

SOUTHWEST RESEARCH INSTITUTE



# Fire Testing and Modeling

Southwest Research Institute® (SwRI®) has a long history of providing fire testing, fire protection engineering evaluations, associated research, and related services for a wide range of industries and government clients. The Institute first reported fire testing activities in 1949. Today, the SwRI Fire Technology Department has more than 40,000 ft<sup>2</sup> of laboratory floor space in San Antonio, Texas, and has access to an off-site facility for large fire experiments.

The Center for Nuclear Waste Regulatory Analyses (CNWRA®) at SwRI supports the U.S. Nuclear Regulatory Commission (NRC) with the review of license amendment requests from nuclear power plants transitioning to a risk-informed, performance-based fire protection program according to National Fire Protection Association (NFPA) Standard 805. More recently, CNWRA has developed extensive experience in computer-based fire modeling.

The synergism between the Fire Technology Department and CNWRA allows us to offer creative and efficient solutions to the most challenging fire protection and safety problems.

## Testing Features

Ability to perform a wide range of standardized tests and design custom experiments to assess

- Flammability of materials and finished products
- Burning rate of combustibles such as upholstered furniture and cable trays
- Generation rate of toxic and corrosive products of combustion
- Fire resistance of structural elements
- Active fire protection systems and efficacy of extinguishing agents
- Flammability and explosibility of gases and vapors

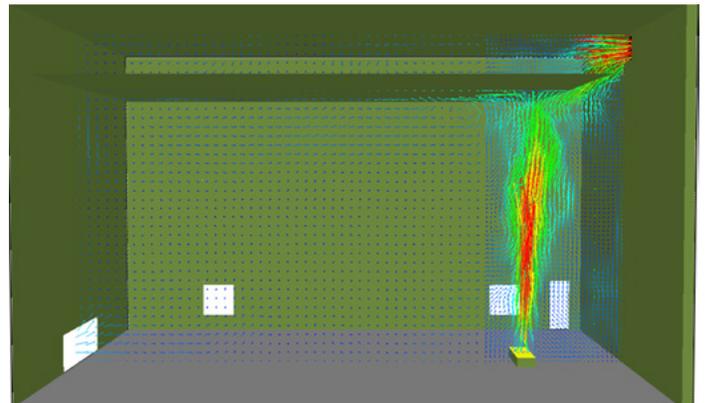


*Full-scale test to evaluate fire propagation through a vertical stack of horizontal cable trays*

## Computational Features

Computer cluster with 128 nodes and ability to use a variety of simulation software to calculate

- Effects of compartment fires on people and structures using zone models and computational fluid dynamics (CFD) codes
- Rate of flame spread over solid surfaces
- Spread of fire between combustibles as a result of radiative heat transfer
- Performance of loaded structures exposed in fully developed fires of varying severity
- Damaging effects of high-energy arcing faults



*Fire Dynamics Simulator calculations to evaluate efficacy of smoke extraction system*

## Applications

SwRI's expertise and capabilities in fire protection and safety have been applied to

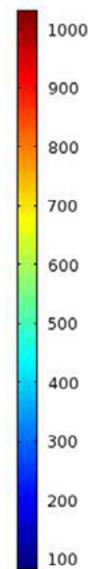
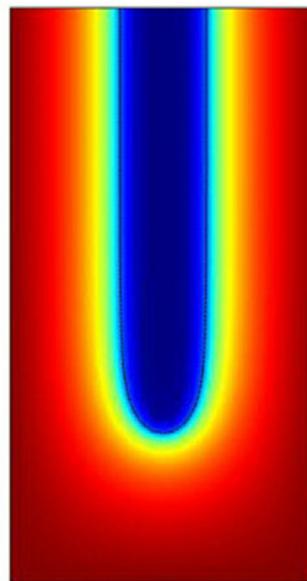
- Standard testing to demonstrate compliance with prescriptive fire safety code requirements
- Conducting custom projects to provide support for prescriptive code variances or performance-based code compliance
- Obtaining material property data for input into computer fire models and fire safety analyses
- Performing large-scale fire experiments to obtain data for computer fire model validation
- Conducting fire hazard and fire risk assessments
- Assisting with code and standard development



*Liquid fuel pool fire test to quantify the effect of a wall or corner proximity on the burning rate*

## Benefits of CNWRA Support

- We provide one-stop shopping for solving problems that require a multidisciplinary approach and unique expertise and capabilities
- Our long-standing relationships with U.S. and international clients assure confidentiality and excellent communication, trust, and teamwork
- Patent rights arising from sponsored research are often assigned to the client
- Our quality system assures that our work meets stringent QA requirements
- We are accredited, certified, and internationally recognized as an independent testing laboratory and inspection agency



*Temperature contours in a beam section after 150 minutes of exposure in a standard fire resistance test*

## For additional information, please contact:

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## SOUTHWEST RESEARCH INSTITUTE

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