To: Cindy Walden
Subject: RE: OIR-B1-1802

From: Ed Callahan [mailto:eec@callahaninc.com]
Sent: Monday, September 19, 2011 3:19 PM
To: Cindy Walden
Subject: OIR-B1-1802

Cindy
While not complete I have attached some random and additional thoughts relative to the above. While there is no question in my opinion as to the need for a revised list, I believe considerable more time is needed on this matter to inform the homeowner, adjust the risk, allow options for the homeowner and prepare him for any changes in the wind for 5 years from now!!

Thank you for giving me the opportunity to prove my thoughts on this matter.

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On Monday September 2, 2011 I received information from the office of insurance regulation concerning a meeting on an upcoming hearing on the 1802 draft and other information for the OIR-B1-1802 Uniform Mitigation Inspection hearing to be held September 20, 2011. Included with the information received was a link for comments and recommendations on the 1802 draft (An inspector's check list). Of special importance to me was a study performed in 2002 on Development of Loss Relativities for Wind Resistive features of Residential Structures and a 2008 ARA study on Florida Residential Wind Loss Mitigation. I had previously received a copy of the 1802 draft and submitted comments on item #5 of the draft. Indicated below are the comments I submitted concerning the classifying of Hip v. Gable roof geometry. (I was not aware of both of these studies at the time these comments were sent).

Classification of HIP roof v. GABLE shaped roof geometry

It is recognized that Hurricane Andrew was one of the most destructive storms to hit the coastal regions of Florida. Andrew had sustained winds of 140 mph with gusts up to 164 mph as it moved through southern Florida. In addition, the hurricane force winds extended 45 miles from the eye. The material cost of the disaster alone in 1992 was estimated at 20 to 30 billion dollars. Accordingly, this would reflect insurance concerns and related premiums charged to affected homeowners. In 1992 the writer participated as a consultant on a truss industry Andrew damage assessment team. These opinions are limited to observed damage after this storm relative to classification of a hip roof v. a gable roof on the proposed Uniform Mitigation Verification Inspection Form.

Comment

Hip roof construction And simple gable shaped roof Geometry is a roof shape commonly formed by trussed roof construction (trussed rafters) or conventional framing constructed of common rafters and ceiling joists. Conventional framing for framed homes or portions of the roof framing dependent upon the spans are also constructed of only rafters and in flat roof construction of joist framing. Roof pitches vary as can bearing support locations including, if necessary, the differentiation between building widths, story height i.e. one story and two story and adding additional considerations for the inspector who completes the check list. An incorrect interpretation may affect discounts to be applied to insurance premiums.

With hurricane Andrew, Gable ends for gable roof construction were more severely damaged than hip roofs. It was presumed that this damage occurred as a result of suction on the leeward side of a home. Typical construction of the gable for trussed rafters consists of 2x4 studs positioned to be loaded on the flat (1-1/2inch face). The higher the pitch of the roof the longer length of some of the studs and the importance of lateral bracing to prevent excessive lateral bending as well as buckling from some loading conditions.

Hip roof systems present an advantage due to their aerodynamic shape in addition to the inherent bracing characteristics unique to hip trussed roof construction. This is due to the "end jacks" which are an integral part of hip-roof system framing. However, it was observed that roof sheathing was equally lost from both roof and gable systems. This sheathing loss was representative of the higher pressure strips defined in ASCE-7 under components and cladding.

No aerodynamic testing (wind tunnel tests) has ever been performed for such construction. A question arises as to any changes in aerodynamic effects with hip roofs designed with valley set framing planted (constructed) on top of the trussed roof on which the valley sets are fastened. This framing is assumed to be supported and anchored to the

main truss system upon which it rests. This primary framing system is assumed to be independently anchored to resist the design loads regardless of the "plant-on" valley set framing. Therefore, the roof should still be classified as a hip roof and not a gable roof. One of the valley set members may be located on an exterior wall (the longest span) exhibiting the appearance of a gable between the hip ends (for a rectangular building). This member may require lateral bracing of the web member(s) but classifying the entire roof as a gable roof as a result would be incorrect as well as raising the insurance premium of homeowners. Unless this information (testing) indicates otherwise it is a my opinion that structures that have the end-wall conditions entirely constructed with standard hip roof framing as the primary framing system should be classified as HIP ROOF construction and not as a gable roof.[1]

As is frequently the situation when hours have been spent by a competent group of technical experts developing standards or documentation that will be presented at a public hearing, for review by the general public, the history which led to this work may not be fully understood. A history presented was apparently a study begun in 2002 by ARA which presented differences in Florida building code requirements (depending upon the date of issue and adoption) which might have resulted in differing hardening (wind protection) requirements with a follow up ARA study completed in 2008. It was apparently recognized as a result of damage surveys (and newer research) that even if the home was constructed in conformance to the code, later codes might result in homes with less damage and some uncertainty as to insurance risk(s).

To cope with such complexity and concerns, a check list was created to be used by an inspector which indicates the actual construction (framing, fastening, reinforcement, hardening, etc.). The 1802 draft as I understand it at the present time considers differences up until 2001based on the ARA 2002 report. As indicated, I was not aware of either of these studies and have begun a review of both the ARA 2002 as well as the 2008 ARA reports which appear to be quite detailed. In as much as the 2008 study could incorporate more conservative changes possibly as relates to FBC updates and inspections every 5 years for existing as well as new construction, what would be the forward thinking on this matter as relates to homeowner understanding and responsibilities ?

After review of portions of the study I am left with questions as to how the process works as well as how to dumb it down for the homeowner? Would it be assumed that with incorporating the check list after final public hearings an inspector would initially meet with the homeowner and explain the check list, and prior to submission of the completed list to an insurance company for coverage renewal, the homeowner be given the opportunity to update the construction accordingly or receive an increase in premium? A large portion of (not all) the Andrew hurricane damage was a result of incomplete or inferior construction practices as opposed to code requirements such as Pan anchor Straps not fastened, ineffective nailing of roof deck, no gable end stud bracing or inadequate gable end bracing As a practical matter many failures (gable end) observed with hurricane Andrew and Charley could have been prevented by simply adding the required gable end stud bracing where required. In as much as comments submitted on the draft should be understandable to any committee for final action it is equally important that the average homeowner understand the ramifications of the draft as well as options prior to final publishing of the draft! I.e. harden the construction or pay an increased premium. In the event of a possible upgrade in 5 years guided by the 2008 report, the homeowner would be

[1] While the above reasons were presented on some of the construction differences between Hip roof v. Gable roof construction, it should not prevent the strengthening of gable end bracing and gable end installation to improve a buildings wind resistance capabilities. There should exist a procedure whereby the inspection results would allow for method(s) to improve such hardening capabilities and allow for the homeowners premium to be modified accordingly.

expected to understand this as well. Studies and tests made indicate risk involved on the part of the insurer in my opinion not only as a result of code conforming structures built at earlier times but newer information being presented learned from newer research. As such changes are incorporated into changing risk for homeowners, the general public needs to be informed as to how they can plan for any such changes. Periodic revision(s) of check list(s) seems to resolve only half of the problem concerning homes affected by damaging hurricanes... Informative uniform and detailed literature educating the public should also be provided with an agreed upon check list given to the homeowner for planning purposes for the next 5 years and beyond (No surprises later) before they be are given a completed check list. Such information should consider how retrofit (hardening) will effect premiums

Indicated below are additional thoughts relative to the check list:

Roof Deck Material

(Deck sheathing attached to structural roof framing)☐ 7/16" min. thickness plywood
A ☐ 7/16" min. thickness OSB
B ☐ T&G wood decking
C ☐ Two inch thick Dimension lumber
D ☐ Other _____
E ☐ Unknown or not identified

Structural Framing supporting Roof deck
A ☐ Field fabricated wood trusses
B ☐ Plant fabricated wood trusses
C ☐ Field fabricated truss frames
D ☐ Plant fabricated light gauge cold formed steel trusses
E ☐ Wood common framing (wood rafters/joists)
F ☐ Parallel chord "4x2"fabricated wood trusses
G ☐ Other_____
H ☐ Unknown or not identified

Fastening Connecting Roof Deck to Support Framing
A ☐ 6d common nails
B ☐ 8d common nails
C ☐ 10d common nails
D ☐ 8d Ring Shank nails
E ☐ Staples
F ☐ Adhesive* (Credit given for any proprietary products such as Foam Seal^{R} which is used to Connect the interior interface of deck and deck framing
G ☐ Other_____
H ☐ Unknown or not identified

Fastener Spacing
A ☐ 6" along perimeter board edge& 12 inches intermediate (in the field)
B ☐ 6 inches along perimeter board edge & 6 inches intermediate (in the field)
C ☐ 24 inches on center
D ☐ 2 nails into deck boards
E ☐ 10d over batten decking
F ☐ Other _____
G ☐ Unknown or not identified