PMB: Recycling to Eliminate Hazardous Waste by Bill Stromdahl

Presented to the 1998 ICBM - Corrosion Prevention Advisory Board
June 8 - June 11, 1998

Plastic Media Blasting (PMB) is a process that is used widely by the U.S. military and the airline industry for the safe and efficient removal of paints and coatings from airframes, aircraft components and other machinery and equipment. PMB is a pneumatic process which uses engineered plastic particles as the abrasive media. The plastic abrasive is harder than the coating to be removed, yet softer than the underlying surface, thereby allowing coatings to be stripped repeatedly without damaging the surface. This is particularly important for non-steel surfaces (such as aluminum and composites), which cannot tolerate the more aggressive abrasion of other blast media.

PMB has been the overwhelming choice to replace wet chemical strippers for depainting airframes and components. Depainting of airframes and components historically was achieved by using wet solvent-based chemicals, primarily methylene chloride based strippers. But the use of wet chemicals to depaint aircraft caused serious environmental problems due to the production of large volumes of hazardous wastewater. For example, Hill Air Force Base near Ogden, Utah, estimated that the wet stripping of a single F-4 aircraft produced approximately 20,000 gallons of hazardous wastewater.

In 1990, methylene chloride was listed as a toxic air contaminant, and was found to pose an increased risk of cancer, and damage to other bodily functions. In 1995, the EPA published a final rule which requires phasing out the use of methylene chloride and other hazardous wet chemical strippers for depainting aircraft and components. PMB is recognized by EPA as one of the preferred substitutes.

But even prior to EPA's move to phase out wet chemical strippers, PMB was coming into widespread use. In 1985, the Air Logistics Center located at Hill Air Force Base near Ogden, Utah, and Republic Airlines in Atlanta, Georgia, began full-scale dry stripping operations for F-4 phantom and DC-9 airframes. The implementation of PMB technology easily eliminated polluting air and water emissions. But minute paint chips in the spent plastic media frequently will contain some heavy metals, primarily cadmium and chromium which may require the spent media to be treated as a hazardous waste if it is disposed of in a conventional manner.

In early 1995, Solidstrip, Inc. and Composite Leasing Corporation developed a new recycling program to use spent PMB media as an ingredient in another manufacturing process, in such a manner that it is not considered a hazardous waste, but rather a valuable raw material. This recycling technology has been confirmed by EPA and several state pollution control agencies as meeting the requirements for exemption from the definition of solid and hazardous waste.

Solidstrip has entered into a long-term contract with Solid Surface Acrylics, which produces molded or cast solid surface products used in various decorative applications, primarily countertops. Traditionally, the recycling manufacturer has used finely ground scrap from other sources for its products. But, because the ground scrap was sometimes colorless, pigments had to be added to the production process. The spent plastic media is a superior substitute, because it provides the proper size of material, and the minute paint chips provide the proper color and opaqueness required by the manufacturer. Thus, the manufacturer is able to substitute the spent PMB dust for both the scrap and the pigments otherwise required for its products. In this manner, the “impurities” in the spent PMB dust make a positive beneficial contribution to the finished product. This is a critical factor. To qualify for the solid/hazardous waste exemption found in the EPAs and most states' regulations, the “toxic constituents” in the spent material must be useful in the finished product, or they will be deemed “toxics along for the ride.” If the regulators determine that the toxic constituents are not providing a benefit to the finished product, the exemption does not apply, and the material must be handled as a hazardous waste.

A Composite Leasing service contract covers the requirements for the lease of Solidstrip plastic abrasive for use in coatings removal. When the plastic media has been reduced to a spent material containing impurities from the blasting process, Composite Leasing ships the spent media from the user directly to the recycling manufacturer where it is used as a raw material. In this manner, Composite Leasing offers a complete service: supply of top quality plastic media, shipping to and from the user, and recycling of the spent media. Composite also takes care in securing all necessary governmental approvals prior to beginning a service contract with any user. With approvals, a federal facility can be secure in knowing that it is handling the spent media in an acceptable manner.

By instituting the recycling program with Composite Leasing, federal facilities can eliminate the production of hazardous waste in the PMB process. The leasing arrangement is less expensive to the user than purchasing plastic media and disposing of the spent media as hazardous waste. In addition, the recycling arrangement is environmentally sound and assists the federal facility in meeting the pollution prevention mandates relating to source reduction.

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*NESHAP for Aerospace Manufacturing and Reworking Facilities, Federal Register (Sept. 15, 1995)

1The spent PMB is used as an ingredient in an industrial process to make a new product without any pretreatment or reclaimation. 40 C.F.R. 261.2(e)(1)(ii).