).

American Laser Distributors' 2,000-Watt Laser, a continuous wave technology, offers a small footprint on a shop floor.

According to Marc Wilson, senior process engineer at Titan, the company was shipping its molds to a plant in Des Moines, Iowa, which proved problematic in terms of cost. Wilson says just one shipping trip would average $13,000.

The company began searching for the right in-house mold cleaning equipment to address this challenge. The solution manifested in the form of American Laser Distributors' (ALD) 2,000-Watt Laser.

The Larger the Mold, The Larger the Stakes

According to Wilson, it was not feasible for the company to continue shipping its molds out at such high costs, so many of its molds were not getting cleaned.

However, within this challenge, there was also room for opportunity. "We had the ability to start from scratch and really ask ourselves: What do we really want and need in terms of a cleaning solution?" Wilson says.

TITAN INTERNATIONAL INC.

PROBLEM: The company found itself in a situation where it lacked the necessaryequipment to clean its molds in-house. Outsourcing for such large molds proved costly and time-consuming.

SOLUTION: Titan invested in American Laser Distributors' 2,000-Watt Laser, a continuous wave technology.

RESULTS: The laser offered an in-house cleaning method, resulting in cost and time savings, as well as improving the quality and longevity of the molds.

Titan knew the method which had been being used — sandblasting — was not a viable option to continue with, as this process can be destructive to the molds. "There's places in the company where millions of dollars have been spent on molds that have not even been used yet. This is a critical point of interest, because if we are going to be using these molds for new development tires, in order to get them clean, do we really want to be sandblasting companywide?" Wilson adds.

For Titan, there is a lot of money invested in these large tire molds and so they require proper, safe and cost-effective cleaning to maintain. Technically speaking, without cleaning a mold, a tire's rubber is not going to flow properly. When the rubber doesn't completely fill out in areas of the mold, it will create a void resembling a streak where the rubber did not fill all the spaces it was intended to fill. Keeping a clean mold serves as the best preventive solution.

Titan knew it needed an easy-to-operate, cost-effective and safe method to clean its molds in-house. The large, agricultural tires the company manufactures can be as large as 1,400 mm wide. This is a huge area to clean and it is vital the cleaning is done properly to ensure the mold is fully functional to correctly form the tires. Mistakes prove costly, which is why finding a reliable cleaning method was crucial for Titan.

Laser Cleanings Per Day Keeps Outsourcing Away

About a year ago, the company went down a couple of paths of experimentation with different lasers to find an alternative cleaning method to sandblasting and outsourcing. Titan pursued laser cleaning as it provides a cost-effective, efficient and safe/ low-risk method for industrial cleaning.

After a variety of demonstrations to test out different laser

The 2,000-Watt Laser in action, cleaning a large mold.

models, Titan ultimately chose American Laser Distributor's 2,000-Watt Laser. Compared to other mold cleaning methods (such as sandblasting), utilizing a laser for mold cleaning offers a relatively clean operation.

"This works well, because outside of emptying the particulates out of a separate fume evacuator, the laser provides a clean setup," Wilson says.

When you're dealing with lasers, as you increase the power, you can clean at a wider pattern more effectively. "With the 2,000-Watt Laser, there is about 12 inches of effective cleaning width," says Vincent Galiardi, managing partner of American Laser Distributors.

According to Galiardi, what sets Bescutter and ALD's laser cleaning technology apart is that it is perfecting the higher power continuous wave technology, while other laser companies focus on pulse laser technology. The theory in the industry is that pulse lasers are the only lasers that don't adversely affect the metal while removing contaminants. However, just within the past few years, this perspective has begun to shift.

"We worked to improve upon our laser head and scan speed — which is how fast the mirror is actually moving left and right to move the laser beam across the pattern," Galiardi adds. The 2,000-Watt Laser from American Laser Distributors can be adjusted from 5,000 mm per second which is a rough finish, all the way up to 20,000 mm per second to provide a soft, clean and smooth finish.

At 20,000 mm per second, the laser is moving so fast it doesn't even have time to etch the material. Galiardi shares that this is a common misconception with continuous wave lasers versus pulse lasers. American Laser Distributors utilizes the continuous wave laser technology to offer significantly more power with the capability to not etch the material while cleaning.

Wilson shares that in collaborating with American Laser Distributors, he felt the team was knowledgeable in describing the specs and specific benefits of the application for Titan's purposes.

"Once we saw what the laser could do, it was clear we finally had a time-saving, cost-effective option to clean out our molds," Wilson says. Titan needed a quick method for mold cleaning and the 2,000- Watt Laser delivered.

So far, Titan has used the laser to clean its molds for tires up to 6,000 pounds — called the Super Slick. The company has also utilized the laser for cleaning molds for its flagship product, the LSW tire.

Additionally, the laser takes up a minimal footprint on the shop floor. On the flip side, the designated area Titan utilizes for mold cleaning is probably the biggest footprint, simply because its molds are so large. The enclosed space offers a safe spot for utilizing the laser, which is utilized between three of Titan's shopfloor operators.

> "It was a combination of (A) Cleaning our molds was not fitting into our production timeline and (B) We were not willing to spend an exorbitant amount of money in order to clean as many as we needed to," Wilson says.

One of the three operators includes Josh Harwell, Titan's mold shop manager. "The setup process as well as training proved user-friendly and efficient," Harwell says.

In terms of safety features, the laser offers a triple click system, where the operator has to rapidly press the trigger three times and hold on the third for the laser to actually fire. This built-in feature prevents misfires and accidents from occurring. Additionally, the continuous wave lasers are far more user-friendly than pulse lasers, as there are fewer settings to contend with — which assists technicians who are just learning how to use the technology.

Also, the continuous wave technology the 2,000-Watt Laser provides is concentrated on a two- to three-foot distance from the mold the operator is cleaning. This ensures the operator can hold the laser at their hip or near their chest/shoulder area to fire over a much larger range.

"One aspect I immediately liked was American Laser Distributor's heightened focus on safety. Ensuring there's

American Laser Distributors' 2,000-Watt Laser has become an integral part of keeping Titan's molds clean while also providing time, labor and cost savings.

enough light in the enclosed space where the laser operates, utilizing blackout blinds so nobody passing would be susceptible to the laser, as well as making sure the filters used on our respirator helmets were equipped with the HEPA filters," Harwell says.

For Harwell, the biggest benefit of the laser was that it did not take any material off the mold, meaning it cleans it properly, but does not affect the alloys or anything else structurally on the mold itself.

"The laser works on contamination that alternative methods — such as dry ice blasting — do not. Additionally, the continuous wave laser is equally as fast as the sandblasting process (without mess or hazards associated with media blasting)," Harwell says.

This factors into a huge benefit — cleanliness. It is a big time-saver when media and particulates are not covering the parameters of the shop floor.

In terms of Titan's customer feedback, Harwell shares there is excitement in using the laser for cleaning as the products (tires) look aesthetically better in the field as well — they are no longer as rough from previous cleaning processes such as sandblasting. The laser is just as fast as sandblasting, it just affects the mold surface less.

Harwell adds he has used the laser on a wide range of alloys, from bronze to aluminum, with optimal results. The laser comes equipped with nine presets to offer different finishes for different molds and material options.

Unlocked Time, Cost and Resource Savings

Bringing mold cleaning in-house via American Laser Distributors' 2,000-Watt Laser proved successful for Titan in terms of cost, time and shop-floor resource savings.

Now an integral part of Titan's mold maintenance process, the laser technology has enabled the company to clean its molds without compromising on cost and time. Prior to utilizing the 2,000-Watt Laser, Titan was only able to clean about 3% of its molds per calendar year, due to the sheer cost of shipping its large molds for outsourced cleaning. This totaled about $13,000 a shipment — and did not include all the molds the company needed cleaned, as cost-wise it was just not feasible.

"All in all, we have saved roughly $260,000 on the initial $50,000 investment. There has also been value added to quality KPIs and marketability of our tires," Wilson adds.

Time wise, having in-house cleaning technology means more molds have the opportunity to undergo cleaning. "We've been using the laser for less than a year and we've already cleaned over 50% of our molds and counting. Inside this percentage, we

FOR MORE INFORMATION

Titan International Inc. / 630-377-0486 / na.sales@titan-intl.com / titan-intl.com /

American Laser Distributors / 770-558-5300 / sales@americanlaserdist.com / americanlaserdist.com /

have been able to clean some of these molds multiple times, to ensure a higher quality standard," Wilson shares.

According to Wilson, compared to that 3% annually, at such a high cost, Titan has already made its money back and then some in utilizing the laser. Avoiding outsourcing time and cost constraints has proven instrumental in Titan's mold maintenance process, which continues to improve.

Looking to further bolster its mold maintenance capabilities, Titan is interested in purchasing American Laser Distributor's newest laser model, a 3,000-Watt Continuous Wave Cleaning Laser. MMT