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**USE OF ASBESTOS-MILLBOARD SURFACED PLYWOOD PANELS
IN HOT LABORATORIES**

Berkeley, California

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This report describes a method of making ordinary plywood fire-safe by surfacing it with asbestos millboard. Plywood prepared in this way is an excellent material for the construction of glove boxes.

At the Lawrence Radiation Laboratory at Berkeley, California, we have, over the years, used a number of materials with which to construct our enclosures. Sheet metal, plastic, and plywood have all proved useful. For general use, however, when an inert atmosphere is not one of the requirements, we prefer plywood panels. They are rigid, easily worked, generally inert, reasonably light, and inexpensive. Plywood has one major disadvantage: it is flammable.

In 1961, we were instructed by our Department Head, Patrick W. Howe, to henceforth construct our various types of research enclosure with non-flammable material. Our solution was to develop a laminated material with plywood as the strong core and asbestos millboard as the surfacing on each side. Tests in the laboratory and in the field showed that this combination panelboard possessed excellent fire-resistant qualities and adequate strength for our purposes.

The laminating method is to coat one surface of a sheet of 1/2-in. -fir plywood with sodium silicate, then coat one surface of a 1/8-in. -thick sheet of hard grade asbestos millboard with silicate, and lay the millboard, coated surface down, on the coated surface of the plywood. Then another sheet of plywood is rested on top of the dry upper surface of the millboard and the process is repeated until a sufficient number of plywood panels has been covered with asbestos millboard on one side. These stacked panels are left to set up overnight, and the following day the process is repeated on the uncoated side of the panels.

Asbestos millboard is a mixture of roughly 94% asbestos, 5% Portland cement, and 1% water. It is manufactured in thin sheets 42x48 in., 1/8 or 1/4 in. thick. The hardness of the board is regulated by small changes in the cement content. The so-called hard board is still easy to cut with ordinary woodworking tools.

Asbestos millboard should not be confused with another asbestos-cement combination called Transite. Transite is a rigid, rock-hard material with an appreciable amount of water bound in the mixture.

The 3/4-in. -thick laminated plywood-asbestos millboard panel can be cut and handled in much the same manner as an ordinary plywood panel, except that there is an asbestos dust hazard. Asbestos dust in chronic doses is classed as a respiratory irritant. Fibrosis of the lung tissue can result after prolonged

exposure. It is highly desirable to use air-suction dust catchers around the cutting machines. In the absence of such equipment, respirators and adequate ventilation should be used.

The surfaced panels are easily joined by means of screws, nails, pegs, or threaded inserts, providing that the fastenings are well seated in the plywood core.

Asbestos-millboard surfaced panels may be coated with most of the common paints. Shellac may be used as a surface filler, and the final coat or coats be applied on top. Our painters spray on two coats of gloss white vinyl-base paint. Two coats of quick-drying paint can be applied in one day.

The use of asbestos millboard is, of course, not limited to surfacing plywood. It can be quickly nailed up on doors, walls, or other surfaces that might be subject to fire. In addition to being fireproof it provides an attractive surface either by itself or after a coat or two of paint is applied.

At Berkeley we have carried out a series of fire tests on gloved boxes constructed of asbestos-millboard plywood. The results may be seen in the film that accompanies this paper.

Color Film Showing Fire Tests of Various Gloved Boxes

(Viewing time approximately 12 minutes)

- A. Box No. 1 - Interior plywood
 - (a) Internal fire tests with and without side door open
 - (b) External fire test

- B. Box No. 2 - Asbestos-millboard surfaced plywood construction
 - (a) Internal fire tests with and without side door open
 - (b) External fire tests

Comparison of the two test boxes after tests

- C. 40-cfm Box - Plywood construction
 - (a) Internal fire with doors closed

- D. 1962 Box with
 - (1) Asbestos-millboard surfaced plywood construction
 - (2) Wire glass top window
 - (3) Safeteeed Plexiglass front window
 - (a) Internal fire test
 - (b) External fire test

