As seen in the November 2014 issue of
Modern Metals

GREEN DREAM

Company expects persistence will pay off with a safer, super effective coating

BY CORINNA PETRY

What if you developed a chemical process whereby you could coat material for as little as one-third the cost of the standard coating while getting three times as much corrosion resistance and oh, by the way, it's environmentally friendly?

What Eco-Green Coatings LLC has done is promote its products, test and test them, have customers test and test them, repeatedly proving the products' viability and sustainability. Acceptance takes time but once Eco-Green's InterReactive Coatings and InterCoat ChemGuard products become first choice for everything from building studs to appliances to garage doors, the potential is immense.

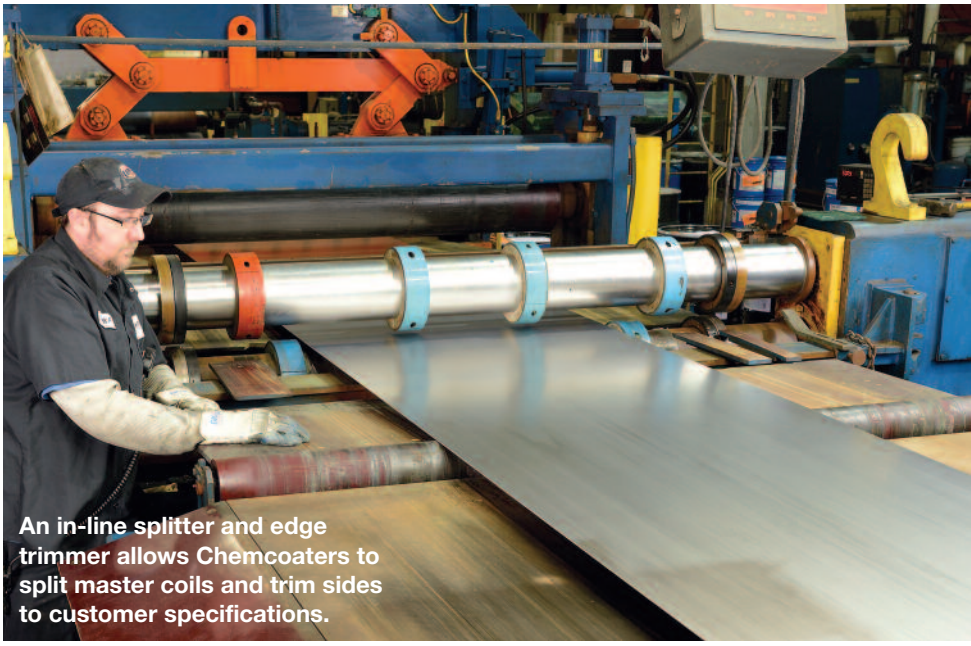
Eco-Green's parent, Gary, Indiana-based Chemcoaters, was almost doomed from its start. The coil coating line ramped up in April 2001 as a joint venture with LTV Steel Inc. "About six weeks before we opened the doors, LTV went bankrupt so that put us in a tizzy. The whole premise of this processing line was to do all of the coating and secondary processing for LTV Steel. We had to scramble to fill the line with outside products and customers," president Bill "Capi" Capizzano says.

Even before creating Eco-Green, Chemcoaters' line was designed to be a low-touch, extremely efficient applicator of specialty coatings: chemical treatments, pre-treatments, thin-film acrylics, dry film lubricants and some pre-paints, he says.

Workers inspect both sides of strip for defects as it enters the coating line. Finished product can end up in Class I automotive and appliance applications.

"The whole point of the line is that it is low energy, producing low to no VOCs [volatile organic compounds] and low to no HAPs [hazardous air pollutants]. A typical coil coating line has thousands of tons of VOCs and HAPs. We are at 5 to 8 tons a year of VOCs and HAPs, so low that we don't have to capture them [in a closed loop system]. Traditional coil coating competitors must capture and destroy 98 percent of the VOCs and HAPs."

To do that, most coil coating companies must spend millions of dollars on collection equipment and then burn off the pollutants using natural gas heated to 1,350 degrees Fahrenheit. By contrast, Eco-Green's coatings are all waterborne. One or two formulas have HAPs and two or three have VOCs "but they are very, very low. We also employ a low-energy cure. All of our coatings cure at between 140 and 300 degrees Fahrenheit," says Capizzano. As a result, "we use probably one-third of the energy required on a typical coil coating line."



An in-line splitter and edge trimmer allows Chemcoaters to split master coils and trim sides to customer specifications.

Hazard reduction

One key part of Eco-Green's coatings development is that it functions with trivalent rather than hexavalent chromium, the latter being a toxin that governments throughout the world are seeking to reduce and even ban from factories to drinking water (see sidebar, Page 32).

In testing, "we were stunned because the trivalent product performed every bit as well as the hexavalent product. Right now in our industry, trivalent chemical treatments don't work very well at preventing rust. That's why nobody uses them," says Capizzano, adding that this is why metal industries are struggling to attain compliance with the European Union's RoHS and REACh standards. "Even though the EU is banning hexavalent chromium, you don't really have a product that performs as well. We hope to eventually take on the European standards because we are prepared with a compliant product."

Eco-Green has applied for patents in the U.S., Canada, Mexico, EU, Argentina, Brazil, Japan, Korea, India and Australia and is working to eventually market and license its process abroad.

The strip enters an infrared curing oven which, with temperatures between 140 and 300 degrees Fahrenheit, is energy efficient.

What's possible

When Capizzano joined Chemcoaters in 2007, he realized there were technology hurdles to overcome to give customers what they wanted, even catering to some pie-in-the-sky ideas.

"We had to develop and engineer our own coatings." ClarkDietrich Building Systems, for example, "came to us and said: Prepaints and resins are kind of expensive. We are looking for an alternative, ultra-thin coating that will give us the same amount of corrosion protection but, by the way, we want to apply it to secondary automotive Galvanneal. And then after you coat it, we want to post-reduce it.

"I said, 'You've got to be kidding me!'" recalls Capizzano. There is tremendous stress applied in post-reduction, enough that it could be expected to compromise any coating. "I thought, is this a joke? Am I on Candid Camera?"

But, after Dietrich's people left, he says, "We sat down and asked one another, what if we took this challenge seriously? We brainstormed. We have a brilliant chemist on staff with more than 40 years in the chemical treatment industry."

In-house research and development and laboratory testing ensued. "We hired an extra person to focus on it. We have the line so we ran the test product off hours." Over nine months, Chemcoaters spent 30 to 40 man hours per week on development at a rough cost of $300,000, plus $1.5 million on line trials. Meanwhile, Dietrich had issued the same challenge to one of Chemcoaters' competitors, and eventually suggested the two companies work together.

"They just wanted results," says Capizzano. "We worked on our product, getting good but not great results. Something was missing. Then we ran the other company's

product, which had OK results. But they added one raw material that we didn't have, and if we used it, it could get us to where we need to be. So we tested our coating containing the additional raw material and that got us to the greatness level."

Joint venture

The competitors formed a 50/50 joint venture, Eco-Green Coatings LLC, which trademarked InterCoat Chemguard and is soon to have InterReactive Coatings trademarked.

InterReactive works "completely differently than any pretreatments or chemical treatments in the industry. Most are applied to the surface and may have some bonding ability. Ours is applied to the substrate and a chemical reaction takes place that literally creates that coating on the surface." Heat—applied to the coil when it enters an infrared oven—then "locks up the inter-reaction so it's etched and integrated and part of the zinc-coated substrate. You're never getting it apart once it has reacted."

Salt spray results

Generally, a galvanized coil, stud or other part gets an additional chemical treatment or coating to protect the material during shipping. "A typical chemical treatment on a hot-dip galvanized coil gives 24 to 72 extra hours of corrosion protection. It's designed only to prevent corrosion during transportation because when mills ship in winter, the condensation will lend itself to rust. That's all that mill-applied chemical treatments are designed to do. But our coating goes way beyond that."

In certain applications, it can go 2,500 to 3,000 hours of salt spray equivalent weathering before beginning to rust, Capizzano claims.

The coating has also been extensively tested in various accelerated corrosion tests. Chemcoaters kept questioning the results after testing labs could find no rust on the material long after other coatings dematerialized. For ClarkDietrich Building Systems, "we have gone to over 300 million linear feet of studs, and an additional 100 million feet for all metal stud manufacturers, and it's growing," Capizzano says.

TOXINS & STANDARDS

Hexavalent chromium: The National Institute for Occupational Safety and Health considers all chromium compounds to be occupational carcinogens. NIOSH issued new recommendations to limit workers' exposure to it in early 2013.

Trivalent chromium: Occurs in trace amounts in foods and water. The nutritional benefits appear to outweigh the theoretical risk of genotoxic effects.

RoHS: The Directive (for restriction of the use of certain hazardous substances) limits or bans lead, cadmium, mercury, hexavalent chromium and certain chemical compounds in consumer products.

REACh: Registration, Evaluation, Authorization of Chemicals: Chemicals of "very high concern" would be phased out and replaced by safer alternatives.

His company won new business last year with a Midwestern customer that stamps galvanized coils, then ships the stamped parts to Mexico where they are assembled into automotive components. Throughout transit, that material faces corrosion. Before adopting ChemGuard, "the customer scrapped 20 percent of the product because it was rusted by the time it got to Mexico. Now we coat their product and that problem has gone away."

Applications multiply

Eco-Green launched less than three years ago, starting with studs "but we are now running 10 to 15 new trials a month" for diverse applications ranging from rebar and pipe to auto parts, appliances and garage doors. The coating has become a pill to soothe expensive headaches.

"One of the biggest successes outside of studs was for a bus company Bus manufacturers have had a tremendous problem with floors corroding, and they industry has extensive warranty issues as a result." After trials, Eco-Green Coatings is now "actually specified into the bus for the driver's platform and a couple other areas. We're trying to get the entire floor," says Capizzano.

One satisfied customer is Arrowhead Steel, a Burr Ridge, Illinois, distributor of flat-rolled carbon steels. "We serve the agricultural equipment, transportation, residential construction industries and general-line manufacturers," president Arnold Koldenhoven says.

Arrowhead began working with Chemcoaters four years ago "on a project to help a customer achieve longer life on his galvanized material. The customer needed to solve its rust problem because it was causing them warranty claims on their product."

Chemcoaters engineered "a specific formulation for this specific application that performs well for our customer." Chemcoaters, he says, "is terrific to deal with. They went through a couple variations before final testing achieved the goals for the product. The customer did their own testing against several other products available in the market and ours was the favorite due to the performance," which saves the customer money in the long run, Koldenhoven adds.

"There is nothing else like [Chemcoaters' product]. We believe in the product and we are selling it," he says, adding that he expects the special coatings portion of his business will grow. Arrowhead even started a division, Ecologic Steel, to provide customers with information about ChemGuard. "Even though it's still in its infancy, there's no telling where it will go." ■

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