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What is the expected fire performance of Canadian houses?

John Archer

Secretary, Canadian Commission on Building and Fire Codes

In 1989, a Canadian Commission on Building and Fire Codes task group looked into making sprinklers mandatory in new houses. It came to the conclusion that modern code-complying houses are already quite fire safe. The number of deaths occurring in Canadian houses is low. In other words, the introduction of such measures as flame spread limitations on finish materials, smoke alarms and modern wiring has made modern houses much safer than the older housing stock where the bulk of these fire deaths occur.

However, a new question has arisen. Will there be sufficient safeguards to ensure that this level of fire safety will be maintained? The concern is the advent of new structural materials and innovative products that may not perform as well in fire as traditional materials.

Generally the National Building Code (NBC) requires structural components to have sufficient inherent or added fire protection that they will remain in place long enough in a fire situation. Long enough means enough time for the occupants of the building to escape, using egress routes supported by those structural components. For the structural components of houses, however, there are no requirements in the National Building Code.

Experience, up to now, has shown that the inherent fire performance of traditional housing structural components (i.e. concrete foundation walls and solid lumber floor joists and wall studs) is adequate. People are able to escape from a house fire, and with the introduction of smoke alarms, the rates of injury or death have declined substantially.

However, there are an increasing number of non-traditional materials being used as structural components in houses – composite materials, plastics and even cardboard. We do not know how these materials perform in a fire, but there is some anecdotal evidence of problems. For example, the fire protection community has expressed concern that such unprotected materials may lose their structural integrity in a fire much more quickly than solid lumber floor joists.

The question of how to evaluate these products has already become a significant challenge for the Canadian Construction Materials Centre (CCMC). With no explicit measures for the fire performance for houses in building codes against which the new products could be compared, the evaluation is incomplete. A long-range solution is needed and this will require significant new research.

The Fire Risk Management Program at the Institute for Research in Construction at the National Research Council of Canada is preparing a research proposal for review by the Canadian Commission on Construction Materials Evaluation (CCCME) and the Canadian Commission on Building and Fire Codes (CCBFC). It is expected that the research will need to achieve the following goals:

1. Determine how important the maintenance of a viable egress route is in the evacuation of a house, and if the fire performance of the structural materials is an issue for the safety of occupants. Perhaps it isn't really an issue – with smoke alarms, the occupants may be out of the house long before the fire has grown to any size. But if it is, how long should an egress route's structural integrity last in a fire?
2. Develop appropriate tests to measure the fire performance of unprotected structural materials in a house. The fundamental issue here is that there are no test methods that can currently be used to measure fire performance in these situations.
3. Measure the actual fire performance of a house constructed of traditional materials to the minimum requirements of the National Building Code.

These are significant goals with some significant questions to resolve. Even though not articulated in current building codes, it is reasonable to believe that Canadians do hold fire safety objectives for their houses. The research may lead to the establishment of criteria to describe that expectation. It may also lead to proposals to change the codes. However, the current position of the Canadian Commission on Building and Fire Codes is that no code changes resulting from this research will raise the current minimum code requirements for traditional construction.

Any comments you may have on the proposed research should be sent to the author at:

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