31st Annual State Construction Conference
March 22nd, 2012

Significant Changes to the 2012 NC State Building Code

By: Farouk Zaman, RA
REMINDER: ALL APPENDIXES AT THE BACK OF THE NC STATE BUILDING CODE 2012 HAD BEEN ADOPTED BY THE STATE AND ARE AN INTEGRAL PART OF THIS CODE.

ALL NEW AND CHANGES TO THE 2012 CODE ARE HIGHLIGHTED IN RED. REFERENCE TO 2009 CODE ARE HIGHLIGHTED IN BLUE.
31st Annual
State Construction
Conference
March 22nd, 2012

STAFF ARCHITECTS

Farouk Zaman, RA  farouk.zaman@doa.nc.gov
Steve Key, RA  steve.key@doa.nc.gov
Eric Tjalma, RA  eric.tjalma@doa.nc.gov
Ronald Little, RA  ronald.little@doa.nc.gov
Jim Lora, RA  jim.lora@doa.nc.gov

SCO Website – http://www.nc-sco.com
## Code Effective Dates

<table>
<thead>
<tr>
<th>Code</th>
<th>Optional Effective Date</th>
<th>Mandatory Enforcement Date</th>
<th>Notes</th>
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<td>Jun 1 2012</td>
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<td>Jan 1 2011</td>
<td>March 1 2012</td>
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<td>Jun 1 2012</td>
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2012 NC STATE BUILDING CODE
SIGNIFICANT CHANGES:

NSCBC Chapter 5
NSCBC Chapter 7
NSCBC Chapter 9
NSCBC Chapter 10
ICC A117.1-2009 Chapter 11
# NCSBC 2002

## TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS

<table>
<thead>
<tr>
<th>GROUP</th>
<th>TYPE I</th>
<th>TYPE II</th>
<th>TYPE III</th>
<th>TYPE IV</th>
<th>TYPE V</th>
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<tr>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>HT</td>
</tr>
<tr>
<td>HEIGHT</td>
<td>UL</td>
<td>160</td>
<td>65</td>
<td>55</td>
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<table>
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<th>STORIES (S)</th>
<th>AREA (A)</th>
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<td>B S UL 11</td>
<td>5 3 5 3 5 3 2</td>
</tr>
<tr>
<td>A UL UL</td>
<td>37500 23000 28500 19000 36000 18000 9000</td>
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<tr>
<td>M S UL 11</td>
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</tr>
<tr>
<td>A UL UL</td>
<td>21500 12500 18500 12500 20500 14000 9000</td>
</tr>
<tr>
<td>S-1 S UL 11</td>
<td>4 2 3 2 4 3 1</td>
</tr>
<tr>
<td>A UL UL</td>
<td>48000 26000 17500 26000 17500 22500 14000 9000</td>
</tr>
<tr>
<td>S-2 S UL 11</td>
<td>5 3 4 3 5 4 2</td>
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<tr>
<td>A UL UL</td>
<td>79000 39000 26000 39000 26000 38500 21000 13500</td>
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SCO conference 2012
### TABLE 508.2.5 (2012)

<table>
<thead>
<tr>
<th>ROOM OR AREA</th>
<th>SEPARATION AND/OR PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage rooms over 100 square feet</td>
<td>1 hour and provide automatic fire-extinguishing system</td>
</tr>
<tr>
<td>Parking garage, Section 408.2</td>
<td>2 hours and provide automatic fire-extinguishing system</td>
</tr>
<tr>
<td>Rooms containing fire pumps in high-rise buildings</td>
<td>2 hour</td>
</tr>
</tbody>
</table>

SCO conference 2012
### Table 302.3.2

NCSBC 2006

Separation of Occupancies

#### TABLE 508.4

Required Separation of Occupancies (hours)

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>GROUP A-1</th>
<th>A-2</th>
<th>A-3</th>
<th>A-4</th>
<th>A-5</th>
<th>U-1</th>
<th>U-2</th>
<th>U-3</th>
<th>U-4</th>
</tr>
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<tbody>
<tr>
<td>S</td>
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<td>1</td>
<td>2</td>
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<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E-1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<td>E-2</td>
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<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Notes:**
- S = Buildings equipped throughout with an automatic sprinkler system approved to standards with respect to 508.3.1.1.
- NS = Buildings not equipped throughout with an automatic sprinkler system approved to standards with respect to 508.3.1.1.
- N = No separation required.
- NF = Not permitted.
- For Group H-4 occupancies, see Section 502.3.5.5.
- The required separation from areas used only for public or storage purposes shall be reduced by 1/4 hour for any storage not more than 1 hour.
- See Article 406.1.
- Confidential areas need not be separated from the restaurant serving areas that they serve.
- Separation is not required between occupancy of the same classification unless separated minimum area as required.
- For Group K-1 occupancies, see Section 410.2.1.
- For Group K-2, K-3 and K-4 must be separated by the designated construction rating unless they are to be considered mixed use.
- Group K-1, K-2, K-3 and K-4 must be separated by the designated construction rating unless they are to be considered mixed use.

2012 North Carolina Building Code

SCO conference 2012
## TABLE 508.4
**REQUIRED SEPARATION OF OCCUPANCIES (hours)**

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>F-1</th>
<th>F-2</th>
<th>H-1</th>
<th>H-2</th>
<th>H-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>S</td>
<td>2 e,g</td>
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<td>1</td>
<td>1</td>
<td>N</td>
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<td>NS</td>
<td>2 e,g</td>
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<td>NP</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>S</td>
<td>1</td>
<td>2 e</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>NP</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>2</td>
<td>2 e</td>
<td>2</td>
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<td>2</td>
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<td>2 e</td>
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<td>F-2</td>
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<td>2 e</td>
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<tr>
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<td>NS</td>
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<td>2</td>
<td>2 e</td>
<td>NP</td>
<td>4</td>
</tr>
</tbody>
</table>
TABLE 508.4 - Footnotes

e. Separation is not required between occupancies of the same classification unless separated mix use is implemented.

f. For Group H-5 occupancies, see Section 415.8.2.2 Separation.

g. Groups A-1, A-2, A-3, A-4 and A-5 must be separated by the designated fire-resistance rating unless they are to be non-separated mixed use.

h. Groups R-1, R-2, R-3 and R-4 must be separated by the designated fire-resistance rating unless they are to be non-separated mixed use.
### TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (hours)

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>F-1</th>
<th>F-2</th>
<th>H-1</th>
<th>H-2</th>
<th>H-3</th>
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<tbody>
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</table>

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SECTION 706.3.9 SINGLE-_OCCUPANCY FIRE AREAS. The fire barrier or horizontal assembly, or both, separating a single occupancy into different fire areas shall have a fire-resistance rating of not less than that indicated in TABLE 706.3.9.

**TABLE 706.3.9**
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES OR HORIZONTAL ASSEMBLIES BETWEEN FIRE AREAS

<table>
<thead>
<tr>
<th>OCCUPANCY GROUP</th>
<th>FIRE-RESISTANCE RATING (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1, H-2</td>
<td>4</td>
</tr>
<tr>
<td>H-1, H-3 S-1</td>
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<tr>
<td>A, B, H-2, H-4 H-5, I, M, S-2</td>
<td>2</td>
</tr>
<tr>
<td>U</td>
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</tbody>
</table>
SECTION 707.3.9 FIRE AREAS: The fire barriers or horizontal assemblies, or both, separating a single occupancy or multiple occupancies into different fire areas shall have a fire-resistance rating of not less than that indicated in TABLE 508.4.

TWO CODE SECTIONS REFERENCED
SECTION 901.7 FIRE AREAS

Where buildings, or portions thereof, are divided into fire areas so as not to exceed the limits established for requiring fire protection system in accordance with this chapter, such fire areas shall be separated by fire barriers having a fire resistance rating of not less than that determined in accordance with Section 706.3.9.

[Separated Occupancies and Table 508.4 Required Separation of Occupancies.]
### TABLE 508.4
REQUdRED SEPARATON OF OCCUPANCIES (hours)

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>F-1</th>
<th>F-2</th>
<th>H-1</th>
<th>H-2</th>
<th>H-3</th>
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<tbody>
<tr>
<td>A</td>
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# TABLE 704.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS

<table>
<thead>
<tr>
<th>CLASSIFICATION OF OPENINGS</th>
<th>0 to 3</th>
<th>Greater than 5 to 10</th>
<th>Greater than 10 to 15</th>
<th>Greater than 15 to 20</th>
<th>Greater than 20 to 25</th>
<th>Greater than 25 to 30</th>
<th>Greater than 30</th>
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</thead>
<tbody>
<tr>
<td>UNPROTECTED</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>No Limit</td>
</tr>
<tr>
<td>PROTECTED</td>
<td>Not Permitted</td>
<td>15%</td>
<td>20%</td>
<td>45%</td>
<td>No Limit</td>
<td>No Limit</td>
<td>No Limit</td>
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</table>

FIRE PROTECTION DISTANCE (feet)
# TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE (feet)</th>
<th>DEGREE OF OPENING PROTECTION</th>
<th>ALLOWABLE AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to less than 3</td>
<td>Unprotected, Nonsprinklered (UP, NS)</td>
<td>Not Permitted</td>
</tr>
<tr>
<td></td>
<td>Unprotected, Sprinklered (UP, S)</td>
<td>Not Permitted</td>
</tr>
<tr>
<td></td>
<td>Protected (P)</td>
<td>Not Permitted</td>
</tr>
<tr>
<td>3 to less than 5</td>
<td>Unprotected, Nonsprinklered (UP, NS)</td>
<td>Not Permitted</td>
</tr>
<tr>
<td></td>
<td>Unprotected, Sprinklered (UP, S)</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Protected (P)</td>
<td>15%</td>
</tr>
<tr>
<td>5 to less than 10</td>
<td>Unprotected, Nonsprinklered (UP, NS)</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Unprotected, Sprinklered (UP, S)</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Protected (P)</td>
<td>25%</td>
</tr>
<tr>
<td>OCCUPANCY</td>
<td>WITHOUT SPRINKLER SYSTEM</td>
<td>WITH SPRINKLER SYSTEM</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Stairways (Inches per occupant)</td>
<td>Other egress components (Inches per occupant)</td>
</tr>
<tr>
<td>Occupancies other than those listed below</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Hazardous: H-1, H-2, H-3 and H-4</td>
<td>0.07</td>
<td>0.04</td>
</tr>
<tr>
<td>Institutional: I-2</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
SECTION 1005.1
MINIMUM REQUIRED
EGRESS WIDTH

Stairs: Exit width per occupant **0.3 inch**.

Other egress components: Exit width per occupant **0.2 inch**.
SECTION 1005.1
MINIMUM REQUIRED EGRESS WIDTH

Example: 2 story building with 1,000 occupants per floor

Building (2009) - Sprinklered
Stair width: 1000 x 0.2 = 200”
Other width: 1000 x 0.15 = 150”

Building (2012) – Sprinklered or Nonsprinklered
Stair width: 1000 x 0.3 = 300”  50% increase
Other width: 1000 x 0.2 = 200”  33.3% increase
CURVED STAIRS & WINDERS
SECTION 1009.3 WALKLINE

Walkline across winder treads shall be concentric to the direction of travel and located 12” horizontally from the handrail where the winder is narrow.
SECTION 1009.11
SHIP LADDERS

Pitch: 60 to 70 degrees

Riser: 9½” min. to 12” max.

Tread: Min. 5” deep

Pipe rail: 1¼” dia.

30” max. width

20 feet Max

SCO conference 2012
SECTION 1012.3
HANDRAIL GRASPABILITY

Section 1012.3.1 Type I. <6¼” Perimeter

- 1½” Clear
- 1½” Clear
- 1½” Clear
- 1½” Clear

- 1¼” to 2” Dia.
- 2¼” Max.
- 4” to 6¼” perimeter dim. or circumference
SECTION 1012.3
HANDRAIL GRASPABILITY
Section 1012.3.2 Type II. >6¼” Perimeter

Tallest Portion
Finger Recess Area

Finger Recess begins within ¾”
Within 7/8” of the widest portion

Min 5/16” Depth

SCO conference 2012
SECTION 1013.3
OPENING LIMITATIONS

<4” sphere

<6” sphere

<4” sphere

<2” sphere

<8” sphere

SCO conference 2012
The length of a common path of egress travel in a Group R-2 occupancy shall not be more than 125 feet provided that the building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Section 903.3.1.1 = NFPA 13 Sprinkler system
Section 903.3.1.2 = NFPA 13R Sprinkler System
<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>WITHOUT SPRINKLER SYSTEM (feet)</th>
<th>WITH SPRINKLER SYSTEM (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, E, F-1, M, R, S-1, I-1</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>I-1</td>
<td>Not Permitted</td>
<td>250</td>
</tr>
<tr>
<td>I-2, I-3, I-4</td>
<td>Not Permitted</td>
<td>200</td>
</tr>
</tbody>
</table>
SECTION 1018.3
DEAD ENDS
Exception 2

In occupancies in Groups B, E, F-1, M, R-1, R-2, R-4, S where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of dead-end corridors shall not exceed 50 feet.
<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>STORY</th>
<th>MAX. OCCUP. (or DWELLING UNITS) / FLOOR AND TRAVEL DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>First story or basement</td>
<td>A, B, E, F, M, U, S</td>
<td>49 occup. 75 feet</td>
</tr>
<tr>
<td></td>
<td>H-2, H-3</td>
<td>3 occup. 25 feet</td>
</tr>
<tr>
<td></td>
<td>H-4, H-5, I-1, I-4, R</td>
<td>10 occup. 75 feet</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>29 occup. 100 feet</td>
</tr>
<tr>
<td>Second story</td>
<td>B, F, M, S</td>
<td>30 occup. 75 feet</td>
</tr>
<tr>
<td></td>
<td>R-2</td>
<td>4 dwell units. 50 feet</td>
</tr>
<tr>
<td>Third story</td>
<td>R-2</td>
<td>4 dwell units. 50 feet</td>
</tr>
</tbody>
</table>

SCO conference 2012
d. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum travel distance of 100 feet.
SECTION 1022.8.1 SIGNAGE REQUIREMENTS > 3 STORIES

ACCESS TO FLOORS 1 TO 6
ROOF ACCESS
EXIT DISCHARGE AT
FLOOR 1

1½” IN HEIGHT
CHARACTERS SHALL CONTRAST WITH THEIR BACKGROUND OR VICE VERSA

BUILDING OVER 75’-0” IN HEIGHT, SECTION 1024 SCO conference 2012
SECTION 1024
LUMINOUS EGRESS PATH MARKINGS

Section 1024.1 General. Approved luminous egress path markings delineating the exit path shall be provided in buildings of Groups A, B, E, I, M and R-1 having floors located more than 75’ above the lowest level of fire department vehicle access in accordance with Sections 1024.1 and 1024.5.
SECTION 1024.4
SELF-LUMINOUS AND PHOTOLUMINESCENT

Luminous egress path markings shall be permitted to be made of any materials, including paint, provided an electrical charge is not required to maintain the required luminance. Such materials shall include but are not limited to self-luminous materials and photoluminescent materials. Comply with UL 1994 or ASTM E 2072

SECTION 1024.5 ILLUMINATION

Minimum means of egress illumination for at least 60 minutes prior to periods when the building is occupied.
SECTION 1024.2.1 Steps

1” TO 2” WIDE STRIPE

½ “ LAP OVER NOSING
SECTION 1024.2.3 Handrails

1" WIDE STRIPE AT TOP OF HANDRAIL

4" GAP MAX
SECTION 1024.2.4.1

Floor-mounted demarcation lines

- Within 4” of wall
- 2” of leading edge of landing

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SECTION 1024.2.4.2
Wall Demarcation Lines

WITHIN 2” OF STEPS OR LEADING EDGE

BOTTOM EDGE OF STRIPE 4” ABOVE FINISHED FLOOR

SCO conference 2012
SECTION 1024.2.5 Obstacles

OBSTACLES AT OR BELOW 6’-6”, PROJECT >4” INTO EGRESS PATH
SECTION 1024
LUMINOUS EGRESS PATH MARKINGS
SECTION 1024.2.6.2
Door hardware markings

16 square inches of luminous material.
SECTION 1024.2.6.3
Door frame markings

SCO conference 2012
SECTION 1024.2.6
Door from exit enclosure

SCO conference 2012
ICC A117.1-2009
CHAPTER 11
RECREATIONAL FACILITIES

1. Recreational Boating Facilities.
2. Fishing Piers and Platforms.

U.S. DEPARTMENT OF JUSTICE
2010 ADA STANDARD IS MANDATORY ON
MARCH 15, 2012.

SCO conference 2012
Thank you!

Questions?

Farouk Zaman, RA  farouk.zaman@doa.nc.gov
Steve Key, RA  steve.key@doa.nc.gov
Eric Tjalma, RA  eric.tjalma@doa.nc.gov
Ronald Little, RA  ronald.little@doa.nc.gov
Jim Lora, RA  jim.lora@doa.nc.gov

SCO Website – http://www.nc-sco.com
Significant Changes to the 2012 NC State Building Code Chapters 16-23

By: Bert Neily, PE
STAFF
CIVIL/STRUCTURAL ENGINEERS

Bert Neily, PE
herbert.neily@doa.nc.gov

Mike Ali, PE
michael.ali@doa.nc.gov

Tim Langford, PE
tim.langford@doa.nc.gov

SCO Website – http://www.nc-sco.com
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Structural Chapters 16 - 23

“There were more than 350 proposed code changes to the structural provisions in Chapters 16 through 23 of the 2006 IBC. Of these proposed code changes, approximately 200 were successful and [were] incorporated into the 2009 edition of the IBC.” - Structural Engineer Magazine

About 60 code changes via the 2012 NC Amendments.
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Structural Chapters 16 - 23

Increasing Migration to Referenced Standards

- Ch. 16 – Structural Design
- Ch. 21 – Masonry
- Ch. 23 – Wood

2009 IBC

2012 NC

ASCE 7-05

ACI 530-08

AF&PA NDS-05

SCO conference 2012
Table 1604.5

Is significant because:

- Determines Importance Factors ‘$I_x$’
- Influences Seismic Design Category (SDC = ‘C’, etc.)
- Determines Req’t. for Spec. Insp.

<table>
<thead>
<tr>
<th>OCCUPANCY CATEGORY</th>
<th>OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES</th>
</tr>
</thead>
</table>
| I                   | Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to:
|                     | • Agricultural facilities.
|                     | • Certain temporary facilities.
|                     | • Minor storage facilities. |
| II                  | Buildings and other structures except those listed in Occupancy Categories I, III and IV |
| III                 | Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to:
|                     | • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 500.
|                     | • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250.
|                     | • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500.
|                     | • Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities.
|                     | • Group I-3 occupancies.
|                     | • Any other occupancy with an occupant load greater than 5,000’. |
|                     | • Power generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV.
|                     | • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released. |
| IV                  | Buildings and other structures designated as essential facilities, including but not limited to:
|                     | • Group I-2 occupancies having surgery or emergency treatment facilities.
|                     | • Fire, rescue, ambulance and police stations and emergency vehicle garages.
|                     | • Designated earthquake, hurricane or other emergency shelters.
|                     | • Designated emergency preparedness, communications and operations centers and other facilities required for emergency responses.
|                     | • Power generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures.
|                     | • Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Table 307.1.2(3).
|                     | • Aviation control towers, air traffic control centers and emergency aircraft hangars.
|                     | • Buildings and other structures having critical national defense functions.
|                     | • Water storage facilities and pump stations required to maintain water pressure for fire suppression. |

a. For purposes of occupant load calculation, occupancies required by Table 1004.1.1 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Not intended for such use in Categories I, II and III.
**Changes to the NORTH CAROLINA STATE BUILDING CODE 2012**

**TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES**

| 2009: • Buildings and other structures with an occupant load greater than 500 for colleges or adult education facilities. |

| 2012: • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500. |

University Dormitory (R-2) with >500 Occupants is a Category II structure.

---

SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

<table>
<thead>
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</table>
| I                   | Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to:  
  • Agricultural facilities.  
  • Certain temporary facilities.  
  • Minor storage facilities. |
| II                  | Buildings and other structures except those listed in Occupancy Categories I, III and IV  
  • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.  
  • Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250.  
  • Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 250. |

• Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.

“Primary Occupancy” Is not defined in 2012 Code or acknowledged in Appendix ‘B’

See IBC Commentary
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

<table>
<thead>
<tr>
<th>OCCUPANCY CATEGORY</th>
<th>NATURE OF OCCUPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New Footnotes:

- Any other occupancy with an occupant load greater than 5,000.

Footnote a.

For purposes of occupant load calculation, occupancies required by Table 1004.1.1 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

New Footnotes:
Footnote b.
(NC Amendment)

- Water storage facilities and pump structures required to maintain water pressure for fire suppression.

b. Not intended for such uses in Categories I, II, and III.
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

TABLE 1604.5 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

<table>
<thead>
<tr>
<th>OCCUPANCY CATEGORY</th>
<th>OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities, Certain temporary facilities, Minor storage facilities,</td>
</tr>
<tr>
<td>II</td>
<td>Buildings and other structures except those listed in Occupancy Categories I, III and IV</td>
</tr>
<tr>
<td>III</td>
<td>Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 500. Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250. Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500. Group I-2 occupancies with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities. Group I-3 occupancies. Any other occupancy with an occupant load greater than 5,000. Power generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV. Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.</td>
</tr>
<tr>
<td>IV</td>
<td>Buildings and other structures designated as essential facilities, including but not limited to: Group I-2 occupancies having surgery or emergency treatment facilities. Fire, rescue, ambulance and police stations and emergency vehicle garages. Designated earthquake, hurricane or other emergency shelters. Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. Power-generating stations and other public utility facilities required as backup facilities for Occupancy Category IV structures. Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Section 307.12. Aviation control towers, air traffic control centers and emergency aircraft hangars. Buildings and other structures having critical national defense functions. Water storage facilities and pump structures required to maintain water pressure for fire suppression.</td>
</tr>
</tbody>
</table>

Future Change: “Occupancy Category” will become “Risk Category” in 2012 IBC /2015 NC

SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Section 1609 Wind Loads

Wind Application Reference

2012 NC / 2009 IBC
2009 NC / 2006 IBC
2006 NC / 2003 IBC
2002 NC / 2000 IBC

Section 1609.6 Simplified wind load method.

Section 1609.6 All-heights method.

Method 1 – Simplified Procedure (≤ 60’H, etc.)
Method 2 - Analytical Procedure (aka “Difficult”)
Method 3 – Wind Tunnel Procedure (Infrequent)

ASCE 7-05
ASCE 7-02
ASCE 7-98

SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Section 1609 Wind Loads

Section 1609.6 Simplified wind load method.

Section 1609.6 All-heights method.

2012 NC / 2009 IBC
2009 NC / 2006 IBC
2006 NC / 2003 IBC
2002 NC / 2000 IBC

ASCE 7-05
ASCE 7-02
ASCE 7-98

Wind Application Reference

Method 1 – Simplified Procedure (≤ 60’H, etc.)
Method 2 - Analytical Procedure (Most SCO)
Method 3 – Wind Tunnel Procedure (Infrequent)

SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Section 1609 Wind Loads
Section 1609.6 All-heights method.

Features:
• Provides tables for net pressure coefficient “$C_{net}$“; consolidating multiple ASCE 7 coefficients.
• Eliminates ASCE 7 “zones” for Main Wind Force Resisting System (MWFRS).
• Component & cladding tables still reference ASCE 7 zoned figures.
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Section 1609 Wind Loads
Section 1609.6 All-heights method.

“More-heights”?

Limitations:

- **Height Limitation of 75-feet.**
- Height/Width Ratio ≤ 4
- Frequency ≥ 1 Hertz (“rigid” structure).
- Must have ASCE 7 simple diaphragm.
- Can’t be fully open, have multiple gables, roof steps, or roof slope > 45°.

When Using:

- Stay within limitations.
- Don’t mix with other methods.
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Section 1614 Structural Integrity

• Pertains to High-Rise Category III & IV Buildings.
  • Hospitals
  • University Classroom/Lab Buildings

• Structural Continuity & Progressive Collapse
  • Based on ACI 318 structural integrity requirements.
  • IBC adoption prompted by WTC studies.

• Implications
  • Concrete: Minimal – ACI 318
  • Steel: Moderate – Beam & Column Tension
  • Bearing Wall Structures: Substantial – Tie Req’ts.
Chapter 17
Structural Tests and Special Inspections

SCO Special Inspections Guidelines
- Being updated to 2012 Code
- Ready in May 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Chapter 17
Structural Tests and Special Inspections

- 1706 Spec. Insp. For Wind Resistance

1704.1.2 Special Inspections requirement.
Established in 2007
**1704.1.2 Special inspections requirement.** Special inspections per Section 1704 are required for building, building components or other structures per the following:

1. Buildings or other structures listed in Table 1604.5 in Occupancy Category II if:
   
   1.1. Building height exceeds 45 feet (13.7 m) or three stories, or
   
   1.2. The building is an underground building per Section 405.1:

2. Buildings or other structures listed in Table 1604.5 in Occupancy Categories III or IV;

3. Piles, piers and special foundations per Sections 1704.8 through 1704.11, 1810.3.5.2.4 and 1810.3.5.2.5;

4. Retaining walls exceeding 5 feet (1524 mm) height per Section 1806.2 1807.2;

5. Smoke control and smoke exhaust systems;

6. Sprayed fire-resistant materials; or

7. Special case described in Section 1704.15.
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

- 1706 Spec. Insp. For Wind Resistance

**SECTION 1706
SPECIAL INSPECTIONS FOR WIND REQUIREMENTS**

**1706.1** Special inspections for wind requirements. Special inspections itemized in Section 1704.1.2 and Sections 1706.2 through 1706.4 are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Categories C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/sec) or greater.

**SECTION 1707
SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE**

**1707.1** Special inspections for seismic resistance. Special inspections itemized in Sections 1707.2 through 1707.9, and where required by Section 1704.1.2 unless exempted by the exceptions of Section 1705.3 or 1705.3.1, are required for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1613.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Sections 1707.6 and 1707.7.

Exp. Cat. B, ≥ 120 MPH  
Exp. Cat. C, ≥ 110 MPH  
“High Wind”  
Seismic Design Categories C, D, E, F  
“High Seismic”  
SCO conference 2012
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

“….an act of abject inconsistency…”

Member of Ad-Hoc Structural Committee, NC Code Council

*Intended* inconsistency: In NC, High Wind Event is *More Likely* than Seismic Event

SCO conference 2012
# Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

## Chapter 17 Structural Tests and Special Inspections

### Section 1704.1.2

<table>
<thead>
<tr>
<th>“Whole Building”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cat. II - “Tall” only</td>
</tr>
<tr>
<td>2. Cat. III or IV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Itemized”</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Piles, Piers....</td>
</tr>
<tr>
<td>4. Retaining Walls</td>
</tr>
<tr>
<td>5. Smoke Systems</td>
</tr>
<tr>
<td>6. Sprayed Fire Protection</td>
</tr>
<tr>
<td>7. Special Conditions</td>
</tr>
</tbody>
</table>

### Diagram

1. Yes
2. No
3. Yes
4. No

**SCO conference 2012**
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Chapter 17 Structural Tests and Special Inspections

Section 1704.1.2

Whole Building? Yes No

Itemized? Yes No

No Special Inspections

Seismic? Yes No

Wind? Yes No
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Chapter 17 Structural Tests and Special Inspections

Section 1704.1.2

Whole Building?

- Yes
  - Seismic?
    - Yes
      - Wind?
        - Yes
          - Basic SI
          - 1707
          - 1708
        - No
          - Special Inspections
          - 1706
      - No
    - No
      - Itemized?
        - Yes
          - Special Inspections
          - No Special Inspections
        - No
          - No Special Inspections

No

- Itemized?
  - Yes
    - Special Inspections
    - No Special Inspections
  - No
    - Whole Building?
      - Yes
        - Basic SI
        - 1707
        - 1708
      - No
        - Special Inspections
        - No Special Inspections

- No
  - Itemized?
    - Yes
      - Special Inspections
      - No Special Inspections
    - No
      - No Special Inspections

- Wind?
  - Yes
    - Basic SI
    - 1707
    - 1708
  - No
    - Special Inspections
    - No Special Inspections
Changes to the NORTH CAROLINA STATE BUILDING CODE 2012

Chapter 17 Structural Tests and Special Inspections

Section 1704.1.2

Whole Building?  
Yes  
Seismic?  
Yes  
Basic SI  
1707  1708
No  
Wind?  
Yes  
Itemized?  
Yes  
No Special Inspections

No  
Wind?  
Yes  
No  
Seismic?  

SCO conference 2012
Chapter 17
Structural Tests and Special Inspections
Miscellaneous Changes:

• 1704.3.4 & 1704.6.2
  Light Gage Metal Trusses & Wood Trusses with Spans > 60’:
  Added SI for permanent & temporary bracing.

• 1704.12
  Sprayed Fire-Resistant Materials:
  Increased scope & clarified timing of fireproofing SI.
  Reminder: Sprayed fire-resistant material is an “Itemized” SI per Section 1704.1.2.
Chapter 18
Soils and Foundations

• IBC Chapter 18 is completely rewritten. No margin bars (⅓).

• Definitions: Extensively revised to reflect current practice.

• Helical Piles: Now addressed by Code (Including Chapter 17 SI).
Chapter 18
Soils and Foundations

NC Amendment Carryovers:

- 1805.4.2 Foundation Drain
- 1806.2 Presumptive Load-Bearing Values
- 1807.2.5 Retaining Systems
- 1809.4 Depth and Width of Footings
- 1810.3.5.2.4 &5 Pile Test & (Pile) Qual. Contr.
Chapter 21
Masonry

• Continued migration to ACI 530-08
• Autoclaved Aerated Concrete (AAC) masonry added (w/corresponding Seismic criteria in Chapter 16).
• 2109 Empirical Design of Masonry:
Chapter 21
Masonry

• 2109 Empirical Design of Masonry:

2009 NC / 2006 IBC:
6 Pages of IBC provisions with several NC tables.

2009 IBC:

2109.1 General. Empirically designed masonry shall conform to the
requirements of Chapter 5 of TMS 402/ACI 530/ASCE 5, except where
otherwise noted in this section.

2012 NC / 2009 IBC: NC Amendment
Table 2109.1.1 Empirical Wind Limitation clarified.
All underlined.
Chapter 22
Steel

- 2209 & 2210
  Cold-Formed Steel & Light-Frame Construction:
  - References to AISI Standards for design.

- 2210.3 Trusses: New, Similar to Chap. 23 Wood
  - Truss design & placement drawings sealed.
  - Truss submittal package approved by
    Registered Design Professional In Resp. Charge.
  - >60’ span: Registered Design Prof. does bracing.
  - >60’ span: Special inspections required.
Chapter 23
Wood

• Continued migration to AF&PA NDS-05
• 2303.4 Trusses:
  • Truss design & placement drawings sealed.
  • Truss placement drawings sealed if deviation.
  • Truss submittal package approved by Registered Design Professional In Resp. Charge.
  • >60’ span: Registered Design Prof. does bracing.
  • >60’ span: Special inspections required.
Thank You!
Questions?

Bert Neily, PE  
Mike Ali, PE  
Tim Langford, PE

herbert.neily@doa.nc.gov  
michael.ali@doa.nc.gov  
tim.langford@doa.nc.gov

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