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Thesis

Analysis of Ontario Fires and Reliability of Active Fire Protection Systems

Abstract

As countries move towards the development and implementation of performance-based building codes, it is expected that there will be an increase in the use of scientific and engineering techniques and methods for the design of fire protection systems in buildings. Some of these calculation methods which evaluate the risk from fire to building occupants and contents require statistical data on the performance of active fire protection systems such as sprinklers and smoke detectors. This study aimed at obtaining reliability estimates for these systems using fire incident data from the Ontario Fire Marshal's office.

The study also analyzed the data to obtain the main causes and location of origin of fires in buildings, for all occupancies, and to see the impact of detectors and sprinkler systems on life safety and property damage.

The performance of smoke detectors, heat detectors, and sprinkler systems was analyzed for various occupancies to obtain mean and 95% confidence limits of reliability. The findings show that operational reliability for these systems is lower than commonly used figures. The computer model DETACT was used to explore reasons for failure of sprinkler systems and heat detectors in some occupancies.

Degree

M.A.Sc.

Completion

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Supervisor

Hadjisophocleous