

news of engineering forensics


 MDE Inc.

ALTERNATIVE SAMPLING METHODS TO COLLECT IGNITABLE LIQUID RESIDUES FROM LARGE AREAS

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Unscented cat litter has been shown to efficiently absorb residues of an ignitable liquid residue from a concrete pad better than an expensive absorbent marketed for that purpose. A recent study conducted at MDE Inc. compared several different absorbent materials that can be used for this purpose.

During the course of many fire investigations, there is a need to sample a

MDE's Educational Speakers

If you are in need of an educational speaker, please call MDE today. Part of MDE's mission is to inform and educate affected parties in insurance, legal, engineering and other scientific issues. MDE professionals schedule speaking engagements locally and nationwide. Continuing education credits are available for some classes. Talks presently scheduled include:

- Dale Mann, Defense of Clandestine Drug Laboratories, Washington Public Defenders, Seattle, September 12, 2006
- Susan Evans, Characterizing Water Infiltration in Buildings By Utilizing Mold Observations and Moisture Measurements, Joint Meeting of Pacific Northwest Chapter, American Industrial Hygiene Association & American Society of Safety Engineers, Seattle, WA, September 20, 2006
- Paul Moore and Noel Putaansuu, NFPA 921 – Electrical Chapter, IAAI – Oregon Chapter, Bend, September 21, 2006
- Mike Fitz, Forensics of Fire Damage to Structures, Structural Engineers Association of Washington – Seattle Chapter, Seattle, September 26, 2006
- Mark Nordstrom, Building Defendable Illustrative Media for Major Loss Recovery, Fire and Casualty Seminar, Chicago, November 2, 2006
- Noel Putaansuu, Alternative Sampling Methods to Collect Ignitable Liquid Residues From Non-porous Areas Such As Concrete, Fire and Materials Conference, San Francisco, January 30, 2007

concrete pad or similar surface for evidence of an ignitable liquid residue. Collecting this type of sample can be difficult because the potential residues may be widely dispersed and in very low concentrations. Standing water on the sampling surface is also likely to be present. The choices for collecting these ignitable liquid residues are few; one can either chip up the concrete, adsorb/collect volatile residues in situ, or spread a powder of some type to absorb the residue.

Many powders have been used in the past for absorbing the residues including sodium bicarbonate (baking soda), flour, clay (unscented cat litter), magnesium/calcium sulfate (Epsom salts/gypsum) and others. Recently, an additional product called ILA (Ancarro Company, Indianola, IA)



has been introduced to the fire investigation profession as a product developed specifically for collecting and detecting ignitable liquid residues from a variety of surfaces. A search of current literature showed there is little to assist the investigator in their selection of an absorbing material for use on concrete. To fill this void, MDE Forensic Laboratories recently compared many of the possible absorbents in side-by-side testing to determine which are the most effective.

Small volumes of a gasoline/diesel fuel blend were applied to separate 16"X16" concrete pads and heated for a range of predetermined times using a forced air heater. The temperature of the concrete surface climbed to approximately 200°F during these tests. Heating durations ranged from 15 minutes to 90 minutes. Surviving residues were collected after 4 hours. A variety of absorbing powders were compared to an in-situ volatiles collection technique and to collecting the concrete itself. Analysis

of the residues was accomplished using accepted ASTM laboratory methods.

Our experiments showed that cat litter was an effective absorbent for collecting the accelerant residues, even surpassing the in-situ volatiles collection method. Of course, the analysis of the entire concrete pad proved to be the most sensitive, but the collection of a similar sample from a fire scene is very difficult. The highly touted ILA product concentrated less of the ignitable liquid residue and contained a high background that interfered with the identification of trace levels of the residues. The other absorbents demonstrated very low background interferences with the analysis methods but showed varying sensitivity.

SAMPLING PROCEDURE

Keep in mind that the surfaces to be sampled can not have any standing water on them. Allow any standing water to dissipate and preferentially allow the concrete pad (or other surface) to dry prior to applying the absorbent. Use unscented cat litter. 30-60 minutes at ambient temperature is sufficient

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to allow the absorption to take place. Sweep the absorbent up with a new disposable brush and place in an appropriately sized can that is filled to a maximum of $\frac{3}{4}$ full for laboratory analysis. Remember to collect a comparison absorbent sample from an area free of suspected ignitable liquid and also send a control sample of the unused absorbent powder to the laboratory for comparison purposes.

If desired, MDE Forensic Laboratories can supply verified clean absorbent materials and brushes to investigators. Laboratory testing can be completed within two days if necessary. MDE Forensic Laboratories employs state-of-the-art techniques and is on the leading edge when it comes to providing quality laboratory support for fire investigation. Feel free to call Dale Mann at MDE with any questions about this technique or to discuss other issues you may have with your fire scene work.

Mold – More Than Just An Indication of Wetness

Susan Evans, CIH, CSP, P.E., Certified Industrial Hygienist and Civil Engineer

Mold is most typically associated with the presence of a water problem. Indeed, a source of water or moisture plus cellulose or other suitable food source materials are part of the conditions needed for mold to grow. However, there are two areas of concern associated with mold growth:

- Mold growth can deteriorate the building material substrate
- Mold growth, if disturbed to become airborne, may impact the health of exposed individuals

Building materials that are porous, such as gypsum wallboard or ceiling tiles, deteriorate as mold colonization (growth) continues. When mold is found in combination with elevated moisture in the material, the material often loses its structural integrity. Typically all porous materials with mold growth must be replaced to correct the deteriorated and moldy conditions.



For building materials that are semi-porous, such as unsealed wood or building lumber, the amount of deterioration can vary depending on the depth and type of mold growth. If the mold growth is found and scheduled for removal when only superficial mold is present on the surface, then the mold can be fairly easily removed through abrasive cleaning actions. However, more extensive mold growth and elevated moisture can be associated with forms of wood rot and can only be removed by replacing the wood.

If mold growth in a building is disturbed, individuals who live or work there may be exposed to increased concentrations of airborne mold. Differing individuals are sensitive in varying degrees (from highly sensitive to not apparently sensitive at all) to one or more of the many types of molds

found in the environment or on building materials. For the general population, the ill effects that sensitive individuals may experience include exacerbation of asthma or allergies. In certain cases, physicians experienced in working with fungal related illnesses may have other diagnoses.

MDE has experience in the industrial hygiene services needed to identify and recommend corrective actions for mold growth in buildings. We compliment these mold specific services with civil engineering, mechanical engineering and forensic chemistry for water source identification and other building related consultation needs.

MDE Featured Service:

Scheduling Inspections Outside of Business Hours

MDE is able to rapidly respond or schedule investigations 24 hours a day, 365 days a year. During normal office hours, please call our general office number at 206-622-2007. For off-hours and weekends, professionals can be reached at 206-957-2155 to meet your emergency needs. The need for these off-hour calls may include:

- Fire origin and cause investigations
- Catastrophic machinery failure analysis
- Vehicular accident analysis
- Emergencies of chemical exposures/releases

If we can be of help, please, do not hesitate to call.

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