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Models for Assessing the Fire Resistance of Wood-Stud Wall Assemblies

Objective

To develop a model that can be used to reduce the need for costly fire-resistance testing of lightweight wood-frame wall assemblies and a tool that can be incorporated into fire risk assessment systems.

Background

In North America, the fire resistance of a wall assembly is generally evaluated by subjecting it to a standard test, such as CAN/ULC S101 published by Underwriters' Laboratories Canada. However, this approach has drawbacks, including high costs and the time required for testing. It also has limitations in terms of specimen size and loading conditions. To address these limitations, researchers conducted the following work.

Statement of Work

- Developed an analytical model to predict the behaviour of lightweight, load-bearing wood-frame wall assemblies, both insulated and non-insulated, in fires of varying severity, building on an existing model developed by Forintek Canada Corp.
- Adapted this model to take structural loading into account so that both thermal and structural performance could be determined.

Results

The project produced a fire resistance model and verified model predictions by comparing them to the performance of assemblies in full-scale tests in which the severity of the fire varies. This verification broadens the application of the model, including its incorporation into fire risk assessment systems.

Partners

Forintek Canada Corp.

Start/Completion Dates

The project began in 2000 and was completed in 2004.

Project Manager

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For more information, see http://irc.nrc-cnrc.gc.ca/fr/frss/frc_lwf_frws_e.html

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A wood-stud wall buckles during a fire test.