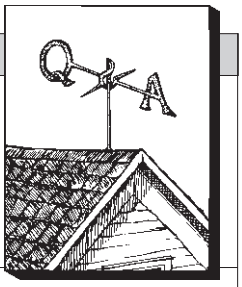
To Felt or Not to Felt



by Henry Spies

Roofing Felt Findings

Q. *Is roofing felt necessary under asphalt shingles?*

A. According to the National Roofing Contractor Association (NRCA), No. 15 roofing felt underlayment should be laid on roofs with a pitch of 4:12 or steeper. The felt serves as a temporary water barrier before the shingles are laid. This is particularly important with OSB sheathing. The felt also provides a secondary barrier in case of blow-offs. And finally, it protects the asphalt in the shingles from the solvent effect of pitch oozing from the roof sheathing.

On roofs with a 3:12 pitch, the NCRA recommends a double layer of underlayment felt to prevent wind-driven rain and snow from leaking in. And for slopes of 2:12 to 3:12, a double layer of felt should be bedded in hot asphalt or mastic. In areas with a mean January temperature of 30-F or less, an ice shield is recommended, as well. This can be made with two plies of No. 15 felt or one ply of No. 50 felt set in hot asphalt or mastic, or one layer of an adhesive-backed modified-bitumen material. The shield is laid along the edge of the road extending at least 2 feet inside the wall line.

Tying in the Stoop

Q. Should a concrete stoop be tied to the foundation? If so, how can it be tied to an existing poured concrete wall?

A. A concrete stoop should be connected to the foundation wall to prevent it from settling or moving differentially in relation to the foundation. The stoop should also be sufficiently reinforced so that it does not crack if it is supported at the house edge and the backfill settles.

The best way to connect the stoop to an existing solid concrete wall is to drill about two-thirds of the way through the outside of the wall and grout pieces of rebar (at least #4, preferably #6) into the holes. The rebar should project about a foot into the stoop. Space these dowels about two feet on-center. You should also wire horizontal bars between these dowels to reinforce the house edge of the stoop landing.

Poly Under Concrete

Q. I have heard that polyethylene sheeting will deteriorate over time in contact with concrete. If so, what should I use as a vapor barrier under concrete slabs?

A. This seems to be a common misconception in the building industry. I have checked with the Portland Cement Association, the National Institute of Standards and Testing, and the National Research Council of Canada, and no one knows of any problems with poly sheeting deteriorating from contact with concrete. In fact, it is recommended as a radon barrier. Polyethylene only seems to fail under a slab if it is damaged during construction, either accidentally or deliberately. I have known concrete contractors who intentionally stuck a shovel through the poly "so the water could drain out."

The poly should be installed over a well-drained granular fill. A thin layer of sand can protect the poly from damage during placement of the concrete.

Post-tensioning Explained

Q. What is a post-tensioned slab? How does it compare to a conventional slab-on-grade foundation?

A. When a concrete beam is loaded (and a slab does act as a beam), the top is in compression and the bottom in tension. Concrete is strong in compression and weak in tension, so the beam will crack at the bottom fairly easily. Consequently, a concrete beam or slab is reinforced with steel (which is strong in tension) in the lower part of the section. To strengthen concrete further, there are two ways of pre-loading the concrete in compression to counteract the tension forces: pre-stressing and post-tensioning.

In pre-stressing, the reinforcing steel is stretched with hydraulic jacks and held in tension while the concrete is poured and cures. When the jacks are released, the tension in the steel compresses the concrete. As a visual demonstration, glue a stretched rubber band to a piece of paper with rubber cement. After the rubber cement dries, the rubber band will crumple the paper in compression. Pre-stressed concrete is usually pre-cast in a production yard rather than on sight.

In post-tensioning, a flexible sleeve is cast into the concrete, and, after the concrete has cured to about three quarters of its ultimate strength, a steel cable is passed through the sleeve and fastened to a bearing plate on one end. A hydraulic jack is then used to stretch the cable. When the cable is tight, it is clamped to a bearing plate on the other end, and the jack is removed. The tension in the cable then compresses the concrete. This would be the equivalent of running a rubber band through a soda straw, stretching it, and tying it off at the ends. The rubber band would then place the straw in compression. Post-tensioning is well suited to cast-in-place concrete work.

Both pre-stressed and post-tensioned slabs are much stronger than conventional slab-on-grade construction, and are useful for structural beams and for slabs poured over expandable soils. ■

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