

Changes in Codes - Save Lives
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There's an old expression ... "Good enough just isn't good enough"

For writers of the standard building codes, that expression is pretty accurate. Each time the code is reviewed, it's a sure bet that there will be changes. Some of those changes lighten up restrictions to take into account significant technology improvements. More often, the restrictions become tighter in an attempt to eliminate recognized potential errors in system design or installation that can cost the lives of building occupants and/or first responders.

Certainly, that is the case regarding changes in the code section concerning perimeter fire protection in mid-rise and high-rise buildings. While there was only one change in this section, allowing the perimeter void installation to conform to the new ASTM E2307 test method, that change alone had quite an impact.

There are two code references that are of particular importance in perimeter fire containment. If readers of this article have the IBC code book handy – the old version or the new one – this is an opportunity to highlight the important sections.

The first code reference is in section 704.9. Here the code writers are trying to protect against the vertical spread of fire on the exterior of the building. The code requires three-foot or greater vertical spandrel girders or at least 30" horizontal protrusions, such as balconies, on buildings more than 3 stories high when not equipped with an automatic sprinkler system.

Section 713.4 - Exterior curtain wall/floor intersection focuses on maintaining the integrity of the floor slab. This section requires the filling of the void (safing area) between the floor slab and the exterior curtain wall. This must be done to protect against the interior spread of fire, between the floor slab edge and the curtain wall. The void is to be sealed with an approved system or materials to prevent the passage of flame and hot gasses, and must maintain the same fire resistance rating as the floor assembly.

As mentioned earlier, a change in this section of the code adds that the installed material can either meet the requirements of ASTM E119 or it can be a system "installed in accordance with ASTM E2307," which is a recently adopted two story fire test.

Now let's address an important caveat in the code that results from practical application.

Section 704.9. Vertical separation of openings, provides that separating devices such as spandrel girders or exterior protrusions are not required for buildings that are three stories or less in height, or are they required for buildings that are equipped throughout with automatic sprinkler systems.

On the surface, section 704.9 code language eliminates the need for spandrel panels in sprinkled buildings. However, the code language does not eliminate section 713.4. Therefore, taken in context with section 713.4, it is clear that *the assembly of the spandrel area along with the perimeter void must be protected and must remain in place to provide at least the same fire-rated performance as the floor slab.*

Without a tested assembly to assure that the curtain wall structure won't be compromised in event of a fire, there can be no assurance that the protection in the perimeter void will remain in place. If the curtain wall gives way, perimeter void protection fails.

This has already been proved in a testing environment. Mineral wool safing was installed between a floor slab and an unprotected glass curtain wall. Just 5 minutes into the test, the curtain wall glass failed, allowing the safing insulation to dislodge¹. In other words, even though the void between the curtain wall and the floor slab edge was filled to meet the intent of the code requirement, the assembly failed to meet the fire-rated expectations of the building codes.

Breach of a floor barrier in a five minute span calls into question the exceptions stated in the current code under section 704.9. Can we really expect the fire department response time to be better just because a building is less than three stories tall?

Prudent readers of the code will recognize that properly protected spandrel panels at the curtain wall/floor slab intersection are essential for truly meeting code requirements. Assemblies tested to ASTM E2307 provide those assemblies. There are no exceptions.

References:

1. American Society for Testing Materials, "ASTM E2307-04 – Standard Test method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using the Intermediate-Scale Multi-story Test Apparatus", Volume 04.07, Building Seals and Sealants, Fire Standards: Dimension Stone, 2005
2. International Code Council, International Building Code, Section 704.9 "Vertical separation of openings" and Section 713.4 "Exterior curtain wall/floor intersection", IBC 2006.
3. Loss Prevention Council, "Fire Spread in Multi-Storey Buildings with Glazed Curtain Wall Facades", LPR 11:1999
4. Shriver, James C. and Cordts, Brandon, "Clarifying Curtain Wall Firestop Standards", Technical White Paper, 2001
5. www.fcia.org, Firestop Contractors International Association, website – 2006
6. www.firestop.org, International Firestop Council, website – 2006
7. www.afscc.org, Alliance for Fire and Smoke Containment and Control, website - 2006