

## Case Study

# The Dow Chemical Company Selects **Surface Prep** to **Save Total Costs**

Tony Anni

*When faced with the risk of coating failure in one of their manufacturing lines, The Dow Chemical Company turned to Lake Painting and the Spong-Jet Silver Sponge Media™ abrasive for help.*

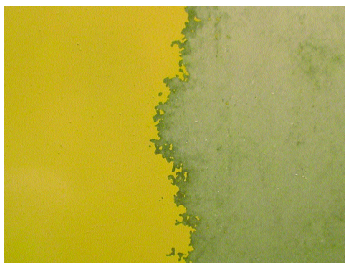
**T**he Dow Chemical Company's ("Dow") Midland, MI chemical plant is a major supplier of raw polymer material to the largest producers of plastic film in the U.S. To satisfy demand, Dow has multiple manufacturing lines devoted to production. One floor of the building has manufacturing lines or process "trains" with hot air furnaces used to make the intermediate form of this product. These trains are situated closely together and each have approximately 1,500ft<sup>2</sup> (140m<sup>2</sup>) of stainless steel drying ducts. Moisture used in the preparation process is removed before the finished plastic product is shipped to the end-user. Dryers with long compartment-like ducts convey the product and dry it as it moves down the train. The final result is a dry, powder-like substance which is then sent to the customer as raw material for final production. Any contamination in this product would be a problem and is unacceptable.

Over time, these trains need maintenance, especially the inside of the coated stainless steel ducts. Given the product and the velocity and temperature with which it travels through the drying ducts, periodic coating removal and a subsequent re-coating application is required.

### Coating Challenge

Over the past three years, Dow has teamed up with Lake Painting (Midland, MI) to perform maintenance on the trains. During the last shutdown, Dow engineers determined that the coating system, although still tightly adhered, would not last until the next planned shutdown. Furthermore, the risk of contaminating product batches due to coating failure was unacceptable.

The project called for the removal and reapplication of Plasite 7122/7122TFE, a phenolic-cured, cross-linked epoxy coating. This type of coating withstands short periods of high temperatures and also importantly reduces product sticking, bridging or hang-ups. Before applying this same coating, it was specified that the old coating, which was 12 to 15 mil (300 to 375 micron) thick, had to be removed. An SSPC SP-10/NACE2, near white metal blast cleaning finish with a 2.4 to 3.75 mil (60 to 94 micron) profile was specified.



Before/after blasting with Spong-Jet Silver 30 Sponge Media™ impregnated with 30-grit aluminum oxide.

Lake Painting was challenged to remove this highly-bonded paint and create the required profile without leaving behind residual abrasives. Lake Painting had formerly used water blasting with coal slag to prepare the ducts, which was effective, but residual abrasives and abrasives dust in tight and confined areas were nearly impossible to completely remove. As a result, these fine particles would dislodge during the drying process and become part of the production stream. As a result, initial startup batches were contaminated and had to be scrapped, resulting in significant dollar losses.



Sponge Blaster prepares ducting surface to an SSPC SP-10/NACE2, near white metal blast cleaning finish with a 2.4 to 3.75 mil (60 to 94 micron) profile.

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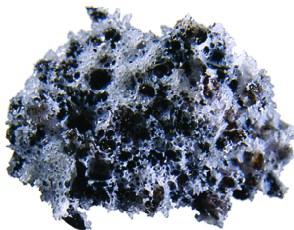
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Sponge Media™ particles are a composite of urethane sponge and conventional abrasives.

### Streamlining Operations

The choice to change surface preparation technologies was initiated by Thomas Reder P.E., an engineering and development materials engineer with Dow, and Gary Smith, president of Lake Painting. They were looking to streamline blasting and painting operations and more importantly, reduce the wasted product associated with restarting each train. The use of water blasting with coal slag or water jetting had been used in the past yielding benefits, but each technology in this application had its challenges.

On the one hand, water blasting with a water induction nozzle reduced dust, was productive and able to profile, but the heavy, muddy sludge created by the process was very difficult to handle, clean and completely remove from the ducts. Additionally, time consuming water washes were necessary after water blasting. On the other hand, water jetting was able to remove the coating, was easy to handle and clean, but could not achieve the required surface profile.

Reder introduced Lake Painting to composite abrasive blasting, which is a dry, low dust process. Each media particle, a composite of sponge and abrasive, is comparable with conventional abrasives in aggressiveness, but offers dust suppression. Based on the cleanliness, low dust attributes and its ability to profile stainless steel, Smith and Reder chose to use Sponge-Jet Silver Sponge Media™ abrasive with 30-Grit aluminum oxide.

"We sacrificed a little production time with Sponge Media abrasives, but the operators stayed dry and could see exactly what they were doing," offered Smith. "The project went as expected... it was easy to recover and clean... only vacuuming was needed and no water washing was necessary." The amount of dust was reduced by more than 95 percent, making it easier to see the work as well as reduce the potential contamination. About 1,000 pounds of the Sponge Media was required, compared to about 8,000 pounds of coal slag abrasives. The material cost was slightly higher for the Sponge Media but the greatly reduced volume of abrasive reduced disposal costs, thus making the total costs for the Sponge Jet less than coal slag.

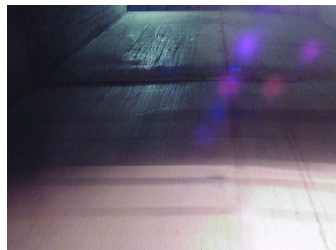
### Project Success

The results after blasting multiple ducts with composite abrasive media were measured by the number of batches that were saved. Reder commented that the cost ramifications of using composite abrasive media was minor compared to the savings, and added, "[they] were able to use startup batches without disposing of many pounds of contaminated product, which we had previously experienced using former techniques."

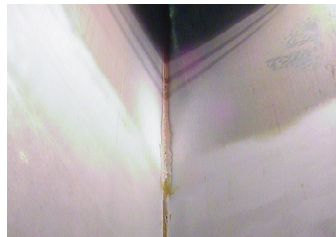
"The success of this project was a matter of selecting the right tool for the job," concluded Smith. Composite abrasive blasting eliminated the historical waste of the contaminated plastic product by suppressing what would have been fugitive dust. It resulted in no product loss, and reduced cleanup time and dust concerns related to any surrounding production and nearby maintenance trades. Smith and Reder both agreed that the Sponge Jet process was a great success and would be used in subsequent outages to control dust and eliminate waste of product.

### PCM

**Tony Anni** specializes in marketing and promotions in the specialty abrasives segment of the industrial coatings industry. He is the Marketing Manager for Sponge-Jet, Inc. and can be reached via email at [tanni@spongejet.com](mailto:tanni@spongejet.com).



Duct during (above) and after (below) being prepared.



Representative photos courtesy of Sponge-Jet, Inc.

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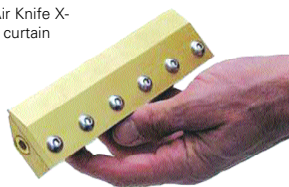
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