

AIA 1-hour Presentation Higher Education & Building Code Compliance

Please review the script and incorporate it into your own personal style of presenting. It is important to become thoroughly acquainted with the material so you may speak freely and make eye contact with your audience. You will sound more knowledgeable and appear more professional.

The content of the slides has been created to function as a teaching tool. PowerPoint and Keynote slides are designed to act as a visual aid to assist the presenter. Slides do not teach, the presenter teaches.

Many slides have fewer words and more imagery. When graphics predominate, the script provides adequate information that you as the presenter may study and learn beforehand. You will better engage with your audience if you are not both trying to read a content-heavy slide.

Conversely, when a slide has more copy, the script is silent. The content of this slide is meant to be presented in your own words and style. The slide becomes supplemental to the content.

Please do not attempt to promote code concepts, test data or compliance issues that are not specifically referred to in the script or slides. Answering questions with “I don’t know but I will find out for you” is more credible than an attempt to respond beyond your knowledge.

By simplifying basic code principles, script and slides to illustrate concepts rather than using long narratives, we think you will find it much easier to both learn and present this 1-hour AIA program.

Should you have additional questions or comments, please do not hesitate to contact us.

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Slide 1

(Title)

Slide 2

(AIA Accreditation)

Slide 3

(Copyright)

Slide 4

(Objectives)

Slide 5

(Bowie State University Student Center – Title)

Slide 6

(Scope of Project)

Slide 7

(Exterior – description)

Slide 8

(Interior – description)

Slide 9

(Project Key Features)

Slide 10

(Fire & Life Safety considerations)

Slide 11

Wide-span opening protectives played a significant role on all three floor levels. Beginning with the 1st floor, doors 1 & 2 are vertical acting, non-fire-rated insulated service doors in the loading dock area.

Door 3 is a vertically acting security grille at the bookstore and corridor intersection.

Doors 4, 5, & 6 function as fire and smoke rated assemblies of which we will explore in conjunction with the 2nd and 3rd floor separations.

On the 2nd floor, door 7 is another security grille for the kitchen area. Doors 8, 9, & 10 function as fire and smoke rated assemblies of which we will explore in conjunction with the 1st and 3rd floor separations.

On the 3rd floor we see the height extension of door 10 and an additional fire rated assembly represented as door 11. Both of these we will explore in conjunction with the 1st and 2nd floor separations.

Slide 12

This project was designed under the 2009 International Building Code with concurrence from the State Fire Marshal and the 2009 NFPA 101 provisions that would apply to business and assembly occupancies. It is common practice, based upon local jurisdictions and their legislative mandates, to include the State Fire Marshal's office in the plan review process. Even though the vertical space provisions are similar in both NFPA 101 and IBC, the former is more restrictive and allows for additional options to avoid the atrium requirements by providing separation at each floor. Let's examine this issue more closely with the next slide.

Slide 13

Section 404 of the IBC and Section 8.6.7 of NFPA 101 require the same conditions be met in order to declare a vertical space an atrium. There are essentially nine provisions that must be adhered to in order to have the atrium entirely open which includes extremely expensive smoke evacuation and rated separation.

However, the provisions in NFPA 101, separation on every floor, helps to avoid complying with the atrium provisions of either code.

Let's begin by examining the requirements for creating a communicating space on the next slide.

Slide 14

(Review the requirements of the Communicating Space on the slide and then explain):

In simple terms we learn that in a sprinklered building we can have 3 floors common without protecting the floor penetrations if we separate the vertical space from the rest of the structure with smoke barriers at each floor level. Remember, smoke barriers as defined in NFPA 101 do not have to be fire labeled assemblies. Let's take a closer look on the next slide.

Slide 15

Please note the 3-story communicating space is shown within the red circles. Before we examine in more detail the actual separations, let's also review the provisions for the other large vertical space areas – the 2-story convenience openings on the next slide.

Slide 16

The communicating space, wherein door assemblies 4, 5, & 6 are located, must be separated from both the corridor and the rest of the Level 1 floor area.

Slide 17

(Discuss the challenge as shown on the screen)

Slide 18

Since this is a sprinklered building, we learned the separation to create the 3-story communicating space requires nothing more than a smoke barrier without a fire label. This

particular assembly is a fire rated opening protective under UL10B for 20 minutes, UL10D for 3 hours and UL1784 for smoke. It also incorporates multiple IBC Chapter 10 complying egress features for easy exiting out of the space once the assembly is activated and closed during a fire emergency.

Slide 19

The same space we discussed in the previous slide is also open at this end as shown.

Slide 20

This opening must also be enclosed during a fire event.

Slide 21

And finally, the opposite end needs to be enclosed. This has been accomplished with a side coiling system due to headroom constraints.

Slide 22

Once all three opening protective systems are in place, the entire 3-story communicating space that is normally open to the 1st floor area, is enclosed automatically in accordance with Section 716 of the IBC and NFPA 80 when the building goes into fire alarm. Remember, building occupant egress is accommodated within the 51' vertical rolling assembly.

Note: If someone questions, on the first-floor separation of the 3-story communicating space, why the 51' opening protective is a curtain and the other two are steel assemblies, please answer with the following:

Even though NFPA 101 only requires a smoke barrier separation, there other code compliance issues to be considered –

- The 3-story communicating space is not an adequate enclosure for the convenience stair.
- The convenience stair provisions as shown on slide #34, in order to be unprotected without shaft walls, require NFPA 13 compliance with draft curtains and closely spaced sprinklers as well as the area of the floor shall not exceed twice the horizontal projected area of the stairway. Since compliance with this requirement does not take place on the penetration at Level 2 then the normally required smoke barrier only separation is not sufficient.
- The 51' fire & smoke curtain on the first floor was approved under alternate methods for 3 hours under UL10D as an adequate fire-labeled assembly.

Slide 23

Let's now examine how the 3-story communicating space enclosure is accomplished on the 2nd floor. Please note door assemblies 8, 9, & 10 are fully open until the building goes into alarm.

Slide 24

(Discuss the challenge as shown on the screen)

Slide 25

This photo features two of the three assemblies used to enclosed the communicating space. The tall assembly on the left side actually spans the 2nd and 3rd floor and is featured on the next slide.

Slide 26

Notice the complexity of combining floor areas and floor levels in order to achieve openness and spacious ambience.

Slide 27

During a fire event all separation, regardless of height or width, deploys in accordance with all applicable code provisions.

Slide 28

Similar to Levels 1 & 2, Level 3 is protected from all other floor areas but only during a fire event.

Slide 29

The challenge is still present and the complexity of the combination of floor areas and floor levels can only be handled with wide-span opening protectives.

Slide 30

The resolve is simple and in accordance with the opening protective provisions of the both IBC and NFPA.

Slide 31

The third challenge we face with vertical openings in this structure is that of designing a convenience stair within the 3-story communicating space.

(Click 1)

Here we can see its presence on Level 1.

Slide 32

(Click 1)

And in these photos we see how the stair transcends two additional Levels, 2 & 3.

Slide 33

From these drawings, we can see the convenience stair is clearly located within the 3-story communicating space on all three levels.

Slide 34

(Review the code provisions as shown on the slide)

In simple terms, all 5 conditions must be met in order to have a convenience stair, as defined in NFPA 101, unenclosed. The key to understanding the resolve to this challenge is whether or not the stair is enclosed.

Slide 35

Due to the location of the stair within the 3-story enclosed communicating space, due to the building being full sprinklered, and due to the location of draft stops located appropriately at the stair landings, this application was approved as an adequate enclosure for the stair and deemed safe for building occupants.

Slide 36

On these drawings we can identify the 2-story convenience opening occupying the remaining common vertical space in the structure.

Slide 37

(Review the code provisions as shown on the slide)

In simple terms these provisions allow for a 2-story space to be unenclosed as long as only one floor is penetrated, the 2-story space is separated from all other vertical openings with fire-resistance rated construction and separated with smoke barriers from all corridors. One final requirement includes these spaces cannot host a required means of egress.

Slide 38

(Discuss the challenge as stated on the slide)

Slide 39

The fire protection-rated rolling door assemblies are located within fire-resistance rated walls and form the fire-resistance rated separations required between the two vertical spaces.

Slide 40

(University of Nevada, Las Vegas, Science and Engineering Building – title)

Slide 41

(Scope of Project)

Slide 42

(Challenge with code compliance and open design)

Slide 43

(Key Building Architectural Features)

Slide 44

(Fire & Life Safety concerns)

Slide 45

We will begin on the first floor with three opening protectives for separation. Please note, this project was plan-checked under the last edition of the legacy code, Uniform Building Code of ICBO which required rated corridors even though the building was sprinklered.

Slide 46

These are the opening protectives specified to provide code complying separation.

Slide 47

(Review the code reasons shown on the slide for occupancy separation)

Slide 48

These fire-rated rolling shutters will close only case of fire, otherwise the two spaces are common and open.

Slide 49

As we move to the 2nd level, we can identify the need for separation from the rated corridor at door location 4 as well as doors 5 & 6 separating a convenience stair.

Slide 50

(Review each of the door locations and explain how they operate when the building goes into alarm)

Slide 51

This communicating stair is not in the path of required egress and is not required to be constructed of non-combustible materials.

Slide 52

Section 1019.3 of the IBC allows exit access stairs to be unprotected for a total of two stories or floors. The two open or common floors do not have to be adjacent each other. Since this stair travels from the 2nd floor thru the 4th floor, separation would technically only be required on the 3rd floor leaving the 2nd and 4th floor open to each other.

In this case, the fire marshal weighed in on the plan review process and determined the need for separation at all three floor levels. The reasoning behind the requirement was due to the fact that immediately across the corridor from this vertical opening are two 4-story atrium wells of which we will address in subsequent slides. Since both vertical spaces are in such close proximity, the concern was related to failure of any of the opening protection systems could potentially leave the spaces vulnerable.

Slide 53

Many folks who have seen this photo and understand the current code language regarding exit access stairways, question why the exit sign is located on the inside of the stair well and shutter rather than the outside guiding building occupants to the stair for egress.

(Review the information on the slide)

Slide 54

The combination of a non-egress shutter and complying egress shutter provide the needed separation for optimum building occupant safety during a fire event.

Slide 55

As the structure grows in height, so do the challenges of vertical opening separation. Note close proximity of the exit access stairway to the atrium wells marked by door assembly numbers 8 & 9.

Slide 56

Let's move our attention to the atrium wells that are protected by horizontal fire shutters.

Slide 57

(Discuss the advantage of atrium spaces as shown on the screen)

Slide 58

Atrium spaces by definition in the IBC are shaft enclosures. They are classified this way because a complying atrium must meet nine basic provisions that are extremely restrictive in both cost and design. For example, all atriums three stories or more must host a smoke evacuation system, be separated with minimum 1-hour Fire Barrier const, etc.

Slide 59

However, Section 404 of the IBC provides exceptions that allow two floors common in the atrium to exempt smoke evacuation and Fire Barrier separation, two of the most restrictive and costly requirements.

Slide 60

By implementing a semi load-bearing, 2-hour fire labeled and UL1784 smoke rated opening protective in the horizontal orientation, the floor opening is closed, eliminating the atrium condition.

Slide 61

As shown, door assemblies marked 12, 13 & 14 on the 4th floor resolve additional challenges with vertical spaces open to rated corridors.

Slide 62

All 18 fire and smoke rated assemblies applied in this structure made it possible to comply with the current model building codes and maintain open spacious design. Where required, Chapter 10 complying egress has been incorporated without disruption to the function and operation of NFPA 80 certified fire door systems.

Slide 63

(Quiz)

Slide 64
(Social Media)

Slide 65
(Closing Slide)