

Dump bodies take a powder

Godwin's new powder coat operation is its latest weapon in the war on rust

BY BRUCE SAUER

THEY told Pat Godwin Sr that it isn't possible to build an automated line to powder coat dump bodies.

"I'm going to powder coat dump bodies," the founder of Godwin Manufacturing informed his potential supplier. "The only question is will I be doing it with you or without you."

That question has been answered with the opening of Godwin's new automated powder coat line in Dunn, North Carolina.

Yes, the supplier participated in the project that included doubling the size of the company's finishing area. But Godwin also did as much of the construction as possible, substantially reducing the out-of-pocket cost of an investment that otherwise would have cost an estimated \$12 million.

The result: Godwin now has an automated paint line that enables the company to offer a corrosion-resistant zinc primer as standard on its steel dump bodies.

"We have been powder coating some of our products since 1999," says Pat Godwin Jr. "The use of zinc epoxy primers, though, is something more recent. Because so many of our dump bodies are used in snow and ice applications, corrosion resistance is really important."

With the new addition, Godwin's finishing building is now 256 feet long and 138 feet wide—a total of more than 35,000 square feet.

Before committing to such a major capital project, however, the company needed evidence that zinc epoxy primer was effective. At the time, standard corrosion tests involved measuring resistance to salt spray. However, Godwin's interest was in how well the primer resists magnesium chloride. PPG developed a test cabinet to see how well its primer could withstand the presence of magnesium chloride.

"It performed well in the lab tests," Godwin says. "We were ready to move on to the next step."

The company produced a prototype and conducted field tests in 2008. Based on the results of their testing, Godwin decided to make a zinc epoxy primer with top coat the standard finish for all snow and ice related products.

The next challenge was to be able to deliver that type of finish on a production line basis.

"We only had one paint line," Godwin says. "We didn't have the capacity to fully commit to primer powder coating. But now that we have our new line in operation, we are making zinc primer standard across the board."

Putting that line in place was a major undertaking. It involved buying a new Wheelabrator shot blast machine, new automated paint booth, additional oven, and the



Godwin Manufacturing recently installed an automated finishing line to powder coat steel dump bodies. Shown here: a dump body leaves the new 70-ft-long Wheelabrator shot blast machine en route to the booth where a zinc-rich primer is applied.

overhead conveyor that moves the assembled products through the system.

The company is well pleased with the results, both in terms of the performance of the coating as well as the application process.

"Powder coating is a very efficient way to coat a dump body," Godwin says. "Our system is designed to capture overspray and recycle it. Try doing that with a liquid system."

Powder coating is also an effective way to bond the corrosion-resistant properties of zinc to a steel substrate.

"Essentially, you are mixing zinc with epoxy," Godwin says. "PPG won't tell us how much zinc is in the powder, but my guess is that it's well above 90%. The epoxy acts as



A mixture of hot water and biodegradable cleaner is sprayed to remove surface contaminants. By sending a clean body to the shot blast booth, the shot can be recycled more effectively.



Dump bodies are transported by forklift from the assembly plant to the beginning of the conveyor line that will carry the body through the finishing process. This turning fixture accepts the dump body from the forklift and rotates it 90° so that it can more easily be attached to the conveyor line.



After being cleaned, forced air speeds the drying process, reducing the possibility of flash rust.



Key components of the Godwin powder coat line can be seen here. Moving at an average speed of three feet per minute, bodies move through the shot blast machine, foreground, followed by the powder coat booth and primer oven. Including the top-mounted hopper that feeds the shot, the shot blast machine is 30 feet tall.

Godwin...

a binder. We are using just enough epoxy to bond the zinc. Doing so gives maximum corrosion protection."

Preparing the surface

Like any finishing operation, preparing the surface is critical. Godwin begins with a standard steam cleaning process in order to remove any oils and loose dirt. Bodies are then transported to the shot blast machine.

"We recycle the shot," Godwin says. "By cleaning the surface first, we remove a lot of the material that we don't want mixed in with the shot when it's used again. Cleaning the bodies before we send them to shot blast helps us get as much life out of the shot as possible."

As the conveyor system moves completed dump bodies as well as components such as steel stake sides away from wash, a forced air system speeds the drying process to prevent flash rust. From cleaning, through the wind tunnel, and on to the shot blast is a five-minute trip.

In conjunction with the new paint operation, Godwin bought a new shot blast to replace a similar piece of equipment that Godwin bought 11 years earlier. The new automated shot blaster is massive: 70 feet long and more than 10 feet wide. Including the upper hopper mounted above the booth, the machine is 30 feet high. The hopper holds 17 tons of steel shot.

The inside of the shot blast machine is a pretty violent place. At its peak, the machine fires more than two tons of shot per minute at whatever passes through. The shot travels at the velocity of a bullet fired from a .22 caliber rifle. But as the result of all that shooting, bodies and sub-assemblies emerge from the blast booth with a white metal finish, free from impurities and with ideal texture to which the powder coat can bond.



Electrostatic guns charge the powder, creating a cloud that is attracted to steel.



A powder coat of zinc-rich primer is applied immediately after bodies leave the blast booth, background.

After being shot blasted, component parts and fully assembled bodies are conveyed a few feet forward to the automated powder booth. The conveyor system moves the products through the booth where both manual and 26 automated electrostatic guns envelop the bodies in a cloud of powder, producing a coat of zinc approximately two mils thick.

A partial cure

The conveyor system then transports the products from the paint booth to a partial-cure oven. The recipe calls for the coating to bake for 20 minutes at 325°F. This causes the powder to begin to gel and cling to the surface being coated.

After leaving the oven, yet still relatively hot, the bodies receive heat-cured caulk around the cab shield and wiring conduit to seal out moisture and contaminants. As the caulk cools down along with the body, it hardens into a surface that is both hard and easily painted.

The last stage is the application of a top coat. This, too, is performed in a booth with 26 electrostatic guns. With a top coat 2-3 mils thick, products then move to the final cure oven to be baked at 375° F for 56 minutes. This final bake fully bonds the primer to the metal and the top coat to the primer.

"Once the powder cools down to room temperature, that's it," Godwin says. "It is fully cured. It doesn't need to be handled with kid gloves."

Turning up the heat

Powder coating entire dump bodies, however, is an energy intensive process. Godwin must fuel two ovens—an 80' long, 15' wide, and 21' high partial-cure oven and a 156' long, 15' wide and 24' high final-cure oven.

"Both ovens produce in excess of 15 million Btus per hour when in operation," Godwin says. "That calculates to



Manual application of powder supplements the 26 guns contained inside the automated spray system inside the booth.



The first load a Godwin body dumps is the residual shot blast material that cleans its surface. The steel shot falls through the floor grate so that it can be collected and recycled.



Primed bodies move into an oven that causes the powder to gel and to bond to the substrate.



Compressed air removes the remaining shot that did not fall out when the body was hoisted up.



This caulk gun is used to apply heat-cured caulk to seal out water as the body comes out of the first oven. As the body cools from the oven, the caulk hardens.



Caulked seams along the cab shield easily accept the powder top coat.

Godwin...

about 500 gallons per hour at 30,000 Btus per gallon of propane."

Expensive? Yes, but with some forethought, the company has been able to substantially slash its energy costs.

Godwin Manufacturing used to operate with a single 18,000-gallon propane tank. At times, the company was on an allotment and could not always get the propane it needed.

Today Godwin has nine storage tanks and a total capacity of 252,000 gallons, enough to meet the company's propane needs for a full year.

Turning down the cost

The tanks make sure that Godwin has the propane it needs—and at the lowest price available.

"Propane is a commodity that goes up and down in price," Godwin says. "We get faxes every day that report propane pricing to us. Typically the price is at its lowest in August, and that's when we buy our propane for the year."

Godwin also got a reduced price on its propane storage tanks. Rather than buy them new, the company bought them used from companies that were going out of business. By reducing the purchase price of the tanks and being able to buy a year's supply of propane when the price is at its lowest, Godwin paid for the 252,000-gallon storage system in less than five years.

Propane offers several advantages over other energy sources, Godwin believes.

"Propane has a higher energy content than natural gas," he says. "Plus, the price is more stable. The price for natural gas can really fluctuate."

Compared with gasoline and diesel, propane has a longer shelf life.

"You probably wouldn't want to store gasoline for as long as we store propane," Godwin says. "But for the timeframe we store propane, we haven't had a problem."

Godwin says his company handled the propane issue the same way it addresses other major projects—including its new powder coat line.

"Before we jump into something, we really try to think it through," he says. "It may not be a good fit for other companies, but we have to ask ourselves 'Does it make good sense to us?'" ■



Completed bodies are ready for work. Godwin installs bodies for customers based within 250 miles of Dunn NC and relies on distributors beyond that radius.



Godwin uses PPG powder coat material. During a recent visit to the Godwin plant, PPG's Mike Sloop is shown here testing the thickness of the coating. Standard specs call for the primer to be two-mils thick. Thickness of the top coat should be between three and four mils.

Touched by tornados

Godwin Manufacturing was one of several truck body and trailer manufacturers affected by the devastating series of tornados that blew through the South, Oklahoma, and Missouri this year.

A twister touched down near the Godwin facility in Dunn, North Carolina but did not hit the plant directly, Pat Godwin Jr says. Even so, the tornado created enough turbulence in the atmosphere that it blew out 26 overhead doors at the company's campus.

Production ceased for one day until electricity was able to be restored.

"We were fortunate to have minimal damage and to have our power out as briefly as it was," he says. "The damage was pretty widespread in our area. The power company brought in quite a few trucks to help restore power to the community. Our property served as a staging area for the trucks that were sent here to repair the damage."