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New NIST Report Shows Fire Crew Size Matters

Study compared how long it took crews of three, four and five to handle the same tasks.

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WASHINGTON, D.C. -- For years, firefighters across the nation have touted the importance of having enough crew members when they start to attack a fire.

Now, they have scientific research to back up their claim that size does matter when it comes to saving people from fires as well as making sure they go home after their shift.

On Wednesday, the National Institute of Standards and Technology released the results of an extensive study that used technology to determine how long it took for crews of two, three, four and five to handle the same 22 tasks.

"Four- and five- person crews were able to complete the 22 essential firefighting and rescue tasks in a residential setting 30 percent faster than the two-person crew and 25 percent faster than the three-person crews," said Jason Averill, NIST fire protection engineer and the project manager. NIST announced the findings of the study to members of the fire service attending the annual Congressional Fire Services Institute event in Washington, D.C.

The data also showed that the largest crew was able to apply water to the fire 22 percent faster than two-person crews.

The small crew also encountered a much larger fire upon arrival than the five person team.

NIST also used its fire dynamic simulator to determine slow, medium, and fast-growth fires and estimate how the crew sizes would affect the exposure of occupants to toxic gases.

"Two-person crews arriving later (than the larger ones) would also likely find a significant portion of the general public incapacitated by the time of the rescue," Averill said about his findings.

IAFF General President Harold A. Schaitberger lauded the research, saying it will be used as a tool for fire officers across the country as they educate public officials.

"This is an extremely important document," he said. "Now, we have the technology and research to back up what we've been telling politicians who are cutting budgets..."

He said the research validates NFPA recommendations regarding crew size. Schaitberger said while he understands the tough economic hardships, reducing the number of firefighters, stations or apparatus is not the answer.

In addition to firefighter safety, the public welfare is at risk, he said, when small crews are involved.

NIST received a federal Assistance to Firefighters Grant to fund the project that involved only career firefighters. Researchers said the results could be similar for combination or volunteer fire departments that have crews in their stations.

USFA Administrator Kelvin Cochran said the document will be utilized by those who need justification for additional personnel, equipment or training. This will give officers something to back up their requests.

"We now have the technology, the science to prove what we've known for a long time -- it's very dangerous for a small crew to attempt an attack," he said.

A 2,000-square-foot, two-story building was specifically constructed for the study on the grounds of Montgomery County, Md. Fire Rescue training center.

Rooms contain cameras as well as instruments to measure toxic gases and temperatures. The data is recorded on computers and other monitoring equipment located in a separate section of the building.

Each assignment included a truck and three engines.

"Our study is the first to quantify fire service lifesaving and firefighting operations for a low-hazard residential structure including the effects of changes in crew size, arrival time and stagger on rescue and suppression effectiveness," Averill explained to the crowd.

Dennis Compton, chairman of the National Fallen Firefighters Foundation, called it a landmark study. "This can really help everyone," he said.

"It will benefit local decision makers tremendously as they work to determine and provide the resources necessary to adequately protect their communities from fire and other life safety emergencies," Compton said.