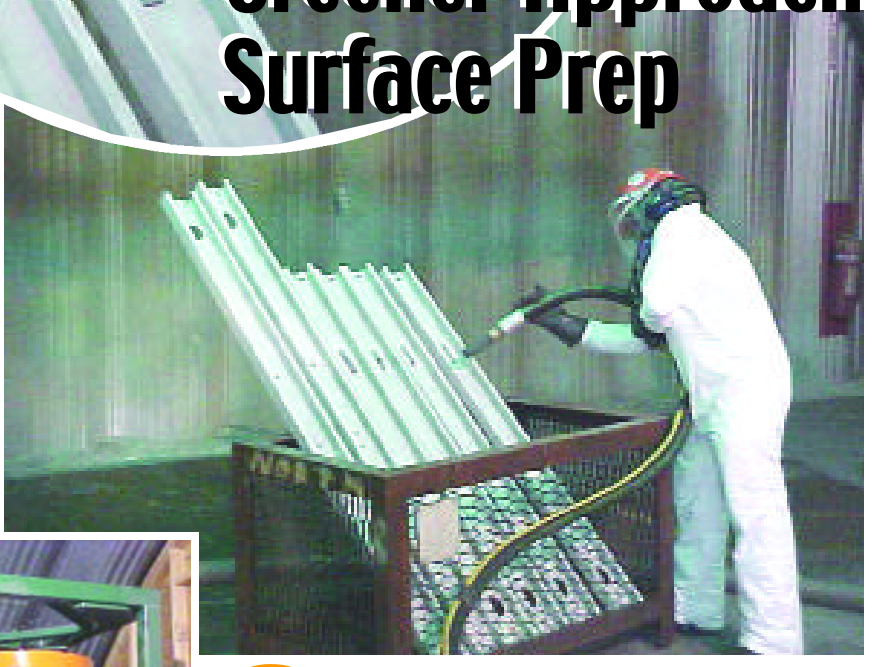
Case History

Shipyard Takes Softer, Greener Approach to Surface Prep



Top and center: Aluminum guards for windshield wiper motors being cleaned on racks. No emissions visible.

Bottom: Sponge blasting unit.

Photos courtesy of Todd Pacific Shipyard

As part of the shipyard's effort to use "greener" technologies and products, Todd Pacific Shipyard adopted the use of sponge media early this year to prepare non-ferrous parts for coating, says Peter Judt, manufacturing production supervisor for the shipyard. Previously, the shipyard used conventional blasting with mineral abrasives and glass beads. Judt first evaluated sponge media for possible use approximately 15 years ago, but at that time the technology was not yet suitable for industrial applications, he says. In 2002, he revisited the idea, in part as a result of a cooperative study of the shipyard's practices with the Pollution Prevention Resource Center, an organization that helps industries identify and use green technologies.

Most recently, the shipyard used sponge media in its dedicated blast booth to prepare aluminum guards for windshield wiper motors on fishing trawlers. When the shipyard decided to forgo the use of mineral abrasives for non-ferrous parts, it's only other blast room housed a recyclable steel grit blasting unit, says Judt. The aluminum oxide-impregnated sponge media is better suited than steel grit to non-ferrous metal preparation: Embedment of ferrous particles from steel abrasives in non-ferrous substrates leads to rapid and severe galvanic corrosion, he says.

Continued

Made to slide over window wiper motors, the aluminum guards are 4 ft long by 5 in. wide (1.2 m by 13 cm), constructed in a channel shape. The wiper guards were coated on their exteriors with a number of coatings, which had mostly worn away. Because the parts are made of thin-gage metal, workers must be careful not to warp the parts during surface preparation. This problem was avoided by lowering the pressure during sponge blasting from 100 psi to 60 psi (7 bar to 4 bar). The result was a finish comparable to SSPC-SP 10, Near-White, with no damaged parts. Lowering the blast pressure for these easily damaged parts reduces productivity, but only as compared to that of parts that do not require such measures, says Judt. "If you don't have the ability to lower psi for this circumstance, you have zero or negative productivity—as in re-work and/or replacement," he says.

Following sponge blasting, the wiper guards were coated with a three-coat system—two layers of an epoxy in contrasting colors and a polyurethane topcoat for ultraviolet light resistance and protection from salt water, says Judt. The total system thickness ranges from 10 to 16 mils (250 to 400 micrometers).

Judt notes that blasting with sponge media yields a cleaner operation with less dusting than mineral abrasive. In addition, the media can be recycled between five and seven times, thus reducing the blast debris. For example, one ton (0.9 Mg) of mineral abrasive will yield about the same amount of blast debris to dispose of, compared with the 400 lbs (180 kg) of sponge media that yields a 50-gallon (185 L) drum of debris and 10% of the original amount for re-use. Garnet abrasive may be recycled up to three times, he says, but the labor involved in collecting and cleaning the abrasive makes it a less attractive option. Although the sponge blasting process is slightly slower than grit blasting, says Judt, the method makes up that time during preparation and clean-up because the minimal dusting allows greater visibility for the workers (and hence more effective surface preparation) and it reduces waste generation.

According to a cost analysis Judt prepared, the media offers a savings in raw material costs over mineral abrasive, as well as additional savings associated with clean-up labor. Although, as Judt states, sponge blasting is not appropriate for all surface preparation jobs at his shipyard, the method is superior for some types of jobs, such as the preparation of non-ferrous parts.

Sponge-Jet, Inc. (Portsmouth, NH) manufactures the sponge media and surface preparation equipment.