
March 2005

Fire investigation into high-rise apartment fire

In the fall of 2004, the Electrical Safety Authority (ESA) was asked to assist the Office of Fire Marshal (OFM) in a fire investigation involving an electrical fire in a high-rise apartment complex in Eastern Ontario. This fire left more than a thousand people homeless, the damage extensive, resulting in multi-million dollar damage and given the circumstances, it was fortunate there was no associated loss of life or life-threatening injury. This fire was so severe that even after 4 weeks following the fire, the building continues to remain unoccupied.

The fire, which involved one of the apartment building's main electrical distribution risers (busway), originated from the main electrical panel board located in the basement, and ran up the building through electrical closets located on each floor. The busway supplies power to the electrical closets, which in turn supplies power to the electric heating located in every individual apartment.

Preliminary investigations of the site identified that a water leak on a higher floor migrated into an electrical closet. The water entered the busway and caused a short circuit. The busway overcurrent and ground fault protection failed to clear the fault resulting in catastrophic failure of the busway. The failure resulted in an electrical fire, spreading to multiple floors throughout the building.

Following further investigation, ESA and OFM determined the busway protection failure was due to a malfunction in the busway protective device. The switch mechanism did not work freely causing the operating linkage to bind, preventing the switch from opening to clear the fault.

Rule 2-300 of the Ontario Electrical Safety Code requires "All operating electrical equipment shall be kept in safe and proper working condition".

The fire investigation identified that regular testing, calibration and maintenance of the protective systems and related switches in the main distribution switchgear should have identified and corrected the problem.

Recommendations

The Electrical Safety Authority strongly recommends all owners, condominium associations, and rental management companies involved in high-rise buildings initiate a program of regular testing, calibration, and maintenance of electrical systems to ensure electrical systems in buildings function properly and safely. Testing, calibration and maintenance must follow what the manufacturers recommend.
