The seminar will cover the unique aspects of the code related to assembly uses including:
- ICC 300 Standard for Bleachers, Folding and Telescopic Seating, and Grandstands, the special egress provisions of Section 1028,
- stage and platform requirements of Section 410,
- special amusement building requirements from Chapter 4.

Group A assembly occupancies cover a number of uses and building types.
- Theaters
- Nightclubs
- Restaurants
- Art galleries
- Libraries
- Airport terminals
- Places of worship
- Arenas
- Stadiums
Overview

- Largest life-safety losses and building disasters have occurred within assembly occupancies. Some of the most notable losses here in the United States include:
  - Iroquois Theater (fire), Chicago, 1903. At least 605 dead
  - Rhythm nightclub (fire), Natchez, Mississippi, 1940. 207 dead
  - Coconut Grove nightclub (fire), Boston, 1942. 492 dead

Overview

- Most of these fires were found to have several things in common that contributed to the high numbers of people killed:
  - Overcrowding.
  - Locked or blocked exits.
  - Flammable decorations or interior finishes.
  - Lack of or inoperative sprinkler systems.

Overview

- Most of these fires were found to have several things in common that contributed to the high numbers of people killed:
  - People trying to get out the same way they entered, not using a fire exit.
  - Failure to follow existing fire codes.
  - Failure to exit promptly after the fire started.
  - Using elevators during the fire.

Classification—302

- Section 302.1 of the IBC requires that all structures or portions of structures be classified into one or more of the occupancy groups listed in Chapter 3 of the code.
- Occupancies are classified according to the structure’s purpose and function.
Assembly Group A—303

- 303.1 Assembly Group A.
- 303.2 Assembly Group A-1.
- 303.3 Assembly Group A-2.
- 303.4 Assembly Group A-3.
- 303.5 Assembly Group A-4.
- 303.6 Assembly Group A-5.

303.1.1 Small buildings and tenant spaces

303.1.2 Small assembly spaces.

303.1.2 Small assembly spaces.
303.1.2 Small assembly spaces.

For SI: 1 square foot = 0.093 m².

303.1.3 – Assembly Associated with Group E Occupancies

- Section 303.1.3 uses the term “associated” as opposed to the word “accessory” to establish the relationship between the assembly and educational occupancies.
- This revision first occurred in the 2012 IBC with the intention of clarifying that the “accessory occupancy” limitations of Section 508.2 are not applicable in this situation.

Business Group B—304

- Sections 303.1.1 and 303.1.2 allow small assembly spaces to be classified as a Group B occupancy.
- Code official must make decisions regarding the classification of certain uses to determine if they are appropriately classified as a Group B or a Group A-3 occupancy.
304.1 Business Group B

- Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Group B Occupancy

1. Given that Group B occupancies include “educational occupancies for students above the 12th grade” what is the proper occupancy classification of a college classroom with 55 students?

Are these spaces required to be dealt with as a A-3 occupancy or can they remain as a Group B use?

Group B Occupancy

2. Similar to question #1 above; given that “training and skill development not within a school or academic program” are listed as a Group B use, what is the proper occupancy classification of such use where there are 50 or more persons?

Is the occupant load of 50 the only distinction?
Would the type of seating be a reasonable distinction?

Group B Occupancy

3. Lecture halls are listed under the A-3 occupancy classification. Since the term “lecture hall” is not defined, discuss what features differentiate between a “lecture hall” and a general college classroom.

- Is the occupant load of 50 the only distinction?
- Would the type of seating be a reasonable distinction?
Group B Occupancy

- Would a tiered or sloping floor help to distinguish a lecture hall from a classroom?
- Does a lecture hall have certain features that easily distinguish it from other classrooms?
- The code clearly classifies a "lecture hall" with 50 or more occupants as an A-3 occupancy but is that the correct classification for a traditional classroom?

Overview

- Whenever dealing with assembly occupancies it is important to realize that the International Fire Code contains a number of requirements which are applicable and may include requirements that are not addressed within the IBC.

Permits—IFC 105

- 105.1.1 Permits required
- 105.1.2 Types of permits
Permits—IFC 105

- Amusement buildings. (IFC Section 105.6.2)
- Carnivals and fairs. (IFC Section 105.6.4)
- Cellulose nitrate film. (IFC Section 105.6.5)
- Exhibits and trade shows. (IFC Section 105.6.13)
- Liquid- or gas-fueled vehicles or equipment in assembly buildings. (IFC Section 105.6.26)
- Open flames and candles. (IFC Section 105.6.32)
- Places of assembly. (IFC Section 105.6.34)
- Temporary membrane structures and tents. (IFC Section 105.6.43)

Permits—IFC 105

- Automatic fire-extinguishing systems. (IFC Section 105.7.1)
- Fire alarm and detection systems and related equipment. (IFC Section 105.7.6)
- Fire pumps and related equipment. (IFC Section 105.7.7)
- Standpipe systems. (IFC Section 105.7.1)
- Temporary membrane structures and tents. (IFC Section 105.7.16)

IFC Chapter 4 Emergency Planning and Preparedness

- Chapter 4 of the IFC addresses the emergency planning and preparedness requirements.
- A number of sections affect the operation and use of assembly spaces (both indoor and outdoor).

Public Assemblages and Events—403

- Section 403.1 grants the code official the authority to require the owner, agent or lessee provide fire watch personnel to be on duty at places of assembly or events where they believe it is essential to the public safety.
Public Assemblies and Events—403

- The duties of the fire watch personnel are listed in Section 403.1.1.
- Crowd managers are required in larger facilities or events where more than 1,000 people will congregate.

Fire Safety and Evacuation Plans—403

- Group A facilities used exclusively for religious worship which have an occupant load of less than 2,000 people are exempt from the fire safety and evacuation plan requirement.
- A plan is also required for any building with an atrium and a Group A occupancy.

Emergency Evacuation Drills—405

- Evacuation drills are to be conducted for the employees of a Group A occupancy on a quarterly basis.

Employee Training and Response Procedures—406

- Employees in Group A occupancies are to be trained in the fire emergency procedures described in their facilities fire evacuation and fire safety plans.
- Employees are to be trained as part of their new employee orientation and at least annually thereafter.
Use and Occupancy-Related Requirements—408

- A detailed seating plan, occupant load and occupant load limit shall be included with the fire safety and evacuation plans.
- An announcement regarding the location of exits is to be made in theaters, motion picture theaters, auditoriums and similar assembly occupancies used for “noncontinuous programs.”

Means of Egress Requirements for Assembly Spaces

Assembly Spaces

Means of Egress – Assembly—1028

- Requirements should be used in any room “used for assembly purposes which contains seats, tables, displays, equipment or other material” and may be applied in occupancies other than Group A assembly spaces.
- Notice that the wording is “used for assembly purposes” and not limited to assembly occupancies.
1004 — Occupant Load

- Determine the occupant load of the assembly space or of the area served by a specific component in the egress system.
- The requirements for assembly spaces are not unique in this aspect, but a quick review of the general code requirements is appropriate.

For areas with fixed seating (1004.4.)

- Occupant load is determined by counting the number of fixed seats.
- If the seating does not have dividing arms, the occupant load is determined as follows:
  - One person for each 18 inches (457 mm) of seating length (general requirement).
  - One person for each 24 inches (610 mm) of booth seat length where seating is in a booth.

For areas with fixed seating (1004.4.)

- Remember that general egress provisions of Section 1004 also address:
  - Cumulative occupant loads
    - Where egressing through intervening rooms, areas or spaces
    - Where egressing from adjacent levels such as mezzanines or stories
  - Allowing increased occupant loads
  - Outdoor areas
  - Multiple occupancies or use of space for multiple uses
1028.2 – Assembly Main Exit

- Main Exit:
  - Has sufficient width to accommodate not less than one-half of occupant load.
  - Accommodates not less than the total required width of all means of egress leading to the exit.
  - Front onto a street or an unoccupied space that adjoins a street or public way if the building is classified as a Group A occupancy. Minimum width of space is not less than 10 feet (3048 mm).

- REQUIRED CAPACITY AND WIDTH:
  - 80 + 80 + 180 = 340 OCCUPANTS
  - × 0.2" = 68" WIDTH

- 80 OCCUPANTS
  - 36" MIN. AISLE REQUIRED
  - 40" MIN. PROVIDED

- 180 OCCUPANTS
  - 36" MIN. AISLE REQUIRED
  - 40" MIN. PROVIDED

- MAIN EXIT
  - ≥ TOTAL REQUIRED WIDTH OF ALL MEANS LEADING TO EXIT
  - SUFFICIENT TO ACCOMMODATE ONE-HALF OF OCCUPANT LOAD
1028.3 – Assembly Other Exits

ASSEMBLY PURPOSE

ACCESS TO AND ARRANGEMENT OF EXITS (See 1015.2)

ACCESS TO AND ARRANGEMENT OF EXITS (See 1015.2)

MAIN EXIT - 1028.2 AC commodate not less than one-half of occupant load

AGGREGATE FOR OTHER EXITS TO PROVIDE CAPACITY FOR AT LEAST ONE-HALF OF OCCUPANT LOAD

ACCESS TO AND ARRANGEMENT OF EXITS (See 1015.2)

1028.4 – Foyers and Lobbies

FOYER OPEN TO MAIN FLOOR BELOW

BALCONY WITH 50 OR MORE OCCUPANTS

ONE BALCONY EXIT WITH DIRECT ACCESS TO AN EXIT

AT LEAST TWO MEANS OF EGRESS WITH ONE AT EACH SIDE

1028.5 – Interior Balcony and Gallery Means of Egress

AT LEAST TWO MEANS OF EGRESS WITH ONE AT EACH SIDE

BALCONY FOYER

OPEN TO MAIN FLOOR BELOW

1028.6 – Width of Means of Egress for Assembly

- Required width and egress capacity is determined by multiplying the occupant load served by the appropriate egress width factor.
- This section therefore sizes the means of egress based upon the occupant load using the system.
- Egress width factors for the various elements will depend on whether the assembly space has smoke-protected seating or not.
Smoke-protected Assembly Seating

- Seating served by means of egress that is not subject to smoke accumulation within or under a structure.

### 1028.6.1 – Minimum Egress Width – Without Smoke Protection

<table>
<thead>
<tr>
<th>Element</th>
<th>Width requirement per occupant served</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stair</td>
<td>0.005 inch additional width (see limitations)</td>
<td>0.005 inch of additional width is required for each occupant for each 0.10 inch of riser height above 7 inches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Width requirement per occupant served</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stair</td>
<td>0.3 inch</td>
<td>Riser height 7 inches or less, Tread depth 11 inches or greater</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Width requirement per occupant served</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stair</td>
<td>0.075 inch additional width (see limitations)</td>
<td>0.075 inch of additional width is required for each occupant on stairs not having a handrail within a 30 inch horizontal distance</td>
</tr>
</tbody>
</table>
1028.6.1 – Minimum Egress Width – Without Smoke Protection

<table>
<thead>
<tr>
<th>Element</th>
<th>Width requirement per occupant served</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramped (Slope &gt;1:12)</td>
<td>0.22 inch</td>
<td>For slopes steeper than one unit vertical in 12 units horizontal (&gt;1:12, &gt;8%). Maximum slope of 1:8 per 1028.11. Stair required if &gt;1:8.</td>
</tr>
</tbody>
</table>

1028.6.2 – Smoke-Protected Seating

- Smoke-protected Assembly Seating

- Seating served by means of egress that is not subject to smoke accumulation within or under a structure.
The Life-Safety Code (NFPA 101) defines a life safety evaluation as “A written review dealing with the adequacy of life safety features relative to fire, storm, collapse, crowd behavior, and other related safety considerations.” (NFPA 101, Section 3.3.158)

The Life-Safety Code (NFPA 101) defines a life safety evaluation as “A written review dealing with the adequacy of life safety features relative to fire, storm, collapse, crowd behavior, and other related safety considerations.” (NFPA 101, Section 3.3.158)

The life safety evaluation is to:
- Be performed by a person acceptable to the Building Official (NFPA 101, Section 12.4.1.1).
- Shall include assessments of both building systems and management features upon which reliance is placed for the safety of facility occupants (NFPA 101, Section 12.4.1.3).

The life safety evaluation is to:
- Shall consider scenarios appropriate to the facility (NFPA 101, Section 12.4.1.3).
- Shall be approved annually by the Building or Fire Code Official and shall be updated for special or unusual conditions (NFPA 101, Section 12.4.1.1).
- Shall include a written assessment of all of the following conditions and appropriate safety measures (NFPA 101, Section 12.4.1.2).

1028.6.2.1 Smoke-Protected Seating - Smoke Control

- SMOKE SINK (SHADED AREA)
- ROOF
- 10'-0'
- 0'-0'
- AISLE WALKING SURFACE
- SEATING
1028.6.2.1 Smoke-Protected Seating - Smoke Control

- Smoke-protected seating area
- Transition zone 6 ft. min. above floor of means of egress
- First indication of smoke
- "Whiffy Stuff"

1028.6.2.2 Smoke-Protected Seating - Roof Height

- Lowest portion of roof
- 15 min. height
- Highest aisle or aisle accessway
- Roof canopy at outdoor stadium
- Height above highest aisle or aisle accessway to any object
- 80" min.
1028.6.2.3 Smoke-Protected Seating - Automatic Sprinklers

Three exceptions:

1. Over the floor area used for contests, performances or entertainment; provided the room construction is more than 50 feet (15 240 mm) above the floor and the area is limited to low fire hazard uses.

2. Press boxes and storage facilities that are less than 1,000 square feet (93 m²) in area are also exempted from the sprinkler requirement even though they may be enclosed.

3. An outdoor seating facility is not required to have sprinklers installed in the enclosed areas where the seating and the means of egress within the seating area are “essentially open to the outside.”
1. Outdoor smoke-protected may use Section 1028.6.2 for smoke-protected seating where it permits less width.

2. Minimum factor. See 1028.6.1 for additional with factors that may apply based upon stair configuration, handrails and direction of travel.

3. Ramp factors are dependent upon whether slope is steeper than 1:12 or not. See Section 1028.6.1, Item 4.
1028.8 – Common Path of Egress Travel

- That portion of exit access which the occupants are required to traverse before two separate and distinct paths of egress travel to two exits are available.
- Paths that merge are common paths of travel.
- Common paths of egress travel shall be included within the permitted travel distance.

1028.8.1 Path Through Adjacent Row

- Maximum number of seats between the adjacent aisles when traversing through the aisle accessway:
  - 24 seats (general requirement)
  - 40 seats if smoke-protected assembly seating
1028.8.1 Path Through Adjacent Row

- Clear width between adjacent rows when traversing through the aisle accessway:
  - 12 inches plus 0.6 inch (304.8 plus 15.2 mm) for each seat greater than seven in the row between the aisles (general requirement)
  - 12 inches plus 0.3 inch (304.8 plus 7.6 mm) for each seat greater than seven in the row between the aisles if smoke-protected assembly seating

Example for row width

- In an section with 20 seats between the aisle, the row spacing would be determined as follows: 12" + 0.6"(20-7) = 12" + 0.6"(13) = 12" + 7.8" = 19.8" (For SI: 1 inch = 25.4 mm)

1028.9.1 and 1028.9.2 Minimum Aisle Width

- Minimum clear width required for a stepped aisle serving seating on both sides is 48 inches (1219 mm).
- In an area without smoke-protection a stepped aisle is required to provide at least 0.3 inch (7.6 mm) of width for each occupant served (Section 1028.6.1, item 1).
- Assuming the aisle serves 180 people, the minimum width to provide sufficient egress capacity for the number of people accommodated is 54 inches (180 x 0.3" = 54") (1372 mm).
- Therefore the aisle must be 54 inches (1372 mm) in width and cannot use the 48 inch (1219 mm) minimum specified in Section 1028.9.1, Item 1.
Section 1028.9.2 – Aisle Width

1. Does the type of assembly space affect what assumptions are appropriate?
   - For example in a motion picture theater with stadium seating where everyone enters from the front at the ground level, is it reasonable to assume that half will go up to an exit at the top/back of the auditorium? If the space was a performing arts theater and people enter from the rear of the auditorium will that change or influence whether people would exit towards the stage and doors or aisle that may be available at the front?

2. Referring to the figure, how will the following situations be addressed:
   a. How are things like the 3 way (T) intersection handled where the main aisle in the back intersects the cross aisle? Will people in the cross aisle stay in the cross aisle or will they turn and try to head up to the lobby even though people in the back area may be trying to move forward toward the cross aisle?
2. Referring to the figure, how will the following situations be addressed:

   b. Will the people coming up out of the front aisles really split 50/50? Consider the fact they may not just split left or right into the cross aisle but whether a different percentage would split off towards the main lobby or if proportionally more would simply turn and head to the closest side exit.

   c. Would people from the front aisles be affected by how much of an offset there is to the main aisle in the back? (Notice there is only a short offset like this plan shows versus having more of an equal distance to the side aisle/exit and the main aisle.)

   d. How would an aisle across the front of the auditorium affect the plan? What would be the impact if the front aisle only occurred in front of the side sections as opposed to extending across the entire seating area?

   3. Assuming a plan with a main aisle running from the front to the back of the auditorium but goes past a cross aisle or two. Since we size the main exit for 50 percent of the occupants and know that most people will tend to head that direction, is it really safe to assume people will keep moving that direction and will walk past cross aisles or other routes (especially if they are more open and available)?
1028.9.3 – Converging Aisles

1. Aisle “A” and “B” each serve 100 people. Aisle “A” and “B” are each a minimum of 42 inches in width (Section 1028.9.1, Item 4). Aisle “C” is required to be a minimum of 42 inches in width (Sections 1028.9.3 and 1028.9.1, Item 4).

2. Aisle “A” and “B” each serve 150 people. Aisle “A” and “B” are each a minimum of 42 inches in width Section 1028.9.1, Item 4). Aisle “C” is required to be a minimum of 60 inches in width (Sections 1028.9.3 and 1028.6.1, Item 4) [300 x 0.2" = 60”]

3. Aisle “A” and “B” each serve 250 people. Aisle “A” and “B” are each a minimum of 50 inches in width Section 1028.6.1, Item 4) [250 x 0.2" = 50”]. Aisle “C” is required to be a minimum of 100 inches in width (Sections 1028.9.3 and 1028.6.1, Item 4) [500 x 0.2" = 100”]
1028.9.3 – Converging Aisles

4. For this example assume that aisles “A” and “B” are level travel but aisle “C” is a stepped aisle with a 7 inch riser height. Aisle “a” and “b” each serve 150 people. Aisle “A” and “B” are each a minimum of 42 inches in width Section 1028.9.1, Item 4) [150 x 0.2" = 30" but 1028.9.1, Item 4 requires a minimum 42 inch width]. Aisle “C” is required to be a minimum of 90 inches in width (Sections 1028.9.3 and 1028.6.1, Item 1). [300 x 0.3" = 90"]

1028.9.4 – Uniform Width

A REDUCTION IN AISLE WIDTH IS PERMITTED PROVIDED REQUIRED WIDTH IS MAINTAINED THROUGHOUT AISLE

1028.9.5 – Assembly Aisle Termination

AISLE

Lobby

Exit

Exit

2012 IBC Assembly Means of Egress
1028.9.5 – Assembly Aisle Termination

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1028.9.5 – Exceptions 2 and 4 Dead-End Aisles - Permitted Increases

- Maximum number of seats between the adjacent aisles when traversing through the aisle accessway:
  - 24 seats (general requirement)
  - 40 seats if smoke-protected assembly seating

---

1028.9.5 – Exceptions 2 and 4 Dead-End Aisles - Permitted Increases

- Clear width between adjacent rows when traversing through the aisle accessway:
  - 12 inches plus 0.6 inch (304.8 mm plus 15.2 mm) for each seat greater than seven in the row between the aisles (general requirement).
  - 12 inches plus 0.3 inch (304.8 mm plus 7.6 mm) for each seat greater than seven in the row between the aisles if smoke-protected assembly seating.
1028.9.5 – Exceptions 2 and 4 Dead-End Aisles - Permitted Increases

- Row Width:
- In an section with 20 seats between the aisle, the row spacing would be determined as follows: 
  \[12" + 0.6"(20-7) = 12" + 0.6"(13) = 12" + 7.8" = 19.8"\]

1028.10 – Aisle Accessways

- “That portion of an exit access that leads to an aisle.” Therefore the aisle accessway is generally the starting point that the occupant must get through in order to reach the aisle and then ultimately to leave the room and reach an exit.

1028.10.1 and 1028.10.1.1 Aisle Accessway for Seating at Tables

- Measurement to back of fixed seats (19" space not needed)
- Measurement taken to here
1028.10.1 and 1028.10.1.1 Aisle Accessway for Seating at Tables

AISLE ACCESSWAY (12" MINIMUM)
AISLE WIDTH (36" MINIMUM)

AISLE OR AISLE ACCESSWAY

AISLE OR AISLE ACCESSWAY WIDTH

AISLE ACCESSWAY WIDTH

WALL

TABLE EDGE

19"

19"

19"

19"

12"

MIN. AISLE ACCESSWAY

+ 0.5"

FOR EACH FOOT BEYOND 12′
(MEASURE FROM AISLE TO CENTER OF SEAT)

MEASUREMENT TAKEN

TO HERE

12" OF EACH FOOT REQUIRED BETWEEN AISLE (MINIMUM 0.5"
FROM AISLE)

12" OF EACH FOOT REQUIRED BETWEEN AISLE (MINIMUM 0.5"
FROM AISLE)

AISLE ACCESSWAY

1028.10.2 – Aisle Accessways Serving Seating in Rows

1/2 CLEAR 1/2 CLEAR

FIXED SEATING

AUTOMATIC OR SELF-RECLINING SEATS

1028.10.2 – Aisle Accessways Serving Seating in Rows

SLOTS IN THIS ROW

ACCESSION WIDTH AT EACH ROW

16 13.5" 12.5"

18 15" 12.5"

20 16.5" 12.5"

22 18" 12.5"

24 20.5" 12.5"

MAXIMUM 32 SEATS PER ROW

1086 PDF 27
1028.10.2 – Aisle Accessways Serving Seating in Rows

1028.11 – Assembly Aisle Walking Surfaces

1:8 slope as the dividing point as the dividing point for where the ramped/level aisle provisions are appropriate and where the stepped aisles requirements must be used.
1028.11 – Assembly Aisle Walking Surfaces

- Section 1028 is a specific set of requirements (see Section 102.1) and uses the terms stepped aisles, risers and treads, or aisle steps versus stairways.
- slope of the aisle is 1:20 or less
- 1:8 slope is allowed for egress purposes within the assembly space
- 1:12 maximum slope would be required if the assembly aisle also serves as an accessible route

1028.11 – Assembly Aisle Treads and Risers

- Treads extend across the full width of aisle
- Uniform tread depth required
- Inconsistent tread depth not permitted
- Variation between adjacent treads and risers shall not exceed 3/16”
- Distinct marking is required by general provisions for non-uniform risers
- Increases in riser height not permitted
- Outrigger flange or solid edge is required when riser projection exceeds 7/8”
- Treads extend across the full width of aisle

GENERAL PROVISION:

- Treads extend across the full width of aisle
- Uniform tread depth required
- Inconsistent tread depth not permitted
- Variation between adjacent treads and risers shall not exceed 3/16”
- Distinct marking is required by general provisions for non-uniform risers
- Increases in riser height not permitted
- Outrigger flange or solid edge is required when riser projection exceeds 7/8”
- Treads extend across the full width of aisle

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1028.11 – Assembly Aisle Treads and Risers

- 0.3 inch width per occupant for 7" riser, 0.35 inch factor for 8" riser, and 0.4 inch factor for 9" riser (179 mm, 8.9 mm, 203 mm and 10 mm for 229 mm)

1028.12 – Seat Stability

- SEAT SECURELY FASTENED TO GROUND
- SEATS FASTENED TOGETHER IN GROUP OF 3 OR MORE

1028.13 – Aisle Handrails

- 3 exceptions eliminate or modify the handrail requirements:
  - Ramped aisles with seating on both sides do not require a handrail if the ramp slope is no greater than 1:8.
  - Where the side of an aisle is protected by a guard that complies with the handrail graspability requirements, a separate handrail is not required.
  - Handrail extensions are not required beyond the top or bottom of an aisle stair or ramped aisle.
1028.13.1 and 1028.13.2 Discontinuous and Intermediate Handrails

5 ROWS MAXIMUM BETWEEN BREAK IN HANDRAIL

INTERMEDIATE HANDRAIL IS NOT REQUIRED FOR RAMPED AISLES

INTERMEDIATE HANDRAIL, APPROXIMATELY 22" LOWER THAN CENTER HANDRAIL.

22" MIN. (1028.9.1)

22" to 36"

22" to 36"

22" to 36"

5 ROWS MAX. CENTER AISLE HANDRAIL

GAP OR BREAK

2012 IBC Assembly Means of Egress

1028.14 – Assembly Guards

CROSS AISLE

SEPARATE RAILING NOT REQUIRED IF SEAT BACK IS AT LEAST 24" ABOVE THE CROSS-AISLE FLOOR.

SECTION 1028.14.1

ASILE HANDRAIL

26" MIN.

CROSS AISLE

GUARD NOT REQUIRED IF SEAT BACK >24"

FOR GUARD OPENING LIMITATION SEE SECTION 1028.14.4

26" IN FRONT OF SEATING, BOXES, BALCONIES AND GALLERIES

26" FOR AISLES ENDING AT PASCODA

26" MIN.

FOR GUARD OPENING LIMITATION SEE SECTION 1028.14.4

26" IN FRONT OF SEATING

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1028.14 – Assembly Guards

Guards at cross aisles (Section 1028.14.1)
- Required to comply with Section 1013 where the drop-off from the aisle is more than 30 inches (762 mm).
- Permitted to be 26 inches (660 mm) minimum in height where the drop-off from the aisle is 30 inches or less.
- Permitted by the exception to use seat backs not less than 24 inches (610 mm) in height on the front of the cross aisle.

Sightline-constrained guard heights (Section 1028.14.2)
- Permitted to be 26 inches (660 mm) minimum in height where guard would interfere with sightlines of “immediately adjacent seating”
- Must comply with ICC-300 guard provisions if serving bleachers regulated by that standard.
- Specifically states measurement is from the floor or footboard level. (Distinction for difference from Section 1028.14.3 and ICC-300.)
- Applies to any guard immediately adjacent to the seating which would affect sightlines, not just those in front of seats. May affect guards at side of seating, or at vomitories.

Guards at the end of aisles (Section 1028.14.3)
- Due to increased tripping hazard in the aisle, a 36 inch minimum height is required at the foot of an elevated aisle.
- Increase in the 26 inch (660 mm) minimum height typically allowed by Section 1028.14.2.
Guards at the end of aisles (Section 1028.14.3)
- Additional requirement for a 42 inch (1069 mm) minimum guard height where measured diagonally from nosing of nearest tread.
- Unique opening limitations in Section 1013.4, Exception 5, uses 4 inch sphere limitation up to a height of 26 inches (660 mm) and then 8 inch (203 mm) sphere from 26 inch (660 mm) height up to 42 inch (1069 mm) height.

1028.1.1 and ICC 300 – Assembly Seating - Bleachers
- ICC-300 standard - Standard on Bleachers, Folding and Telescopic Seating and Grandstands which is adopted by reference in Section 1028.
- Scope of the standard deals with both temporary and permanent bleachers, folding and telescopic seating, and grandstands which are supported on their own dedicated structural system and are not constructed as part of the building.

1028.1.1 and ICC 300 – Assembly Seating - Bleachers
- A temporary wooden bleacher seating section is constructed within a building.
- The bleacher system is constructed and resting directly on the existing building floor system. This system is regulated by the standard.

1028.1.1 and ICC 300 – Assembly Seating - Bleachers
- A metal bleacher seating system is erected outdoors for viewing a soccer match.
- The seating is erected on metal pads/skids so that the seating may be relocated to the baseball field when needed there. This system is regulated by the standard.
### 1028.1.1 and ICC 300 – Assembly Seating - Bleachers

- A metal bleacher seating system is erected outdoors for viewing a soccer match.
- The seating is erected on metal columns and beams which are bolted onto cast concrete piers extending 5 feet (1524 mm) in depth into the ground. This system is regulated by the standard.

### 1028.1.1 and ICC 300 – Assembly Seating - Bleachers

- A permanent bleacher seating system is constructed as a part of a basketball arena.
- The main beams and supports for the seating connect back to the building’s columns and foundation. This system is regulated by the IBC and not by the standard.

### ICC 300—Standard for Bleachers, Folding and Telescopic Seating and Grandstands

### ICC 300

- The applicability of the standard is as follows:
  - Provisions apply to both temporary and permanent installations. Temporary installations are those that are erected for less than 180 days in a calendar year.
  - New bleachers, folding and telescopic seating and grandstands must comply with Chapters 1 through 4 of the standard.
  - Existing installations must comply with Chapters 1, 2 and 5 of the standard.
ICC 300

- The primary requirements of the standard are found within Chapters 3 and 4 which regulate the construction and means of egress requirements for the seating systems.

The main topics include:
- Location on lot for outdoor installations
- Structural design and support for interior installations
- Spaces beneath the seating system
- Clear height for the egress system and above seating area if a smoke-protected seating or outdoor installation with a roof canopy
- Fire alarm system requirements
- Accessibility for tiered seating areas
- Open spaces between footboards and seatboards

Means of egress requirements

Construction Requirements—ICC 300 Chapter 3

- Systems regulated by the ICC 300 standard are permitted to be constructed of combustible or non-combustible materials.
- IBC Section 1028.1.1 are not “building elements” and therefore are not limited or regulated by the building’s type of construction. They are also not to be considered as a part of the “interior finish” even when located within a building.
Construction Requirements—ICC 300 Chapter

Spaces Beneath Seats—ICC 300 Sections 305 and 311

- Removal of combustible waste, or other materials.
- Use of space for ticket booths, toilet rooms or other purposes.
- Sprinkler requirements if enclosed spaces over 1,000 sq. ft. (93 m²).
- Any other applicable section.

Minimum Number of Means of Egress—ICC 300 Section 404
Minimum Number of Means of Egress—ICC 300 Section 404

<table>
<thead>
<tr>
<th>OCCUPANT LOAD</th>
<th>REQUIRED MEANS OF EGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–250</td>
<td>1</td>
</tr>
<tr>
<td>251–750</td>
<td>2</td>
</tr>
<tr>
<td>751–2,500</td>
<td>3</td>
</tr>
<tr>
<td>Over 2,500</td>
<td>4</td>
</tr>
</tbody>
</table>

ICC 300 – Section 404.3 – Exterior Installations – Means of Egress

In situations where the path of travel to the public way is not safe or achievable due to site constraints, security concerns or other reasons, this section allows the occupants of the seating facility to move to a safe dispersal area where they would be a safe distance away from the seating area and could safely wait until the exits are available or until the hazard is resolved.
ICC 300 – Section 405.6 – Dead End Aisles

- Under the ICC 300 the increased aisle accessway requirements only apply to the rows beyond the generally permitted dead end length of 16 rows for general seating and 21 rows for smoke-protected seating.

- Therefore the aisle accessways in the back of the seating section may be required to be wider than those in the same seating section which are close to an exit or cross aisle.

ICC 300 – Sections 406.3 and 406.5 – Aisle Stairs - Tread and Riser Construction

- What is maximum permitted gap?

- Tread constructed of "more than two elements"
ICC 300 – Sections 407.2, 407.3 and 407.4 – Aisle Accessways Minimum Width

Rows served by aisles or doorways at both ends (Dual access)

- 100 seats maximum between aisles.
- Clear width increased by 0.3 inch (7.6 mm) for each seat beyond 14 where seats have backrests.
- Clear width increased by 0.3 inch (706 mm) for each seat beyond 21 where seats do not have backrests.
- Maximum required clear width of 22 inches (559 mm).
- Exception for smoke-protected assembly seating - 12 inch (304.8 mm) minimum for longer rows in large occupancies. (See Table 407.5)

Rows served by aisle or doorway at one end only (Single access)

- Clear width increased by 0.6 inch (15.2 mm) for each seat beyond 7 where seats have backrests.
- Clear width increased by 0.6 inch (15.2 mm) for each seat beyond 10 where seats do not have backrests.
- Maximum required clear width of 22 inches (559 mm).
- 30 foot (9144 mm) maximum common path of travel distance (Section 407.4.1).
- Exception for smoke-protected assembly seating - 12 inch (304.8 mm) minimum for longer rows in large occupancies. (See Table 407.5)
### Comparison of ICC 300 to IBC Requirement

<table>
<thead>
<tr>
<th>Topic</th>
<th>ICC 300 Section</th>
<th>IBC Section</th>
<th>Comparison comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aisles Minimum aisle widths</td>
<td>405.2</td>
<td>1028.9.1</td>
<td>Same</td>
</tr>
<tr>
<td>Aisle width/capacity</td>
<td>405.3</td>
<td>1028.9.2</td>
<td>Same</td>
</tr>
<tr>
<td>Converging aisles</td>
<td>405.4</td>
<td>1028.9.3</td>
<td>Same</td>
</tr>
<tr>
<td>Uniform width</td>
<td>405.5</td>
<td>1028.9.4</td>
<td>Mostly similar. IBC general limit is 20 feet while standard uses 16 rows. Exceptions in IBC provides 7 seat limit for 12 inch aisle accessway. Standard uses 7 seat limit if seats have backrests and 10 seats without backrests.</td>
</tr>
<tr>
<td>Dead ends</td>
<td>405.6</td>
<td>1028.9.5</td>
<td></td>
</tr>
</tbody>
</table>

### Comparison of ICC 300 to IBC Requirement

<table>
<thead>
<tr>
<th>Topic</th>
<th>ICC 300 Section</th>
<th>IBC Section</th>
<th>Comparison comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aisles Required aisle entrance</td>
<td>M1.1</td>
<td>K300.1.2 and M1.2.2.1</td>
<td>Standard requires four rows of seating. Minimum aisle depth specified in M1.1.2.1.</td>
</tr>
<tr>
<td>Minimum Width</td>
<td>M1.2</td>
<td>K300.1.2.2</td>
<td>Same</td>
</tr>
<tr>
<td>Diagonals</td>
<td>M1.3</td>
<td>K300.1.4.3</td>
<td>Mostly similar. IBC provides 14 seat limit for 12 inch aisle accessway. Standard uses 14 and limit 3 seats have backrests and 3 seats without backrests.</td>
</tr>
<tr>
<td>Single access</td>
<td>M1.4</td>
<td>K300.1.2.2</td>
<td>Mostly similar. IBC provides 7 and limit for 12 inch aisle accessway. Standard uses 7 and limit 3 seats have backrests and 3 seats without backrests.</td>
</tr>
<tr>
<td>Path of egress need</td>
<td>M1.4.2</td>
<td>K300.2.2</td>
<td>Same</td>
</tr>
<tr>
<td>Parapets through parapet rail</td>
<td>K205.4.2</td>
<td>K300.6.1(E)</td>
<td>Mostly similar. IBC provides 7 and limit for 12 inch aisle accessway. Standard uses 7 and limit 3 seats have backrests and 3 seats without backrests.</td>
</tr>
<tr>
<td>Smoke protected aisle entrance</td>
<td>K75.3</td>
<td>Table H202.1</td>
<td>Mostly similar. Standard includes reference to address smoke without backrests.</td>
</tr>
</tbody>
</table>

### Comparison of ICC 300 to IBC Requirement

<table>
<thead>
<tr>
<th>Guards</th>
<th>ICC 300 Section</th>
<th>IBC Section</th>
<th>Comparison comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required guards</td>
<td>408.1</td>
<td>1028.14 and subsections 1013</td>
<td>Same</td>
</tr>
<tr>
<td>Opening limitations</td>
<td>408.2</td>
<td>1013.4</td>
<td>Similar. Standard allows 8 inch sphere above 3/4 inches while IBC limits to 4-3/8 for heights above 36 inches. 8 inch limit for upper portions of guards at the ends of aisles is consistent.</td>
</tr>
<tr>
<td>Guard design</td>
<td>408.3</td>
<td>1607.8</td>
<td>Same since standard references IBC.</td>
</tr>
</tbody>
</table>
Comparison of ICC 300 to IBC Requirement

<table>
<thead>
<tr>
<th>Topic</th>
<th>ICC 300 Section(s)</th>
<th>IBC Section(s)</th>
<th>Comparison comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handrails</td>
<td>408.1</td>
<td>1006.4.1 and 1007.2</td>
<td>Similar intent.</td>
</tr>
<tr>
<td>Mid-side handrails</td>
<td>408.11.1</td>
<td>1006.11.1 and 1006.11.2</td>
<td>Same, standard specifically exempt is interpreted as same as emerging requirements.</td>
</tr>
<tr>
<td>Height</td>
<td>408.2</td>
<td>1017.2</td>
<td>Same.</td>
</tr>
<tr>
<td>Occupancy</td>
<td>409.5</td>
<td>1017.2.3 and 1017.2.3.1</td>
<td>Same.</td>
</tr>
<tr>
<td>Continuity</td>
<td>408.4</td>
<td>1017.2.6 and 1006.13.1</td>
<td>Same.</td>
</tr>
<tr>
<td>Railing termination</td>
<td>409.5</td>
<td>1017.10</td>
<td>Same.</td>
</tr>
<tr>
<td>Mid-side/handrail termination</td>
<td>409.5.1</td>
<td>1017.2.6 and 1006.13.2</td>
<td>Similar intent. Standard minimum handrail height is lower than minimum height in IBC requirements.</td>
</tr>
<tr>
<td>Clearance</td>
<td>409.6</td>
<td>1017.2.7</td>
<td>Same.</td>
</tr>
<tr>
<td>Projections</td>
<td>409.7</td>
<td>1017.28</td>
<td>Same.</td>
</tr>
<tr>
<td>Handrail design</td>
<td>409.8</td>
<td>1007.8</td>
<td>Same. (not standard references in IBC).</td>
</tr>
</tbody>
</table>

Section 1004.3 – Posting of Occupant Load

- Multipurpose assembly room will be used without seats, for classroom and for dining, it is appropriate to show each of those occupant loads on the sign. This establishes the appropriate occupant load for each use and helps prevent overcrowding.

Chapter 10 Means of Egress

1004.3 – Posting of Occupant Load

*Sign posted near main doorway from space in conspicuous place.*
Means of Egress Illumination—Section 1006

- Exceptions for assembly uses permit the following:
  - Aisle accessways are not required to be illuminated.
  - In auditoriums, theaters, concert or opera halls and similar assembly spaces are permitted to reduce the lighting to 0.2 footcandles (2.15 lux) during performances provided the illumination automatically returns to the 1 footcandle level when the fire alarm system is activated.

1008.1 – Door Hardware - Lock and Latch Requirements

- Section 1008.1.9.3: Key operated locking device is permitted on main exterior door provided:
  - Device is distinguishable as being locked
  - Sign posted adjacent to door "Door to remain unlocked when building is occupied"
  - Use of device is revocable by building official

- Section 1008.1.9.9: Electromagnetically locked egress doors are permitted if equipped with a "listed hardware" with a switch that does the following:
  - Obvious method of operation under all lighting conditions
  - Capable of being operated with one hand
  - Operation interrupts power to lock and immediately unlocks the door
  - Loss of power automatically unlocks the door
  - Operation of the listed panic or fire exit hardware also releases electromagnetic lock
1009.3 – Exit Access Stairways

- Exception 8: Allows the stairways serving stages, platforms and technical production areas to be open and unenclosed. This was previously discussed with Section 410.6.

- Exception 9: Allows stairways between the main assembly floor and any balcony, gallery or press box to be open in assembly uses such as theaters, places of religious worship, auditoriums and sports facilities.

Section 1009.3, Exception 9 does allow the stair between the balcony and other spaces to be open to the main floor, code users should remember the requirements of other code sections and how they may affect the design. Section 1028.5 requires balconies, galleries or press boxes with a seating capacity of 50 or more to have:

- A minimum of two means of egress,
- One egress path from each side of the space, and
- At least one means of egress leading directly to an exit.
1018.1 – Exception 1 Corridor Construction

- Exception 1 in Section 1018.1 allows for the fire resistance rating of a corridor to be eliminated where:
  - Each room used for instruction has at least one door opening directly to the exterior.
  - Each room used for assembly purposes has at least one-half of the required means of egress doors opening directly to the exterior.

Overview

- Chapter 4
  - Contains a number of provisions which apply in addition to the code’s general occupancy and construction requirements.
  - Additional provisions apply to the special uses and occupancies.

410.6 and 410.6.1 – Means of Egress and Arrangement

- Code users must recognize that the various sections may apply to any or all of:
  - Stages;
  - Platforms; and
  - Technical production areas.
410.6 and 410.6.1 – Means of Egress and Arrangement

- Many sporting arenas may have spaces which could use the technical production area egress provisions or the technical production area may be a stand-alone building element.

410.6.2 – Stairway and Ramp Enclosure

- Exit access stairways are not required to be enclosed.

STAGE REQUIRING TWO OR MORE MEANS OF EGRESS:
- OCCUPANT LOAD ≥ 50
- COMMON PATH OF TRAVEL > 75 FEET
- NO LESS THAN ONE EXIT OR EXIT ACCESS DOORWAY ON EACH SIDE OF STAGE

TECHNICAL PRODUCTION AREA

EXIT ACCESS STAIRWAYS ARE NOT REQUIRED TO BE ENCLOSED

STAGE OR PLATFORM

TECHNICAL PRODUCTION AREA

EXIT ACCESS STAIRWAYS ARE NOT REQUIRED TO BE ENCLOSED
410.6.3 – Technical Production Areas – Means of Egress

- This section references both means of egress and means of escape since some components such as ladders would not generally be acceptable for egress and because 410.6.3.3 will allow an escape to the roof.

410.6.3 – Technical Production Areas – Means of Egress

- The provisions reflect the special allowances for:
  - Minimum number of means of egress;
  - Maximum travel distance;
  - Allowable exit access components; and
  - Minimum travel path width.

Means of Egress, 410.6.3.1

- Since these spaces are unique and typically occupied by a limited number of people who are familiar with the area, a single means of egress is required and will typically be adequate.

Travel distance, 410.6.3.2

- Due to the limited occupant load and hazard, and the location of these spaces, the exit access travel distance can be 300 feet (91 440 mm) in buildings without a sprinkler system and 400 feet (121 920 mm) in a building with an automatic sprinkler system.
Two means of egress, 410.6.3.3

- If two means of egress are required, the maximum length of the common path of travel within the area is limited to 100 feet (30 480 mm).
- This will limit dead ends and limit the travel distance before a choice of paths leading to two means of egress.

Path of egress travel, 410.6.3.4

- Components allowed to serve as the egress path from these areas include:
  - stairways,
  - ramps,
  - spiral stairways,
  - catwalks,
  - alternating tread devices and
  - permanent ladders.

Width, 410.6.3.5

- Egress width for egress path to be a minimum of 22 inches (559 mm) in width.
- Width would apply to stairways, ramps, catwalks, spiral stairs, and the width adjacent to alternating tread devices and ladders.

Special Amusement Buildings—Section 411

- The code requirements address many of the issues which made this fire so tragic including:
  - Uncertainty of exit locations and access to them.
  - Dark and confusing exiting system.
  - Confusing or conflicting sounds and visual distractions.
  - Lack of notification and awareness of fire (which led to additional people entering the building after the fire had begun).
  - Flame spread of materials which lead to fire progression and smoke development.
Special Amusement Building

- A special amusement building is any temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction so arranged that the means of egress path is not readily apparent due to visual or audio distractions or is intentionally confounded or is not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

Note the key features are:
- The means of egress is not readily available or apparent
- The potential for sound or lighting which can distract or confound the occupants and affect their egress
- Buildings can be permanent or temporary
- Building could include a passenger conveying system or walkway through it
411.7 – Exit Marking

- Exit signage is required as it is generally done for all other buildings.
- Where the egress path is disguised or mirrors or mazes are used, there are additional marking and signage requirements.