# CTC Meeting #26
# April 8 - 9, 2013
# Unenclosed Exits

The following 2013 Group B changes have been compiled for the above noted CTC Area of Study. Code changes with an (*) indicate CTC sponsored code changes. These changes are intended to serve as the agenda for the CTC in order to establish CTC positions, if any, for the upcoming 2013 Group B Committee Action Hearings.

**F137-13**

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# F137 – 13
## 202, 903.3.1.2.2 (New) [IBC [F] 903.3.1.2.2 (New)], 1104.21

**Proponent:** Al Godwin, CBO, CPM, Aon Fire Protection Engineering, representing Aon Fire Protection Engineering Corporation (al.godwin@aon.com)

**Add new text as follows:**

**SECTION 202**
**GENERAL DEFINITIONS**

**OPEN-ENDED CORRIDOR.** An interior corridor that is open on each end, and connects to an exterior *stairway* or *ramp* at each end with no intervening doors or separation from the corridor.

**Revise as follows:**

**903.3.1.2.2 (IBC [F] 903.3.1.2.2) Open-ended Corridors.** Sprinkler protection shall be provided in *open-ended corridors* and associated *exterior stairways* and *ramps* as specified in Section 1026.6, exception 4.

**1104.21 Exterior stairway protection.** Exterior *exit stairs* shall be separated from the interior of the building as required in Section 1026. Openings shall be limited to those necessary for egress from normally occupied spaces.

**Exceptions:**

1 through 3 *(No change to current text)*

4. Separation from the ~~interior~~ *open-ended corridor* of the building is not required for *exterior stairways* ~~connected to open-ended *corridors*~~, provided that:
   - ~~4.1 The building, including *corridors*, and stairs, is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.~~
   - ~~4.2~~ 4.1 The *open-ended corridors* comply with Section 1018.
   - ~~4.3~~ 4.2 The *open-ended corridors* are connected on each end to an *exterior exit stairway* complying with Section 1026.
   - ~~4.4~~ 4.3 At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 $m^2$) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

**Reason:** This is a correlation with code change E153-12 which was approved last cycle. New Section 903.3.1.2.2 is to clarify that when using a 13R system for this provision, extra heads are required in the breezeway.

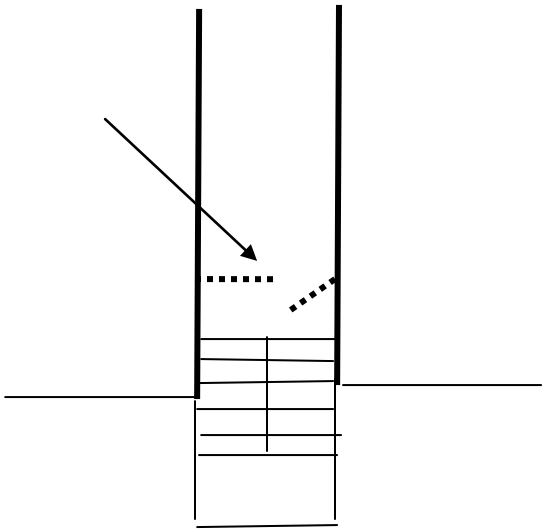
The Reason statement for E153-12 is as follows:

**Reason:** Breezeway stairs is what this section is talking about. Whether straight through the building with a stair on each side, or taking a turn somewhere during its path through the building with a stair on either end, it is still a breezeway with exterior stairs. This point is not clear in the current language.

There is this opinion that an open breezeway stairs are allowed by basic code. They are not. 2012 IBC Section 1026.6 states that exterior stairs must be separated from the interior of the building. The breezeway (interior corridor) is part of the interior of the building. I have conferred with the original proponent of this code change many times and confirmed that the intent was to allow the removal of the wall and door that separates the stair from the corridor, creating a breezeway.

Many designers and jurisdictions assume that breezeway stairs are allowed by right. However, in order to not have to build the wall and fire door separating the exterior stair from the interior corridor, exception 4 must be complied with, which includes sprinklers in this breezeway.

The following is a representation of the intent of Exception 4, allowing the removal of the separation wall and door:



We are all familiar with the required protection on each side of the exterior stair as represented in this clip from the 2000 International Building Code Commentary.

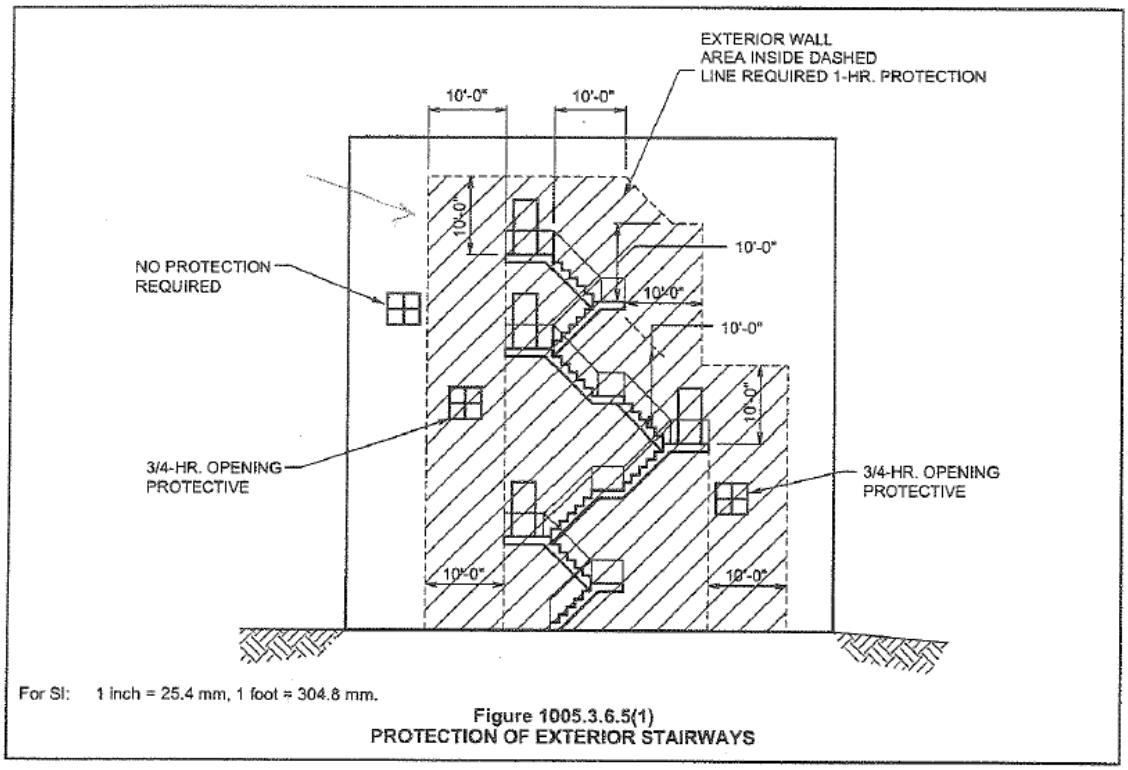
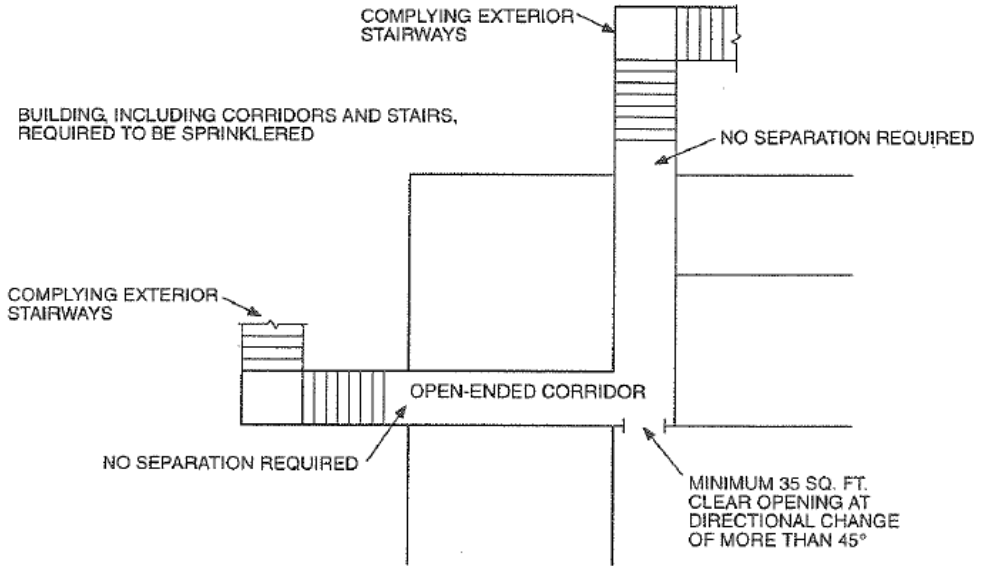



**Figure 1005.3.6.5(1)**
**PROTECTION OF EXTERIOR STAIRWAYS**

So, if the walls on each side of the stair have to be protected, how can a large opening where the door occurs be removed and have an unprotected connection to the interior corridor.

The 2000 IBC Handbook, provided an accurate depiction of what this code change applied to as follows:




**OPEN-ENDED CORRIDOR**

**FIGURE 1005-10**

Here is the original code change that inserted the provision. Notice the statement "The purpose of this analysis was to determine if an equivalent level of life safety could be achieved by the design of an open breezeway in comparison to an enclosed corridor or balcony for these multifamily buildings."

technical change.

Public Hearing: Committee: AS AM D
Assembly: ASF DF

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# 1008.7-2

**Proponent:** Ron Nickson, National Multi Housing Council/National Apartment Association

**1. Revise as follows:**

**1008.7 Exterior exit stairways.** Exterior exit stairways that conform to the requirements for interior exit stairways except for the enclosure requirements, are permitted as an element of a required means of egress for buildings not exceeding six stories or 75 feet (22.9 m) in height for occupancies other than Group I-2.

An exterior exit stairway that serves as an exit component shall be open to the outside on at least one side except for required structural columns beams, ~~and open-type~~ handrails and guards. A minimum of 35 square feet (3.22 $m^2$) of aggregate open area shall be provided within the horizontal projection of each floor to ceiling level at each exterior stair or within the horizontal projection of the floor to ceiling level of the stairway landing that is located no more than 1/2 level above the corridor floor.

The adjoining open areas shall be either yards, courts or public ways; the remaining sides are permitted to be enclosed by the exterior walls of the building. Any stairway not meeting the definition of an exterior stairway shall comply with the requirements for interior stairways.

Exterior stairways shall be located in accordance with Section 1009.1.

**2. Revise the definition of Stairway, Exterior as follows:**

**SECTION 1002**
**DEFINITIONS**

STAIRWAY, EXTERIOR A stairway that is open on at least one side, except for required structural columns, beams, ~~and open-type~~ handrails, and guards. The adjoining open areas shall be either yards, courts or public ways; the other sides of the exterior stairway need not be open.

**Reason:** To establish minimum requirements for open area on exterior exit stairways and permit the use of enclosed guards and handrail systems.

The 35 sq. ft. of open area is based on computer fire studies of six multifamily projects in Virginia containing more than 2000 individual dwelling units. The analysis was completed by the Sullivan Code Group using HAZARD I, a fire hazard assessment method developed by the United States National Institute of Standards and Technology. The procedures used by the Sullivan Code Group were reviewed by Professor Jonathan Barnett, Ph.D., Associate Professor, Center for Firesafety Studies, Worcester Polytechnic Institute who checked for conformity with the fire modeling expectations and limitations.

The findings, which are based on the provisions in the 1996 BOCA National Building Code, apply equally to the provisions in the IBC. The results, summarized by the Sullivan Code Group in the following Executive Summary, for the six buildings included in the studies were very similar. The buildings studied were multifamily apartments with various configurations of corridors connected to exterior open stairs.

EXECUTIVE SUMMARY

The purpose of this analysis was to determine if an equivalent level of life safety could be achieved by the design of an open breezeway in comparison to an enclosed corridor or a balcony for these multifamily buildings.

The multifamily buildings were analyzed using engineering judgement, referenced literature, the suite of computer programs called FASTlite, and CFAST and, computer-based fire models developed by the United States National Institute of Standards and Technology, Building and Fire Research Laboratory.

The reasonable worst case fire scenario modeled was an arson fire on the breezeway. By assuming that the design fire is a fast growing arson fire, this analysis goes beyond the requirements of the Building Code which does not consider arson fire situations in determining building fire safety regulations. Therefore, this analysis is evaluating the building under more adverse conditions than are addressed in the Building Code. The results of the analysis are:

1. For the life safety of the building occupants on the floor of fire origin, the open breezeway configuration is superior to the enclosed corridor configuration.
2. For the life safety of the building occupants on floors other than the floor of fire origin, the open breezeway configuration meets the intent of the egress provisions in the BOCA Code. With the open breezeway configuration, at least one stairwell should maintain tenable egress conditions depending on the wind direction. In all cases analyzed, one stairwell was capable of handling the occupant load. Therefore, the intent of the code is met.
3. Smoke conditions on floors other than the floor of fire origin will remain safe for a suitable period of time to allow occupant egress with the open breezeway configuration, even without sprinklers. If there is a wind, the tenability in the open breezeways is improved.
4. With the enclosed corridor configuration, sprinkler activation is predicted to occur after the time at which the upper smoke layer reaches a level that could impede egress. With the open breezeway configuration, sprinkler activation is predicted to occur prior to the time at which the upper smoke layer reaches a level that could impede egress.
5. The results of this analysis have demonstrated that an open breezeway protected by quick response automatic sprinklers provides occupant egress conditions which are better than code-complying balcony designs. Therefore an open breezeway protected by quick response sprinklers, as designed for this project, should be regulated by the same requirements as the open balcony which does not require a fire resistance rated floor when standard response automatic sprinklers are present. The design of the open breezeway provides a level of life safety equivalent or superior to that required by the BOCA Code Sections 106.2 and 106.4.

Copies of the Fire Studies are submitted for reference (see NMHC/NAA proposal for Section 1004.7). Additional copies are available from the proponent.

Public Hearing: Committee: AS AM D
Assembly: ASF DF

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In the 09/10 cycle, code change E134-09/10 made it clear that this exception only applied to the wall and door that would normally separate an exterior stair from the interior corridor. This exception does not apply to other separation requirements on the sides of the stairs.

The specific section reasoning for this code change is as follows:

Section 202, provide a definition of an open-corridor. Hopefully this will expand on code change E134-09/10 to clarify that this provision is only to eliminate the separation required between the stair and the interior corridor. Not the units on either side.

Section 1026.6, expanding the same concept, adding clarity.

Section 903.3.1.2.2, providing an explicit requirement that sprinkler protection must be provided in this open-ended corridor when using a residential system. As with Section 903.3.1.2.1, this protection is above the requirements of a standard 13R system. If not checked in the design, these heads will not be installed. As such, the open-ended corridor will not be in compliance with code.

Section 1104.21, deletes the sprinkler protection requirement for existing buildings. Once understood that in order to have breezeway stairs, the building, the breezeway and associated stairs must be sprinklered, this provision is actually a retroactive sprinkler provision for all existing buildings with breezeway stairs.

If not sprinklered, in order to keep the breezeway stairs, the building and corridor must be sprinklered. If already sprinklered with a 13R, retrofit sprinklers in the corridor must be installed.

**Cost Impact:** Since this is correlation between the IFC and IBC, no extra construction cost is expected. And, removing the retroactive implication to existing non-sprinklered breezeways, or 13R sprinklered breezeways without breezeway sprinklers, will reduce costs.