



Without using water, a novel approach using abrasives embedded in urethane sponges has proven to be comparable in price and results to conventional methods with a considerable decrease in dust levels

High-quality surface preparation is absolutely essential to ensure successful coating applications, and never more so than in marine situations that present particularly challenging conditions and where chloride removal can be a significant factor.

For many applications, conventional abrasive blasting produces the required results. It is a familiar technique using tried-and-tested equipment and materials. But it has undoubted drawbacks in some situations, which can reduce productivity, increase costs and adversely affect operations in the surrounding area. Most of these factors will be familiar to businesses in the maritime sector:

Operators have to wear full personal protection equipment (PPE) to avoid injury. This is uncomfortable and inconvenient, which tires them and reduces their productive work time.

Unless the area being worked on can be sealed off to contain the dust created, other work nearby has to stop and machinery also has to be switched off and protected.

This situation can last for some time until the dust has settled, at which point it will also be possible to inspect the surface, but not before. The need to control dust is even stronger if hazardous materials are involved.

Cleaning up and disposing of waste material are also important factors with associated costs. Conventional abrasive is heavy, so handling can be awkward and freight costs considerable.

A new approach

Hodge Clemco is one of Europe's leading manufacturers and suppliers of abrasive blasting equipment, materials and services. Founded in 1959, it is part of the 100-year-old Samuel Hodge Group, a diverse engineering group active for many decades in the marine industry. Recognizing the negative aspects of conventional blast cleaning in many situations, particularly the enclosed work spaces often found in ships, oil/gas platforms, power generation plant, etc, the company started an intensive two-year research and development program in 2011 that led to the introduction of EnviraSponge.

The aim of this effort was to develop a system that virtually eliminated dust without the use of water, was effective, could be recycled and, when all factors were taken into account, was comparable in price to alternative methods.

The key feature of EnviraSponge is the urethane sponge that encapsulates the abrasive and which flattens on impact with the target surface, absorbing the dust created by the internal abrasive on impact. The abrasive inherently limits rebound because it absorbs and transfers collision energy caused by the media's impact on the substrate. Also, the particles are less dense and have a greater surface area, so the ricochet is more controlled and less hazardous. This technology is particularly suitable for confined spaces that are awkward to work in and may also be difficult to supply with ventilation and/or extraction systems. In addition, for certain applications PPE requirements can be reduced compared with conventional shot-blasting work. Operators find the reduced PPE more comfortable and easier to work in, which



LEFT: EnviraSponge abrasive is available in a wide choice of grades to suit many different applications
 ABOVE: Sponge blasting on shipping container to demonstrate the low-dust produced
 RIGHT: Media generators from EnviraSponge sized from 100 to 500 liters



in turn reduces operator fatigue and can increase productivity.

When EnviraSponge is used, the surface preparation work can very often be done without dust extraction systems and with reduced containment equipment such as sheeting, even if other work is ongoing and equipment is operating nearby. The lack of dust also means that the progress of the work can be seen clearly while it continues, without waiting for the atmosphere to clear, and staff can continuously keep the area clean while work continues. Disposal costs are also greatly reduced.

Reusable media

In any surface preparation project, the ability to reuse blast media can considerably reduce total costs, when all factors are taken into consideration, including the abrasive itself and disposal operations. As part of its EnviraSponge technology, Hodge Clemco has developed a specialist mobile re-grader that separates good reusable media from dust, contaminants, oversize particles and other potentially harmful waste that might

Internal tank blasting

A major Malaysian shipyard appointed to undertake the maintenance, repair and overhaul of internal tanks on an oil/gas carrier has successfully used EnviraSponge ESA30 for surface preparation to meet the strict specifications required by the ship's owners. The aluminum oxide abrasive achieved the minimum SA2.5 surface cleanliness and uniform profile of no less than 25µm on ballast tank weld seams and all construction joints.

The ESA30 media was chosen following careful evaluation process instead of the previous method involving surface grinders, which created uneven surfaces and variable roughness, some of which fell below specification. The EnviraSponge procedure met the SA2.5 cleanliness specification and created a required uniform 60-75µm profile.

Despite the confined spaces the operators worked in and the limited effectiveness of conventional dust extraction systems, the dust-encapsulating performance of the media enabled the operators to work with good visibility and maintain high production rates. They also found it easy to feather in areas of existing coatings thanks to the good visibility and controllability of the equipment.

By using this system instead of slurry/wet blasting to reduce dust they avoided the problems caused by run-off. The shipyard also found the low rebound energy of the material an advantage, as the reduced ricochet stopped adjacent coated surfaces being damaged and made the media easy to contain and collect. As a result of these factors and the fact that other trades could work simultaneously while the surface preparation work continued, the shipyard could considerably reduce the contract time.

Grades ESA60, ESA80 and ESA90 are recommended for removing light coatings from steel and aluminum substrates and for profiling previously painted surfaces. Average profile on steel is 30-60µm.

In addition to these standard grades, Hodge Clemco manufactures bespoke materials for special applications.

Sponge blast equipment

As part of the EnviraSponge program, the company has developed three specialized media generators with hopper capacities from 100 to 500 liters, providing blast times from 10 to approximately 100 minutes depending on the application. Output pressure can be adjusted from 14psi to 115psi (1 to 8 bar). The machines are on wheels so they can be moved into position.

A specially designed vertical screw and agitation system optimizes the flow of media from the pressure vessel into the air blast stream to ensure consistent, reliable performance. The screw can reverse to easily clear a blockage. A compact control panel monitors essential functions and allows precise adjustment of blast and flow pressures. Specialized Power Plus nozzles increase production efficiency by up to 35% compared with standard versions. The machines are also fitted with heavy-duty wheels and specially designed handles to increase maneuverability. \\

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otherwise become airborne dust. This equipment, which is available in pneumatic or electric versions, allows the media to be reused between 6 and 10 times, providing considerable cost savings.

Abrasive grades to match jobs

EnviraSponge abrasive is available in a wide choice of grades to suit many different applications. On steel and most other metallic substructures, the process removes rust, paint and mill scale to leave an SA2.5 or SA3 quality surface finish. Depending on the surface hardness, air blast pressure and grade selected, a surface roughness or profile up to 125µm can easily be achieved.

Grades ESA16 and ESA30 are both aluminum oxide grades typically producing average profiles on steel of 80-100µm (ESA16) and 60-80µm (ESA30).

Grade ESG17 has chilled iron abrasive for use on heavily pitted surfaces and for removing elastomeric or extremely thick coatings. Average profile achieved is 100-125µm, but this grade is not recommended for wet environments.