

BUILDING IT RIGHT

Click in the top of this page for an updated/expanded article about the cause, repair, & prevention of cracked or buckled foundations at InspectAPedia.com

Buckled Foundations: Is Insulation Guilty?

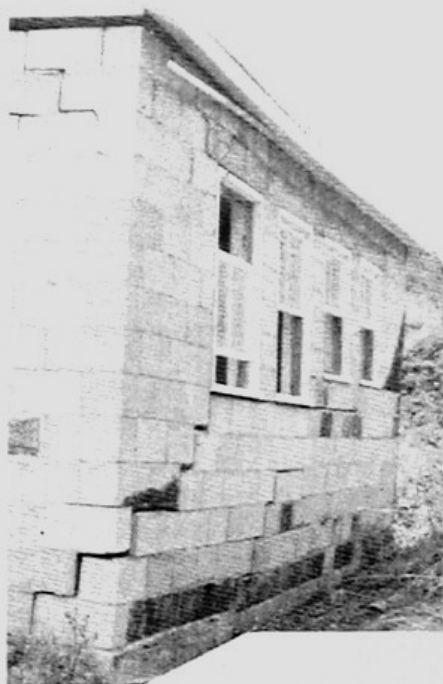
By Steve Bliss

Every now and then we hear a story about insulation causing a foundation wall to crack. But until I received a letter from Minnesota engineer Paul Shea, I had never had one of these stories verified. Shea wrote that "Buckling of foundations as a result of adding insulation is well known in Duluth, Minnesota. I personally audited three houses in Duluth that performed OK until insulation was installed."

When I called Shea, he had four cases to report, two of which took place in "vegetable rooms"—small basement alcoves for storing produce—that had been insulated in otherwise uninsulated basements. In each case, said Shea, the walls buckled after they had been insulated on the interior, either with fiberglass or polystyrene.

The failed walls faced the uphill sides of sloped sites, which acted as catch basins for rain and meltwater. As far as he knows, all the walls were of unreinforced concrete block. The soil in the area, he says, is very heavy clay. The climate is very cold (10,000 degree days), and wet. Frost penetrates 5 feet and deeper.

I tracked down another case in the area and spoke with the owner, who, incidentally, sells masonry supplies for a living. He had insulated two adjacent foundation walls on the interior with extruded polystyrene, planning to finish the other two walls later. That winter, one wall cracked and the other burst, pushing in up to 6 inches at one joint. The wall that cracked had a concrete patio next to it. The wall that gave way abutted the driveway. The house, said the owner, had been built around 1920. It cost him \$3600 to repair the two walls. At the time the basement burst, he said, the room was cold—it had no



The force of freezing soil lifted and cracked the block walls of this unheated garage in central New Hampshire. Free-draining backfill and deep footings offer the best protection against frost damage.

boiler or furnace—just a small, rarely used space heater.

In the Duluth area, said the owner, many builders won't insulate foundations on the interior. Even when they put it on the exterior, he says, some hold it a foot short of the footing—to let household heat bleed into the soil to moderate the freezing. Minnesota Power Co. energy auditor Roger Freeman recommends that basement insulation stop two feet below grade, then flare out if desired. Some area contractors refuse to install basement insulation altogether.

Across the state of Minnesota, in Fargo, North Dakota, they don't seem to have this problem. Soils engineer Duane Heley, of Midwest Testing, in Fargo, says he has seen many basements damaged by expansive clay soils,

Steve Bliss is building editor of Solar Age.