

Hurricane Research Advisory Committee

REPORT TO THE FLORIDA BUILDING COMMISSION

JUNE 7, 2010—MEETING XVIII

ORLANDO, FLORIDA

FACILITATION, MEETING AND PROCESS DESIGN BY



CONSENSUS CENTER

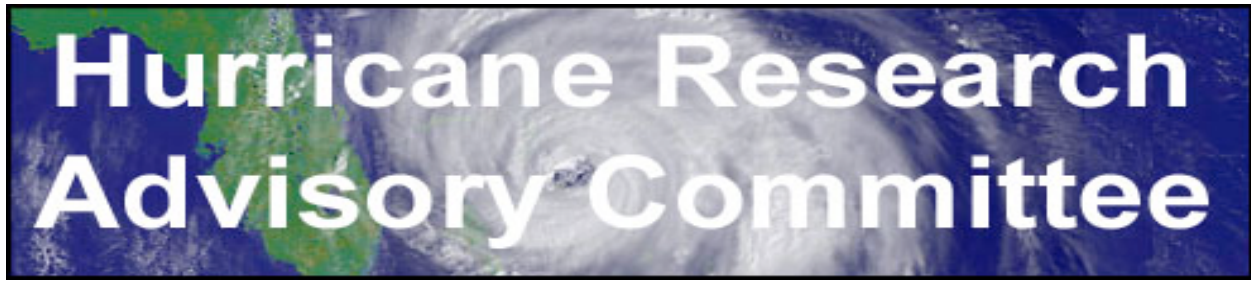
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FLORIDA BUILDING COMMISSION



Overview and Project Scope

At the January 26, 2005 Commission meeting, Chairman Raul L. Rodriguez, AIA appointed a small coordinating group consisting of Commissioners and other stakeholder representatives, charged with identifying what research is being conducted related to building failure issues resulting from the 2004 hurricanes, identifying any research gaps on key issues identified but not being researched, and finally, to ensure that the Commission is provided with all relevant research findings on each of the major issues, prior to the Commission considering code enhancements resulting from lessons learned.

The Hurricane Research Advisory Committee (HRAC) meets on an ongoing basis for the purpose of receiving updates on current research initiatives, providing recommendations on needed research projects and funding for same, and providing recommendations regarding proposed code amendments relevant to hurricane and storm protection enhancements.

Raul L. Rodriguez, AIA, Chair of the Florida Building Commission, made the following appointments to the Hurricane Research Advisory Council. Members are charged with representing their stakeholder group's interests, and working with other interest groups to develop a consensus package of recommendations for submittal to the Florida Building Commission.

Members and Representation

Raul L. Rodriguez, AIA, Chair

Chris Schulte
Do Kim, P.E.
Jim Schock, CBO
Jaime Gascon
Craig Parrino, P.E.
Tim Reinhold, PhD, P.E.
Joe Crum, CBO (President, BOAF)
Jack Glenn, CBO
Dave Olmstead
John Ingarola
Richard Reynolds

Architects
Roofing contractors
Insurance industry
Building officials
Local government
Product manufacturers (concrete products)
Insurance industry/Researchers
Building officials
Home builders
Product manufacturers (windows)
Federal government (FEMA)
Insurance Industry

REPORT OF THE JUNE 7, 2010 MEETING

Opening and Meeting Attendance

Chairman Raul L. Rodriguez, AIA, welcomed participants and opened the meeting at 11:00 AM. The following Workgroup members were present: Do Kim, Jaime Gascon (Herminio Gonzalez alternate), Jack Glenn, Dave Olmstead (Joe Belcher alternate), Richard Reynolds, Jim Schock, and Chris Schulte.

Members Absent

Raul L. Rodriguez, AIA, Chair, Joe Crum, John Ingargiola, Craig Parrino, and Tim Reinhold.

DCA Staff Present

Suzanne Davis, Rick Dixon, Mo Madani, and Jim Richmond.

Meeting Facilitation

The meeting was facilitated by Jeff Blair from the FCRC Consensus Center at Florida State University. Information at: <http://consensus.fsu.edu/>



Project Webpage

Information on the project, including agenda packets, meeting reports, and related documents may be found in downloadable formats at the project webpage below:

<http://consensus.fsu.edu/FBC/hrac.html>

Agenda Review and Approval

The Workgroup voted unanimously, 7 - 0 in favor, to approve the agenda as presented including the following objectives:

- To Approve Regular Procedural Topics (Agenda and Summary Report)
- To Hear a Report Regarding 2010 FBC Amendments Initiatives of Respective Workgroups
- To Hear an Update Regarding Wind Load Requirements for Air Conditioning Equipment Options for Demonstrating Compliance
- To Hear a Presentation on FY 2009-2010 Hurricane Resistance Research
- To Discuss Follow-up Research Supporting Hurricane Resistant Construction Standards Development
- To Consider Public Comment
- To Identify Needed Next Steps, Assignments and Agenda Items for Next Meeting

October 13, 2009 Facilitator's Summary Report Review and Approval

Jeff Blair, Commission Facilitator, asked if any members had corrections or additions to the October 13, 2009 Report, and none were offered. The Workgroup voted unanimously, 7 - 0 in favor, to approve the October 13, 2009 Facilitator's Summary Report as presented.

Report on Status of 2010 FBC Amendments Initiatives of Respective Workgroups

Rick Dixon reported on the status of 2010 Code amendments initiatives of respective workgroups and answered members' questions.

Summary of Recommendations:

Window/Wall Workgroup

Following are options that achieved a consensus level of support as proposed code amendments for the 2010 Florida Building Code:

1. Reorganize the code sections to split curtain wall from garage door requirements.
2. Add requirement to Chapter One, plan review requirements, detail through wall penetrations for fenestrations for both commercial and residential plans.
3. Include a standard detail for each type of installation and place in the code commentary.
4. 106.3.5 Minimum plan review criteria for buildings. The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/roof framing plan or truss layout; all fenestration penetrations; flashing; and rough opening dimensions and all exterior elevations.
5. Additional Code amendments to recognize the AAMA/FMA 200 and 300 as reference standards for window installation.

Soffit Systems Workgroup

Following are options that achieved a consensus level of support as proposed code amendments for the 2010 Florida Building Code:

Individual soffit piece labeling requirements for manufactured products in the Florida Building Code, as follows:

1. Individual soffit pieces shall be marked at not more than four foot on center with a number/marking that ties the product back to the manufacturer.

Soffit system packaging label requirements for manufactured products in the Florida Building Code, as follows:

1714.8.2 The following information shall be included on the labels on impact-resistant coverings:

1. Product approval holder/manufacturer name and city and state of manufacturing plant.
2. Product model number or name.
3. Method of approval and approval numbers as applicable. Methods of approval include, but are not limited to: Miami-Dade NOA, Florida Building Commission FL #, TDI Product Evaluation, and/or ICC-ES.
4. The test standard or standards specified in Chapter 14 used to demonstrate Code compliance.
5. The net free area (note: also to be indicated in product approval)

Manufactured soffit system installation:

Soffits must be installed in accordance with the manufacturer's instructions.

Flood Resistant Standards Workgroup

Following are options that achieved a consensus level of support as proposed code amendments for the 2010 Florida Building Code:

1. The I-Code provisions should be used as the basis for inclusion of flood provisions relevant to buildings and structures into each of the respective codes (FBC). Members agreed that on balance, ICC provisions should be retained unless there is a specific need for a Florida Specific Requirement.
2. Adopt ASCE 24 (Flood Resistant Design and Construction Standards) by reference as the flood provisions in each of the codes (FBC).
3. Allow local jurisdictions to adopt higher standards for flood resistance provision to address local concerns within the Code (~~based on local flood studies~~), to ensure local's ability to be eligible for the NFIP's Community Rating System.
4. Seek a legislative exception so that local CRS (higher flood resistant standards) would not be subject to the local technical amendment requirements of the Code, subject to a consistency review with updated editions of the code. (Established by HB 663)
5. Retain ICC format, modify as appropriate for Florida and develop cross-reference list, similar to Chapter 27 for the Electrical Code.
6. Seek statutory change to section 553.80 F.S. to clarify that this provision not be used to deviate from flood resistant requirements.
7. Seek statutory authority to allow local jurisdictions to issue variances/waivers, via the locally adopted companion flood plain ordinance, regarding flood provisions adopted in accordance with the provisions of 44 CFR 60. (Established by HB 663)

Following are options that achieved a consensus level of support as 2010 Florida Building Code related issues not to be proposed as code amendments:

Adoption of flood maps and administrative procedures shall be at the local level.

Develop a model "companion" ordinance that includes NFIP-consistent administrative provisions and includes NFIP requirements for development other than buildings and structures that are not within the scope of the Code. Also, include a list of more stringent requirements that local jurisdictions could consider for possible adoption.

Inconsistencies between the CCCL and V Zone requirements shall continue to be resolved at the local level, and on a case-by-case basis.

A interagency group should be formed to develop a strategy for determining whether any inconsistencies between the CCCL and V Zone requirements can be resolved by code changes in the next code cycle (i.e., coordination between FBC, DEP, DEM, FEMA).

Green and Energy Efficient Roofs Subcommittee to Energy Code Workgroup

Following are options that achieved a consensus level of support as proposed code amendments for the 2010 Florida Building Code:

Amend the Florida Building Code, Energy, to provide minimum energy code credits (points) for the use of vegetated roofs.

Additional energy credits may be achieved if documentation is provided to support the additional energy efficiency credits.

Structural, fire, etc. standards should be included in the Code to address building performance issues in addition to energy.

Hurricane Research Advisory Committee—Air Conditioning Equipment and Appliance Wind Resistance
2010 Florida Building Code amendment clarifications:

State explicitly that AC equipment and appliances must themselves be capable of resisting design wind loads without coming apart.

Provide prescriptive methods for attachment of ground mounted AC equipment.

Update on FBC Wind Load Requirements for Air Conditioning Equipment Options for Demonstrating Compliance

Rick Dixon provide the HRAC with an update on FBC wind load requirements for air conditioning equipment options for demonstrating compliance and answered members' questions.

Summary of Recommendations:

HB 663 deferred enforcement of the 2007 Florida Building Code requirements as interpreted by the Commission until implementation of the 2010 Florida Building Code. Until such time that a standardized method of evaluating AC products' compliance with wind load design is developed and adopted by the Code, manufacturers can use the customized evaluations authority established by s.553.842(5)(b), Florida Statutes, to demonstrate compliance. Manufacturers may also obtain State approval as a method of demonstrating compliance to local enforcement officials.

HB 663 Legislation:

Section 40. Subsection (4) is added to section 553.844, Florida Statutes, to read:

553.844 Windstorm loss mitigation; requirements for roofs and opening protection.—

(4) Notwithstanding the provisions of this section, exposed mechanical equipment or appliances fastened to a roof or 1788 installed on the ground in compliance with the code using rated stands, platforms, curbs, slabs, or other means are deemed to comply with the wind resistance requirements of the 2007 Florida Building Code, as amended. Further support or enclosure of such mechanical equipment or appliances is not required by a state or local official having authority to enforce the

Florida Building Code. This subsection expires on the effective date of the 2010 Florida Building Code.

Presentation on FY 2009-2010 Hurricane Resistance Research

David Prevatt from University of Florida provided a PowerPoint presentation update on hurricane research resistance and answered members' questions.

Summary of PowerPoint Presentation:

Hurricane Resistant Research for Fiscal Year 2009/2010

Structural Retrofit of Wood Roofs Using Closed-cell Spray Applied Polyurethane Foams (ccSPF)

- Effect of water leakage on uplift capacity
- Potential energy benefits of cooler vented attics

Wind Uplift on Discontinuous Roof Covering

- Wind tunnel studies Particle Imaging Velocimetry
- Developing Impinging Jet – Asphalt Shingle Test

Design Guidelines for Retrofitting Wood Roof Sheathing Using Closed-cell Spray Applied Polyurethane Foams

- Principal research thrusts are:
 - Accelerated wetting/leakage and water penetration testing
 - Monitoring of wood moisture content and deterioration
 - Laboratory scale testing – tensile strength of ccSPF to wood bond.
 - Comparative wind uplift tests of 'control' vs. aged panel specimens
 - Benefits of ccSPF Retrofits:
 - Increases the wind uplift capacity of roofs
 - Acts as a secondary water barrier
 - Excellent thermal insulation – R6 per inch
 - Remaining Research Questions:
 - Do undetected leaks contribute to wood degradation?
 - Can trapped water weaken ccSPF-to-wood bond?
 - Questions/Concerns:
 - What about long-term performance/durability?
 - Few tests done on installed ccSPF strength in place. –(UF performed 1 test on a retrofit house in 2008)
 - Are acceptance criteria for use/installation appropriate?
 - Research Goals:
 - ccSPF roof retrofit = energy savings in vented attics?
 - ccSPF = more durable roof retrofit?
 - Wood material can dry to exterior?
 - Design and installation guidelines for ccSPF Retrofits

Performance of Asphalt Single Roofing:

- Two thrusts
 - Particle Image Velocimetry study performed at the University of Western Ontario
 - Design and development of a dedicated dynamic wind field simulator

- UOW Wind Tunnel Study:
 - Characterize turbulent wind over residential roof surfaces and their impact on roof coverings ... by initially conducting wind tunnel studies which shall characterize wind behaviors for integration into the design and development of a dynamic testing apparatus.
- UWO Methodology:
 - High suction and high wind speeds above a house roof are important for the performance of roof cover, such as shingles, in extreme wind conditions.
 - In order to better understand which flow features cause these, Particle Image Velocimetry (PIV) experiments were performed on the wind tunnel model.
 - Experiments were performed with time-resolved PIV (sampling rate of 500 Hz) for a duration of 120 seconds simultaneously with pressure measurements.
 - A work prior to this study can be found in the following video showcase, which portrayed the significance of the current study.
- WT Modeling—Full-Scale Simulation
 - PIV data: High resolution, time varying, spatially varying wind vectors near the roof
 - Dynamic wind action causes the uplift forces that act on discontinuous roof coverings
 - *Now* developing an experimental simulation apparatus capable of replicating the dynamic wind field observed in the wind tunnel
 - Aerodynamic objective: Create 180+ mph wind speeds over an 8 ft x 1.5 ft cross section
- Design:
 - Components
 - 3512 Caterpillar 1800 hp Diesel Prime Mover
 - Centrifugal blower (200,000 cfm @ 20 in WC)
 - Sound attenuation (multiple measures)
 - Ductwork
 - Flow control
 - FBC contributed to prime mover
 - Preliminary design of ducting completed but flow control still in development

Discussion on Follow-up Research Supporting Hurricane Resistant Construction Standards Development

Rick Dixon reported on follow-up research supporting hurricane resistant construction standards development and answered members' questions. Following questions and answers, public comment, and discussion the Committee took the following action:

Committee Action:

Motion—The HRAC voted unanimously, 7 - 0 in favor, that current year funding be directed to supporting studies to characterize the wind field on roofs and to leveraging funding for roof systems related research provided by federal organizations including FEMA/DHS, NOAA/Sea Grant and RCMP/DEM, and to continue funding post-hurricane buildings investigation research on a contingency basis.

The Commission previously voted to support DCA funding research projects that leverage the funding of other agencies for projects that support resolution of Florida hurricane related building failures.

Summary of Report:

Research was begun on roof coverings and components during 2008-2009 in response in part to the Legislature's Hurricane Mitigation (Roofing) Initiative and in part as extension of the Wind-Borne Debris Studies begun in prior years. The studies included construction and testing of large scale model roof samples at the UF hurricane simulator test facility and testing of soffit components of the roof system. Experimental work also was conducted in wind tunnel test facilities via contract with UF that evaluated wind pressures on roof systems and roof component failure. Results of these tests verified the under-prediction of wind forces at roof edges by the ASCE 7 design standard and demonstrated the acceleration nature of roof cladding failures.

In 2009-2010 the Commission sponsored roof systems research that leveraged larger sources of funding at UF. Commission resources provided wind tunnel tests to determine large scale wind simulator design characteristics and begin test equipment construction. This project leverages larger resources from Florida State University and Oak Ridge National Laboratory to begin roof system evaluations with shingle systems. A small source of funds also went to supplement research and testing of closed cell foam adhesive systems for increasing roof diaphragm resistance to wind forces that is funded primarily by a NOAA Sea Grant.

Each project investigates questions identified during the Commission and its committees and workgroups deliberations of systems for improving hurricane performance of roofing systems. It is proposed that this funding track of leveraging outside funded roof research projects that answer fundamental building construction questions be continued in 2010-2011. Roof research would continue to look at shingle system evaluation and improvement, innovative roof deck strength enhancement systems and innovative roof covering system wind performance. The goal to be ensuring technologies being introduced into the Florida market are appropriately evaluated for their application to this high wind region and ultimately establishing standards for uniform evaluation of different manufacturers' systems.

The study of roof component and cladding and roof attached structures and equipment must be conducted by various hurricane wind effects simulation methods. The beginning point of any such simulation studies is accurate characterization of the wind field and its effects. Then simulation models can be constructed to test various components and attachments. Research conducted in response to the 2004 and 2005 hurricanes has been directed primarily to window and wall components and cladding. Work was begun last year on roof systems. Current year funding will be directed to supporting studies to characterize the wind field on roofs and to leveraging funding for roof systems related research provided by federal organizations including FEMA/DHS, NOAA/Sea Grant and RCMP/DEM.

The DCA has spending authority identified in the legislature approved budget for hurricane related research in FY 2009-2010 that comes from fees collected by DBPR that are transferred to DCA for research and from building permit surcharge fees. However, it anticipates encumbering just half the spending authority this year dependent upon the status of fee collections by next spring.

The Commission previously voted to support DCA funding research projects that leverage the funding of other agencies for projects that support resolution of Florida hurricane related building failures.

General Public Comment

Members of the public were invited to provide the Workgroup with comments.

There were no general public comments provided. Members of the public were provided opportunities spoke on each of the substantive discussion issues before the Workgroup.

Next Steps

The Workgroup will continue to meet as needed to review research project updates, provide recommendations on needed research projects and funding for same, and provide recommendations regarding proposed code amendments relevant to hurricane and storm protection enhancements

Adjourn

The Workgroup voted unanimously, 7 - 0 in favor, to adjourn at 1:00 PM.

ATTACHMENT 1

MEETING EVALUATION

Average rank using a 0 to 10 scale, where 0 means totally disagree and 10 means totally agree.

1. Please assess the overall meeting.

- 8.33 The background information was very useful.
- 9.33 The agenda packet was very useful.
- 9.67 The objectives for the meeting were stated at the outset.
- 9.67 Overall, the objectives of the meeting were fully achieved.

2. Do you agree that each of the following meeting objectives was achieved?

- 9.33 Report Regarding 2010 FBC Amendments Initiatives of Respective Workgroups.
- 9.17 Update Regarding Wind Load Requirements for Air Conditioning Equipment Options for Demonstrating Compliance.
- 9.33 Presentation on FY 2009-2010 Hurricane Resistance Research.
- 9.33 Follow-Up Research Supporting Hurricane Resistant Construction Standards Development.
- 9.33 Identification of Next Steps.

3. Please tell us how well the Facilitator helped the participants engage in the meeting.

- 9.40 The members followed the direction of the Facilitator.
- 9.83 The Facilitator made sure the concerns of all members were heard.
- 9.17 The Facilitator helped us arrange our time well.
- 9.50 Participant input was documented accurately.

4. Please tell us your level of satisfaction with the meeting?

- 9.17 Overall, I am very satisfied with the meeting.
- 9.33 I was very satisfied with the services provided by the Facilitator.
- 9.00 I am satisfied with the outcome of the meeting.

5. Please tell us how well the next steps were communicated?

- 9.33 I know what the next steps following this meeting will be.
- 9.33 I know who is responsible for the next steps.

6. What did you like best about the meeting?

- Great participation by everyone. Excellent facilitator running the meeting.
- D. Prevatt's presentation.
- The end.

7. How could the meeting have been improved?

- Distribution of meeting documents/presentations need to be made available prior to meeting.
- Start on time and have computer working and compatible with presentations.
- Would have liked to see the UF video.
- Technical difficulties with equipment.
- Provide a copy of the presentation by disc.

8. Other Comments.

- Good productive meeting.

ATTACHMENT 2
MEETING ATTENDANCE—PUBLIC

Public Meeting Attendance	
NAME	REPRESENTATION
Bob Boyer	FBC
Dick Wilhelm	FMA/WDMA
Do Kim	Do Kim