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OPTIMIZING THE SELECTION OF RADON FANS

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ABSTRACT

The instrument illustrated in this poster session makes it possible to select the optimum cfm and static pressure required to mitigate the radon in practically every subslab environment. The instrument is placed over a 3-1/2 inch or larger cored hole from which 5 to 10 gallons of earth have been excavated. Two powerful vacuum cleaner motors with variable speed drives draw air past averaging total pressure and static pressure probes. As fan speed is gradually increased, communication with micromanometers inserted in remote holes drilled through the floor indicate when sufficient depressurization has taken place. At this point the instrument's three magnehelic gauges provide an accurate readout of the static pressure and cfm required for mitigation. As a result, the mitigator can often downsize the radon fan, commonly saving the mitigator $25.00 to $50.00 in fan costs, and the owner a like amount in annual operating costs.

RADON FAN SELECTION

How do you determine the static pressure and the flow is cubic feet per minute of the exhaust fans that you use in subslab mitigation? Do you drill a primary hole at the proposed location of your radon stack, and several small holes around the perimeter of the space you are about to mitigate? Do you apply suction at the primary hole with your shop vac, and test for communication at the remote holes with a smoke gun or a micromanometer? The shop vac may have a suction capability in excess of 100 inches W.C., whereas the radon fan may not develop 4 inches of static suction. The only result of the above test is that, given sufficient suction, communication is possible. Radon fans selected on the basis of tests like the above may cost the homeowner $50.00 per year in added electrical costs if a fan with excess capacity is selected; conversely, the fan may not do an adequate job of radon removal if underselected.

The instrument illustrated in this poster session consists of two powerful vacuum cleaner motors, variable speed drives for each motor, averaging pitot tubes for measuring total pressure and velocity pressure, and three 4 magnehelic pressure gauges. The first magnehelic is graduated form zero to 100 inches W.C. The second magnehelic has dual scales, with a valve to switch from one to the other, and is graduated from zero to 10 inches W.C., and from zero to 600 cfm. The third magnehelic also has dual scales and is graduated from zero to one inch static pressure and from zero to 200 cfm. A valved tap into both the static pressure line and the total pressure line greatly facilitates calibration of the magnehelics.

To use the instrument, a hole sized to accept 3 inch or 4 inch pipe is bored through the concrete floor and five to ten gallons of earth, depending upon the amount of compaction encountered, are removed. Several one quarter inch holes are bored through the floor in remote areas from the primary hole, and a sensitive micromometer is placed in the remote holes. The pressure of the soil gases in the remote holes is noted. The test instrument is placed with its gasket over the primary hole, and the motors started. The motor speeds are gradually reduced until the soil gas pressures in the remote holes become negative, or until desired amount of depressurization has been attained. The radon fan requirements in both cfm and static pressure needed to achieve depressurization are directly read from the magnehelics.

This instrument has been especially useful in larger commercial radon mitigation jobs where fan static pressure and volumes required are greater than in residences, and where multiple suction holes are required. It can locate major cracks under carpeted floors (the static pressure drops dramatically and the cfm rises), and it can show the need for an extra suction hole in areas where the subslab soil density or compaction is greater.