

Widespread Use of *In-Residence Shelters*

presented to

National Hurricane Conference

New Orleans, LA

April 17, 2003

presented by

Ernst W. Kiesling, P.E., Ph.D.

Wind Science and Engineering Research Center

Texas Tech University



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

