BBRS Official Interpretation No. 2013_06

Date: July 9, 2013

Subject: 8th Edition Base Code; Type III Construction, Exterior Bearing Walls, Application of §603.3, §705.5 & §703.3.

Background/Discussion:

In recent years, numerous developments (mostly R-2, residential uses – apartments and condominiums) are utilizing Type III Construction for five story wood framed buildings (modular and conventional construction methods). The basis includes a single story height increase allowance for sprinklers[1] (§504.2) added to the base Table 503 height limit of four stories (R-2, Type III Construction).

A condition of Type III Construction is that the exterior walls be constructed of noncombustible materials. However, in accordance with §602.3, Fire Retardant Treated Wood (FRTW) may be substituted for the interior structural system of the exterior walls rated for 2 hours or less: interior and exterior skins for the walls must still be noncombustible materials (typically gypsum serves as the interior sheathing and the exterior sheathing is cement board or similar product passing ASTM E136.)

The code approach above has lead to a variety of interpretations from building officials and others with regard to application of:

1. §705.5, which deals with the fire rating of exterior walls depending on separation distance, and on the need to rated the exterior wall from the exterior side, and

2. §703.3, on the determination of whether a proposed assembly has an acceptable fire resistance rating.

With regard to §705.5, interpretations vary as to the application of this section to bearing walls. More specifically, some interpretations have been issued that indicate §705.5 is not applicable to bearing walls[2] and therefore the allowance which omits the rating from the exterior side when a fire sepration distance of 10 feet or greater exists, is not applicable.

In discussions with staff from the International Code Council, as well as review of the Commentary to the *International Building Code 2009* (IBC), it is clear that §705 is applicable to both bearing and nonbearing walls. More specifically, §705.5 states in part that: *'The required fire-resistance rating of exterior walls with a fire separation distance of greater than 10 feet shall be rated for exposure to fire from the inside."* It is noted, that the fire separation distance criteria was increased from 5 feet to 10 feet with the 2009 IBC cycle.

With regard to §703 (and more specifically §703.3), a frequent issue is the limited tested and/or listed exterior wall assemblies available demonstrating two hour fire resistance from the interior only. This consideration, along with details necessary to demonstrate compliance with energy code provisions,

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[1] NFPA 13 sprinkler design required for 5th story

[2] For instance this confusion may arise when one reads Table 601 and notes f and g pertaining to bearing walls.

frequently results in unique exterior wall designs that have not been tested or listed. As such, alternative methods for determining fire resistance must be used as identified in §703.3.

§703.3 allows 5 options for alternative determination:

1. Fire-resistance designs documented in sources.
2. Prescriptive designs of fire-resistance-rated building elements, components or assemblies as prescribed in Section 720.
3. Calculations in accordance with Section 721.
4. Engineering analysis based on a comparison of building element, component or assemblies designs having *fire-resistance ratings* as determined by the test procedures set forth in ASTM E 119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.

- Option 1 is not usable as frequently no documentation exists as yet for the unique designs.
- Option 2 is not usable as the prescriptive methods are general in nature and frequently differ from the unique design.
- Option 3 is not available as the prescriptive methods for wood assemblies is limited to fire resistance ratings of one hour or less per §721.6.1.1.
- Option 4 and Option 5 are therefore the remaining available options. Frequently, building officials are opposed to Option 5 so ultimately §703.3 defaults to Option 4.

Option 4 uses comparison of the wall elements to assemblies tested in accordance with ASTM E119 (or UL 263). Engineering judgment must be applied in the comparison and frequently not only is a tested assembly used in the analysis, but elements of both Prescriptive and Calculated fire resistance may be used to support the judgment.

It is important to note that §703.2 Exception limits exterior bearing walls performance relative to ASTM E119. More specifically, the unexposed temperature rise and ignition of cotton waste criteria are required to comply with the fire resistance rating required for a nonbearing exterior wall with the same fire sepration distance. For example, an exterior bearing wall with a fire separation distance of greater than 30 feet needs to comply as a nonrated nonbearing wall: i.e. the temperature rise and ignition of cotton waste criteria are nonconsequential.

QUESTION 1: Are exterior bearing walls that are provided with a fire separation distance of more than 10 feet required to be rated from the exterior side?

ANSWER 1: No. Section 705.5 applies to all exterior walls (bearing and nonbearing walls) and specifically identifies that a rating is not required from the exterior side when a fire separation distance greater than 10 feet is provided.

QUESTION 2: May Option 4 of §703.3 be used in conjunction with §703.2 Exception to determine the fire resistance rating of an exterior bearing wall assembly?

ANSWER 2: Yes. §703.2 Exception may be considered under Option 4 to §703.3. Since Option 4 relies on Engineering Analysis, the building official may require a report sealed by the *registered design professional* or professionals issuing the judgment.