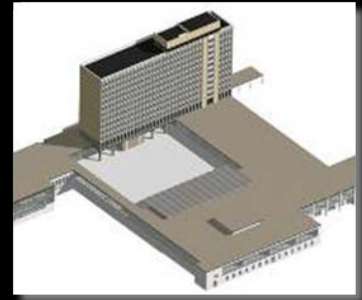




Success Stories

- **Fire Resistance of Concrete Construction** – enabling use of high-strength concrete in building construction
- **Innovative Connection for Precast Concrete Buildings** – enabling use of precast concrete construction in high seismic regions through significant cost savings
- **Enhanced Fujita Tornado Intensity Scale** – nationwide adoption of new scale which more realistically relates observed damage to wind speeds



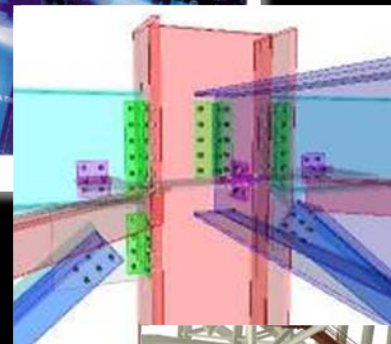
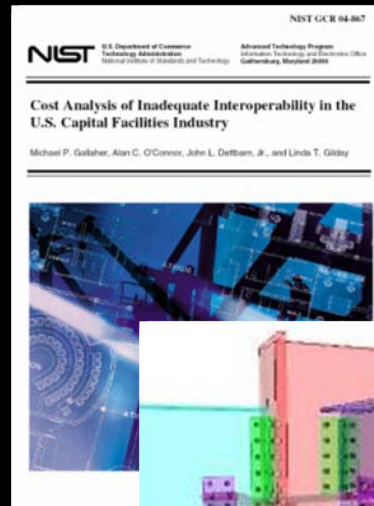
BUILDING AND FIRE RESEARCH LABORATORY Vision

To be the source for creating critical solution-enabling tools—metrics, models, and knowledge—and promoting performance-based standards that are used by the U.S. building and fire safety industries to establish global leadership.



Success Stories

- **Inadequate Interoperability in the U.S. Construction Industry** – catalyzed industry to action on addressing interoperability through an authoritative analysis of costs to industry and the country
- **Assembly of Manufactured Parts for Construction** – enabling improved engineering productivity through international data exchange standards
- **Engineering and Fabrication of Equipment and Components Used in Constructed Facilities** – enabling improved engineering and fabrication productivity through emerging industry standards
- **Engineering and Construction of Buildings** – enabling improved engineering and construction productivity through emerging test suites, guidelines, and industry standards



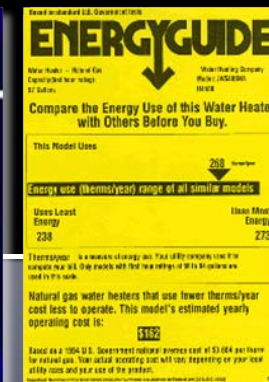
BUILDING AND FIRE RESEARCH LABORATORY Mission

To promote U.S. innovation and competitiveness by anticipating and meeting the measurement science, standards, and technology needs of the U.S. building and fire safety industries in ways that enhance economic security and improve the quality of life.



Success Stories

- **Building Automation and Control** – enabling energy savings, reduced operating costs, and improved occupant comfort and safety via BACnet standard for integration of building automation and control systems adopted by ISO, CEN, and over 30 countries
- **Energy Efficiency of Appliances** – enabling energy savings, reduced operating costs, and consumer awareness via standard DOE testing and rating procedures for HVAC, water heaters, and appliances
- **Indoor Air Quality** – enabling indoor air quality by providing minimum threshold standards for ventilation while ensuring efficient use of energy resources in buildings nationwide
- **Renewable Energy** – enabling use of solar equipment through test method and rating procedure development that forms the basis of industry (Solar Rating and Certification Corporation) certification programs
- **Sustainability Assessment** – enabling science-based selection of cost-effective, environmentally preferable building products through incorporation in major U.S. “green building” rating systems



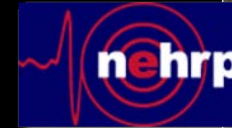
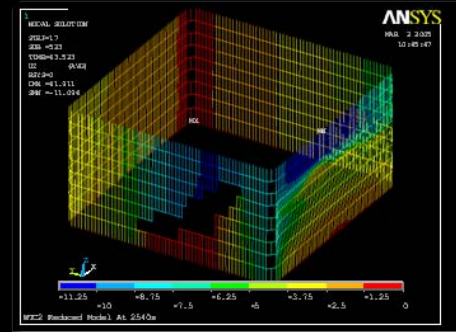
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Success Stories

- **Lead Agency for the National Earthquake Hazard Reduction Program (NEHRP)** – the Federal government’s coordinated long-term nationwide program to reduce risks to life and property in the U.S. from earthquakes
- **Federal Building and Fire Safety Investigation of the World Trade Center Disaster** – enabling enhanced safety of buildings, occupants, and emergency responders through scientific advances in predicting the performance of complex building systems and in understanding evacuation and emergency response procedures during extreme events
- **Reconnaissance of Physical Structures Following Hurricanes Katrina and Rita** – enabling enhanced safety of major buildings, physical infrastructure, and residential structures through adoption and enforcement of model building codes and standards and risk-based storm surge maps to reduce losses due to catastrophic hurricanes



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Success Stories

- **Smoke Alarm Standards** – enabling a 50 percent reduction in U.S. fire death rate from the mid-1970's via smoke alarm standards
- **Mattress Flammability and Cigarette Ignition** – enabling reduction in smoking related fires and unsafe mattresses through widely adopted standard test methods for reduced-ignition-propensity cigarettes and mattress flammability
- **Fire Fighter Protective Equipment** – enabling safer and more effective fire fighting through performance metrics and standards for thermal imagers and personal alert safety systems and positive-pressure ventilation techniques for fire fighting
- **Automatic Fire Sprinkler Standards** – enabling reductions in loss of life and property due to fire by developing the only installation and design standard for residential sprinkler systems
- **Fire Dynamics Models** – enabling transformation from prescriptive to performance standards through tools to predict the spread of fire, smoke, and toxic products
- **Heat and Visible Smoke Release Measurements** – enabling fundamental heat release rate measurements worldwide via improved standard test method



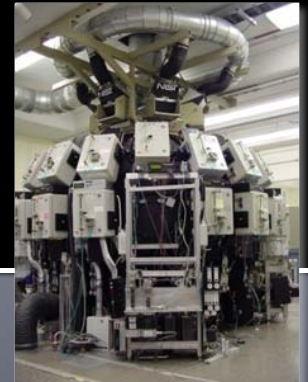
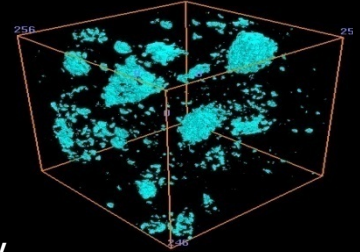
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Success Stories

- **Doubling the Service Life of Concrete** – Concrete microstructure models and electrical/diffusive transport algorithms accurately predict the dependence of transport properties on pore structure leading to insight that ionic diffusion rates through concrete could be remarkably reduced by affecting the fluid-filled pore space, rather than the solid matrix
- **Derivation and validation of scientifically-based models for linking field and laboratory experimental results and predicting field performance of a clear polymeric film** – first demonstration that models derived from laboratory results can be used in predicting field performance of a polymeric material
- **Development of the NIST Sphere** – first weathering apparatus in which essentially all experimental and systematic errors have been eliminated from laboratory experiments
- **Discovery of universal mechanism of nanocomposite flammability reduction** – nanoparticles act as heat shields radiating incident radiation away from the polymer



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