

#### Fire Protection Research: Look ahead

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# Challenges and Opportunities

- Challenges
  - Evolving technologies
  - New fire and explosion hazards
- Opportunities
  - New technologies
  - Research progress

# Challenges

- New construction
- New products
- New storage
- Innovative technologies

**-** ....

#### **New Construction**

- Large volumes
  - Ceiling heights > 80 ft
  - Innovative airports, railway stations, stadiums...
- Building materials
  - Thermal insulation, plastics, EIFS
  - Green materials, wood structures
- Alternative energy....

#### **New Products**

- Li-ion Batteries
- Electronics
- **-** ...
- Ignitable liquids
  - New type of usage (cooling)
  - Lighter storage (IBCs)



Li-ion battery testing

# New Storage

- Higher ceiling
- Higher storage





# New Storage

- More plastics
- Tighter spacing
- Lighter construction





ASRS - Ben Ditch, Wes Baker

# Innovative Technologies

- Increase usage of hazardous materials
  - Hydrogen
  - Silane



# Opportunities

- Smart systems
  - Integrating electronics and detection with protection
- Optimized protection
- Modeling

#### Smart systems

- Smart valve
  - Reduced inspection requirements

Reliability to be proven



# **Smart Systems**

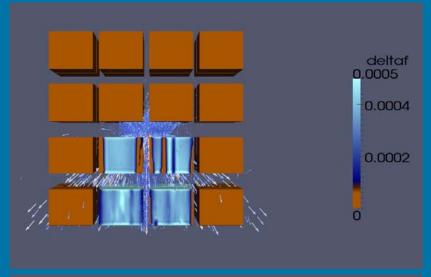
- Smart sprinklers
  - Detection
  - Automated activation
  - Optimized activation pattern
  - No skipping

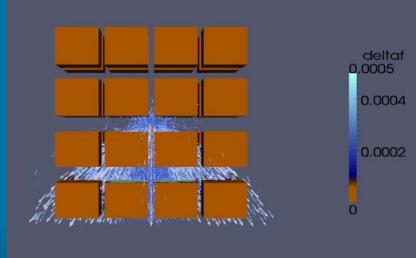
Reliability!



# Optimized Protection

- Specialty sprinklers
  - In-racks
  - Design water pattern

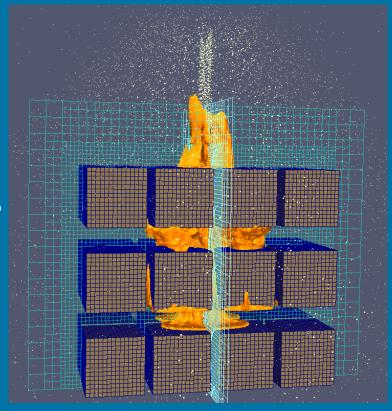




# Modeling

- Fire Modeling
  - Design better tests
  - Generalize test results
  - Optimize protection solutions

Open source modeling in progress











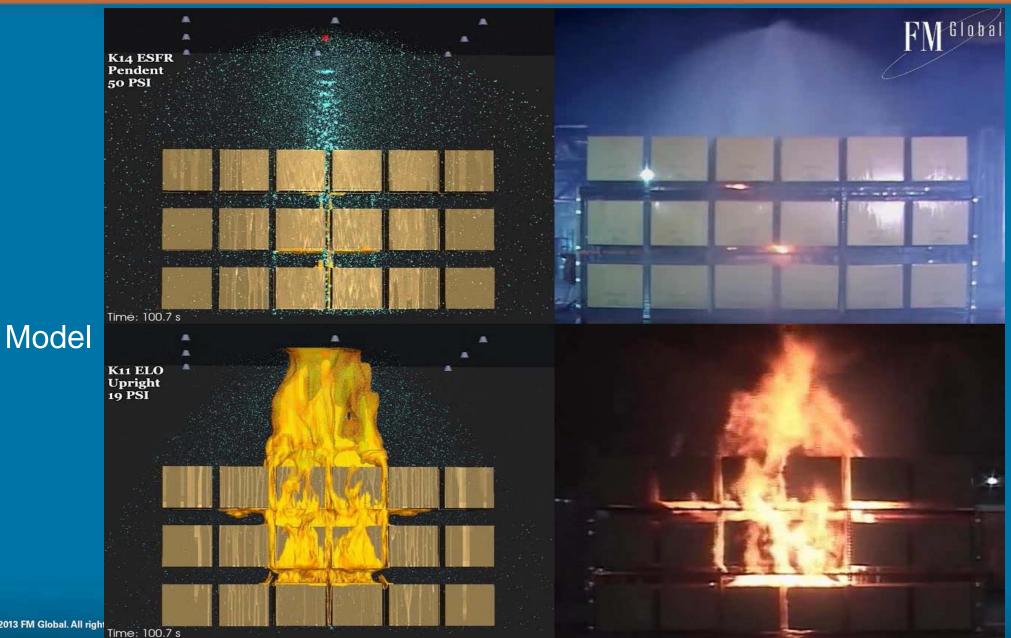








#### Modeling simple protection



Test

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### Summary

- New challenges
- Opportunities: Address new challenges with innovative solutions