

INDUSTRIAL HYGIENE DIVISION
MEDICAL DEPARTMENT
PUGET SOUND NAVAL SHIPYARD

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OCCUPATIONAL HEALTH HAZARDS OF ASBESTOS

ASBESTOS DUST

Pipe Coverers and Insulators handling, sawing, cutting, or ripping out asbestos or asbestos-containing materials often produce considerable amounts of very fine airborne dusts in the work area. The larger particles fall rapidly, but the tiny unseen fibers may remain suspended in air for many hours. These tiny asbestos fibers have an average diameter of 0.1 to 100 microns (a micron is 39 millionths of an inch). Unfortunately, particles of this size range are small enough to enter the lungs easily. Some of the airborne dusts and asbestos fibers are trapped in the lungs and provoke an irritating action, but most of the fibers are eliminated by the lymphatic system and lungs. An inflammatory process occurs around the trapped fibers causing a type of lung damage called pulmonary fibrosis and in the case of asbestos--asbestosis.

EXPOSURE PATTERN

The amount of pulmonary fibrosis provoked in the lungs by asbestos fibers is proportional to the amount of dust breathed daily and the number of years of exposure. Continued exposure at high concentration hastens the amount of lung damage which may be produced.

Exposure to small amounts of asbestos fibers does not imply that asbestosis will develop. The disease develops very slowly, and at a rate proportional to the exposure, so that careful PC&I personnel can limit their exposures and work a lifetime without adverse effect to their health. During low exposure, some unnoticeable lung damage may occur which will not significantly change the health and vigor of the worker.

The workmen actually are the only ones who can effectively limit their exposures by using better tools and work methods, correct ventilation, and safe work practices, and the provided respirators. This is a lifetime goal for each insulator--to minimize his exposure and the exposure of others to airborne asbestos fibers.

DUST RESPIRATORS

The best dust respirators available are selected specifically for PC&I workers to give good face fit, lowest breathing resistance, and good visibility. While the respirators are uncomfortable to some, they

are the best to be found today. Some respirators on the market claimed effective fail the protective tests when put to use. The respirators provided will effectively filter about 90% of the particles that will lodge in the lungs and cause irritation (no respirator is 100% effective).

The respirator must be worn religiously, since the invisible particles remain in the workers' breathing zone for hours and must be prevented from reaching the lungs. Wearing the respirator only when the supervisor is around fools only the worker, and putting on the respirator only when dusty conditions are created only prevents peak exposures.

"Respirators must be worn while working with asbestos or asbestos products aboard ship or in certain shop areas to adequately protect workers," is a mandatory requirement established by Shop 956 and the Medical Department.

CHANGE OF WORK PRACTICES

Workers can do much to reduce the asbestos dust and fiber production by using work practices that produce less dust. If the asbestos fibers cannot become airborne, then inhalation of particles will not occur.

Some of the methods to reduce asbestos dust and fiber production are:

1. Enclose dusty cutting operations and ventilate the process whenever possible.
2. Throw the brooms away and use vacuum cleaners liberally. Brooms create too much airborne dust, thus increasing the exposure.
3. Wet any and all asbestos materials whenever possible, because wetting reduces the amount of dust produced by 50-60%.
- * 4. Substitute fiberglass for amosite blanket whenever possible. Fiberglass is not hazardous to the lungs, but amosite is 95% asbestos!
5. Place scraps in polyethylene bags and seal them. Don't use burlap bags because the fine particles filter through the cloth.
6. Use drop cloths under your work whenever possible to catch scraps. Falling and accumulated scrap account for much of the airborne fibers in the breathing zone of workers.
7. Position cutting tables out of the line of traffic.
8. Do not throw or break materials in small compartments. Carry the materials in plastic bags or boxes, and saw the materials under well-ventilated conditions to minimize exposures.

9. Use good local exhaust ventilation for cutting, ripout, and sawing, and insure that the exhausted air is piped outside the ship.

10. Do not rip cloth since ripping produces high concentrations of asbestos fibers directly in the breathing zone.

11. Use ventilated containment tents of plastic, when available, to limit the spread of asbestos dust.

ENGINEERING CONTROL METHODS

Engineering control methods are expensive and often require a trial period to prove their worth. Some of the control methods that are receiving continual evaluation are:

1. Ventilation controls and methods to minimize accumulation of asbestos dust and fibers in the workers' environment.

2. Substitution of suitable materials for asbestos, especially those products containing a high percentage of asbestos fibers.

3. Prefabrication, cutting and modular assembly in the shop and at the pier.

4. Materials control and packaging for delivery to the ships.

5. Portable ventilation techniques, tools, and cutting tables.

ENVIRONMENTAL MONITORING

The Industrial Hygiene Division, Medical Department, periodically monitors the working environment of PC&I workers to evaluate exposures and recommend control methods.