# Ning Wang

Thesis

Prediction of heat transfer and probability of insulation failure in wood-framed walls

Abstract

A model, *WALL2DN*, was developed by FPInnovation—Forintek Division for predicting the fire resistance of gypsum-board protected wood-stud walls with glass-fibre or mineral-wool insulation filling the stud cavities, or without insulation in the cavities. This model, based on two-dimensional heat-conduction equations and approximated thermo-physical property functions, can facilitate cost-effective and flexible design options for gypsum-board-protected wood-stud walls.

In this study, a statistical method, *Monte Carlo Simulation*, was applied to the existing WALL2DN model to address the uncertainties in the thermo-physical properties of materials used to construct wood-stud wall assemblies. The results of the Monte Carlo simulation are used to calculate the time dependent probability of failure of the assemblies when subjected to the standard time-temperature curve.

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Supervisors

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