NV GREEN BUSINESS NETWORK

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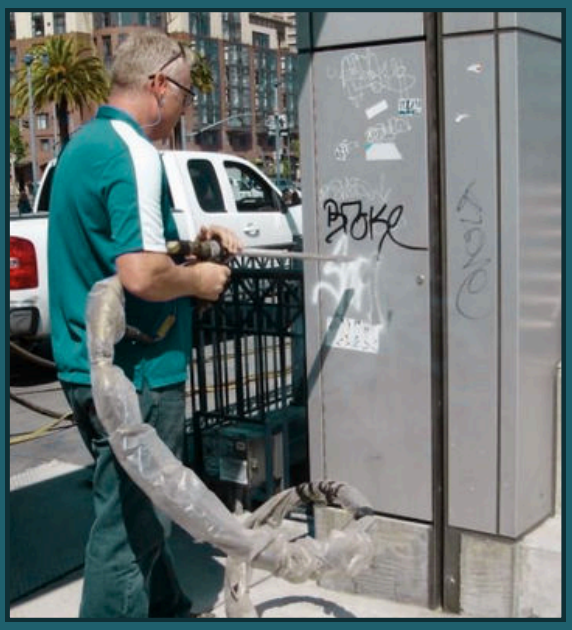
SUCCESS STORY

Working With Suppliers to Promote the Use of Safer Alternative Products for Schools

greenUP! and Western Nevada College worked with Dr. Katy Wolf on safer alternatives to harmful chemicals as part of an EPA P2 Safer Choice grant. Results of the project work are described below.

Key Findings:

- Features successful collaboration between nonprofit organization and manufacturers, suppliers and acquisition contractor
- Resulted in safer products and technologies for use in schools
- Developed new safe and effective graffiti remover
- Promoted use of dry ice blasting, a safer existing technology for graffiti removal
- Further commercialized and promoted safer floor wax strippers
- Tested existing technology, dry ice blasting, for new and innovative application



Background

There are almost 129,000 schools in the U.S. and graffiti has become a significant problem for their maintenance people. It can lead to increased maintenance costs, create a perception of an unsafe environment and potentially contribute to a negative school climate.

Dangerous floor wax strippers can affect the health of children, janitorial staff and residents in the surrounding community. The stripping process can lead to extremely high costs for Publicly Owned Treatment Works (POTWs) for cleaning up perfluoro and polyfluoroalkyl substances (PFAS). With these issues in mind, the project team set out to rely on new and existing products to mitigate them.

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Graffiti Management Methods

Several of the graffiti removers that are marketed today contain toxic components like methylene chloride, a carcinogen, N-methyl pyrrolidone, a reproductive and developmental toxin, and other toxic solvents. Many of the removers also have high Volatile Organic Compound (VOC) content that contributes to the formation of smog. Blasting systems are also used extensively for graffiti removal and the systems commonly used today are sodium bicarbonate (or soda) blasting and high-pressure water blasting.

These systems generate a significant amount of wastewater and spent blasting media and many states and localities have adopted regulations requiring zero discharge to storm water and restricting the spent media from entering the environment.

Safer Graffiti Management Methods

GRAFFITI REMOVER ALTERNATIVE

During this project, a new safe and effective graffiti remover was developed. It was designed to remove spray paint, marker and stickers which are the most common graffiti instruments used by taggers. This new remover has zero VOC content and it meets the stringent VOC limits for removers established by the California Air Resources Board (CARB).

The project also involved promoting an existing technology, dry ice blasting, which is particularly good at removing spray paint. Dry ice is carbon dioxide and the dry ice blasting technology relies on carbon dioxide that is taken from sources that would otherwise be emitted. There is therefore no net increase in global warming from its use.

The distinct advantage of this technology over the other blasting technologies used today is that the dry ice, once it is used, sublimates or evaporates into the atmosphere so there is no secondary waste generated.

There is more information on the graffiti remover in the e Chem and Katy Wolf presentations in the Soy Based Products webinar. Information on the dry ice blasting method for graffiti removal is available in the presentations by Katy Wolf and CryoMode Dry Ice Blasting in the Dry Ice Cleaning webinar at the same link.

DRY ICE BLASTING TECHNOLOGY USED TO REMOVE GRAFFITI

Floor Wax Stripping

SUCCESS STORY

Most schools have a type of flooring called vinyl composition tile (VCT). The problem with this flooring is that it requires waxing and stripping over its life. There are other types of flooring that don't require waxing and stripping, but they have a higher up-front purchase cost. To save money initially when flooring is put in schools, the contractors opt for the cheaper upfront flooring. The consequence is that the janitorial staff must wax and strip the floors for decades. The problem with floor wax strippers is they contain amines which are sensitizers and they also cause asthma. There has been an increase in asthma cases in the last several years. The strippers also have a high pH and this is dangerous for the staff who do the stripping.

In a past EPA project, Dr. Katy Wolf worked with a supplier and formulator to develop and test two floor wax strippers that do not contain amines and have relatively low pH. The strippers were tested and were found to be effective. The supplier ultimately commercialized the new strippers and during this project, promoted the strippers through a webinar and in collaboration with a company that does acquisition contracting with public schools and community colleges.

There is more information on the two floor wax strippers in the presentations by Katy Wolf and e Chem in the Dry Ice Cleaning webinar.

Floor Wax and Floor Wax Stripping Process

Many of the floor waxes on the market today contain fluorosurfactants which are PFAS. When the school janitorial staff does the stripping, they dilute the strippers with water, use a floor machine with an abrasive pad to scrub the floor and use a wet vac to vacuum it up. They then rinse the floor with water, use the wet vac again and flush the spent stripper and wax into the sewer. In this way, the PFAS waxes can make their way to the POTWs. It is technically challenging and very expensive to remove the dilute PFAS from the water and many POTWs do not have enough resources to handle the problem.

Solutions for the PFAS Problem

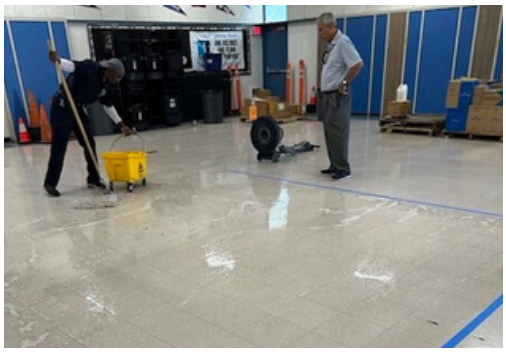
There are four options for dealing with this problem. First, the staff can use waxes without fluorosurfactants and some of these are starting to be available. There are a lot of floors that have legacy waxes on them, however, so the problem is likely to remain for some years to come. The greenUP! consultant proposed a second option that would involve using an existing technology in a new application. This option is to use dry ice blasting to remove the floor wax. The dry ice would evaporate, and the wax with the fluorosurfactants could be collected instead of discharged to the sewer. Dr. Wolf worked with a flooring supplier and a dry ice blasting equipment manufacturer to test the technology on panels

containing several layers of floor wax. The flooring supplier judged that the dry ice blasting was very promising. The blasting system was tested on an actual school floor and the testing was not successful. A third option is to install alternative flooring that does not require stripping and waxing. A fourth option is to apply a coating over the VCT flooring that does not require waxing and stripping.

Information on the two safer strippers, the alternative flooring and the coatings can be accessed in an earlier EPA sponsored project.

Continuing Efforts to Promote Products for Schools

Dr. Wolf and the suppliers of the graffiti remover, floor wax strippers and dry ice blasting technology worked in conjunction with a school acquisition contractor to arrange testing of the products and technologies and promote the new and existing technologies for use in schools. Tests and demonstrations of the new graffiti remover and the dry ice blasting for graffiti removal with a school district indicated that both technologies would be very useful for schools.



Tests of the two wax strippers with the same school district indicated that both strippers would work effectively for schools. The acquisition contractor is working with greenUP! and Dr. Wolf to make schools in Nevada, Arizona and California aware of the safer graffiti remover and the dry ice blasting technology for graffiti management and the strippers for floor wax stripping.

Takeaways

This success story demonstrates that a nonprofit organization can collaborate successfully to help design and promote products that are safer for health and the environment. The products described here are very effective and are also cost effective for use by schools and other entities. Industry and nonprofit organizations can both innovate in their own ways and working together with a common goal can be beneficial for them and for the public.

Future efforts involving collaboration of the acquisition contractor and the supplier team will lead to the adoption of safer products and methods by schools. As an illustration of what can be achieved, consider the two floor wax strippers developed in the earlier EPA project and further commercialized and promoted by this work. The two floor wax strippers are priced competitively. Their advantage compared to other strippers on the market is that they contain no amines and have relatively low pH so they are much safer for workers, students and people living in communities surrounding schools. Making estimates of school square footage and stripper usage and assuming the team can convert 100 schools to the safer strippers, the more dangerous stripper use would be reduced by 10,300 gallons per year.