ANIKA BANK, TRAINEE

“I can sleep better at night”

Dan Hayden is a pioneer of laser cladding in the US. In this interview, he explains why the process gives him peace of mind as the owner of a business.

Laser cladding is a rather expensive process. What added value does it offer your customers?

The parts we process are often worth hundreds of thousands of dollars and need to function reliably for a long time. For example, we work with parts for industrial systems that are subject to extremely high levels of wear and corrosion.
Laser cladding extends the service life of such workpieces substantially. Some of the very first tools we reinforced for oil production applications, for example, come back to us time and again for post-processing, and the protective layer of tungsten carbide still looks the same as when we first applied it all those years ago.

Your company is highly experienced with protective coating processes – and has even invented some of its own. Why did you invest so heavily in laser cladding?

As a business owner, I can sleep better at night when I see a laser-coated workpiece leave the shop. For us, the primary advantage over thermal spraying is the bonding strength. We can apply many of the same materials by thermal spraying, but if the coating is misused, it can peel or flake off. With laser cladding, however, the overlay physically becomes part of the substrate. You can’t chip it or crack it off.
I’m pleased to say that the technology has now reached a point where it attracts a broader range of interest and is far more widely accepted. We get a whole range of enquiries from research institutes, machine manufacturers, shipbuilders, car manufacturers and nuclear power plants as well as from small repair shops.

How did you get into laser cladding in the first place?

One of our thermal spray customers asked us to start employing the method. They had experience and were familiar with the technology, and wanted us to use a CO_2 laser to process shafts up to twelve meters long and 30 inches in diameter.
We investigated our options and considered piecing together our own system, but I’m glad we didn’t go down that route in the end. I flew to Europe and had samples processed at providers in France and Germany. The samples produced in France varied widely one from another, while the samples from TRUMPF in Germany were practically identical.

The option of building your own system instead of buying it was out of the question, then?

Many of our competitors worked with third-party integrators or assembled their own systems, but now they are often limited to processing cylinders with the powder nozzle in a vertical position.
The design of our laser’s nozzle, however, allows us to process the workpiece in practically any direction we need, even from top to bottom. Also, the consistency of the powder delivery system and accuracy of the positioning system make

programming easy, even for challenging surfaces. This enables us to tackle more delicate work and finished pieces, too. I can throw any project – no matter how geometrically complex – into the laser cell and our talented team will always find a solution.

Can you describe a typical job?

We apply protective coatings to machine parts used in harsh environments, something we've been doing for over 70 years and for which we still employ a range of technologies. Up until a few years ago, most of the laser work we did was for still for the oil and gas industry. But that changed when the price of oil dropped. Now the work we do is less specialized, meaning we are able to fulfill a wide assortment of different orders.
Cylinders and wearing surfaces are pretty common geometries for us, but we work on a broad range of applications. We've cladded some very large parts – blades for hydroelectric turbines 1.5 meters in diameter, for example – but also small parts measuring just 1.5 centimeters.

Laser-cladded turbines: "Does it work?" is a question Dan Hayden often hears. Photo: Steve Adams Photography

"What does the future look like?" The founder's great-grandson Dan Hayden believes it lies in lasers. Photo: Steve Adams Photography

Have you reengineered any parts for more efficient processing?

Customers often give us specifications based on older welding technologies that require more material to achieve the necessary hardness. One customer, for example, requested hardfacing with a thickness of 1.52 to 2.54 millimeters based on old specs. Since the laser gives us undiluted hardness on the first pass, we reduced the hardfacing thickness to 0.76 to 1.01 millimeters while providing greater protection, extending part life, and saving materials, time and costs, too.

Are any of your customers still skeptical about laser cladding?

Up until a few years ago, some industries still had some reservations about the new process. We realized how important it is to give customers a sample of a laser-cladded part so they can see the outstanding quality for themselves. Now, the uncertainty has subsided and laser metal deposition (LMD) technology is much more widely accepted.
If, at first, customers don't understand how the technology works, we show them the process in action. Seeing the application of the bead firsthand and checking the actual weld is usually enough to convince them.

What direction do you see future business taking?

I anticipate that the growing number of light rail systems will encounter wear and corrosion problems that haven't materialized yet. We've also discussed ways to serve the wind and solar power markets. Over time, I expect more and more orders for conventional, manual welding – like arc welding or plasma spraying – to be replaced by laser cladding. The reasons are clear: laser cladding gives better protection but involves less risk.
All the same, we plan to continue offering the less expensive alternatives. For this reason, the other methods, such as thermal spraying, definitely still have a future. We offer a broad portfolio, rather than a specialized one.

What about the repair business?

Hopefully, industry will look to increasingly return worn parts to service by re-coating them with better and harder materials that significantly prolong their service life.
But most of our repair and restoration business to date has involved damaged parts or parts that have been incorrectly processed. It's easy for machine operators to make small but costly errors. Previously, the only option was to scrap parts damaged in this way. Now, we're able to reverse the error and save expensive parts made of titanium and nickel-base superalloys, for instance, from the scrap heap. Repairs like this can save our customers a lot of cash.

Which is your favorite laser processing machine?

Given the high quantities of small components we process, the TruLaser Cell 5020 is the ideal candidate for our purposes. The cell offers great flexibility in terms of positioning: offering six-axis tool motion and a dual-axis workpiece manipulation system, it is the perfect solution for small but geometrically complex projects. Our experience with the tool has been very

positive from the outset. And there's still no shortage of work for our 5020.

Sounds like you are a true laser fan?

Yes, I am. We also use our laser for cutting operations. In off-hours, we use the laser to manufacture tooling for our thermal spray business.
We have also invested in a TruMark machine that supports our thermal spray business, too, with part traceability. It's common for thermal spray parts to come back to us for resurfacing over the years. We can permanently laser mark parts with a serial number and date to track how frequently they pass though our facility. If a customer complains about a coating, we can determine whether or not it was us that applied it. Once again, the laser helps us sleep better at night.

This is an updated version of the interview first published in fall 2011.

The company

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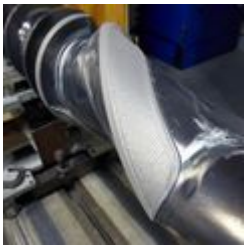

Das Ergebnis

Beschichtetes Großteil. Die Raupen der zweiten Schicht kreuzen sich diagonal mit denen der ersten. Foto: Steve Adams Photography

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