Published in AFE Facilities Engineering Journal, May/June 2002
(As "Some Hazardous Materials Can Be Managed Without Removal")

ABATEMENT OF HAZARDOUS MATERIALS BY ENCASEMENT: COATINGS FOR DEALING WITH HAZARDOUS/DIFFICULT SURFACES

- *ASBESTOS, LEAD-BASED PAINT AND MOLD/MILDEW* -

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Hazardous materials that are found in and on buildings such as asbestos (ACM), lead-based paint (LBP) and mold and mildew (M&M) are a problem only when they become airborne and are capable of being inhaled or ingested. The principal method for dealing with ACM and LBP during the past two decades has been removal and replacement. Due to the high overall costs and inherent dangers of removal and replacement, the present position of the USEPA, OSHA and HUD is that, where possible, non-disruptive "management-in-place" should be employed. The use of encapsulants has proven to be a satisfactory method of "management-in-place" of ACM and LBP in many cases. Encasement represents an advanced method of "management-in-place" that goes beyond encapsulation in that the surface hazard is first stabilized before it is encapsulated. The advantages encasement offers over standard encapsulation is that it is usually less expensive, it is less disruptive, it permits dust-free surface stabilization, and there is less concern of hazardous materials being released after encasement if the abated surface is compromised in any way. Contrary to common perceptions, both encapsulation and encasement are EPA-approved forms of abatement. Encapsulation and encasement are used for M&M remediation to prevent the re-growth of M&M out of porous surfaces that have been cleaned and disinfected and to prevent the growth on newly coated surfaces of fresh M&M.

Encasement has been used to abate ACM fireproofing and thermal insulation along with surfaces coated with asbestos-containing paint and textured ceilings containing asbestos. Some other surfaces abated via encasement include ACM based grouts and mortars. LBP has also been abated via encasement coatings on homes (both inside and outside), in industrial facilities, schools and universities, and commercial and government buildings. More recently, encasement has been used increasingly to deal with mold and mildew in buildings on walls, ceilings and structural members as well as in HVAC systems (on drain pans and over insulated and un-insulated surfaces). The versatility of encasement is illustrated by one project in which encasement was used on ACM, LBP, and M&M in the same basement!

<u>The Traditional Approach – Removal and Replacement</u>

The removal of ACM followed by replacement with alternative insulating materials or fireproofing and the removal of LBP followed by repainting are procedures that suffer from many disadvantages. Even situations involving non-hazardous surfaces such as fiberglass insulation, etc. contaminated with M&M present significant safety issues.

1. Safety – Extensive precautions are required to protect workers and prevent the release of the hazardous materials into the environment. This work is highly regulated by governmental authorities on a federal, state and local basis. In spite of the best efforts by trained and licensed abatement contractors, accidents can still occur in which hazardous materials are released into the environment. As an indication of the difficulty in completing an ACM removal project, in nearly all situations it is necessary to spray a "lock down" coating on all cleaned surfaces before the final clearance can be achieved. So even with abatement by removal and replacement, some remaining ACM is encapsulated!

2. Cost - The cost of abatement in this manner is high. Typical costs are in the range of $5-10 per square foot or more for LBP and $5-20 per square foot or more for ACM.

3. Time – The extensive amount of time required for removal and replacement frequently leads to high relocation costs. This is an added expense that is rarely factored in, and is frequently of the same magnitude as the cost of abatement.

4. Hazardous Waste – The waste generated must be disposed of in accordance with prevailing regulations (usually in an approved hazardous waste landfill) and the owner retains the liability for safe disposal and permanent storage indefinitely.

Management-In-Place Methods

The EPA presently accepts three methods of management-in-place.

1. Enclosures – Dust-tight barriers such as sheetrock or plywood are erected to protect against the release of the hazardous material into the environment. When the enclosure is eventually removed the hazardous material is once again exposed and it usually has become more friable and prone to being released into the atmosphere. Care must be taken to insure that untrained or uninformed workers do not re-expose the hazardous surfaces unknowingly and endanger themselves and/or the inhabitants by causing a release into the environment.
2. Encapsulation – A coating material that passes EPA-specified ASTM tests is applied over a surface to prevent the release of hazardous materials into the atmosphere. A problem experienced with encapsulants in some cases is that the added weight of the encapsulant can cause ACM fireproofing on ceilings or walls to delaminate. A second potential problem with encapsulants is that if the coating is compromised (e.g. by a forklift truck running into a column that has been encapsulated) the potential for release of the hazardous material into the environment is once again present. With LBP a significant amount of scraping of loose, flaking paint is often required to provide a stable surface before the encapsulant that is applied can be expected to achieve adequate adhesion.
3. Encasement – A 2-coat system, which also passes EPA-specified ASTM testing, wherein the first coat (primer) stabilizes the substrate by penetrating into the friable ACM and through the loose, flaking paint, and cures into a flexible film that mitigates these hazardous properties. The second coat bonds to the topcoat providing a tough, long-lasting, monolithic, composite coating system that prevents the release of any hazardous material into the environment. Because of the penetration of the primer, the adhesion of the overall system is increased, a necessity as the weight of the system increases. Additionally if the outer coat is compromised in any manner, there is little or no risk of the hazardous material being released because the surface-stabilizing primer has mitigated the brittle, chalky and friable properties of the hazardous surface. In a very real sense, encasement can be viewed as "stabilization + encapsulation".

Encasement

The coating materials that make up the basic encasement system are water-based acrylic elastomers that contain no volatile organic compounds (VOC's). As such they are very safe to work with. A corrosion-inhibiting version of the primer is used when dealing with metal surfaces. Spraying, brushing or rolling may be used to apply all of the products and cleanup is with water. Use of a coatings technology-based solution such as encasement usually results in savings of 50-80 percent when compared with the cost of removal and replacement, not including comparable savings in relocation costs in many cases. According to the EPA, to qualify as an approved 20-year encapsulant/encasement system for use over LBP the coatings must pass a series of ASTM

performance tests that are encompassed by ASTM E1795-97. Little or no hazardous waste is generated. Because this is elastomeric technology, cracking, chipping or peeling will never occur.

When encasing most forms of ACM, spraying is recommended to prevent disturbing the surface. Once the primer has been applied the surface is stable and there is no longer any risk of asbestos getting into the environment. In fact, tests have shown that there is minimal release of asbestos during the spraying of the primer, so the abatement of ACM by encasement is much safer from the standpoint of worker safety.

When encasing LBP, very little or no surface preparation is required in most cases. In general, only very loose, flaking paint need be removed, which should be done in a dust-free manner. When dealing with masonry surfaces, it is usually necessary to remove any efflorescence, which is best done by power washing, which also serves to remove any loose, flaking paint. When dealing with metal surfaces, power washing is also recommended, and it is further recommended that 2-4 percent Chlor*Rid soluble salt remover be added to the wash water to facilitate the removal of soluble salts that cause corrosion. If a power wash is not feasible, scrubbing with 5% Chlor*Rid is another step for making sure these corrosion- catalyzing salts are removed. Once the surface has been prepared, a corrosion- inhibiting primer and the normal topcoat are applied. Encasement coatings may be tinted to give any desired color. Any individual or store experienced with tinting can perform this task; tints used should be those used with any acrylic latex coating materials. Encasement has been used extensively for dealing with LBP on historic restoration projects, where the removal of the old paint without damaging the substrate is frequently very difficult and time-consuming.

When dealing with M&M, the surface is first cleaned and disinfected. Then, to prevent the re-growth of the M&M, particularly on any porous surfaces that will remain, the surface is coated with the encasement primer to achieve a stable surface, following which it is over-coated with the appropriate topcoat. Any coatings used in the remediation of M&M should pass ASTM D3273/D3274, which indicates that the coating will not support the growth of M&M. Most coatings that pass this testing have accomplished this by adding a poison to the coating, an EPA-registered pesticide. An important advantage of the encasement coating system we prefer is that it passes this testing as is, i.e. without the addition of a poison. The importance of this fact becomes clearer when one considers the instances of people who, upon re-inhabiting their property after the M&M remediation is complete and an encapsulant with a poison has been applied, then begin to develop allergic reactions to the coating's mildewcide. One particular encapsulant used for M&M remediation includes an iodine-containing mildewcide that is known to produce allergic reactions among a significant portion of the populace. Another encapsulant used for this purpose employs a chlorine-containing mildewcide, also known to cause sensitivity issues. The basic encasement system will provide adequate protection against the future growth of M&M in most cases without the use of a mildewcide. In extreme cases, a few mils of a high-gloss topcoat can be applied over the encasement system to provide added protection against the future growth of M&M. This added protection comes from the gloss and its nature to soil less, and the improved ability to clean it. As a final option, a high-gloss coating can be used that contains an EPA-approved mildewcide that contains neither iodine nor chlorine.

<u>Other Uses, Other Products</u>

The family of encasement products has a variety of other valuable uses.

1. An encasement satin-finish topcoat may be used directly over the primer to provide a more washable surface without resorting to a 3-coat system. This has been used in food processing facilities.

2. A clear high-gloss topcoat that doesn't contain a mildewcide may also be applied over the basic encasement system to provide a surface that doesn't soil as readily. It may also be used directly over the primer to provide a clear coating system.

3. The encasement primer by itself has been used as a demolition aid. Surfaces that are covered with loose, flaking paint must be stabilized prior to demolition or containment must be employed (e.g. shrouding of windows prior to removal) to prevent LBP from getting into the environment during the demolition process. The application of a thin coat of primer to stabilize the surface prior to demolition is a much less costly means of preventing the release of LBP, which also results in construction materials that can be disposed of as ordinary construction debris because the LBP is viewed by the regulatory authorities as stabilized lead. This same concept has been deployed on ACM surfaces prior to demolition.
4. The stabilizing primer has also been used extensively in many projects where LBP was not involved in combination with other topcoats. Its use permits substantial savings in surface preparation labor.

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