The New Hydronics

Volume 3, Issue 6 Supplement to Plumbing & HVAC Product News November 2004

The bubble bursts

CMHC study compares underslab insulation materials

By Simon Blake

A new study on underslab insulation conducted by the Canadian Mortgage and Housing Corporation (CMHC) has confirmed what a lot of people in the hydronic heating industry have suspected.

"The floor we tested with bubble foil underneath did not look like it had any insulation underneath," reported Don Fugler, senior researcher in the CMHC policy and research division.

In fact the report left no doubt about how bubble foil performed: 'Bubble-pack insulation showed performance that was similar in nature to an uninsulated floor. There was little temperature difference between the inside of the basement and the ground below, the ground temperature varied with indoor temperature, and the ground under the insulation was warmer than expected for undisturbed deep ground temperatures,' said the report.

CMHC conducted the study in four newly constructed test homes in Paris, Ont., from February through June. Three of those homes were equipped with different types of underslab insulation while another, for comparison, had no insulation.

The materials

The test used double-layer bubble-pack with an intermediate foil layer. Two other 1,200 sq. ft. floor slabs were insulated with 50 mm extruded polystyrene (XPS) and steel skinned 44 mm polyurethane panels (window cutouts from insulated doors). All four homes used in the test were located on the same block.

The deep-ground temperatures ranged from 12°C to 14°C in the uninsulated basement compared to 11°C to 14-15°C for the bubble-foil equipped basement. Both results indicate considerable heat loss into the ground. (The last issue of *The New Hydronics* reported that bubble foil requires an air space and a temperature difference from one side to the other to function as an insulation material.)

This underslab insulation made from scrap insulated steel door window cutouts scored highest in the CMHC test.

Perhaps the best material tested proved to be the double skinned 44 mm window cutouts, which are discarded as scrap by manufacturers of steel doors, said Fugler. "It's a great idea and it is being used (for underslab insulation)."

This material achieved a thermal resistance (RSI) value of 2.56 (R-14.5) in the test. XPS followed at 2.13 (R-12.1) with bubble foil recording 0.40 (R-2.3). (It should be noted that the

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XPS achieved a slightly higher rating than that established by the Canadian Construction Materials Center (NRCan). However, notes Fugler, the Paris test involved new material versus aged material for the NRCan result.)

The window cutouts achieved a 7.2°C temperature difference between the slab and deep soil, while the XPS achieved 6.4°C difference. "Both of them showed a big temperature difference across the insulation, which is exactly what insulation is supposed to do," said Fugler.

Bubble-pak insulation scored a rating of just over R-2.

The method

Resistance temperature detectors (RTDs) were used for measuring temperature. Each home was equipped with two sets of four sensors - installed before the concrete was poured - plus an indoor temperature sensor.

Each set of sensors was aligned vertically to measure the temperature from the top of the slab through the insulation into the soil below. One sensor stack was installed in the center of the slab; the other one metre from the foundation wall. A single sensor was mounted one metre above the floor slab to read the basement air temperature.

The traditional extruded polystyrene (XPS) scored excellent results.

Fugler noted that he has seen manufacturer's claims of as high as R-15 for bubble-pack. The message, he added, is that the contractor should not accept a manufacturer's claims if they cannot provide independent verification for their test results.

As for bubble foil as an underslab insulation: "If you want to use it instead of six mil poly, that's okay," he laughed.

The full report is available on the CMHC website at www.cmhc-schl.gc.ca/publications.

Hot Flashes

Two-day hydronics schools

The Canadian Hydronics Council (CHC) is working with the Northern Alberta Institute of Technology (NAIT) to create a two-day Introduction to Hydronics school based on practices outlined in the CSA B-214 hydronic heating code. CHC began recruiting instructors in September with pilot programs planned for December. The two-day program is designed to complement comprehensive hydronic heating courses available at NAIT and the British Columbia Institute of Technology (BCIT).

Hydronic technical committee

The CHC has asked Canadian building code officials to approve the formation of a technical committee on hydronic heating systems. It will provide input into future editions of the Canadian Building Code. The recent failure to have the CSA B214 code accepted into the Part 9 - manadatory - part of the building code sparked the move. Richard Peck (Slant/Fin) has been named chairman. Committee membership is still being determined. It is expected to have its first meeting in the late fall.

In Memorium

Longtime B.C. hydronic heating industry supporter Dale Riggs died suddenly Sept. 18 at age 56, reports the Canadian Hydronics Council. Dale was active in his company, Modale Industries Ltd., for over 30 years and served on the board of directors of the RHWHA and HVCI. He was also B.C. representative on the CHC. He will be missed.