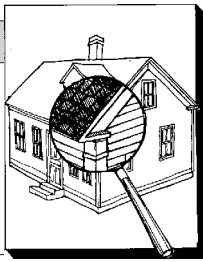


Crawl Spaces: There Oughta Be a Law

by William A. Lotz, P.E.



Someone should write a building code that forbids crawl spaces.

Crawl spaces are a classic compromise between a slab-on-grade and a basement that benefits no one, providing generally useless space that collects bugs, rodents, junk and debris—and serving as an infinite source of moisture for a building.

When a prospective client calls and describes a horror story of rot and ruin, I calmly await their telling me that the building has a crawl space.

Seldom, if ever, do I see a building in New England with a crawl space that is not in a serious state of deterioration. When they're not causing rot, mildew, fungus and corrosion, they're likely to be causing some other major problems.

To wit: I recently inspected a group of brand new condos last fall at the request of the complex manager, who had called to seek my advice on energy conservation. The electric bill for heating the uninsulated, 30' x 40' crawl space to prevent the pipes from freezing was \$150 to \$200 a month. He became quite concerned when I explained that the moisture problem was much more serious than his electric bill.

My advice on crawl spaces is this: First, if you're about to design or build a building, leave them out. Second, if you already have a crawl space, there are a few solutions that will allow you to sleep at night.

- Spread heavy poly on the ground and pour a concrete slab on top, *or*

- Spread heavy (8- to 10-mil-thick) *black* poly on the ground and seal the edges (to the foundation wall, columns, etc.) with acoustical sealant and 3-M Contractor's Tape. Cover the poly with three inches of sand to prevent future foot damage to the poly.

- Insulate the building foundation. This can be accomplished with urethane spray, polystyrene, fiberglass, nail-base composite insulation boards—or whatever works and meets your local building code. (In a recent church with a rubble-rock foundation, we specified gunite on the rock, then two inches of sprayed urethane covered with a fire-resistant paint.)

- Insulate the hot and cold water pipes—the hot for energy conservation; the cold for condensation control. And provide for ventilation during non-freezing weather by installing windows on two sides.

- If you must insulate the floor above the crawl space, do *not* use a vapor barrier. Whether it is above or below the fiberglass, a vapor barrier on fiberglass above a crawl space causes problems. Keep the fiberglass batts in place with Tyvek and strapping. (In most crawl spaces, the fiberglass batts are falling down.)

- Install drainage pipes and a sump pump to keep any standing water out of the crawl space.

- If all else fails, jack up the building and move it to a new full foundation like it should have had in the first place!

Now let's move on to some specific examples of homes with crawl-space problems and how they were corrected.

Homes with Headaches

Last month I saw a beautiful home with magnificent views in serious trouble. The house had a rock foundation, a crawl space, rot, water stains *and* a heating problem.

The hot-water heating pipes in the

crawl space were not hot when the water arrived at the far end of the house. The fiberglass batts were falling down and were draped over the fin tubing that was installed in the crawl space to keep the other pipes from freezing.

I recommended installing poly on the ground, insulating the pipes, removing the fiberglass from the joists and using it to insulate the rock foundation, and venting the crawl space in warm weather.

Another case I encountered was a group of condos built with poured-concrete foundation walls and no insulation (ugh).

A five-kilowatt electric heater was suspended from the joists to keep the water pipes from freezing. The sandy soil in the crawl space had a number of pools of standing water, and the 12" to 24" of above-grade foundation was covered with condensation.

While the "usual" crawl space lies under a heated space, some of these condos were used only during warm weather and occasionally on weekends during the winter. The electric heat in the living spaces above (an unfortunate choice of heat in the first place) was kept at 40 F.

As a result of this—plus the fact that the builder "forgot" to insulate the foundation—the crawl space *had* to be heated. The electric heat in the crawl space and the lack of insulation made for a terrible combination.

The solution included site-drainage work, installing drainage pipes and sump pumps, insulating the foundation with NRG Barrier's Nailboard, and replacing the electric heat with Lennox pulse furnaces fired with LP gas, which cost half or less to operate than electric heat.

Another crawl-space nightmare came to light when I inspected a housing authority project consisting of two old buildings (with elevators) that were built on ledge and clay with a high water table.

Rot and water damage were everywhere, and considerable dollars had been spent over the years to rebuild rotten walls and the like. The elevator room in the crawl space had standing water, and the elevator company predicted dire problems with its equipment if the water remained.

I recommended drainage pipes, sump pumps, poly and concrete, and foundation waterproofing.

All of this leads me to suggest that if your construction business is slow, you might consider becoming a specialist in repairing crawl spaces. Follow the easy steps outlined in this article, and you can become *the* crawl-space expert in your neighborhood.

As a final note on the subject, I recently inspected a house built on ledge with—you guessed it—a crawl space. The new owner had just paid \$140,000 for this charming summer cottage. I was called in to decide whether to burn it down or whatever, as there was not enough space in the crawl space to crawl in and fix what was wrong to begin with!

After an hour of head scratching, I suggested removing the floor boards so the work—which included installing the poly on the ground and insulating the foundation—could be done from above.

Where there's a will (and money), there's a way! ■

William A. Lotz is a consulting engineer in Acton, Maine.