

STATE BUILDING CODE INTERPRETATION NO. I-16-04

October 28, 2004

Re: I-16-04

The following is offered in response to your October 20, 2004 letter to me in which you seek a formal interpretation of the provisions of Section R301.2.1.1 of the 2003 International Residential Code portion of the 1999 State Building Code. Your questions concern code requirements for residential structures and accessory buildings in Wind Speed Areas of 110 mph or greater. For clarity, I have based several of my responses on the AF&PA Wood Frame Construction Manual – 2001 (WFCM), one of the standards referenced by the code.

Question 1: What information is required to be shown on the plans to ensure code compliance?

Answer 1: The WFCM contains engineered design methods to calculate specific forces that must be resisted by connections (Chapter 2) and also contains prescriptive solutions for such connections (Chapter 3). The standards place specific limitations on buildings following either course. If those limitations are exceeded, the standards cannot be used and the design must be completed by a design professional licensed or registered to practice in the State of Connecticut in accordance with accepted engineering methods and practices. If the limitations are not exceeded and the engineered design solutions of Chapter 2 are chosen, the design must likewise be performed by a licensed or registered design professional and the calculations upon which the connections are based as well as the resulting size of the connector should be part of the construction documents submitted.

If, however, the permit applicant chooses the prescriptive requirements of Chapter 3, the services of a registered or licensed design professional are not required. Chapter 3 further allows the choice of utilizing a table to select the force that the connection must resist or of choosing a prescriptive solution for any given connection. If this path is chosen, the construction documents must show either the force to be resisted and the selected connector, or must specify the prescriptive connection selected; but since the solution relies on a selection from a table, rather than a calculation, no calculations need be submitted. Keep in mind that in a single building or structure, the applicant may choose some designed and some prescriptive connections. This is acceptable as long as the complete solution comes from the same referenced standard. It would not be appropriate to mix and match connection solutions from different standards.

Question 2: Are accessory structures such as sheds and decks (both freestanding and attached to dwellings) required to comply with the high wind requirements?

Answer 2: Yes. Neither the code nor the referenced standard provide exceptions to the high wind requirements for accessory buildings or structures. In fact, Section R101.2 of the code states specifically that the provisions of the code apply to accessory structures. The rationale for this is that in the event of a high wind event, an unprotected accessory structure, or portions thereof, could become airborne and cause damage to adjacent primary structures.

Question 3: Must a structure in a high wind area that is supported by piers be designed by a licensed or registered design professional to evaluate the ability of the piers to resist uplift?

Answer 3: If the building official performing the plan review is concerned that the given foundation system is inadequate to resist uplift (highly unlikely with a foundation wall system, but conceivable using driven or poured piers), Section R301.1.3 of the referenced code gives such official the authority to require engineering of the non-conventional element. The engineering design would only have to cover the piers themselves when the balance of the design was performed using the prescriptive methods.

Question 4: When an additional floor is added to an existing structure (second to one-story or third to two-story) is it necessary to design a complete load path for the new story all the way down to the foundation?

Answer 4: No. The code requires that the new work be compliant (ie: have compliant connections from the top of the new work to the point of attachment with the existing structure), but does not require upgrading of the existing portions of the dwelling, thus the code would not require the addition of connections through the existing stories down to the foundation. Any alteration to the existing portions of the dwelling must likewise be code compliant, but any portion unaffected by the alteration may remain as existing, providing no unsafe condition exists as defined by Section R115.

Question 5: When a building has cantilevered floor joists in excess of the limitations of the referenced standard, how is that design handled?

Answer 5: As stated in Answer 1, if the limitations of the referenced standard are exceeded, the standards cannot be used and the design must be completed by a design professional licensed or registered to practice in the State of Connecticut in accordance with accepted engineering methods and practices.

Question 6a: Do foundation systems for manufactured housing units have to meet the high wind area requirements?

Answer 6a: Yes. Section AE501.1 states in part that manufactured home foundation systems shall be designed and constructed to sustain all loads specified within the code. All manufactured home foundation systems must be designed to resist wind, but those installed in a wind speed area of 110 mph or greater require special attention.

Question 6a: Do we assume that the manufactured housing units are being designed to the same requirements?

Answer 6b: No. The manufactured housing units themselves are constructed to HUD standards which may or may not bear any relationship to the adopted code. In any case, the local building official has no jurisdiction over the unit itself, only over the foundation system and the other items covered by Appendix E of the referenced code.

Question 6c: If the manufactured housing unit does not meet the code requirements for high wind, must its accessory structures (decks, sheds, garages, etc.) do so?

Answer 6c: Yes. Sections AE301.3 and AE305.5.2 make it clear that permits and inspections are required for all accessory structures, which must thus be code compliant.

Question 7: When an addition is placed alongside an existing building, must the addition be evaluated as a separate structure or does one take the existing abutting wall into account also?

Answer 7: Since the code requires the new work to be code compliant without requiring changes to existing portions of the structure, the choice would lie with the permit applicant. If advantageous to them, and assuming it is possible to gain access to the existing wall, they could choose to include it in the force resisting system. On the other hand, if their desire is to leave the existing structure as is, the connections and shear walls could be incorporated into the addition itself without requiring the existing building to be retrofitted.

Question 8: Is it appropriate to utilize information from a variety of referenced standards if such information is not all contained within one standard? The example given is that the WFCM contains no information regarding foundations, but the SSTD 10 standard does.

Answer 8: No. The referenced standard, like the code from which the requirement stems, is to be considered a system whose parts are interrelated. It is inappropriate to mix and match requirements from different standards. The WFCM clearly states at Section 1.1.1 that structural elements not within the design provisions of the manual shall be designed in accordance with the governing building code. In the case of foundation design, one must then use the foundation provisions of the 2003 IRC.

Question 10: Is the State of Connecticut considering adoption of a prescriptive solution similar to that in effect in Rhode Island for high wind design and construction?

Answer 10: Yes. In addition, the Office of the State Building Inspector is considering revising the wind speeds in Appendix M to be somewhat less restrictive.

Question 11: In municipalities with wind speeds equal to 120 mph, glazed opening protection is required by Section 301.2.1.2. This protection can take the place of compliant window units, storm shutters or wood structural panels cut to fit the glazed opening and provided with attachment hardware. How does this requirement apply to projects other than new construction that involve windows; such as change of occupancy, additions, alterations and window replacement projects?

Answer 11: Any addition or alteration that involves installation of a completely new window unit (glazing, sash and frame) would require that the new window unit must comply with the new requirements. Any window that is being replaced by virtue of removing the entire existing unit (glazing, sash and frame) would also trigger the requirement for compliant windows, storm panels or wood structural panels and attachment hardware (screws). In keeping with other sections of the code, existing windows that are not being changed in buildings undergoing addition or alteration do not have to meet the requirements for new windows. Nor would a change of occupancy trigger a requirement to upgrade the windows for glazed opening protection.

A window replacement or repair that only involves glazing or sash replacement would not require compliance with R301.2.1.2, since the unit as a whole (glazing, sash and frame) must be designed to resist the wind forces. In other words, it does no good to put compliant glazing or sash into a frame that is not designed to resist the wind loads since the net result will be the glass or sash being blown out of the non-compliant existing frame, thus resulting in a breach in the exterior wall which is what this code section is designed to prevent.

Finally, it is important to note that this section is specific to windows only. Exterior doors (including swinging, sliding, bi-fold or other configurations) and garage doors are not covered by this requirement and thus need not comply.