

**FEMA Building Science Branch**

**Flood and Wind Mitigation Accomplishments in  
Fiscal Year 2010 and the First Quarter of Fiscal Year 2011**

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**FEMA**

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## I. Introduction

The Building Science Branch develops mitigation guidance that focuses on creating disaster-resilient communities. Our research-based guidance promotes best practices designed to create safer communities and reduce the loss of life and property. The Building Science Branch of the FEMA Federal Insurance and Mitigation Administration (FIMA) Risk Reduction Division works with industry groups, consulting experts, and State and local communities to provide state-of-the-art technical hazard mitigation solutions for buildings.

This annual report provides highlights of accomplishments related specifically to flood and wind mitigation, including publications, conference participation, and training and outreach efforts. These accomplishments demonstrate how FEMA and its partners are reducing disaster loss throughout the country. The accomplishments detailed in this report include those completed in fiscal year (FY) 2010 and the first quarter (Q1) of FY 2011.

## II. FEMA Flood and Wind Accomplishments in FY 2010 and Q1 of FY 2011

FEMA Headquarters (HQ) project activities are listed first, followed by those conducted in cooperation with Regional FEMA offices. Lastly, projects and activities conducted in cooperation with private industry partners are described. Activities are listed in chronological order.

### a. FEMA Headquarters Accomplishments

#### **FEMA P-765: *Midwest Floods of 2008 in Iowa and Wisconsin (October 2009)***

In response to the 2008 Midwest floods, FEMA deployed a Mitigation Assessment Team (MAT) to evaluate the damage caused by the riverine flooding in Iowa and southern Wisconsin. The MAT documented their observations, conclusions, and recommendations on the performance of buildings and other structures in FEMA P-765. The MAT included FEMA HQ and Regional Office staff, representatives from other Federal agencies and academia, and experts from the design and construction industry. The conclusions and recommendations in this report provide decision-makers with information and technical guidance that can be used to reduce future flood damage. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=3851>.

**WI/MN Association of State Floodplain Managers (ASFPM) Conference: Midwest Flood MAT Findings (October 7-9, 2009)**

FEMA Building Science Branch representatives presented the 2008 Midwest flood MAT findings and recommendations at the WI/MN ASFPM conference in October 2009. Approximately 30 people attended the course.

**Texas Floodplain Management Association: Hurricane Ike MAT Findings and Recommendations (October 14, 2009)**

FEMA Building Science Branch representatives made an opening plenary presentation at the Texas Floodplain Management Association (TFMA) fall conference (*Observations, Findings and Recommendations of FEMA's Hurricane Ike Mitigation Assessment Team*). Approximately 250 attendees were in the audience. The presentation is posted on the TFMA Web site at <http://tfma.affiniscape.com/associations/5819/files/2009%20Fall%20Tuesday%20FEMA%20MAT.pdf>. A companion article was also written for the TFMA newsletter ("The Lightning Rod," December 2009).

**Applied Technology Council (ATC) Hurricane Hugo 20th Anniversary Symposium (October 22-23, 2009)**

Several FEMA Building Science Branch representatives presented at the ATC-77 *Hurricane Hugo 20th Anniversary Symposium on Building Safer Communities – Improving Disaster Resilience*, in North Charleston, SC. The symposium was attended by about 80 people with 23 presentations. The FEMA Building Science Branch is a sponsor of the symposium. Papers presented by FEMA Building Science Branch representatives were:

- Impact of Sea-Level Rise on Current Building Codes in Coastal Communities
- Implementation of Recommendations from Post-Hugo Studies: Where Do We Stand?
- FEMA's Mitigation Assessment Team Program—Where Have We Been and Where Have We Still to Go?
- Adoption of ICC-600
- Historical Performance of Critical Facilities Exposed to Hurricanes: Lessons Learned and Opportunities for Improvement
- Protecting Lives with Shelters and Safe Rooms: 20 Years of Challenges and Successes
- New Wind Design Guide for Practitioners

Conference proceedings can be purchased at: <http://www.atccouncil.org/Event-Proceedings/Hurricane-Hugo-20th-Anniversary-Symposium-on-Building-Safer-Communities-Improving-Disaster-Resilience/flypage.tpl.html>

**FEMA P-85: *Protecting Manufactured Homes from Floods and Other Hazards*, Second Edition (November 2009)**

The FEMA Building Science Branch worked with the manufactured housing industry on a multi-year effort to update FEMA P-85. The second edition of FEMA P-85 was made available for download from the FEMA Library in November of 2009. This second edition of FEMA P-85 offers a series of prescriptive foundation designs to handle typical installations in various flood zones (excluding Coastal A Zone, Zone V, and floodways) as well as for wind, snow, and seismic hazard conditions. The hazards addressed in the foundation designs include:

- Flood depths 3 feet or less
- Riverine flooding
- Flood velocities up to 5 feet per second
- 3-second gust wind speeds up to 150 miles per hour
- Ground snow loads of up to 40 pounds per square foot
- Seismic loads (Zones C, D0, and E)

FEMA P-85 provides engineering solutions for multi-hazard resistant foundations. The foundation designs provided in FEMA P-85 include those for ground anchors and masonry piers, which are often used to support and anchor manufactured homes, as well as more substantial systems like reinforced masonry, reinforced concrete, and wood frame designs. An electronic version of the publication is available from the FEMA library at:

<http://www.fema.gov/library/viewRecord.do?id=1577>.

**FEMA 499 Home Builders Guide to Coastal Construction Course (November 2009)**

In November of 2009, FEMA Building Science Branch representatives conducted three classes on FEMA 499, *Home Builder's Guide to Coastal Construction* in Puerto Rico. The classes were 3.5 hours in length and were held in the cities of Mayaguez, Ponce and San Juan. Due to the majority of the content being focused on residential construction practices common in the contiguous states, the content was modified to better reflect the construction practices typical of Puerto Rico. The content was additionally updated to demonstrate the current state at the time of the Puerto Rican building codes (Uniform Building Code 1997) and the benefits associated with embracing a best practices approach encouraged by FEMA. Other associated documents such as FEMA 55, *Coastal Construction Manual* and FEMA 550, *Recommended Residential Construction for the Gulf Coast* were also discussed to make the engineers and architects in attendance aware of the other available FEMA publications. At the conclusion of the classes a meeting was held with a member of the Puerto Rico Planning and Permitting Department to offer assistance in the transition to the 2009 International Code, which occurred on March 1, 2011. Over 150 students attended the courses.

**American Society of Civil Engineers (ASCE) 5th Congress on Forensic Engineering (November 10-15, 2009)**

FEMA Building Science Branch representatives presented a paper on FEMA Shelter Publications at the ASCE 5th Congress on Forensic Engineering in Washington, DC. The presentation included an overview of FEMA 320, *Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business* (FEMA, date) and FEMA 361, *Design and Construction Guidance for Community Safe Rooms* (FEMA, 2008) that identified these documents as the authoritative design and construction guidance from FEMA on safe rooms (shelters) for wind hazard protection. The presentation was attended by approximately 22 engineers, architects, and researchers at the Forensics Conference on Thursday afternoon, November 12, 2009. The conference proceedings can be ordered from:

[http://cedb.asce.org/cgi/WWWdisplaybn.cgi?9780784410820\\*](http://cedb.asce.org/cgi/WWWdisplaybn.cgi?9780784410820*).

**American Institute of Architects (AIA) Training on Designing for Earthquakes (First Pilot Offering, November 19-20, 2009)**

FEMA Building Science Branch representatives presented a successful 2-day pilot training in San Mateo, CA in cooperation with the San Mateo Chapter of AIA. Twenty-five architects and aspiring architects participated. Course attendees received AIA learning units. Two independent evaluators were present to evaluate the presentation of the course and materials. Based on submitted evaluation forms, both students and independent evaluators, the course was well received.

**FEMA P-312: *Homeowner's Guide to Retrofitting*, Second Edition (December 2009)**

FEMA P-312 was revised in 2009 to provide updated guidance for homeowners in floodprone areas to protect existing homes from flooding. The publication provides a discussion on choosing the right mitigation measures in accordance with the National Flood Insurance Program (NFIP) and includes illustrations, useful tips, and important warnings. The publication features checklists describing the six most common retrofitting methods and their applicability to homes based on whether they are being substantially improved or have been substantially damaged. The six methods are elevation, wet floodproofing, relocation, dry floodproofing, use of levees/floodwalls, and demolition. The publication places a strong emphasis on understanding flood hazards and consulting with licensed design professionals prior to beginning a retrofit project. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=1420>

**FEMA P-550: *Recommended Residential Construction for Coastal Areas, Building on Strong and Safe Foundations, Second Edition (December 2009)***

FEMA P-550, originally published in 2006 under the title of *Recommended Residential Construction for the Gulf Coast, Building on Strong and Safe Foundations*, was updated in 2009 under the title FEMA P-550, *Recommended Residential Construction for Coastal Areas: Building on Safe and Strong Foundations*. FEMA issued the second edition of FEMA 550 to keep pace with developing codes and standards and to improve its guidance. In addition to being renamed to more accurately reflect its applicability, the updated publication contains a new foundation style, Case H, which incorporates an elevated concrete beam for improved structural efficiency. FEMA P-550 was also made consistent with the 2006 and 2009 editions of the IRC and IBC, and the 2005 edition of ASCE 7, *Minimum Design Loads for Buildings and Other Structures*.

Information contained in P-550 includes:

- Descriptions of the different types of hazards and primary issues to consider in the design of residential building foundations in coastal areas
- Different foundation types and methods of construction
- Cost information that can be used to estimate the cost of installing the proposed foundation systems

An electronic version of the publication is available from the FEMA library at:

<http://www.fema.gov/library/viewRecord.do?id=1853>.

**Workshops on Flood Provisions of the I-Codes (Conducted in FEMA Regions throughout 2010)**

The workshop was offered in Regions 2, 4, 5, 7, 8, 9, and 10 during FY2010 and Q1 of FY2011 (Regions 1, 3, and 6 held the workshop during FY2009). Approximately 280 FEMA staff and local and State officials attended these presentations. All the training sessions received positive comments.

**L156: Building Design for Homeland Security Train-The-Trainer Course for Continuity of Operations (Conducted in FEMA Regions throughout 2010)**

The workshop was offered 12 times in 2010. The course was offered in Arlington, VA; Baltimore, MD; Salt Lake City, UT; Honolulu, HI; Atlanta, GA; Kansas City, MO; Boise, ID; Fort Wayne, IN; EMI in Emmitsburg, MD; Houston, TX; Boston, MA; and Trenton, NJ. Approximately 215 students attended the 12 courses. The training courses were well received and had excellent class participation.

**Residential Coastal Construction Course (Gulfport, MS during January 20-22, 2010)**

FEMA Building Science Branch representatives taught a 2½-day course on FEMA 55, *Residential Coastal Construction in Gulfport, MS*; approximately 17 students attended the course.

### **International Builders' Show (January 19-22, 2010)**

FEMA Building Science Branch representatives presented a paper titled *Building Stronger Homes in the Face of Hurricanes, Floods, and Earthquakes* at the International Builders' Show in January 2010. Approximately 50 people attended the session, including many local builders in the Gulf Coast Region.

### **Resilient Home Program Webinars (through North Carolina State University) (March 2010)**

FEMA Building Science Branch representatives provided technical support for developing and delivering two webinars for the Resilient Home Program (RHP) run through North Carolina State University. The webinars were delivered to Resilient Home Program stakeholders. The two webinars developed and presented are identified below.

- A webinar was presented on ATC-45 (*Safety Evaluation of Buildings after Wind Storms*) for the inspection of buildings after hurricane, wind, and flood events. The webinar was delivered on March 9, 2010 and had approximately 15 attendees.
- A webinar was presented on flood-resistant materials and mold issues for buildings damaged by hurricanes and flood events. The webinar was delivered on March 30, 2010 and had approximately 16 attendees.

### **National Hurricane Conference (March 29-April 2, 2010)**

Several FEMA Building Science Branch representatives delivered presentations at the National Hurricane Conference in Orlando, FL including the following:

- Three presentations at the Engineering session on Performance Lessons Learned and Coastal Flood Zone Sustainability: (1) *Vulnerability Assessment of Critical Facilities*, (2) *Hugo + 20 Years, Where Do We Stand*, and (3) *An Analysis of the Impacts of Sea-Level Rise on Four Coastal Communities and Recommendations to Modify the NFIP and Building Codes*. Approximately 25 people attended this session.
- One presentation at the Mitigation session, *The Maze of Hazard Mitigation: 404 and 406 Hazard Mitigation*, highlighted the differences between 404 and 406 mitigation, described FEMA publications and other references (ASCE 24) available to support the development of mitigation projects, and presented best practices for common mitigation project types. Approximately 20 people attended this session.
- Three presentations at the Engineering session on Critical Facilities after a Disaster: (1) *Historical Performance of Critical Facilities Exposed to Hurricane Wind (1989-2008): Lessons Learned and Opportunities for Improvement*, (2) *Assessing Emergency Power Needs*, and (3) *Conducting a Vulnerability Assessment of Hospitals*. Approximately 30 people attended this session.

### **NC ASFPM Annual Conference (April 11-14, 2010)**

FEMA Building Science Branch representatives presented a 90-minute session called *Storm-Resistant Coastal Construction: Lessons Learned and Guidance Available* at the NC ASFPM Conference on April 13, 2010 in Wrightsville Beach, NC. There were about 50 people in attendance. The presentation covered the following topics:

- Assessing the actual extent of flooding versus the FEMA floodplain limits
- Evaluating the need to revise flood modeling or mapping
- Assessing infrastructure performance during the event
- Did my levee or floodwall perform as expected?
- Repairing damaged infrastructure within the confines of your floodplain ordinances
- Will this same flood or a worse flood happen again?
- Did my floodplain ordinance perform as expected?
- Did my community flood infrastructure operation and maintenance plan function as expected?
- Grants and resources at the Federal and State level for mitigation and planning
- What are the biggest flood risks in my community? Employers, schools, etc.
- Incorporating multi-hazard analysis into my recovery process
- Working with multiple Federal and State agencies in the rebuilding process
- Do my citizens have the necessary resources to recover?
- Should I rebuild in place or move?
- Low cost or no cost resources available to the community

### **FEMA P-758: *Substantial Improvement/Substantial Damage Desk Reference* (May 2010)**

The FEMA Building Science Branch produced a new publication on Substantial Improvement/Substantial Damage (SI/SD). The SI/SD Desk Reference is designed as a comprehensive resource for local officials who are responsible for the administration of local codes and regulations, including the SI/SD requirements. It also is intended for State officials who provide technical assistance to communities on the NFIP. Incorporating diagrams, decision charts, illustrations, and examples, the SI/SD Desk Reference is designed to clearly communicate responsibilities and strategies for administering this important NFIP requirement. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=4160>.

**FEMA B-797: Hazard Mitigation Field Book – Roadways (May 2010)**

The FEMA Building Science Branch produced a new publication titled *Hazard Mitigation Field Book (HMFB) for Roadways*. The Field Book is intended to help local governments choose the best hazard mitigation solutions given their operational constraints and design considerations. By offering the user a quick selection of broad characteristics, the Field Book reduces a wide array of technical solutions to a few practical options. Although there are many causes of damage to roadways, this Field Book focuses primarily on flood-related causes of damage. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=4271>.

**E279: Retrofitting Flood-Prone Residential Buildings (May 10-13, 2010)**

FEMA Building Science Branch representatives updated training materials and case studies for E279 and taught the course at the Emergency Management Institute (EMI). Participant feedback received from the EMI Course Administrator indicated the course was well received. There were 17 students.

**National Association of State Floodplain Managers (ASFPM) Conference (May 16-21, 2010)**

FEMA Building Science Branch representatives presented two workshops and one presentation at the ASFPM Annual Conference in Oklahoma City, OK.

- Workshop on Substantial Damage/Substantial Improvement. The ½-day workshop held on May 16, 2010 demonstrated the use of FEMA P-758, *Substantial Improvement/Substantial Damage Desk Reference*. Also, the new Substantial Damage Estimator (SDE) was demonstrated at the workshop. The workshop received strong evaluation scores and positive comments, with several requests that it be expanded into a 1-day workshop and made available for delivery by States and Regional offices. Eighteen people attended the workshop.
- Workshop – *Protecting Manufactured Homes from Floods and Other Hazards*. The 2-hour workshop held on May 17, 2010 provided an overview of the updated FEMA P-85, with an emphasis on methods of evaluating flood risk and selecting prescriptive foundation designs to protect manufactured homes from flooding and other natural hazards. Approximately 12 participants attended the workshop.
- Presentation – *After the Flood: Learning and Applying the Key Lessons*. Presented on May 20, 2010, the presentation discussed the typical situations faced by community officials after a major flooding event has ended, and potential solutions to those scenarios. The discussion focused on the rebuilding phase of the event as the community attempts to return to normality and reinvigorate the economic base. Approximately 50 people attended the presentation.

### **Screening for Severe Repetitive Loss (SRL) Properties (as of May 31, 2010)**

FEMA's efforts to identify properties eligible for inclusion in the Severe Repetitive Loss (SRL) Grant Program continued through FY2010. The Flood Insurance Reform Act of 2004 tasked FEMA with identifying properties eligible for inclusion in the SRL Grant Program to reduce the burden that repeated, significant flood losses had on the NFIP. The validation process reduced the Pending SRL List by 85 percent and, as of May 31, 2010, only 400 properties were identified as pending SRL. As the validation process is further refined, the number of potential SRL properties will continue to shrink.

### **FEMA P-784: *Substantial Damage Estimator* (June 2010)**

FEMA Building Science Branch representatives published the SDE software in June of 2010. The SDE software was created to support enforcement of NFIP regulatory requirements and is based on the concept of using damage estimates for individual building elements to determine whether the structure as a whole is substantially damaged. It is anticipated that local building officials or other persons with limited residential and non-residential construction knowledge will be able to use the software to conduct substantial damage determinations. The software is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=4166>.

### ***Mississippi Tornado Outbreak, April 23<sup>rd</sup>-24<sup>th</sup>* (July 2010)**

In response to the April 23<sup>rd</sup>-April 24<sup>th</sup>, 2010 tornado outbreak in Mississippi, FEMA deployed a Pre-Mitigation Assessment Team (PMAT) to survey the general structural damage and the performance of the residential community safe rooms. The investigations followed the path of the Tallulah-Yazoo City-Durant tornado. Tornado classification, building damage, building performance, and safe room information was collected through investigative site visits and surveys by the PMAT. These investigations allowed the Team to capture important observations, lessons learned, and recommendations. The document is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=4286>.

### **E386: *Residential Coastal Construction Course* (August 2010)**

EMI and FEMA Building Science Branch representatives presented the *Residential Coastal Construction Course* at EMI in Emmitsburg, MD, the week of August 9, 2010. The course is based on the Coastal Construction Manual (FEMA 55). There were approximately 20 students in the class; most students were associated with Federal or State government agencies, with eight from FEMA, four from State agencies, and five from local governments. The remaining three students were engineering consultants. The overall course rating for quality of the content was 4.54 out of 5.0, and the quality of the instruction was 4.69 out of 5.0.

**FEMA P-798: *Natural Hazards and Sustainability for Residential Buildings* (September 2010)**

The FEMA Building Science Branch produced a new publication titled *Natural Hazards and Sustainability for Residential Buildings*. This new document examines current green building rating systems in a broader context. It identifies green building practices—the tools of today’s green building rating systems—that are different from historical residential building practices and that, unless implemented with an understanding of their interactions with the rest of the structure, have the potential to compromise a building’s resistance to natural hazard events. FEMA P-798 discusses how to retain or improve natural hazard resistance while incorporating green building practices. While most common green building practices provide sustainability advantages with little or no effect on structural performance or durability, others require reevaluating the building’s structural design or detailing to retain its integrity during natural hazard events. Often, only minimal design modifications are required to maintain natural hazard resistance. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=4347>.

**Department of Homeland Security, Southeast Region Research Initiative (SERRI) Semi-Annual Meeting Panel Discussion (October 5-6, 2010)**

FEMA Building Science Branch representatives attended the DHS SERRI Semi-Annual Projects Review Meeting in Crystal City, VA, to provide support to projects being proposed and conducted under the SERRI program.

**ICC Annual Conference, Charlotte Convention Center, Charlotte, NC (October 25-28, 2010)**

FEMA Building Science Branch representatives presented two sessions of a workshop on Safe Rooms at the 2010 ICC Annual Conference. The first session had 10 attendees, while the second session had 18 attendees. Additionally, brief presentations were given on flood provisions of the I-Codes and the NFIP, FEMA Technical Bulletins 1 and 2, and on residential safe rooms. Building Science Branch representatives also had a booth at this conference.

**Technical Bulletin 4: *Elevator Installation* (November 2010)**

FEMA Building Science Branch representatives updated Technical Bulletin 4. Technical Bulletin 4 provides guidance on the NFIP regulations concerning the installation of elevators below the base flood elevation in special flood hazard areas (Zones A and V). An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?id=1717>.

**Coastal Construction and Safe Room Courses (Gulfport, MS from November-December 2010)**

FEMA Building Science Branch representatives taught a 1-day course on FEMA 550, *Introduction to Coastal Foundation Design and Construction for Design Professional* on November 4 in

Gulfport, MS, at the Army National Guard Center. There were approximately 15 participants, and most were pleased with the workshop, stating that the instructors were very knowledgeable and the design concepts were well explained.

The ½-day course on FEMA 550, *Introduction to Coastal Foundation Design and Construction for Local Officials* was taught on November 5 in Gulfport, MS, at the Army National Guard Center. There were approximately 20 participants, and most were pleased with the workshop, stating that the instructors were very knowledgeable and the concepts were well explained.

FEMA Building Science Branch representatives taught a 2-day course on FEMA 320/361 titled *Safe Room Design and Construction Training* on December 9-10 in Gulfport, MS, at the Army National Guard Center. There were approximately 25 participants. Most were pleased with the course and enjoyed the field trip to a safe room under construction.

#### **FEMA P-499: Home Builder's Guide to Coastal Construction (December 2010)**

FEMA Building Science Branch representatives updated FEMA P-499. In this edition of FEMA P-499, FEMA produced a series of 37 fact sheets to provide technical guidance and recommendations concerning the construction of coastal residential buildings. The fact sheets present information aimed at improving the performance of buildings subject to flood and wind forces in coastal environments. Photographs and drawings illustrate NFIP regulatory requirements, the proper siting of coastal buildings, and recommended design and construction practices for building components, including structural connections, the building envelope, and utilities. An electronic version of the publication is available from the FEMA library at: <http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2138>.

## **b. FEMA Region Accomplishments**

### **Ike Outreach Trainings in Region VI (Held throughout 2010)**

Following Hurricane Ike and the post-disaster MAT report, the following outreach training courses were offered in Texas:

- Building Science Branch representatives taught the following classes to the Texas Department of Insurance:
  - FEMA 499 – *Home Builder's Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), February 18, 2010, Austin, TX, 28 students
  - FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), February 18, 2010, Austin, TX, 28 students
- FEMA 55 – *Coastal Construction Manual* (1-day course), April 22, 2010, Houston, TX, 25 students, hosted by ASCE

- FEMA P-762 - *Local Officials Guide to Coastal Construction* (1-day course), April 23, 2010, Houston, TX, 36 students, hosted by Houston-Galveston Area Council
- FEMA 499 – *Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), May 11, 2020, Houston, TX, 29 students, hosted by Houston-Galveston Area Council
- FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), May 11, 2020, Houston, TX, 29 students, hosted by Houston-Galveston Area Council
- Ike Outreach – *Executive Briefing on Improving the Performance of High Rise Buildings During High Wind and Flood Events* (2-hour executive briefing, 4-hour staff training), May 12, 2010, Houston, TX, 36 attendees, hosted by CenterPoint Energy
- FEMA 543 – *Design Guide for Improving Critical Facility Safety in Flood and High Winds* (2-day course), May 13-14, 2010, Houston, TX, 20 students, hosted by AIA Houston
- FEMA 499 – *Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), June 29, 2010, Bolivar Peninsula, TX, 30 students
- FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), June 29, 2010, Bolivar Peninsula, TX, 30 students, hosted by Bolivar Chamber of Commerce
- FEMA 499 – *Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), July 1, 2010, Galveston, TX, 23 students, hosted by Galveston County
- FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), July 1, 2010, Galveston, TX, 30 students, hosted by Galveston County
- FEMA 499 – *Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), July 27, 2010, Bolivar Peninsula, TX, 10 students, hosted by Bolivar Small Business Coalition
- FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), July 27, 2010, Bolivar Peninsula, TX, 10 students, hosted by Bolivar Small Business Coalition
- FEMA 499 – *Home Builder’s Guide to Coastal Construction Technical Fact Sheet Series* (½-day course), July 28, 2010, Baytown, TX, 49 students, hosted by Lee College
- FEMA 550 – *Introduction to Coastal Foundation Design and Construction for Local Officials* (½-day course), July 28, 2010, Baytown, TX, 46 students, hosted by Lee College
- A FEMA Building Science representative presented a 75-minute presentation on the Coastal Construction Manual (FEMA 55) at the Structural Engineers Association of Texas (SEAoT)

Annual State Conference in Corpus Christi, TX, on October 22, 2010. Approximately 75 people were in attendance.

**SDE Pilot Training (Texas City, TX, January 26-27, 2010)**

On January 26-27, 2010, FEMA Building Science Branch representatives provided a pilot training at the Texas City JFO to FEMA Regional representatives on the use of the SDE software. The suite of SDE materials includes a train-the-trainer course designed to instruct local users in the use of the SDE software. Other SDE suite materials, whose importance is emphasized during the training, are the *SDE Field Workbook* (also included in FEMA P-784) and *SI/SD Desk Reference* (FEMA P-758). The trainers garnered comments on the training materials throughout the course and these are being incorporated into the final version of the materials. About 25 people attended this training.

**SDE Training (FEMA Region I, August 24, 2010)**

FEMA Building Science Branch representatives provided a ½-day demonstration on the use of the new SDE software to Regional, State, and local representatives at FEMA Region I Annual Summit in Woodstock, VT.

**FEMA P-804 *Wind Retrofit Guide* (December 2010)**

The FEMA Building Science Branch produced a new publication, FEMA P-804, *Wind Retrofit Guide for Residential Buildings*. FEMA P-804 provides guidance to improve the performance of houses in hurricane-prone regions throughout the United States. The purpose of the guide was to assist homeowners and builders in reducing or preventing wind-related damage by improving the performance of residential buildings in high-wind areas. FEMA P-804 proposes three “Mitigation Packages”—Basic, Intermediate, and Advanced. The improvements of each package build on the retrofits of the previous package for increasing levels of wind hazard resistance. This effort was funded through FEMA Region IV. An electronic version of the publication is available from the FEMA library at:

<http://www.fema.gov/library/viewRecord.do?id=4569>.

**1-Day Training Course on FEMA P-762, *Local Officials Guide for Coastal Construction* (FEMA Region IV, December 15, 2010)**

An 8-hour training course on FEMA P-762, *Local Official’s Guide to Coastal Construction* was provided for FEMA Region IV in Biloxi, MI. The course was well received with approximately 25 people in attendance.

### **Wind Retrofit Guide Pilot Training Course (FEMA Region IV, December 16, 2010)**

A 4-hour Pilot Training Course on FEMA P-804, *Wind Retrofit Guide for Residential Buildings*, was provided for FEMA Region IV in Biloxi, MI. The course was well received with 38 people in attendance.

### **c. Private Industry Partner Events and Participation**

#### **Federal Alliance for Safe Homes (FLASH) 2010 Annual Meeting, Tampa, FL (October 6-8, 2010)**

Shortly after its completion, FEMA P-798 Pre-Release for *Natural Hazards and Sustainability for Residential Buildings* was featured in break-out sessions held during the Federal Alliance for Safe Homes (FLASH) 2010 Annual Meeting held October 6-8, 2010, in support of the discussion theme "A Stronger Shade of Green."

The conference presented the recently completed FEMA P-798 (September, 2010). Links to the FEMA Web site where the document could be downloaded were provided to attendees ahead of the conference, and each attendee was given a pre-release copy of the publication at the conference. The two breakout sessions of the conference focused on how natural hazard resistance can be integrated with sustainability. The first breakout session attempted to resolve technical differences between hazard resistance and sustainability, while the second session considered the marketing and policy approaches required for success in promoting such practices.

#### **Institute for Business and Home Safety (IBHS) Annual Conference on Property Loss Reduction, Tampa, FL (November 16-17, 2010)**

FEMA Building Science Branch representatives attended this conference and participated in the panel session titled *Retrofitting for Community Resilience*. Presentations were on FEMA's new sustainability publication (FEMA P-798) and the FEMA *Wind Retrofit Guide* (FEMA P-804). Other speakers in this session included Fred Malik (IBHS) and Miles Anderson (FL Division of Emergency Management). In addition, IBHS allowed FEMA to have a display table to showcase the FEMA publications discussed in the presentation, as well as several MAT reports and design guides on wind and flood hazard mitigation.

### **d. Code Development**

#### **2009 I-Code Development Hearings, Baltimore, MD (November 1-4, 2010)**

FEMA Building Science Branch representatives successfully defended definitions of substantial damage and substantial improvement in the IBC. Additionally, in response to the change in basis of wind loads in ASCE 7, IBC language pertaining to break-away wall loads was revised to clarify its basis in Allowable Stress Design. Both definitions maintain consistency between provisions of the IBC and NFIP. FEMA Building Science Branch representatives were also

successful working with proponents of other proposals including with the National Association of Home Builders (NAHB) regarding introduction of pier foundations into the IRC. While the pier foundation proposal failed to get approved, the modified proposal based on FEMA Building Science Branch representatives' recommendations clarified that design for lateral loads, such as wind, was to be in accordance with accepted engineering practice. Due to FEMA participation, it is anticipated that future versions of this proposal will properly address lateral loads from wind.

### **Building Code Adoption Tracking**

The FEMA Building Science Branch monitors building code adoption and enforcement around the country. Quarterly reports are produced that provide an update to the existing baseline data to determine the number of jurisdictions in hazard-prone regions that have adopted building codes with disaster provisions. Reports are generated for disaster-resistant, flood-resistant, hurricane-resistant, and seismic-resistant building codes.

### **III. Contact Information**

For questions or comments, please contact the Building Science Helpline at (866) 927-2104 or e-mail [FEMA-Buildingsciencehelp@dhs.gov](mailto:FEMA-Buildingsciencehelp@dhs.gov). Please allow up to 5 business days for a response. Additionally, John Ingargiola, EI, CFM, BCSP, Building Science Branch team leader, may be contacted at (202) 646-3452 or [john.ingargiola@dhs.gov](mailto:john.ingargiola@dhs.gov).