Termite Defenses for Slab-on-Grade Foundations

Q: We've been told that it's a good idea to insulate the perimeter of slab-on-grade foundations, but we are concerned with termites in our area. What is the best way to detail the foundation to keep termites out?

TERMIMESH

For slab-on-grade foundations, Termimesh provides a barrier around plumbing penetrations. When concrete cures, it may shrink back from the pipe, allowing a tiny gap for termites to squeeze through. The stainless-steel mesh can be secured to plumbing with stainless-steel clamps (top) or installed beneath a foam blockout (bottom).

A: Exterior foam on any foundation presents a real problem wherever termites are active. Termites tunnel right through the foam, making it nearly impossible to inspect the perimeter of the building for their passageways into the home. A 1/32-inch gap is all a termite needs to squeeze through to get inside a home, which makes it very difficult to detail any type of foundation to keep these insects out. Slabs are the hardest of all. While a monolithic slab will be the best design alternative for a slab because it will eliminate some of the gaps between the slab and a stem wall, termites can burrow beneath the slab and come up through the gaps around plumbing chases and electrical conduit.

TREATMENTS AND BARRIERS

The most common protection for slabs typically involves soil treatments for the soil beneath the slab and the soil around the perimeter of the building. However, these treatments must be maintained on a regular basis, creating a long-term maintenance issue for the homeowner. Alternatives include borate treatments that target all the structural wood above the slab to rob termites of potential food supplies. These methods, which usually involve either buying pretreated framing lumber or spraying all the lumber prior to framing, have proved to be most effective against the Formosan termite, which may nest aboveground (see "Keeping Termites at Bay," Summer 2005; available online at www.coastalcontractor.net).

The most promising termite protection available today is the Termimesh System, which is the only system available that actually blocks the entry of termites into the home. Developed in Australia and tested by U.S. Dept. of Agriculture Forest Service in Gulfport, Miss., for over a decade, Termimesh consists of a stainless-steel screen that is installed at the perimeter of the slab and at interior entry points through the slab.

At the slab's perimeter, Termimesh is bonded using a cementitious bonding agent that's painted over the mesh to seal the screen to the concrete. This will not completely prevent termites from entering a building through hidden gaps, since the insects can still build a passageway around the barrier. But like conventional metal shields that are installed correctly, the screen shield will force termites out into the open areas where their activity can be detected. However, Termimesh offers a critical control that metal shields can't provide: It seals the tiny gaps around plumbing and conduit penetrations. The fine stainless-steel screen is sealed to pipes with stainless-steel clamps or laid beneath plumbing blockouts, then embedded in concrete about halfway through the slab section (see photos, above).

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Got a question?

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EMAIL
coastal-editorial@hanleywood.com

MAIL
Coastal Contractor Magazine
Attn: Soundings
186 Allen Brook Lane
Williston, VT 05495

Making Sense of Air Barriers

Q: With plywood or foam sheathing on the wall exterior and a properly installed poly vapor barrier on the interior, is an exterior housewrap needed as an air barrier?

STEVE EASLEY ASSOC.

Sealing electrical and plumbing penetrations through interior wall plates will go further to air-seal a home than taping the building wrap, providing the building wrap is lapped.

A: Unless all the seams in the poly vapor barrier are taped or caulked and unless the edges of the membrane are adhered to window and door jambs (the units, not the rough opening) and to all electrical and plumbing penetrations, an interior vapor barrier will not function as an air barrier.

VAPOR-DRIVE DYNAMICS

Poly vapor barriers were developed to stop moisture migration by diffusion, which is the least significant moisture transfer method in a home. Interior vapor barriers are typically only needed in northern climates, where air conditioning is not used and where indoor relative humidity can be very high compared with the dry, cold outside air. The extreme difference between indoor and outdoor humidity levels creates a strong vapor drive that, without a vapor barrier, can drive indoor humidity into walls, where it's likely to condense on cold surfaces near the exterior, leading to moisture problems inside the walls. Where air conditioning is used, however, the vapor drive is likely to move in the opposite direction — from the hot, humid outside to the cooled-down inside. When the outdoor humidity hits an interior vapor barrier, it will be blocked, condense into liquid water, and create a moisture problem inside the wall. Therefore, interior vapor barriers are not recommended wherever air conditioning is used.

WEATHER-BARRIER TREATMENTS

Air barriers are a completely different animal and a much more significant player in any home — and doubly so for coastal homes in breezy, humid settings. For starters, air moves moisture through building cavities at a much greater rate than diffusion, making air-sealing a much more important strategy for building a problem-free energy-efficient home. Most exterior air barriers, whether asphalt felt or plastic housewrap, are better thought of as *weather* barriers, because they serve two functions: First, they seal against water penetration, and second, they help stop air leaks through walls. Their most important function is protecting the wall structure from wind-driven rain that gets past the siding. All building wraps should be lapped shingle-fashion (underlying courses overlapped

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GENERAL DETERRENTS

Because termites primarily search for food by the scent of rotten or decaying wood, it's important to remove potential food sources from the job site to every extent possible and to protect wood on the house from moisture:

- Do not bury stumps and wood debris on site, and keep cutoffs and cardboard scrap out of the backfill.
- Remove wood concrete forms and stakes, and peel back the ends of Sonotube forms from the tops of poured piers.
- Control runoff with gutters and downspouts, backfill with well-draining material, provide good foundation drainage, and control site drainage. These practices will keep soil drier, robbing termites of the high soil moisture content they need for survival.
- Use only pressure-treated wood in contact with the ground.
- Be sure to hold siding and trim at least 8 inches above grade.

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by the courses above) and secured with plastic-capped nails.

But building wraps are not the only water barriers a house should have. Building wraps must be integrated with flashing around every opening, including all windows and doors, exterior lighting fixtures, dryer vents, and HVAC air inlets and exhaust outlets. They must also lap over deck ledger flashings, sidewall flashings, window and door cap flashings, and skirtboard caps. Think of the weather barrier as an extension of the roof underlayment that laps over the drip-edge, chimney flashings, and vent boots. It's all done exactly the same way and for exactly the same purpose: to drain water down and away from the building.

Weather barriers act secondarily as air barriers to stop infiltration and exfiltration through wall cavities. Building wraps are the easiest way to air-seal many framing connections that are difficult to seal from the interior. Prime examples include the cracks around headers, rim joists, corners, and wall intersections. But a building wrap, no matter how carefully installed, is *not* the only component of an air barrier. Other vital components include the sill seal between the top of a concrete foundation and sill plates, and the foam sealant between window and door units and their rough openings. And building wraps on the walls do nothing to stop air through the ceiling, which often represents the most significant air loss in a home, carrying energy and moisture away from the interior and into the attic and beyond.

Holes through the lid of the house — through cracks at the top plates of interior partitions, wiring and plumbing holes through interior wall plates and chases, gaps around chimneys and around ceiling lighting fixtures, and leaks in ductwork that runs outside the building envelope — all provide an enormous amount of air leakage that no housewrap can touch. Liberal amounts of foam, dense-pack insulation, duct sealing mastic, plastic drawbands and acrylic duct tape, sealed-canister light fixtures, and plywood barriers (see "Details: Airtight Framing," January/February 2006; available online at www.coastalcontractor.net), plus keeping HVAC systems inside the building envelope, are all key to keeping a house airtight and problem-free.