

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 ft² 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

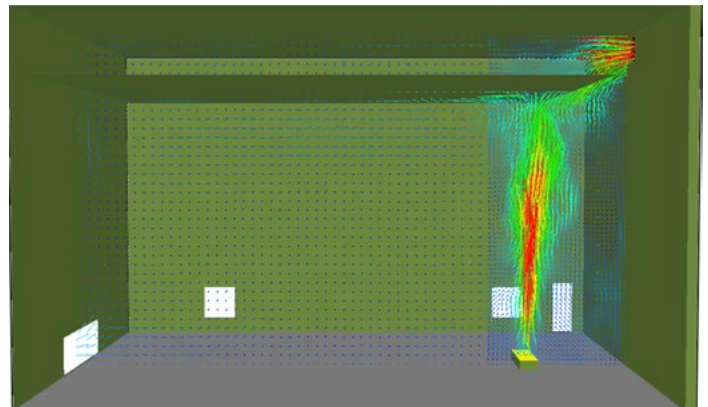


Full-scale test to evaluate fire propagation through a vertical stack of horizontal cable trays

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

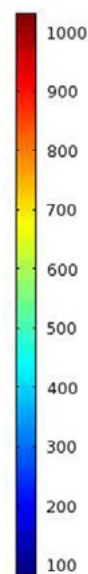
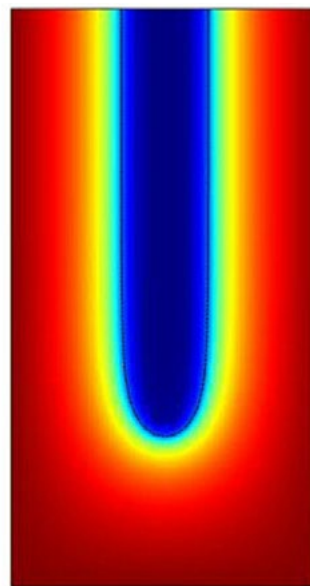
- Standard testing to demonstrate compliance with prescriptive fire safety code requirements
- Conducting custom projects to provide support for prescriptive code variances or performance-based code compliance
- Obtaining material property data for input into computer fire models and fire safety analyses
- 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

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SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world's most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,200 acres, providing more than 2.3 million square feet of laboratories, test facilities, workshops, and offices for more than 2,600 employees who perform contract work for government and industry clients.

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