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Residential Code of New York State Technical Subcommittee
State Fire Prevention and Building Code Council
New York State Department of State
Division of Code Enforcement and Administration
41 State Street, Suite 1130
Albany, New York 12231-0001

Re: Wind Zone, Fenestration and Framing Issues in the NYS Building Code

Dear Ms. Nemeth-Weisser:

As architects practicing in the East End of Long Island, a region which falls entirely within the 120 MPH wind zone, we now have nearly five years of experience working with the current New York State Building Code requirements for fenestration and framing. We believe that the requirements as currently defined are not in the interest of the primary objective of the Codes, the public health, safety and welfare, and that they may actually contribute to the endangerment of the public. Our experience has shown us that these requirements need to be amended. We are therefore proposing to the New York State Fire Prevention and Building Code Council the following changes, which we believe will help to bring the Code into coincidence with its primary objective, the public health, safety and welfare, with the added benefit of eliminating, in difficult economic times, some unnecessary construction and its attendant costs:

- 1) *The present wind zone classifications should be amended to define a Coastal Zone for the 120MPH/3 Second Gust for structures within the first half mile of the ocean, and to include structures within the second half mile only if they are not protected by woods, hills or man-made structures.*
- 2) *For wind zone design and engineering of the framework and envelope in that Coastal Zone, allow options for the partially enclosed design method (windows excluded) or for the required design pressure (windows included), but do not extend a requirement to satisfy one of these options beyond the aforesaid Coastal Zone.*
- 3) *From the accumulated evidence to date, allow fixed site-built glazing, to be excluded from the calculations by election of the partially enclosed design method, or to be installed according to prescriptive standards that respect the design pressure requirements.*
- 4) *Delete from the Code the requirement to protect windows against ballistic impact (by strengthening glass, panels, shutters or other devices), as a protection of contents, instead of a protection of the health, safety and welfare of the occupants.*
- 5) *Include important specific prescriptive standards for wood framing directly in the Code, instead of by reference to external documents.*

While many of us have expressed the concern that designation of our region as a 120 MPH wind zone is an unfair burden to start with, what really is at issue is how our State Code deals with that designation. What concerns us is the false sense of security that the panels, protective devices or impact-resistant windows are giving the public. Above all, our Code should address matters of the public health, safety and welfare. Our Code should include measures meant to ensure that structures will not fail under the design circumstances, but it should not include measures principally intended to protect contents. Protecting contents is an option the public already has, appropriate as the province of insurance and informed choice, but not as a Code requirement.

The present strategies in the New York State Building Code for window protection (and strengthening) appear to be directed at the protection of contents rather than the health, safety and welfare of the public, and may actually cause an increase in danger to the public. New York State should: preserve and improve the codification of partially enclosed structural design for the building framework as the fundamental alternative to the design pressure strategy for the entire building envelope; should refuse to include standards in the Code which favor one industry over another; and should remove the tandem liabilities of opening protection or glass strengthening from the New York State Building Codes.

Very truly yours,

Stephen A. Lesser, AIA
Chair, AIA Peconic Codes Committee

cc: Ron Peister, R.A., Director, New York State Department of State Division of
Code Enforcement and Administration
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Ian McDonald, President, AIA Peconic Chapter
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Members of the Codes Committee, AIA Peconic Chapter

THE FOLLOWING PAGES ELABORATE OUR VIEWS ON THESE PROPOSALS:

1) **WIND ZONE VS. ACTUAL CONDITIONS ON THE GROUND**

The present wind zone classifications do not adequately reflect conditions on the ground - at least for eastern Long Island - and should be amended:

Declare for the 120MPH/3 Second Gust Zone a physical limit of application of the Coastal Zone, defined as the first half mile from the water, and including the second half mile from the water only if the surrounding or abutting land is not wooded, hilly or built-up with man-made structures.

The Code already takes the difference between wind zones into account, but our contention is that it does not do this in a manner that reflects what happens to our structures in protected areas of the zones, that is, wooded, hilly or otherwise built-up locations, and that it distinguishes the Coastal Wind Zone only as a broad, unified and unprotected area. Shelter Island, for instance, a central part of our East End, does not get its name accidentally.

In fact, in our region, there is some question as to whether or not *water* - the advance of the sea - is not a far graver threat to the public health, safety and welfare than wind. The Gulf Coast storms - Katrina *et. al.* - demonstrated the very powerful effect of the coastal surge in hurricanes. For many of us in the East End, these storms were reminiscent of the damage wrought here by the great hurricane of 1939, as well as Hurricane Carol in 1954. Coastal surge can make "opening protection" meaningless, since - in such large wind storms - the structures to be protected can be and were critically damaged or wiped away by wind-driven water. This is far beyond the level of potential threat that the wind zone standards are meant to or can adequately address.

2) **DESIGN PRESSURE ENVELOPE VS. PARTIALLY ENCLOSED DESIGN METHOD**

The requirement to design with pressure tested windows (as well as skylights) appears, rather than to be a protection of the occupants (and therefore by implication of the public health, safety and welfare), to be a protection instead of interior contents, and should be rewritten to reflect that this provision is a matter of choice and should be reflected in insurance rates rather than required in the Code.

Allow options for the Coastal Zone to include, first, engineering the framework and partial envelope (windows excluded) for the required design pressure according to the partially enclosed design method, and, second, engineering the complete envelope for the required design pressure (windows included), but do not extend a requirement to satisfy one of these options beyond the aforesaid Coastal Zone.

Both of these methods of design do address the primary safety issue, the need to preserve structural integrity in the face of severe wind loads. An envelope designed to meet the predicted wind-caused pressure should not fail at that pressure. While it may not result in an envelope that protects interior contents, the partially enclosed design method will adequately address the safety issue.

When subjected to the design stresses, properly built partially enclosed structures should not fail. In both the Code and practice, this means that partially enclosed design adequately addresses the public health, safety and welfare issue: injury or loss of life due to structural failure. Furthermore, in this method, the critical calculation assumes that the windows are not actually there (they have blown out) and, therefore, that the windows used should not have to meet the pressure test.

In buildings engineered with the partially enclosed design method, *both* manufactured *and* site-built windows should be excluded from the design pressure requirements, since the building framework, with its envelope (but without the windows), is the structure under consideration.

3) **FIXED SITE-BUILT WINDOWS**

The present testing requirements are inappropriately prejudicial towards manufactured windows and should be rewritten to allow fixed site-built glazing installed according to prescriptive standards that respect the design pressure requirement. Fixed site-built window glazing is to be excluded from the design pressure requirement by election of the partially enclosed design method (described on page four preceeding), but prescriptive standards can still be set for that type of window construction.

Mathematical calculation (and/or experience with design pressure window units) permits design-tested prescriptive limits for the fixed glass panel-to-jamb relationship for windows to be built on-site. In following the partially enclosed design method, in which windows are effectively excluded from the calculations, neither site-built windows nor manufactured units should be required to meet design pressure standards.

Because of the prohibitive cost attached to the tests affirmatively required as labels by the new Paragraph 1714.5 in Section 1714, Preconstruction Load Tests, as well as Chapter 24, Glass and Glazing, site-built windows have been virtually eliminated from residential construction, further squeezing the few tools owners, architects and builders are left with to control spiraling construction costs, let alone having the unintended consequence of providing a Code-mandated guarantee of income to window manufacturers who have the competitive advantage of being able to test representative samples in the factory and thereby afford the required testing programs.

The argument that site-built windows cannot be prescriptively defined does not hold water:

- 1) Enormous practical and mathematical evidence for prescriptive standards already exists from the manufactured windows tested to date, evidence which can be used to establish adequate standards and generic details for site-built windows.
- 2) Ballistic protection is described currently in the Code *prescriptively*, using protective plywood panels, which are a rough, site-built system constructed according to 'one-size-fits-all' *prescriptive* standards.
- 3) Setting standards for construction is always the issue in the Code; guaranteeing that they will be met is beyond the ability of the Code. The effectiveness of tested, manufactured windows, which rely upon furnished units replicating the tested assemblies as well as the accuracy with which the jamb installation - let alone the adjacent enclosure fabric - is made, is no more of a guarantee of satisfactory construction than a carefully site-built jamb with field glazing.

4) **BALLISTIC OPENING PROTECTION**

Rather than being a warranted protection of the occupants (and, by implication, of the public health, safety and welfare), the requirement to protect windows against ballistic impact - by the use of strengthened glass, panels, shutters or other devices – appears to be an unwarranted protection of contents, and should be included in the Code only as an option which, if employed, may reduce an owner's insurance rates.

Deleting ballistic opening protection from the Code (or leaving it in as an owner's choice) has the added consequence of removing a requirement in the Code which in one form is potentially threatening to the safety of firefighters (strengthened windows) and, in another, threatening to the safety of occupants (panels or shutters) or both, instead of protective of the public health, safety and welfare.

Since wood panels are the obvious preference of many builders, and/or homeowners, because they are a relatively inexpensive solution to the present Code requirements, it should be noted that there are numerous impractical, negative side effects to their installation:

- 1) Installing the panels in anything but zero wind conditions would be a dangerous undertaking, especially if a ladder is involved.
- 2) It is unlikely (probably *very unlikely*) that the panels will actually be installed in the face of an approaching storm by many homeowners here who reside permanently elsewhere.
- 3) If the panels do get installed, homeowners face a safety issue while they are up (which we enlarge upon further below).
- 4) Once the panels are removed, homeowners face a degradation of the integrity of their dwelling, particularly due to water penetration from flashing failures caused by panel attachment penetrations.

Does the degree of liability really warrant ballistic protection in the Code, since there are almost no deaths on record in the continental US attributed to wind-blown debris? The statistical evidence of injury due to glass penetration by debris at winds under 120 MPH is reportedly insignificant.

Is ballistic protection appropriate for the windows when the surrounding enclosure they are installed in does not meet the same standards? Standard 2x4 and 2x6 walls have reportedly failed the Florida missile test for windows.

Isn't the public getting a false sense of security from both the standards of the ballistic test and the pressure test? In 120 MPH wind zones, window protection or strengthening will have little if any protective effect in winds over that magnitude. Doesn't the public imagination picture cinematic-style tornado force winds instead of the hurricane-force winds projected for a typical severe wind zone? The public may well be feeling that these approaches provide protection in far more extreme conditions than intended.

When strengthened windows are used, they endanger both the potential occupants and the potential firefighters and rescuers. In our area, power outages are not uncommon during wind storms because of falling overhead lines. As a consequence, the use of combustible devices, to provide light or heat is also a commonplace during such storms. The two circumstances do not mix well. Not only - if paneled (shuttered) houses are occupied - may rescuers have difficulty finding the occupants in an emergency, let alone difficulty getting them out, but the strengthened windows make this task unnecessarily arduous and dangerous, since a fireman must carry with him and use a diamond-bit chainsaw to go in or out through strengthened glass windows.

It is specious to argue that shuttered houses are expected to be vacated, since the Code does not require shuttered houses to be unoccupied during a severe wind storm or hurricane. If the Code did make this law, it would be difficult to ensure that shuttered houses were unoccupied, therefore contributing to the hazardous nature of opening protection. Moreover, if we accept that ballistic-defended windows (those covered with panels or other protective devices) are intended to be on an unoccupied house, why - *since it is not intended to protect occupants* - is that provision in the Code? In Paragraph R101.3, the Code is intended to protect the public health, safety and welfare, but in the former argument, no one is supposed to be there to be protected. This is therefore a protection of property, not people.

We are left with an overwhelming concern that the currently required installation of strengthened windows or panels is contributing to potential situations that will likely result in disaster that includes the loss of life. A strong case can be made that opening protection, instead of increasing safety, is actually a hazard to the public. Opaque panels - through which firefighters cannot see - may become a hazard for occupants. Impact-resistant glass has been shown to be a serious fire-fighting hazard (*whether or not during a wind storm*) as well as a hazard to occupants, since it cannot be penetrated without the special devices described above. And because strengthened windows using this glass do not appear outwardly to be different from conventional windows, they may be lethally dangerous in an emergency, since rescuers can lose valuable time trying to determine what tools to muster to break them.

These considerations all point to the ever-present importance of our ability to think clearly and independently about our State Building Codes in regards matters of the public health, safety and welfare - matters with which we expect our own State Codes to deal with in the highest regard, even if that means going against the 'one-size-fits-all' approach first put forth in the International Code.

5) **PRESCRIPTIVE STANDARDS FOR WOOD FRAMING**

In order to avoid continuing confusion and misinterpretation in the field, the lack of any prescriptive wood framing standards in the Code (except those included by reference to another standard) should be addressed by including specific minimum prescriptive standards for some important - but not necessarily all - elements of wood framing.

Even if we cannot have a generally applicable prescriptive wood framing standard (similar to cold-formed steel stud) in the Code, we should introduce into the Code alternatives to certain standards for wood framing that are otherwise incorporated into the Code only by reference to external documents (for instance, solid decking under wood shingle, or sheathing in lieu of strapping in appropriate locations in the load path).

The wood framing requirements are not clearly understood because they are not explicitly stated in the Code, while the standards that are included by reference appear to aid the business of the strapping industry:

- 1) Proper nailing of plywood, for instance, has been shown to add diaphragm performance that applied strapping is unable to provide, and required redundant multiple nailing to install strap connectors has the negative consequence of splintering studs at their most important joint in the framing.
- 2) Furthermore, the frequency of inaccurate installation is often documented by the manufacturers, who furnish their product along with the caveat that it will lose their guarantee if inaccurately installed, especially if not nailed through the correct openings. Yet the standard construction sequence - in which siding overlays strapping, and is nailed to the studs through the strapping - is itself a certain guarantee of damage to the strapping sufficient to void the manufacturers' warranties.

It is hard to believe that it is not possible to prescribe at least some essential construction standards for wood framing - plywood sheathing under wood shingle roofing, for instance, or proper nailing of sheathing in the load path in lieu of strapping - that will be adequate to meet the wind zone pressures and then to describe an increment in those standards to meet partially enclosed design, as the Codes Division seemed to be inferring from its November 21, 2003 Memorandum. The Codes Division seemed to be saying in this Memorandum, which analyzed the Code requirements for high wind construction, that, with a little bit of 'beefing up', the way houses are traditionally built on Long Island would satisfy the greater requirements of partially enclosed design in the Code.

Perhaps the International Code Council was overly influenced by the lightweight construction standards in use in the South, standards which were highlighted by the damage done by Hurricane Andrew. Understanding that

the International Code Council is a strong and effective organization, doesn't it beg the question of New York State's inability to introduce any prescriptive wood framing design standards, when it alters each new issue of the International Codes every time it adopts them?