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Cal Poly Studies Future of Fighting Fire with Foam

SAN LUIS OBISPO – Cal Poly is leading multi-disciplinary research efforts that will make up the first comprehensive scientific study conducted on fighting fires with foam. Funded by a \$1 million grant, the research will analyze the benefits of foam versus water and the use of foam to fight structural and interior fires.

“Both water and foam can overwhelm fire,” said Chris Pascual, professor and graduate coordinator for the Fire Protection Engineering program at Cal Poly. “Since both are effective, the question becomes, ‘Is there enough statistical evidence to declare one better than the other?’”

The use of compressed air foam systems (CAFS) is already an accepted practice for fighting wildfires. Structural fires, however, represent a different set of challenges for firefighters and, on that front, foam is still considered an unproven technology.

The foam – a water solution mixed with a special foam concentrate – is that it needs less water, which makes it useful for fighting fires in remote locations. The technology also has other attributes – including faster knockdown time, rapid heat reduction and lowered potential for flare-ups – that can be adapted for fighting structural fires.

Questions, remain, however, about the safety, reliability and cost of foam compared to water.

“Particularly because there are no real guidelines about how the foam technology should be deployed in the field, results vary widely,” said Pascual. There are concerns about slip hazards, the propensity for the hose to kink and other issues that relate to safety and performance.

“Until now, it’s been difficult to separate hearsay from fact. This study should indicate the true measure of foam technology and its potential role in the future of firefighting,” he said.

As a result of the uncharted nature of the technology and its growing use, the full investigation of CAFS’ capabilities and limitations was funded with \$1 million from the Department of Homeland Security’s Assistance to Firefighters Grant program. Cal Poly’s team includes faculty, scientists and students from a cross-section of disciplines including engineering, construction management and fire safety.

“It’s a test grant that will establish a scientific basis for how, where or when – or if – compressed foam is used,” said Thomas Korman, associate professor in the Construction Management and Civil and Environmental Engineering Department at Cal Poly. “It’s all about safety for firefighters and the need to document the effectiveness of compressed air foam technology.”

The project is led by Cal Poly in partnership with the National Institute of Standards and Technology; the Fire Protection Research Foundation, an affiliate of the National Fire Protection Association; and several fire service partners from across the U.S. and

Canada, including Maryland's Montgomery County Fire and Rescue Service and California's Cambria Community Service District Fire Department.

"The collaboration of three different colleges at Cal Poly is a great reflection of the interdisciplinary work that the university espouses, which benefits faculty, students and the nation as a whole," said Christopher Dicus, professor and graduate coordinator, Cal Poly Natural Resources Management and Environmental Sciences Department.

In addition to Dicus, Korman and Pascual, members of the research team include Dan Madrzykowski, fire protection engineer with the National Institute of Standards and Technology in Gaithersburg, Md.; Casey Grant, research director of the Fire Protection Research Foundation; Steve Lohr, chief of Montgomery County Fire and Rescue Service, Montgomery County, Md.; Mark Miller, chief of the Cambria Community Services District Fire Department, Cambria, Calif.; Fred Mowrer, professor-in-residence and director of the Fire Protection Engineering programs at Cal Poly; Dan Turner, chief (retired) Cal Fire/San Luis Obispo County, and a researcher at Cal Poly; and Sean Mitchell, a master's student in the Fire Protection Engineering program at Cal Poly.

Results from the study are expected to be available this fall.

For more information and updates go to www.fpe.calpoly.edu/about/research.html.

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Photo: Large-scale enclosure fire tests are part of a landmark study led by Cal Poly to explore the future of fighting fire with foam. Sean Mitchell, pictured in the foreground, participated in the tests as part of his master's thesis for Cal Poly's Fire Protection program.

