U.S. Army Center for Health Promotion and Preventive Medicine (Provisional)

Just the Facts

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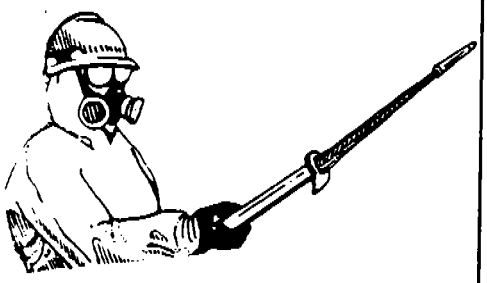
Paint Removal Technologies and Pollution Prevention



- **Department of Public Works**
- **Waste-Reducing Methods**
- **In-Place Removal**

Paint removal by traditional methods, such as sandblasting and solvent stripping, will often result in generating hazardous waste, particularly lead-based paint (LBP). The following are a few waste-reducing alternatives to the traditional paint-removal operations:

1. Binding Agents: Binding agents are nonhazardous additives that blend with abrasive media prior to the blasting process. When used in the specified quantity, a binding agent can limit the solubility of numerous toxic metals in the spent-blast media through physical and/or chemical bonding. This method renders the blast waste nonhazardous and suitable for disposal in a sanitary landfill. Do not consider the binding agent a form of treatment. The Resource Conservation and Recovery Act (RCRA) does not apply because the agent combines with the blast media before producing any waste. Studies on these materials are ongoing to evaluate whether the binding will persist after disposal.

2. Carbon Dioxide (CO_2) Pellets: This technique uses CO_2 pellets propelled by compressed air. The LBP is removed by the shock of impact as well as by the thermal effect of the dry ice pellets. The CO_2 pellets lower the temperature of the coating so that it separates from the substrate and becomes brittle, breaks up and dislodges from the substrate, and subliminates after striking the surface leaving behind only the coating residue. This reduces hazardous waste (as well as total waste) generation since there is no spent-blast media requiring disposal.

3. Plastic Media Blasting (PMB): PMB is an abrasive coating removal method that uses small, irregularly shaped plastic pellets. You can use plastic pellets several times before they wear down and become ineffective. Perform PMB in specialized booths equipped with cyclone-separation systems that segregate the reusable plastic pellets from the rest of the blasting dust. Direct the blasting dust (a mixture of coating particles and unusable plastic particles) to disposal containers.

4. Sodium Bicarbonate: This technology uses a sodium bicarbonate-blast media to remove coatings. Because this media is completely soluble, it provides a mechanism for separating the spent media from the rest of the blast residue.

The sodium bicarbonate often acts as a binding agent when the media combines with the blast residue. This allows the blasting waste to pass the Toxicity Characteristic Leaching Procedure (TCLP) and be disposed of as a nonhazardous, industrial solid waste. However, there have not been any long-term studies to determine if the binding will persist after disposal.

5. Wheat Starch: This is an abrasive process that uses a crystalline-like wheat starch blast media as a means of coating removal. You can

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use this material with the same equipment required for PMB with little or no modifications by recovering plastic media and wheat starch particles with a cyclone separator. The small, unusable wheat starch particles separate from the blast residue.

A process has been developed to liquify the starch by adding an enzyme. The waste is sent to a bioreactor where bacteria digests the solubilized wheat starch. The effluent from this process is a sludge that contains any metals present in the coating residue. Although the sludge typically requires disposal as a hazardous waste, it is a smaller volume of sludge than the original blast residue since it does not contain the spent wheat-starch media.

6. Xenon® Flash Lamp: This technology uses a quartz tube containing Xenon gas to remove paint through light energy. When the gas is electrically energized, an intense flash of light discharges. The surface absorbs the light, and the temperature rises so that a thin layer of paint releases. This achieves complete removal. Some systems use CO_2 pellets in concert with Xenon flash lamps to remove the paint residue more quickly. This technology is more expensive than the other alternatives since you need robotic equipment to control the flash lamp apparatus. In addition, Xenon flash lamp-coating removal is best suited for large, smooth surfaces that will not obstruct the movements of the robotic equipment. As a result, this technology is typically used for aircraft paint removal. Large trailers and communications shelters are well suited for this technology.

Consider these technologies as a means of minimizing pollution during in-place removal. Initiatives for preventing long-term pollution include maximizing in-place management techniques (and, therefore, minimizing lifetime-waste generation) and, more importantly, eliminating the continued use of lead-containing paints. The U.S. Army Center for Public Works has determined that LBPs are no longer necessary for even the painting of exterior surfaces and steel structures. Managers for all construction, renovation, and maintenance operations should ensure that all paints used meet the current definition of non-lead paint (i.e., contain less than .06 percent lead metal by weight in total nonvolatile content of a liquid paint).

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