



Project Summary

Interim Radon-Resistant Construction Guidelines for Use in Florida--1989

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This project was initiated with the objective of investigating, analyzing, and developing radon-resistant construction guidelines which are consistent with other building codes and which could be applied to Florida.

A literature search was conducted in which available information was obtained on radon remediation techniques, new construction methods, and existing codes (e.g., those in Sweden and Canada) for radon-resistant buildings. Techniques identified by the research were amended, modified, or supplemented for incorporation into draft model guidelines for new construction in format consistent with the Standard Building Code promulgated by the Southern Building Code Congress International, Inc.

A technical review advisory committee which included building contractors, architects, engineers and representatives of federal, state and local governments was formed during the development of the guidelines. The committee provided input and recommended changes to the draft guidelines.

Although this project has resulted in guidelines for recommended construction practices, it should be coupled with a carefully planned and implemented program of experimentation. Eventually this approach will lead to building code provisions which are scientifically defensible, cost effective, reliable, and easily incorporated into standard construction practice.

This Project Summary was developed by EPA's Air and Energy Engineering

Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (See project report ordering information at back).

Introduction

Over the past decade there has been growing concern about health effects associated with exposure to radon and its progeny. Florida is the first state in the nation to establish standards which set limits on radon progeny in buildings. Many currently available publications address mitigation techniques. However, few studies document radon-resistant methods for new construction, and mitigation techniques may not be the most appropriate ones for new construction. In addition, many factors in the southeastern U. S. make existing research conducted in the northeast difficult to apply here. These factors include geology, climate, common building practices, and lifestyles.

The approach to identifying ideal radon-resistant features is two-fold: (1) it is necessary to determine the likely entry routes for radon into the building, and (2) standard building practices and details that appear responsible for allowing radon into a structure should be examined to determine how they could be modified to create a radon barrier. These possible modifications require much more investigation.

The problem of elevated radon concentrations in homes can be approached from two directions: by filtering out or diluting the radon and its progeny once they are inside the dwelling, or by preventing the radon-

carrying soil gas from entering the home.

Radon filtration/dilution is a less than perfect solution because: (1) it has a rather high initial cost, (2) as an active system it will require maintenance, (3) it is susceptible to owner interference, (4) it requires energy to operate, and (5) it has a negative impact on other energy conservation measures.

Systems that prevent soil gas from entering a building may be further subdivided into two classes: those which are totally passive, and active systems, those which require continuous energy inputs.

Active systems, perhaps the most tested and documented, can be further divided into those drawing soil gas from beneath the slab of a building and venting it to the outdoors where it is quickly diluted to safe concentrations, and those that attempt to reduce the emergence of soil gas by continually pumping a small volume of air beneath the slab. Both systems have some negative characteristics.

A thorough study of the literature, followed by detailed experimentation of the more promising methods for use in Florida,

should lead to the establishment of firm protocols for radon-resistant new home construction. The guidelines developed in this report are based on the best information obtained to date.

Procedures

A literature search was conducted in which information was obtained on radon remediation techniques, new construction methods, and codes (e.g., those in Sweden and Canada) for radon-resistant buildings. The Swedish codes had to be translated into English before they could be analyzed. The effectiveness of each technique was evaluated, and those techniques with specific application to southern construction were noted.

A technical review advisory committee which included building contractors, architects, engineers, and representatives of federal, state, and local governments was formed during the development phase of the guidelines. The committee provided input and recommended changes to the draft guidelines.

Results/Discussion

The full report contains 11 sections: (1) General, (2) Isolation membranes, (3) Concrete slabs in isolation systems, (4) Crawl space construction, (5) Slab below grade and basement construction, (6) Combined construction types, (7) Soil gas ventilation systems, (8) Other entry pathways for radon, (9) Space conditioning systems, (10) approved materials, caulks, and sealants, and (11) Illustrated details.

Construction details and practices are divided into: (1) those that are most confidently recommended, (2) those which are recommended, but with less confidence, and (3) those which are recommended, but with least confidence.

Conclusions

Institution of these interim guidelines should be accompanied by the knowledge that further experimentation and additions to the literature may require revisions from time to time.

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The complete report, entitled "Interim Radon-Resistant Construction Guidelines for Use in Florida -- 1989," (Order no. PB90-265 349AS; Cost: \$15.00 cost subject to change) will be available only from:

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