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Participation

- Please ask questions
- Use the raise your hand feature or chat
- The more participation, the better





McMicken Incident

- April 19, 2019
- Surprise, AZ
- Hurt 4 Firefighters
- Brought attention
- Only had clean agent system



Chandler, AZ April 18, 2022

- No Injuries
- Burned for two weeks
- Used robots to open doors
- Had to shut down freeway and evacuate neighborhoods



- Sprinkler systems activated
- No explosion
- Water run off issues





Micro Mobility Devices







Impact from LI Battery Fires

Negatives

- Injury and Death
- Financial Impact
- Negative Public Opinion
- Over Regulating

Positives

- More Testing
- Better Codes
- Better Awareness
- Better Prepared



Lessons Learned

- Clean agent fire protection systems alone not adequate
- No sprinkler system approved to control thermal runaway
- Need mechanical ventilation
- Need detection (smoke and gas)





Lessons Learned

- Need explosion control
- Need training
- Need to create partnerships





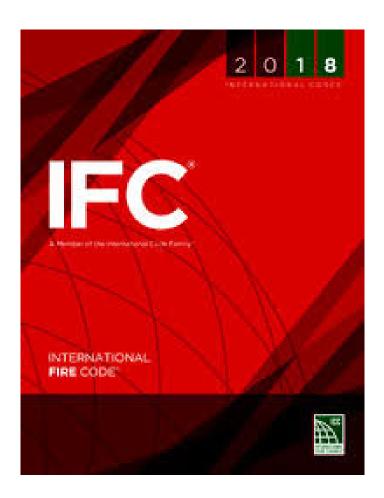
Code / Standards Creation

- International Code Council (ICC)
- National Fire Protection Association (NFPA)
- Underwriter's Laboratory (UL) 9540
- Underwriter's Laboratory (UL) 9540a Test



Code Creation

- ICC
- Chapter 12
- AHJ Code Amendments





Code Creation

NFPA 855 Standard for the Installation of Stationary Energy Storage Systems

- Regulate from Commissioning to Decommissioning
- Fire Protection
- Locations



Standard Creation

UL 9540 and 9540a Test

- Required for all BESS
- Robust Fire Testing
- Need to create batteries that don't propagate



Code Requirements (NFPA 855)

- Hazard Mitigation Analysis (HMA)
 - Evaluate Consequences of Failure
- (1) A thermal runaway or mechanical failure condition in a single ESS unit
- (2) Failure of an energy storage management system or protection system that is not covered by the product listing failure modes and effects analysis (FMEA)
- (3) Failure of a required protection system including, but not limited to, ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, fire suppression, or gas detection



Code Requirements (NFPA 855)

HMA Approval

- (1) Fires will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating.
- (2) Fires and products of combustion will not prevent occupants from evacuating to a safe location.
- (3) Deflagration hazards will be addressed by an explosion control or other system.



- Locations
 - Shall not be installed below grade
 - Shall not be located in an electrical room
 - Shall not be installed on roofs unless approved by AHJ



- Smoke and fire detection
- Annunciation panels
- Fire protection systems



- Fire Sprinklers
 - Density based on fire and explosion testing
 - 0.6 gpm/ft.² (Phoenix Only)
 - Alternate automatic fire control and suppression system





- Mechanical ventilation
- Explosion control
- Adequate water supply





- Is the BESS inside a building or cabinet?
- What are the results of the HMA?
- What is the location?
 - Populated Area
 - Middle of nowhere







Local history of fires

Capabilities of local fire department

Code knowledge



- Contact AHJ as soon as possible
- Understand their processes
 - Plans review
 - Appeals
- Create open dialogue
- 3rd Party Technical Assistance





 Best way to interpret the code, create partnerships with the AHJ





Creating a Partnership

- Meetings as soon as possible
 - Regularly scheduled meetings
 - Preconstruction meetings
- Get their name, cell phone number, email, office location, work hours
- Answer phones calls and emails





Creating a Partnership

- Timeline What is your start date and work backwards
- Plans review can take months
- Open Communication is key
- We all want the same thing project completion.





Creating a Partnership

- Avoid simple errors.
- Understand the codes and standards that are locally adopted
- What edition do they adopt?
- Everyone makes mistakes own it and move on.





- How do we achieve code consistency?
- Training
 - Industry
 - Fire Service
 - AHJs
 - FSSA or similar organizations



- How do we achieve code consistency?
- Participate in the creation of the Standards
 - NFPA 855 Technical Committee





- How do we achieve code consistency?
- Participate in the creation of the codes.
 - ICC





- Be open and transparent on lessons learned
- NDA Are they really helpful and necessary





- LFP
 - Lithium iron phosphate battery
- Hydrogen Fuel Cells
- New fire fighting mediums and tools
- New fire and life safety systems



- Changing lead acid battery systems to LI.
- Battery generators instead of diesel.
- Battery fire pumps



- Parking Garages with Electric Vehicles (EV)
 - Can they support the weight of an EV?
 - Is the sprinkler system adequate?
 - Charging stations in parking garages
 - What happens when they are on the fire?

- What do you know that we don't know yet?
- Let's start the conversation on all new technologies
- Its all about open conservations and creating partnerships



Questions?





Thankyou

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