

Widespread Use of *In-Residence Shelters*

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Reminders of Our Purpose



Objectives in Mitigation

- *Avoid catastrophic loss of life*
- *Reduce anxiety and suffering*
- *Reduce economic losses*
 - *Property damage*
 - *Business interruptions*



Benefits of Widespread Use *of In-Residence Shelters*

- *Benefits to Individual*
 - *High level of storm protection*
 - *Avoid costs of evacuation*
 - *Travel*
 - *Room and Board*
 - *Increase home security; protection of valuables*
 - *Less time off work*
 - *Peace of mind*
 - *More time to secure residence*
 - *Immediate attention to damage repair*



Benefits of Widespread Use

- *Benefits to **Society***
 - *Reduce number of evacuees*
 - *Avoid highway gridlock*
 - *Reduce demands for expanding highway capacity*
 - *Reduce business interruptions*
 - *Decrease lead time for forecasting*



Recent Developments, Trends

- **Advanced shelter technology, introduced new products**
- **Demonstrated improved marketability of houses with shelters**
- **Shown that incentive grants stimulate demand for shelters**
- **Began to shift paradigms of effective mitigation strategies**



Implementation Strategies

Goal

- Increase number of reliable In-Residence shelters

Process

- Optimize shelter designs
 - Develop reliable analysis methods to support designers
 - Texas Tech is making good progress with NIST support
 - Establish design criteria for hurricane shelters
 - ICC/NSSA Committee will address
 - Develop optimum prescriptive designs for residential shelters
 - FEMA 320 results in overly conservative designs for hurricanes
- Quantify benefits & costs of In-Residence shelters
- Implement education programs for all stakeholders
 - Demonstration projects are very effective
- Establish incentive grant program to stimulate growth
- Adopt quality control mechanisms for shelter design and construction



Implementation Strategies

Goal

- Increase number of community shelters
- Provide quality assurance

Process

- Optimize shelter designs
 - Monitor shelter performance
 - Refine design criteria
 - Establish debris impact criteria for community shelters
 - Refine resistance design criteria



Quality Control

- Barriers/Opportunities
 - Few professional designers involved in residential construction. Even fewer familiar with shelter design
 - Residential construction is steeped in tradition
 - Storm shelter design criteria and level of protection are well above standard practice
 - Public must be convinced of benefits of improved codes and practices
- Prescriptive designs are important in residential construction
- Quality verification process is vital



Quality Control

■ NSSA MEMBER requirements

- Pledge to produce only those shelters that meet the NSSA standard
- Test shelters for debris impact resistance (if not in FEMA 320)
- Have independent third party compliance check
- Affix a seal bearing serial number
- File a Certificate of Installation with NSSA for each shelter installed



The Future

- Shelter industry is relatively new
 - Growth pains and quality issues are inevitable
 - Progress is being made
- No single or simple approach will solve sheltering problems
- In-Residence shelters will prove to be the best option for many

