



NIST EVALUATES FIREFIGHTING TACTICS IN NYC HIGH-RISE TEST

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Photo: Firefighters watch as a fan, simulating wind, changes airflow and smoke conditions during experiments in a seven-story high-rise abandoned apartment building on New York City's Governors Island. The NIST tests examined firefighting techniques such as the use of positive pressure ventilation fans, wind control devices and hose streams to control or suppress heat and smoke from wind driven fires.

National Institute of Standards and Technology (NIST) fire protection engineers turned an abandoned New York City (NYC) brick high-rise into a seven-story fire laboratory last month to better understand the fast-moving spread of wind-driven flames, smoke and toxic gases through corridors and stairways of burning buildings. The experiments on NYC's Governors Island, conducted in partnership with the Fire Department of New York (FDNY) and New York's Polytechnic University, examined the effectiveness of firefighting tactics such as the use of positive pressure ventilation fans, wind control devices and hose streams to control or suppress deadly heat and smoke from the wind-driven fires.

Between 1985 and 2002, 1,600 civilians died and more than 20,000 people were injured in approximately 385,000 high-rise building fires in the United States, according to the National Fire Protection Association. Due to temperature differences between the outside and inside of a building on fire, open doors and broken windows far from the actual site of the fire can increase the movement of hot gases and smoke dramatically. Wind-driven flames, heat and smoke with temperatures exceeding 815 C (1500 F) can speed across entire floors and around corridors without warning. Smoke and heat entering stairwells often can block the evacuation of occupants and can hinder firefighting operations.

To develop an understanding of the wind-driven fires and measure the impact of the firefighting tactics, NIST researchers placed cameras, temperature and pressure sensors throughout the building. From a safe ground floor monitoring post, the researchers with laptops monitored the progress of intentionally set fires raging through the apartments and public corridors. They recorded, second-by-second, the effects of opening or closing doors and windows both near and far from the blaze.

Positive pressure ventilation fans, prototype wind control devices and prototype high-rise fire suppression nozzles, which were developed by FDNY, all had a positive impact on controlling the effects of a wind-driven fires.

Research findings from the Governors Island experiments are expected to help improve fire service guidelines for combating high-rise fires, enhance firefighter safety, fire ground operations and use of equipment. NIST expects to issue a report on the high-rise experiments by November 2008. The Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA) funded the Governors Island tests under its "Assistance to Firefighters" grant program.



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