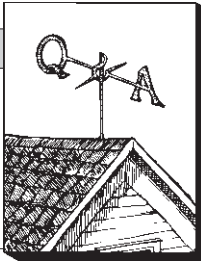


Is Cellulose Insulation Toxic?

by Henry Spies



Insulation Hazard

Q. Is the boric acid used as a fire retardant in cellulose insulation toxic? if so, should special safety precautions be taken when handling it or working in it?

A. Boric acid can have a number of side effects if the exposure is extensive. In very dilute solutions, boric acid is used as an eye wash. However, continuous exposure to high concentrations found in the insulation can cause eye irritation. Goggles should be worn. If any eye irritation is noticed, flush the eyes with tap water for at least 15 minutes. Wear a dust mask to avoid inhaling powdered boric acid. Lung irritation, including coughing, bronchitis, and pneumonitis, can cause a rash, particularly on the palms of the hands, soles of the feet, and buttocks. Severe cases can produce a "boiled lobster" syndrome, with red and sloughing skin and irritated mucous membranes. While these problems are not too common, they can occur, and protective clothing can reduce the chance of worker's compensation claims.

Barn Floor Insulation

Q. Is there an effective way to insulate the floor and sill area of an existing pole barn? I am particularly concerned with infiltration through the floor drain.

A. If the barn has an existing concrete slab floor, the best way to insulate it is to install 2-inch extruded polystyrene foam around the outside of the building. It should be extended at least 2 feet below grade.

If there is an existing wood sill and a wood-frame floor in the building, I would be concerned with the possibility of rot in the sills and joists if there is no crawlspace. However, the sill and the outer 2 feet of the floor perimeter can still be insulated with urethane foam sprayed through holes drilled in the floor.

If there is liquid in the floor drain trap, infiltration should not be a problem. If the drain is used rarely and the water evaporates from the trap, the trap can be filled with mineral oil, which will not evaporate. Or, you can install the type of trap seal that is used to prevent radon entry. These units are available for retrofit or new construction. One brand is *Dranjer* (1441 Pembina Highway, Winnipeg, Manitoba R3T2C4; 204/474-0451).

Engineering Definitions

Q. What is horizontal shear and deflection and how important is it in the structural design of a building?

A. Horizontal shear and deflection are two different subjects. Deflection is the amount a structural member sags or bows under stress. All structural members deflect. The standard acceptable deflection for a horizontal member is figured as the span length in inches divided by 360. This would permit a floor joist with a 15-foot (180-inch) span to have a deflection of 180/360 or 1/2 inch. This is a rule of thumb that is presumably based on

the amount of movement that can be tolerated by plaster without cracking. Although codes require design for strength, structural design should also be controlled by the allowable deflection. Doing so eliminates the "springiness" in structures that often causes failure of the finish materials.

Horizontal shear is the force on the fibers near the center of a beam resulting from the tension on the bottom and compression on the top of a beam. Visualize a beam made of twelve 1x4s laid flat, with no connection between the boards. The beam would be relatively weak because each board would be acting independently, with slippage occurring between each pair of boards. If the boards were nailed or glued together the beam would be many times stronger. The nails or glue lines would be stressed in horizontal shear. Failures in horizontal shear can appear as distorted webs in steel beams or splitting, usually at the center of the piece, in wood. I have seen instances where the pith of the lumber occurred in the center of a 2x8 floor joist which failed in horizontal shear, splitting it into two 2x4s.

Slate Finish

Q. A customer wants a rich, dark gloss on a new polished slate hearth. He says he had such a finish in a previous home. How should the hearth be treated?

A. Several coats of clear alkyd (non-yellowing) varnish should do the job. If necessary, a dark-tinted varnish can be used. As usual, a test patch is a good idea.

Unsightly Stains

Q. We are renovating a commercial building, which will have exposed roof beams and ceiling joists. The beams have been sandblasted, but still have dark stains from water leaks, dirt, and mildew. How can we best remove the stains?

A. A chlorine bleach solution may lighten the dirt stains and remove the mildew, but it may be impossible to remove the deep water stains. The water leaking through the roof probably carried some of the water-soluble coal tar or asphalt deep into the wood. This is very resistant to bleaching. A thinned white stain might help even out the color. Many old commercial buildings had whitewashed beams and ceilings to make them lighter. ■

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