

**NATIONAL TORNADO SUMMIT & DISASTER SYMPOSIUM** MARCH 4 - 6, 2019  
 COX CONVENTION CENTER  
 OKLAHOMA CITY

**Pre-Summit Workshop**

**Public Tornado Shelters:  
 Opportunities and Challenges  
 for Improving Tornado Safety**

**NATIONAL TORNADO SUMMIT & DISASTER SYMPOSIUM**

**Public Tornado Shelters:  
 Opportunities and Challenges for  
 Improving Tornado Safety**

**Workshop Goals:**

- Raise awareness of major changes taking place with the rapid expansion of public-use shelters
- Identify unique challenges posed by public tornado shelters across the many stakeholder communities
- Lay the foundation for a future workshop and subsequent development of guidance and best practices, needed for optimal planning and operations of public tornado shelters

**NATIONAL TORNADO SUMMIT & DISASTER SYMPOSIUM** Pre-Summit Workshop: Public Tornado Shelters

**Workshop Sessions**

1:00 A Changing Paradigm: The Proliferation of Public Tornado Shelters Brings New Challenges

2:00 Weather Information and Communications Challenges

3:00 Operational Challenges

4:00 Panel Discussion  
 Panel I: Weather Information and Warnings  
 Panel II: Shelter Planning and Operations

**TUESDAY BONUS SESSION**

11:00 Road to Construction and Managing Community Safe Rooms

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 SESSION I

**A Changing Paradigm:**  
 The Proliferation of Public Tornado Shelters  
 Brings New Challenges

**Marc Levitan**  
 – National Institute of Standards and Technology

**Kurt Hondl**  
 – NOAA-OAR National Severe Storms Laboratory


**Pataya Scott**  
 – FEMA Building Science Branch

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 SESSION I

**Changing Paradigm for Tornado Protection (1/2)**

Increasing trend in tornado shelter construction

- Community adoption of the 2015 International Building Code
  - Req'd in schools and emergency facilities in the 250 mph tornado wind speed region
- Statewide adoption of requirements for shelters at new schools (AL, IL)
  - Req'd to meet the ICC 500 Storm Shelter Standard
- Availability of FEMA grants
- Increased awareness of shelter options
- Increased availability of specialty tornado resistant building construction products



Source: FEMA

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**Changing Paradigm for Tornado Protection (2/2)**

Many shelters are being made available to public, e.g.

- School shelters (typically dual-use)
  - Sized to accommodate nearby residents as well as school population
  - Dates/times when school is not in session
- Dedicated storm shelters
  - Often smaller in capacity
  - Seemingly more common in the southeast (?)



Source: FEMA

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### Opportunities to Increase Tornado Safety

Provide safe option for people located nearby to the public shelter and not having a safe option where they are, such as those:

- Outside or traveling when the warning occurs
- In manufactured (mobile) homes or travel trailers
- In other buildings or facilities that do not offer adequate protection

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### A Language Challenge

#### Public Tornado Shelter

Red Cross Shelter      Tornado Shelter      Refuge Area



Community Tornado Shelter      Safe Room

Severe Weather Shelter Area      Community Safe Room

Shelter-in-place      Emergency Shelter      Best Available Refuge Area

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### Public Tornado Shelter – a facility expressly designed and constructed (or an existing facility evaluated and/or retrofitted) to meet the criteria of ICC 500 or FEMA 361 and open to the general public

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### Storm Shelter Safety – Correcting Misinformation

**Above Ground Shelters Built to ICC 500 or FEMA Criteria are Safe!**

“FEMA publications presenting design and construction guidance for both residential and community safe rooms have been available since 1998. Since that time, thousands of safe rooms have been built, and a growing number of these safe rooms have already saved lives in actual events. **There has not been a single reported failure of a safe room constructed to FEMA criteria.**”


Source: FEMA P-361, 3<sup>rd</sup> ed

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### Storm Shelter Safety – Correcting Misinformation

**Above Ground Shelters Built to ICC 500 or FEMA Criteria are Safe!**

**In-Residence Safe Room**  
Joplin, MO, May 22, 2011



**Winston County Commission Community Safe Room**  
Arley, AL, November 30, 2016




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### Storm Shelter Safety – Correcting Misinformation

**Above Ground Shelters Built to ICC 500 or FEMA Criteria are Safe!**

**“FEMA’s criteria were developed to provide near-absolute protection for safe room occupants.”**

Source: FEMA P-361, 3<sup>rd</sup> ed


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**Great, Storm Shelters are Safe -  
Let's Build a Lot More!**

**But wait, could something possibly go wrong?**

- Insufficient warning time for people to travel to the shelter
- People not aware of public shelters
- Having to choose between shelter-in-place and traveling to public shelter delays protective action
- Shelter is not unlocked when people arrive
- Shelter is full and more people arrive
- Shelter is unlocked but no one there to staff it and provide security
- Shelter (especially dedicated facilities) have not been properly maintained
- And many more....


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**QUESTIONS?**

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