



The Resilient Home Program

The Fourth Annual DHS University Network Summit
March 10, 2010



Presented by
Dr. David Tilotta
North Carolina State University
Raleigh, NC



The impact of natural disasters on housing in the United States

U.S. disasters	Housing units lost or damaged (major)	Number of deaths	Economic loss, billions
1989 Hurricane Hugo	36,000	49	\$ 6.4
1989 Loma Prieta Earthquake	11,500	65	\$ 7.5
1992 Hurricane Andrew	80,000	52	\$ 23.0
1993 Midwest Floods	50,000	48	\$ 15.0
1994 Northridge Earthquake	60,000	57	\$ 20.0
1999 Hurricane Floyd	80,000	77	\$ 6.0+
2005 Katrina	950,000	1,200	\$ 75

The *Resilient Home Program*: A partnership with the Community and Regional Resilience Institute (CARRI)

Enabling community recovery following a natural disaster by dramatically speeding the return of the residents to their homes.



Program rationale

- Provide more effective tools, techniques, resources, and information—through applied research and development—to people who experience or respond to natural disasters.
- A partnership to serve as a clearinghouse for research and education efforts for the many organizations – government, academia, private and non-profit – working independently towards disaster relief.
- Assist with DHS Presidential Directive #5 “Management of Domestic Incidence.”

Resilient Home Program Team

Team Members



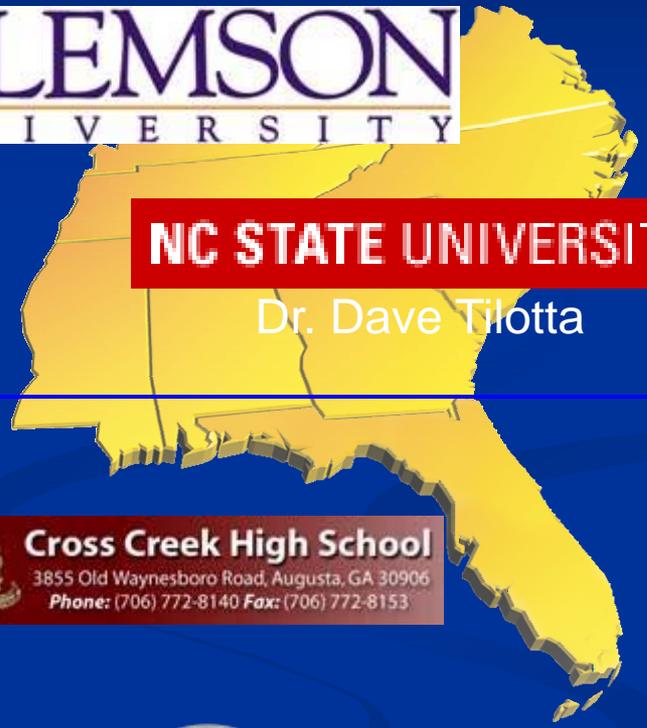
Mr. Tom Napier



Dr. Leidy Klotz



Mr. Tim Smail



Dr. Dave Tilotta

Associates



Additional partners

- Environmental Protection Agency
- FEMA Region 4
- Institute for Business and Homes Safety (IBHS)
- Extension Networks (EDEN)
- Builders, Storm Resistant Homes
- South Carolina Safe Home
- Renaissance Reinsurance (RenRe)
- Tuskegee University
- Others
 - Homeowners
 - Other Builders/Developers
 - Architects
 - Etc.



RHP gap analysis – understanding needs

- Completed in first year through a stakeholder survey and a state of the art study in current technology, practices, education etc.
- Hundreds of research and education needs identified
- Some results:
 - Mold proof materials
 - Resilient rebuilding (retrofitting)
 - Incentives for building resiliently
 - Education and outreach in all areas
- Independent verification and expansion of FEMA strategic priorities



Current RHP projects, overview

Dissemination of results

<http://home.resilientus.org>

Resilient retrofitting



Flood resistant materials



Resilience rating system



Education/
outreach

Rating system for natural disaster resilience of homes

- A rating system, tied directly to insurance perils and linked to incentives, for the higher performance of buildings during natural disasters

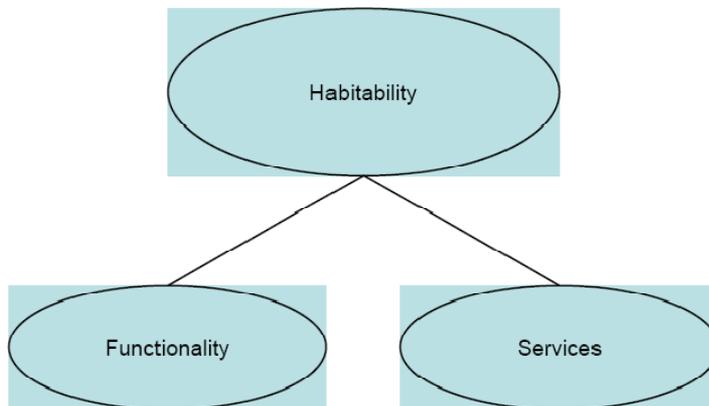


Resilient technology rating system

- A scoring system for assisting home-owners, manufacturer's, and others in prioritizing resilient technology that is available for retrofitting homes."



Importance of Factors Contributing to Habitability of a Residence After a Natural Disaster



Clicking an oval directs the user to more specific aspects of each category. Categories will continue to get more specific until the user finds a red, purple, or blue oval with white text. The color of the oval indicates the importance of that item to habitability.

- Red items indicate those that are most critical to habitability.
- Purple items indicate those that are of importance, but the degree of importance will vary in accordance with the specific situation (health and age of residents, community facilities, access to generators, conditions of alternative, etc).
- Blue items indicate those that are not necessary under normal circumstances for a short period of time.

Holding the mouse over a red, purple, or blue item will display questions and concerns related to each item.



Education and outreach

- Educational materials and appropriate distribution methods for recognized gaps in stakeholder knowledge.
 - Videos
 - Social networking sites
 - Internet (e.g., webinars)
 - Printed formats

Assess
Determine the extent of damage to a home in a quick and cost-effective manner

Rebuild
Rebuild with available resources in a more durable manner

Respond
Stabilize the home, make it a safe interim shelter and control secondary damage

Mitigate
Protect the home from short- and long-term effects of a natural disaster

Program Accomplishments

- A "Gap Analysis" identified needs for:
- rapid assessment
- resilient rebuilding
- incentives to build resilient
- education and outreach
- Completed a report on the state of the art of resilient rebuilding
- Completed a mold prevention and mitigation guide
- Led the 2009 Southeast Resilient Home Program

The Resilient Home Program Team

- Savannah River National Laboratory: Program leadership and applied engineering expertise
- North Carolina State University: Sustainable building materials, research and response and rebuilding expertise
- United States Army Corps of Engineers Construction Engineering Research Laboratory: Construction techniques and unique earthquake test stand
- Clemson University: Structural assessment, unique wind tunnel and wind resistance testing

DO YOU KNOW?

HOW FAST CAN MOLD GROW ON DRYWALL AT 80°F and 85% RELATIVE HUMIDITY?

Turn over for answer.

Resilient Home Program
HOME.RESILIENTUS.ORG

- Opposite side answer: C**
- education for home resilience
 - Self monitoring/self healing homes
 - Resilient home certification program
 - Education and outreach activities

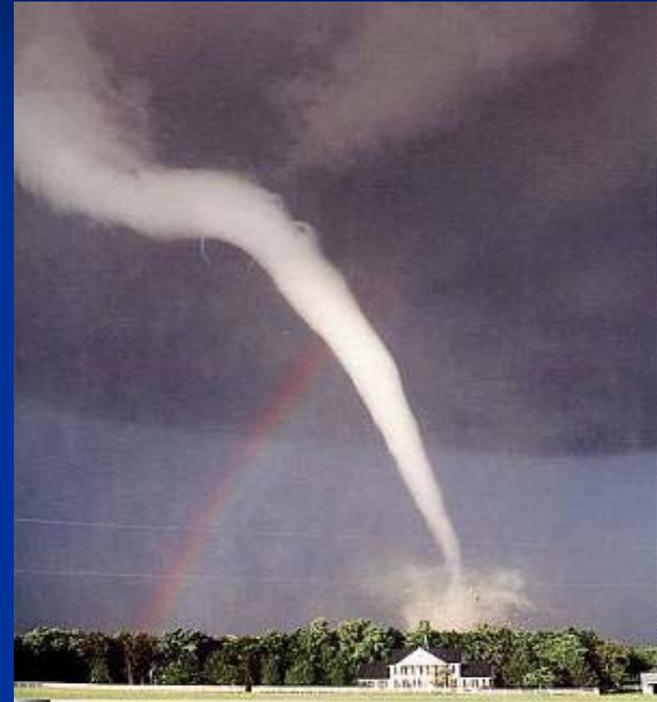
Development of standards for flood resistant materials

- In collaboration with FEMA and Dewberry Engineering, develop testing protocols for a universal rating system for flood resistant materials and assemblies.



RHP affiliated projects

- Tornado safe room campaign
 - **FLASH, FEMA**
- **Gulf Coast Resilient Home Building Conference: Building Strong for the Future**
 - In cooperation with the Home Builders Association of the Mississippi Coast
 - March 19-21, 2010, MS Coast Convention Center, Biloxi, MS



Contact information

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