

Poster Presentation

14.1 ASBESTOS-CEMENT MATERIALS: A PRACTICAL APPROACH TO PROTECTING WORKER HEALTH DURING MAINTENANCE AND CONSTRUCTION

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Asbestos-cement materials are used world-wide!

Shown here (**Figures 1 - 4**) are just a few examples of asbestos-cement products used throughout the world. All of these products are non-friable and do not release asbestos fibers into the air unless disturbed. However, disturbance and deterioration can cause a possible exposure hazard, and ample reasons exist to disturb them during renovation, repair and maintenance activities.

THIS PRESENTATION IS NOT AN ENDORSEMENT OF THEIR CONTINUED MANUFACTURE AND USE. It is intended to raise the level of awareness about the hazards of doing ordinary repairs and maintenance -- small jobs -- on materials that are already installed. It describes a practical approach to protecting the health of workers and others while performing such tasks. The current standard for such work is ISO 7337 - *Asbestos reinforced cement products -- Guidelines for on-site work practices*. This standard would be improved considerably by the incorporation of the validation and training concepts described in this presentation. The author intends to pursue a revision to ISO 7337 through the international consensus standards process.

Managing asbestos-cement materials in place by trained workers using validated methods is vital as long as they remain installed. Removal of these materials, also by properly trained workers, remains the only method of completely eliminating the source of exposure to asbestos fibers.

The problem:

Excessive exposure from uncontrolled work practices such as cutting asbestos-cement sheet with a circular saw as seen in **Figure 5**. This picture shows a test under controlled conditions, but such work is frequently done with no respiratory protection or dust control measures.

- Exposures measured in 1985 by Oberta during the operation shown in Figure 5 were 1.41 - 5.23 fibers/cm³
- A measurement in 1992 by Millette for a similar operation and material, with no ventilation, was 9 fibers/cm³
- Exposures measured in 1985 by Oberta during cutting of corrugated asbestos-cement sheet were 1.64 - 4.21 fibers/cm³

Control of fiber release is clearly needed to protect the worker when any asbestos-cement material is disturbed.

Step One - VALIDATION

Develop and document a simple procedure

The author validated this procedure (**Figures 6 - 8**) for drilling holes through non-friable asbestos floor tile in 1996. The procedure is familiar to the workers, uses readily-available materials and tools, and requires no special equipment (such as HEPA -filtered vacuum cleaners).

Procedures using tools and methods familiar to the workers can be developed and validated for drilling, cutting and other *limited* disturbances of asbestos-cement products.

Worker exposures from the floor tile drilling procedure shown here were determined to be well below the U.S. Permissible Exposure Limit of 0.1 fiber/cm³.

Take air samples under controlled conditions¹

The ultimate test of a procedure is how well it controls the exposure of the worker to airborne fibers. This can only be measured by using the actual asbestos-containing material to validate the procedure.

Personal air samples should be taken while simulating actual conditions where the pace of work can be controlled. The worker whose exposure is being monitored must follow the procedure being validated. It is important to take enough air samples to show statistically that the exposure limit used as a measure of validation will not be exceeded.

The procedure for drilling asbestos siding (**Figure 9**) consists simply of wetting the material with a spray bottle. Exposures measured were less than 0.0327 f/cm³ in 1997 and less than 0.0131 f/cm³ in 1998. These were short-term samples taken for 30 minutes, for which the U.S. Exposure Limit is 1.0 f/cm³.

Show compliance - Regulations, standards, policies

Worker exposure to asbestos fibers is often limited by government regulations. Consensus standards may also govern work practices, and some employers adopt more stringent precautions as a matter of their own policies.

To evaluate the air sampling results, first find out which measures of compliance apply to the procedure being validated. If, for example, a regulatory exposure limit is exceeded, the options may be to revise and re-validate the procedure (with more air samples) or to provide respiratory protection.

A validated procedure that meets the measure of compliance may, in some cases, be performed without the use of respirators if this is agreeable to the employer, worker representatives and government regulators.

While the use of respirators is encouraged for all work on asbestos-containing materials, the practical limitation of their use in many instances is well-recognized.

¹ It was brought to the author's attention during the Global Asbestos Congress that air sampling is not readily available in many developing countries, or may be impractical for a given situation. In such cases, the absence of visible airborne dust during the operation, or the absence of visible residue and debris when it is complete, may have to suffice for purposes of validation.

Respirators should be used when working with asbestos-cement materials unless air sampling shows worker exposure WELL BELOW specified limits.

Step Two: WORKER TRAINING

Convince the workers that they really need the training!

Some workers take a skeptical approach to asbestos training. They aren't convinced that asbestos is a real health hazard, or they take a fatalistic or hostile attitude because of past exposure. They have to be assured that following a procedure is going to protect their health and might make the job easier in some ways.

Gain their confidence by stressing the following:

- Awareness - Inhaling asbestos fibers really can cause disease;
- Validity - The procedure they will use really does keep asbestos exposure as low as possible;
- Familiarity - The procedure is not that different from the way they are used to working, and doesn't involve complicated equipment;
- Comfort - Exposure may be low enough that they won't have to wear respirators -- or shave their beards!

Explain the procedure clearly and concisely!

Nothing comes across more clearly than graphical illustrations and photographs of the work. ***Figures 10 and 11*** illustrate the removal of pieces of a broken Transite duct to access electrical cables for inspection and possible repair. Keep the classroom session short and focused on the work practice.

Emphasize wet methods and simple tools!

Water is the simplest way to control fiber release, and expensive "amended water" used for asbestos abatement isn't necessary for small repair and maintenance jobs. Liquid soap is an acceptable surfactant that allows the water to spread across the surface.

A thicker substance that contains water, such as shaving cream, will also capture dust and debris. Investigate different substances when validating your procedure.

Use hand tools wherever possible instead of power tools. If power tools must be used, make sure that their speed can be easily controlled. Some power tools and dust capture devices may be difficult to clean and maintain.

Many air samples taken by the author on floor tile and asbestos siding have shown that HEPA-filtered vacuum cleaners are NOT needed to keep worker exposure below the U. S. Permissible Exposure Limits if proper wet methods are used.

The hands-on exercise -- a chance to practice!

The hands-on exercise lets everyone in the class practice using the procedure on simulated (non-asbestos) materials (***Figure 12***).

- The exercise should realistically simulate the actual work setting;
- Everybody should participate in each step of the procedure;
- The material should closely resemble the asbestos cement product in the way it responds to cutting, drilling and breaking.

Equipment used during the hands-on exercise should be the same as that which will be used in actual operations, and should be kept as simple as possible. Tools that break down during the hands-on exercise cannot be expected to work reliably under conditions of hard use. For example, the nozzle on the water sprayer in *Figure 12* (yellow object) failed after five exercises and has been replaced in the procedure by a plastic jug from which soapy water is simply poured onto the duct.

Even if respirators may be needed for the work on actual asbestos materials, their use during the hands-on exercise is discouraged because they may detract from the experience of practicing the procedure.

Step Three: OUTREACH

Validation of procedures and training of workers must be complemented by an effective outreach program. Enlightenment, encouragement and enforcement are the essential elements of an outreach program. What does this mean for the various parties involved?

- For ***workers***, this means getting the information to them through their employers, or their labor organizations, about the need for proper work practices and where to receive training;
- For ***employers***, it means working with them individually and through their trade associations to get them the information that they, and their workers, need;
- For ***building owners***, it means creating an awareness that their workers also need to be trained, and that they should only use outside contractors who have properly trained their workers;
- For ***government officials***, it means using the building codes and permit process to ensure that work on asbestos-cement materials is only done by trained individuals. Such programs can be self-supporting through permit and license fees.

It will take the combined efforts and cooperation of all of these groups to develop and use appropriate work practices for asbestos-cement materials.

An example of OUTREACH for industrial purposes

The author validated the floor tile drilling procedure described above for a telecommunications company in the United States. He subsequently developed the training materials for this procedure. Every company employee, and every employee of vendors, who installs equipment in this company's facilities is required to take a four-hour training course on the drilling procedure and to use it whenever drilling through resilient floor tile.

The four-hour floor tile course includes Asbestos Awareness training and a hands-on exercise.

The procedures required for working on asbestos-cement materials can be taught in much less time than it takes to train a worker to do asbestos abatement. The author has found that 4 - 6 hours is sufficient for simple procedures on floor tile and Transite ducts, and this includes a two-hour Asbestos Awareness course.

FOR FURTHER INFORMATION
on conducting a
Validation, Training and Outreach
program for
Asbestos-cement materials

You are invited to contact

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