



IRTA

Institute for Research and Technical Assistance

Fact Sheet, August 2014

Graffiti Removal: Alternative Blasting Systems

Graffiti management and control is a resource intensive and costly problem for public agencies and private companies. Taggers use various materials like spray paint, marker, stickers and acid or diamond tipped tools to deface surfaces like sidewalks, masonry walls, fences, lamp posts, traffic signs, billboards, glass and plexiglass. Some of the methods used today for mitigating graffiti pose risks to workers and community members, lead to emissions of volatile organic compounds (VOCs) or cause other environmental damage. Alternative methods that are safer for workers and the environment are needed.

What Blasting System is Used Today?

One of the methods used widely for controlling graffiti on various surfaces today is a technology that relies on sodium bicarbonate media, the so-called soda blasting system. Most of California is subject to zero discharge storm water regulations and the California Department of Toxic Substances Control regulates the discharge of waste to land. Soda blasting generates a significant amount of waste material during operation and it can pollute the storm water and land. Moreover, soda blasting is not particularly aggressive and cannot effectively remove some of the graffiti commonly found on surfaces. On the Mohs scale of hardness, where talc is set at 1 and diamond is set at 10, soda blasting has a hardness of 2.5. Alternative blasting methods that minimize the generation of waste and are more effective on all types of graffiti need to be identified and tested.

What Alternative Blasting Systems are Available?

As part of a project to investigate and test alternative graffiti management methods, EPA, the Bay Area Air Quality Management District and the San Francisco Department of the Environment sponsored a project which was conducted by the Institute for Research and Technical Assistance (IRTA), a nonprofit technical environmental organization. One of the project tasks was to evaluate and analyze alternative blasting systems that would be effective and minimize waste generation. Two alternative blasting methods were investigated, tested and demonstrated. These include a dry ice blasting system and a crushed recycled glass blasting system. The findings indicate that the combination of the two alternative systems can replace the soda blasting systems used today.

How Do the Alternative Blasting Systems Work?

The dry ice blasting process uses solid carbon dioxide as the media at high velocities. The unique feature of dry ice is that it sublimates or forms a gas upon impact. No secondary waste from the media is generated; the only waste generated in the process is the residue of the graffiti. The carbon dioxide is taken from processes that would otherwise be emitted so there is no net increase in carbon dioxide

emissions. The carbon dioxide is pressurized and refrigerated into a liquid which solidifies into a snow-like consistency which is compressed into either small pellets or large blocks of dry ice. Several companies supply dry ice which they can deliver to a central location or job site. The system is portable and requires compressed air. Dry ice is a relatively soft material and is therefore not very aggressive. On the Mohs scale of hardness, dry ice has a hardness of 2. Dry ice blasting is most effective for removing light graffiti.



The dry ice blasting system can be paired with another system that relies on recycled glass. Crushed recycled glass is a relatively new media made from recycled bottle glass which is known as amorphous silica. It contains less than one percent free silica and is free of heavy metals like arsenic, lead and beryllium which are found in some media. The recycled bottle glass is manufactured in such a way that it is not sharp on the skin; if a worker places a hand in the bag and moves it around, it will not cut the skin. The media is generally used in a Farrow System and it is in the form of a wet slurry. Heat is added to the process to speed the removal. The media has a hardness of 6 on the Mohs scale so it is much harder than the dry ice or the soda and it can be used to more effectively remove heavy graffiti deposits.



How Were the Alternative Blasting Systems Tested?

IRTA worked with several project participants and a technology vendor called Cold Jet to test the alternative systems at three locations, at Agua Vista Park and the Embarcadero in San Francisco and at the Simi Valley Department of Public Works near Los Angeles. Cold Jet provided their trademark Cold Jet system and a Farrow system combined with the crushed recycled glass media for the tests.

At the Agua Vista Park location, the systems were tested on lamp posts, picnic tables and a wooden pier support. At the Embarcadero location, the dry ice system was tested on seats and supports on a walking pier and the crushed recycled glass system was tested on the walkways and walls on a walkway. At Simi Valley, the systems were tested on a concrete barrier, walls and metal cabinets and components.



What is the Cost of the Alternative Blasting Systems?

IRTA conducted a cost comparison of the sodium bicarbonate blasting system on the one hand and the combination of the alternative dry ice and crushed recycled glass blasting systems on the other hand. The results of the demonstrations and analysis indicate that the cost of using the two alternative technologies is comparable in cost to using the sodium bicarbonate blasting system. The alternative blasting systems generate considerably less waste requiring disposal than the soda blasting system. The crushed recycled glass blasting system can remove many types of heavy graffiti that cannot be removed with the soda blasting system and it can also remove graffiti more quickly.

Where Can I Find Out More About the Alternative Blasting Systems?

More information on the alternative blasting systems is available in a report entitled "Safer Alternative Graffiti Management Methods for California." The report can be accessed on the IRTA website at www.irta.us. For more information, contact Katy Wolf at IRTA at (323) 656-1121 or kwolf.irta@earthlink.net.

DISCLAIMER

This report was prepared as a result of work sponsored, paid for, in whole or in part, by EPA Region IX, the Bay Area Air Quality Management District and the San Francisco Department of the Environment. The opinions, findings, conclusions, and recommendations are those of the author and do not necessarily represent the views of the sponsors. The sponsors, their officers, employees, contractors and subcontractors make no warranty, expressed or implied, and assume no legal liability for the information in this fact sheet.