Vapor Retarders: Concrete Slab and Wood Joist Construction

The two most frequent causes of moisture problems in a new home is moisture trapped within the structure during construction and/or a continuing source of excess moisture from the basement, crawl space, or slab. These moisture source(s) can also cause problems with wood flooring. However, a properly placed vapor retarder can prevent or reduce problem moisture from entering the home.

The term "vapor barrier" has been commonly used to indicate materials that inhibit moisture movement. Most of these materials do permit the passage of small amounts of moisture; therefore the term "vapor barrier" is not totally accurate and "vapor retarder" is more appropriate.

A "vapor retarder" is a material which has a permeance of less than 1 perm. 6-mil polyethylene (.06 perm rating) or equivalent materials are now used as vapor retarders. Ordinary asphalt saturated roofing felt or building papers should not be used as vapor retarders.

CONCRETE SLAB CONSTRUCTION:

Strip flooring and related products should be protected from moisture migration through a slab. Proper on grade or above grade construction requires that a vapor retarder be in place beneath the slab. **ALWAYS** perform appropriate moisture tests to determine suitability of the slab before delivering wood products.

Also, a vapor retarder equivalent to 4- or 6-mil polyethylene should **ALWAYS** be installed on top of the slab to further protect the wood products.

The following excerpts are from sources of related information:

"Use a moisture retarding membrane, such as 6-mil polyethylene, under concrete slabs to block moisture from the soil. Use three to four inches of coarse sand or gravel under the membrane to act as a water capillarity break in all but dry, well-drained soils."

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"Wood Flooring...To give added assurance that moisture does not reach the finished floor a vapor retarder must be used on top of each slab. Where this is placed will depend on the type of nailing surface and/or type of wood flooring used."

FROM: Forest Products Laboratory USDA Forest Service, Madison Wisconsin AGRICULTURE HANDBOOK 72 (Revised September 1987)

"REDUCING MOISTURE AT THE SOURCE....Install a 4-inch base course of washed gravel or crushed rock under the slab. Place a vapor retarder such as 6-mil polyethylene film between the base course and the slab..."

FROM: University of Illinois at Urbana-Champaign, Small Homes Council- Building Research Council, MOISTURE CONDENSATION F6.2 (Revised 1990)

WOOD JOIST CONSTRUCTION

For a new home with wood joist construction, after the roof, windows and doors are installed, place a polyethylene film over the crawl space earth as soon as possible. Cover the earth 100%, overlap sheets, turn up at foundation walls, and weight down to avoid dislocation.

The following excerpts are from sources of related information:

"REDUCING MOISTURE SOURCES... Most homes with problems of excess moisture have wet basements or crawl spaces. Some researchers have estimated that as much as ten times the normal moisture production in a house can be contributed by a wet crawl space. … To keep basements and crawl spaces dry, the soil in contact with the foundation must be kept dry...Every crawl space must have a ground cover. This is a sheet or membrane, usually of 6 mil thick polyethylene, which covers all of the exposed soil. The joints may be simply lapped. The edges should extend to the walls. Crawl spaces should be inspected regularly (after every heavy rain, for example) to ensure water does not collect on top of the ground cover."

FROM: University of Illinois at Urbana-Champaign, Small Homes Council-Building Research Council, MOISTURE CONDENSATION F6.2 (Revised 1993)

"SOURCES OF MOISTURE...Dampness within a crawl space can usually be avoided if the lot is graded correctly and a moisture control device, such as a plastic ground cover, is used....Using a vapor-barrier-type of ground cover which is not susceptible to damage by fungi - such as polyethylene film, either 4 or 6 mils thick. Grade and smooth the ground before installing the ground cover. Turn up the ground cover 4 to 6 inches on the wall of the crawl space. Hold the polyethylene in place against the

wall with sand or bricks. Where more than one piece of polyethylene is needed, lap the edges 4 to 6 inches -- sealing is not necessary. The use of wide rolls of polyethylene reduces the number of edge joints."

FROM: University of Illinois at Urbana-Champaign, Small Homes Council-Building Research Council, CRAWL-SPACE HOUSES F4.4 Volume 4 Number 2

"Crawl spaces below the floor of basement-less houses and under porches should be ventilated and protected from ground moisture by a soil or ground cover... A soil cover, preferably 6-mil polyethylene, is normally recommended under all conditions to protect wood framing members from ground moisture..."

FROM: Forest Products Laboratory, USDA Forest Service, Madison, Wisconsin AGRICULTURE HANDBOOK 72, (Revised September 1987)

"CRAWL SPACES The principal source of moisture in crawl spaces is the soil. Moisture from the soil can create excessive humidity that may condense on floor framing members. … In problem-prone areas, a soil cover should always be used. The soil cover should be a heavy, vapor retarding material that is tear and puncture resistant. The material should be laid on the soil with all joints lapped 8-12 inches and held in place with bricks or other weights... While roll roofing was used as a soil cover for many years, 6-mil polyethylene has now become the preferred material..."

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