Minutes of the North Carolina Building Code Council
March 13, 2018
Raleigh, NC

All members of the North Carolina Building Code Council were present for the Council meeting, except Keith Hamilton, Keith Rogers, and Tony Sears.

The following are summary minutes. The official minutes of this meeting are recorded on CD. Anyone desiring verbatim CDs or excerpts from these CDs should contact the Engineering Division of the NC Department of Insurance for information and reproduction costs. The next scheduled NC Building Code Council meeting will be held **Tuesday, June 12, 2018.** The location will be announced 30 days before the meeting.

Part A Administrative Items

Item A – 1 Ethics Statement: Inquire upon conflicts of interest or appearance of conflicts of interest that exist within the Council.

There were no actual or potential conflicts of interest noted.

Item A – 2 Approval of Minutes of the December 12, 2017 NC Building Code Council Meeting.

A motion to accept the December 12, 2017 meeting minutes was made, seconded and approved, with a modification to Item B-7, Residential Super Committee motion.

Item A – 3 North Carolina Code Officials Qualification Board Memo Discussion.

Item A – 4 Rules Review Commission Meeting Report

Barry Gupton reported that the December 2017 D-items were submitted to the RCC. Item D-13 received objections and are subject to OSBM review. All other items were approved. The 2017 NEC effective date is 6/12/2018.

Item A – 5 Public Comments

Dr. Andy Ewens presented the background to a proposal that will be submitted for the June 12, 2018 Building Code Council meeting involving changes to 2018 NC Building Code and NC Fire Code, for school security/lockdown plans.

Part B – New Petition for Rulemaking

The following Petitions for Rulemaking have been received since the last Council meeting. The Council will vote either to deny or grant these Petitions. The Council will give no further consideration to Petitions that are denied. Petitions that are granted may proceed through the Rulemaking process. The council may send any Petition to the appropriate committee. The hearing will take place during or after the June 12, 2018 meeting.

Item B – 1 Request by Bill Newns, representing Currituck County, to amend the 2018 N.C. State Building Code, Volume VII NCRD – Section R-202 (Definitions) as follows:

~~**Family.** Family is an individual, two or more persons related by blood, marriage, or law, or a group of not more than any five persons living together in a dwelling unit. Servants having common housekeeping facilities with a family consisting of an individual, or more persons related by blood, marriage or law, are a part of the family for this code.~~

Residential Super Committee: Motion to deny. Second. Denied.
No action taken by the Building Code Council.

Item B – 2 Request by Joe Gorza, representing Space Walk of Currituck, to amend the 2018 N.C. State Building Code, Volume Fire Code – Section 105.6.43 & 2403.2 as follows:

Exception #3 tents, membrane & air inflated structures associated with single family dwellings less than 800 sq. ft.

Commercial Super Committee: Motion to accept. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 3 Request by Randall Shackelford, P.E., representing Simpson Strong-Tie Company, to amend the 2018 N.C. State Building Code, Volume Residential – Section AM105.1 as follows:

AM105.1 General.
Girders shall bear directly on the support post with the post attached at the top to prevent lateral displacement or be connected to the side of the posts with two 5/8 inch (16 mm) hot dip galvanized bolts with nut and washer. Girder support is permitted to be installed in accordance with Figure AM105.1(1) for top mount; Figure AM105.1(2) for side mount and Figure AM105.1(3) for split girders. See Figure AM105.1(4) for cantilevered girders.
AM105.1.1 Alternate Connection
Where a girder three inches or less in thickness is fastened to the side of the support post as shown in Figure AM105.1.2 the following shall be permitted as an alternate to the two 5/8-inch diameter bolts. The girder shall be fastened to the post with hot-dipped galvanized self-drilling screw fasteners having a minimum diameter of 0.270", staggered so the screws are not in a line, and having a minimum edge distance of 1-1/2 inches. Where the girder is a single 2-by member, a minimum of 3 screws with a minimum length of 4 inches shall be used. Where the girder is a two-ply 2-by member, a minimum of 4 screws with a minimum length of 6 inches shall be used.
Randall Shackelford presented the following alternate language at the meeting.

Code Change to NC Residential Code Section AM105.1 – Version 3
3-13-18

AM105.1 General.
Girders shall bear directly on the support post with the post attached at top to prevent lateral displacement or be connected to the side of the posts ~~with two 5/8 inch (16 mm) hot dip galvanized bolts with nut and washer~~ with one of the methods shown in Table AM105.1. Girder support is permitted to be installed in accordance with Figure AM105.1(1) for top mount; Figure AM105.1(2) for side mount and Figure AM105.1(3) for split girders. See Figure AM105.1(4) for cantilevered girders.

Table AM105.1 Girder Connection to Side of Post

Maximum Girder Thickness		
Any	3" (Double 2X)	1-1/2" (Single 2X)
Two 5/8" diameter bolts[1]	Four 6" long screws[2]	Three 4" long screws[2]

1. Bolts shall be hot dip galvanized through bolts with nut and washer
2. Screws shall be hot dipped galvanized self-drilling screw fastener having a minimum diameter of 0.270", staggered so that the screws are not in a line, and having a minimum edge distance of 1-1/2 inches.

REASON:

There are several reasons for this proposal.

1. Builders throughout North Carolina have approached Simpson Strong-Tie with a request to provide a screw fastener that can be an alternate to a through bolt, and to find a way to get it approved through the code. Installing a through bolt is labor intensive, and some builders prefer to install self-drilling fasteners because it saves time, even if they have to install more fasteners.
2. Modern wood fastening design philosophy is to use more, smaller diameter fasteners rather than fewer, larger diameter fasteners. More, smaller diameter fasteners spread the load out to more of the wood area, and also offer additional redundancy in the case that one of the fasteners is not able to provide its entire design load.
3. New technology in fastener design and manufacture allows screw fasteners that have almost the same capacity as larger bolts. This proposal allows for that new technology.

JUSTIFICATION:
Fastener calculations using the American Wood Council Connection Capacity Calculator are provided. They show the following capacities for two 5/8" diameter bolts, loaded parallel to grain in the main member (post) and perpendicular to grain in the side member (girder). This will be the target load for the alternate.

	Allowable Shear Capacity for a Single 5/8" Bolt	
	Side Member 1-1/2" Thick	Side Member 3" Thick
One Bolt	563	718
Two Bolts	1126	1436

Check SDWH Timber-Hex HDG Screw:
Reference IAPMO UES Report Number 0192.

MODEL	FASTENER LENGTH, L (in.)	THREAD LENGTH, TL (in.)	ALLOWABLE SHEAR LOADS (lbf) WOOD SIDE MEMBER THICKNESS (in.)					
			SP		DF		HF/SPF	
			1.5	3.0	1.5	3.0	1.5	3.0
SDWH27400G	4	3	505	-	440	-	400	-
SDWH27600G	6	3	505	545	440	545	400	450
SDWH27800G	8	3	570	675	440	675	430	595

Connection Geometry with reductions for multiple fasteners:

TABLE 23 – CONNECTION GEOMETRY FOR THE SDWH27G WOOD SCREWS[1,2]

CONDITION[1]		MINIMUM DISTANCE OR SPACING (in.)	Reduction Factor
Edge Distance	Perpendicular to grain loading	1 7/16	1.0
	Parallel to grain loading	1 1/2	1.0
End Distance	Perpendicular to grain loading	6	1.0
	Parallel to grain loading	8	1.0
Spacing	Between fasteners in a row	8	0.80
	Between non-staggered rows	4	0.89
	Between staggered rows	5/8	0.78

Check minimum load case of 1.5" side member with 505 pounds load for 4" screw.
Load for 3 = (505)(3)(0.78) = **1181** lbs.
Which is greater than the target of **1126** pounds. OK

Check load case of 3" side member with 545 pounds load with THREE screws.
Load for 3 = (545)(3)(0.78) = 1275
Which is LESS than the target load of 1436 lbs. No Good.

Check load case of 3" side member with 545 pounds load with FOUR screws.
Load for 4 = (545)(4)(0.78) = **1700.4** lbs.
Which is GREATER than the target load of **1436** lbs. OK.

Further Explanation of Cost of Construction:
Since this is just adding an OPTIONAL method, there will be no mandatory effect on the cost of construction. If the builder chooses, they can just continue to use bolts. No comparison has been made to the actual cost of the fasteners, however builders have told us they have significant labor savings using self-drilling screws rather than bolts.

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Bolt
Loading Scenario	Single Shear - Wood Main Member

Submit Initial Values

Main Member Type	Southern Pine
Main Member Thickness	3.5 in.
Main Member: Angle of Load to Grain	0
Side Member Type	Southern Pine
Side Member Thickness	1.5 in.
Side Member: Angle of Load to Grain	90
Fastener Diameter	5/8 in.
Load Duration Factor	C_D = 1.0
Wet Service Factor	C_M = 1.0
Temperature Factor	C_t = 1.0

Calculate Connection Capacity

Connection Yield Mode Descriptions | Limits of Use

Diaphragm Factor Help | Load Duration Factor Help | Technical Help

Show Printable View

Connection Yield Modes

Im	2691 lbs.
Is	609 lbs.
II	884 lbs.
IIIm	1093 lbs.
IIIs	563 lbs.
IV	780 lbs.

Adjusted ASD Capacity	**563 lbs.**

- Bolt bending yield strength of 45,000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for bolts with adequate end distance, edge distance and spacing pe

While every effort has been made to insure the accuracy of the information presented, and special effort has been made tc information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility fi prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability fro

The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Wash Support for development of the Connection Calculator was provided by American Wood Council

PRACTICAL SOLUTIONS

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Design of Bolted Connections per the 2015 NDS

By John "Buddy" Showalter, P.E.

This article provides an overview of a bolt design example utilizing the *American Wood Council's (AWC) 2015 National Design Specification® (NDS®) for Wood Construction.* Topics include connection design philosophies and behavior, an overview of 2015 NDS provisions related to bolt design including local stresses in fastener groups, and a detailed design example.

Connection Design Philosophies

Discussion of several important design philosophies should help designers better understand connection design for wood members. First, wood is anisotropic, meaning it has different strength properties in various directions: longitudinal, tangential, and radial. Wood is composed of elongated, round, or rectangular tube-like cells. A simple analogy is to imagine the cellular nature of wood as a bundle of drinking straws. When axial compression is applied, the "bundle" is strong longitudinally and connecting the ends, primarily for bearing, is very simple. The "bundle" can also develop considerable tensile strength. Therefore, aligning connections so that loads are transferred concentrically along the length of the wood member is the most efficient design philosophy. However, this is not always practical or possible.

Continuing the analogy, if the load is applied perpendicular to the longitudinal axis of the "bundle" in compression, the straws tend to crush because of the weaker cell walls relative to the axial direction. While capacities are more limited when wood is loaded in compression perpendicular to grain (versus parallel to grain), the limits for bearing conditions on the surface of wood members are deformation-based, not strength-based, and published design values can be increased for smaller bearing areas. Accordingly, dowel bearing strengths are higher relative to compression parallel or compression perpendicular to grain design values. However, dowel bearing strengths perpendicular to grain are lower relative to dowel bearing strengths parallel to grain for larger diameter (>¼ inch) fasteners (see *Table*).

When tension is applied perpendicular to grain, the "bundles" tend to separate. Low strength values for this property can be encountered in commercial grades of lumber. For this reason, no sawn lumber tension design values perpendicular to grain have been published in the NDS. Cautionary provisions have been provided to alert designers to avoid design configurations that induce tension perpendicular to grain stresses wherever possible. Connections where moderate to heavy loads are acting through the tension side of a bending member (see NDS Table 12.5.1C, footnote 2) should be avoided. These connections should be designed to ensure that perpendicular-to-grain loads are applied through the compression side of the bending member, either through direct connections or top-bearing connectors.

Second, wood connections are stronger when the load is spread out over a number of fasteners. Large concentrated loads should be avoided unless designed not to exceed wood's strength capabilities (e.g., net tension and shear). Spreading the load also builds in a degree of redundancy, which is useful in high wind or seismic events. To accomplish this, designers are advised to:

- Use small fasteners,
- Use multiple fasteners when possible; and
- Keep the scale of fasteners relative to the size of wood members being connected.

Third, as with other building materials, wood moves in response to environmental conditions. The main driver for this movement in wood is moisture. Allowances must be made to accommodate potential shrinkage and swelling, particularly in connections.

Dowel-Type Fasteners

Wood members connected with dowel-type fasteners are probably the most common mechanical connection type because they are effective at transferring loads while also being relatively straightforward and efficient to

Design values from 2015 NDS and 2015 NDS Supplement (psi).

No. 2 Southern Pine 2x12	Parallel to Grain	Perpendicular to Grain
Compression Design Value	1,250	565
Tension Design Value	450	No published values
Shear Design Value	175	n/a
Modulus of Elasticity	1,400,000	n/a
Dowel Bearing Strength for 1-inch diameter fastener	6,150	2,550

John "Buddy" Showalter is Vice President of Technology Transfer for the American Wood Council and serves as a member of the STRUCTURE magazine Editorial Board. He can be reached at ***bshowalter@awc.org.***

Residential Super Committee: Motion to accept. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 4 Request by Randall Shackelford, P.E., representing Simpson Strong-Tie Company, to amend the 2018 N.C. State Building Code, Volume Residential – Section R4603.6 as follows:

R4603.6 Tying and bracing of wood piles.
Beams and girders shall fully bear on pilings and splices shall occur over pilings. ~~If~~ S~~s~~ills, beams or girders ~~are~~ shall be attached to the piling with~~,~~ a minimum of two 5/8-inch (16 mm) galvanized steel ~~bolts per beam member shall be~~ through bolts~~ed~~ at each piling connection in accordance with Figure R4~~5~~603.6 (a). When the beam is spliced over the piling, there shall be a minimum of four bolts per connection. When piling is notched so that the cross-section is reduced below 50 percent or is top bearing, sills, beams or girders shall be attached using 3/16 x 4 x 18-inch (5 x 102 x 467 mm) hot dip galvanized straps, one each side, bolted with two 5/8 inch (15.9 mm) galvanized through bolts top and bottom in accordance with Figure R4063.6(b) and Figure R4~~5~~603.6(c). Where beams or girders are spliced, there shall be a minimum of four 5/8 inch bolts top and bottom per connection. As an alternate to the use of bolts in the straps, the following shall be permitted. Where the beams are continuous across the pile, a 7 ga (3/16") by 4 inch by 18 inch strap with eight self-drilling screws having a minimum diameter of 0.270 inches shall be used on each side. The screws shall have a minimum length of 4 inches, and shall be long enough to penetrate at least 1 inch through the remaining pile and into the girder. Where beams are spliced over the piling there shall be two straps on each side, having a minimum size of 7 ga. (3/16") by 2 inches by 18 inches by 18 inches, with four self-drilling screws as described earlier in each end.

R4603.6.1 Tying at corners. At corners, girders shall be connected to the pile with a minimum 3/16 x 4 x 18-inch (5 x 102 x 467 mm) hot dip galvanized strap bolted with two 5/8 (15.9 mm) galvanized through bolts on the exterior and a minimum L4 x 3/16 x 1' -6" (102 x 5 x 467 mm) galvanized steel angle bolted with two 5/8 inch (15.9 mm) galvanized through bolts on the interior in accordance with Figure R4603.6(d).

R4603.6.2 Bracing of Pilings. Bracing of pile foundations is required where the clear height from ground to sill, beam or girder exceeds 10 feet (3048 mm) or the dwelling is more than one story above piles. A line of X-bracing is defined as a row of piles with X-bracing provided in at least two bays. A line of X-bracing shall be provided at all exterior pile lines. Where the perimeter lines of X-bracing exceed 40 feet (12 192 mm), an additional line of X-bracing shall be provided near the center of the building. See Figure R4603.6(e). X-bracing shall be 2 x 10s through bolted with two ¾-inch (19.1 mm) bolts at each end. The code official is permitted to accept alternate bracing designs if they bear the seal of a registered design professional.

Randall Shackelford presented the following alternate language at the meeting.

Code Change to NC Residential Code Section R4603.6 Version 3 3-13-18

Note: Changes are to the 2018 Code Language

R4603.6 Tying and bracing of wood piles.

Beams and girders shall fully bear on pilings and butt joints shall occur over pilings. ~~If~~ Ssills, beams or girders ~~are~~ shall be attached to the piling ~~a minimum of two 5/8 inch (16 mm) galvanized steel bolts per beam member shall be through bolted~~ using either bolts or screws at each piling connection in accordance with Table R4603.6 and Figure R4~~5~~603.6 (a). When the piling is notched so that the cross-section is reduced below 50 percent or the girder is is top bearing, sills, beams or girders shall be attached using 3/16 × 4 × 18-inch (5 × 102 × 467 mm) hot dip galvanized straps, one each side, ~~bolted with two 5/8 inch (15.9 mm) galvanized through bolts~~ fastened top and bottom in accordance with either bolts or screws in accordance with Table R4603.6 and Figure R4603.6(b) and Figure R4~~5~~603.6(c). Where butt joints occur over the piling and screws are used, there shall be two straps on each side of the piling, having a minimum size of 3/16 by 2 by 18 inches (5 × 51 × 467 mm), with four self-drilling screws as described in each end.

Table R4603.6 Minimum Fastening of Beams and Girders to Pilings

Amount Piling is Notched	Beam/Girder Continuous		Beam/Girder Butt Joint	
	Bolts	Screws	Bolts	Screws
≤ 50%	two 5/8" bolts[2]	four screws[3]	four 5/8" bolts[2]	eight screws[3]
> 50%[1]	two 5/8" bolts[2]	four screws[3]	four 5/8" bolts[3]	eight screws

1. Where piling is notched over 50%, use strap as required in Section 4603.6. Install the specified number of bolts or screws in each end of the strap.
2. Bolts shall be 5/8" diameter hot dipped galvanized through bolts with nuts and washers.
3. Screws shall be 0.270" (6.9 mm) minimum in diameter, hot dipped galvanized to a minimum of A153, Class C, and having a minimum length of 4", and also shall be long enough to penetrate at least one inch through the remaining pile and into the girder.

R4603.6.1 Tying at corners. At corners, girders shall be connected to the pile with a minimum 3/16 × 4 × 18-inch (5 × 102 × 467 mm) hot dip galvanized strap bolted with two 5/8 inch (15.9 mm) galvanized through bolts on the exterior and a minimum L4 x 3/16 x 1'-6" (102 × 5 × 467 mm) galvanized steel angle bolted with two 5/8 inch (15.9 mm) galvanized through bolts on the interior in accordance with Figure R4603.6(d).

R4603.6.2 Bracing of Pilings. Bracing of pile foundations is required where the clear height from ground to sill, beam or girder exceeds 10 feet (3048 mm) or the dwelling is more than one story above piles. A line of X-bracing is defined as a row of piles with X-bracing provided in at least two bays. A line of X-bracing shall be provided at all exterior pile lines. Where the perimeter lines of X-bracing exceed 40 feet (12 192 mm), an additional line of X-bracing shall be provided near the center of the building. See Figure R4603.6(e). X-bracing shall be with 2 × 10s through bolted with two 3/4-inch (19.1 mm) bolts at each end. The code official is permitted to accept alternate bracing designs if they bear the seal of a registered design professional.

Revise Figures as follows:

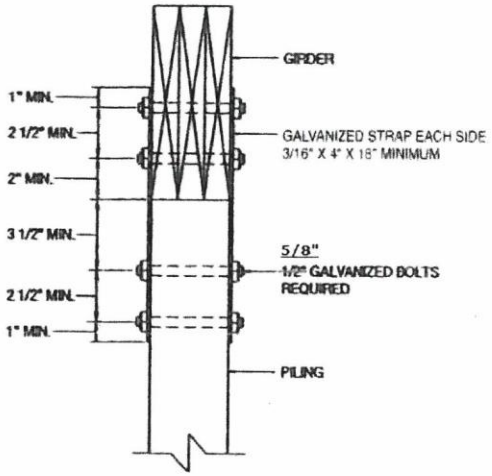

FIGURE R4603.6(b)
TOP MOUNTED GIRDER

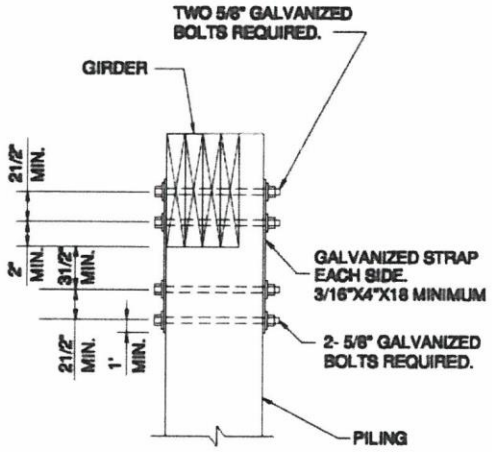

FIGURE R4603.6(c)
PILING NOTCHED MORE THAN 50%

REASON:
There are several reasons for this proposal.

1. Builders throughout North Carolina have approached Simpson Strong-Tie with a request to provide a screw fastener that can be an alternate to a through bolt, and to find a way to get it approved through the code. Installing a through bolt is labor intensive, and some builders prefer to install self-drilling fasteners because it saves time, even if they have to install more fasteners.
2. Modern wood fastening design philosophy is to use more, smaller diameter fasteners rather than fewer, larger diameter fasteners. More, smaller diameter fasteners spread the load out to more of the wood area, and also offer additional redundancy in the case that one of the fasteners is not able to provide its entire design load.
3. New technology in fastener design and manufacture allows screw fasteners that have almost the same capacity as larger bolts. This proposal allows for that new technology.
4. Some parts of this change correct items that appear to have been missed in writing new revisions for the 2018 North Carolina Building Code.
5. Some parts of this change are intended to clarify the requirements for tying beams to piles. The intent is not to change the actual requirements, just to clarify. For example, where the code currently says that there shall be two bolts "per beam member", that could be misinterpreted to require 8 bolts when there is a four-ply girder as shown in Figure R4603.6(c). My impression is that it means when the beam is spliced, there are two members and four bolts should be required, and when the beam is continuous, there is one member and two bolts are required.

JUSTIFICATON:
Calculations are provided using the American Wood Council Connection Calculator, for 5/8" through bolts with two steel side plates, for a main wood member thickness of both 6" and 7-1/2".

Both wood thicknesses resulted in a calculated bolt shear capacity of 1370 pounds per bolt.
So a steel plate with two bolts in each end would have a capacity of

(2)(1370) = 2740 lbs.

Checking against the capacity of the PSQ screwed piling strap, both the 4 by 18 version and the 2 by 18 version exceed a capacity of 2740 lbs.

Model No.	Ga.	Dimensions (in.)		Fasteners (Total)	Allowable Tension Loads (DF/SP)	Allowable Tension Loads (SPF/HF)	Code Ref.
		W	L		(160)	(160)	
PS218	7	2	18	(4) ¾" MB	1,740	1,385	180
PS418		4	18	(4) ¾" MB	1,740	1,385	
PS720		6¾	20	(8) ½" MB	3,075	2,645	
PSQ218		2	18	(8) SDWH27400G	2,815	2,420	170
PSQ418		4	18	(8) SDWH27400G	3,045	2,620	

Additional information on Cost Analysis.
Since this is just adding an option to the code, there is no mandatory increase or decrease in cost. However, some builders find that installing screw fasteners involves much less labor time than installing through bolts so there is some savings there. No cost analysis of bolts compared to screws has been attempted.

Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Bolt
Loading Scenario	Double Shear - Wood Main Member
	Submit Initial Values

Main Member Type	Southern Pine
Main Member Thickness	-- Other (in inches) -- 6
Main Member: Angle of Load to Grain	90
Side Member Type	Steel
Side Member Thickness	7 gage
Side Member: Angle of Load to Grain	0
Fastener Diameter	5/8 in.
Load Duration Factor	C_D = 1.0
Wet Service Factor	C_M = 1.0
Temperature Factor	C_t = 1.0

Calculate Connection Capacity

Connection Yield Mode Descriptions | Limits of Use

Diaphragm Factor Help | Load Duration Factor Help | Technical Help

Show Printable View

Connection Yield Modes

Im	2438 lbs.
Is	2768 lbs.
IIIs	1370 lbs.
IV	1880 lbs.

Adjusted ASD Capacity	**1370 lbs.**

- Bolt bending yield strength of 45,000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for bolts with adequate end distance, edge distance and spacing pe
- ASTM A36 Steel is assumed for steel side members 1/4 in. thick, and ASTM A653 Grade 33 Steel is assumed for than 1/4 in. thick.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made tc information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility fi prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability fror

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Continuing the analogy, if the load is applied perpendicular to the longitudinal axis of the "bundle" in compression, the straws tend to crush because of the weaker cell walls relative to the axial direction. While capacities are more limited when wood is loaded in compression perpendicular to grain (versus parallel to grain), the limits for bearing conditions on the surface of wood members are deformation-based, not strength-based, and published design values can be increased for smaller bearing areas. Accordingly, dowel bearing strengths are higher relative to compression parallel or compression perpendicular to grain design values. However, dowel bearing strengths perpendicular to grain are lower relative to dowel bearing strengths parallel to grain for larger diameter (>¼ inch) fasteners (see *Table*).

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- Use small fasteners;
- Use multiple fasteners when possible; and
- Keep the scale of fasteners relative to the size of wood members being connected.

Third, as with other building materials, wood moves in response to environmental conditions. The main driver for this movement in wood is moisture. Allowances must be made to accommodate potential shrinkage and swelling, particularly in connections.

Dowel-Type Fasteners

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Design values from 2015 NDS and 2015 NDS Supplement (psi).

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Compression Design Value	1,250	565
Tension Design Value	450	No published values
Shear Design Value	175	n/a
Modulus of Elasticity	1,400,000	n/a
Dowel Bearing Strength for 1-inch diameter fastener	6,150	2,550

John "Buddy" Showalter is Vice President of Technology Transfer for the American Wood Council and serves as a member of the STRUCTURE magazine Editorial Board. He can be reached at ***bshowalter@awc.org****.*

Residential Super Committee: Motion to accept. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 5 Request by Jeffrey Mang of Hogan Lovells, representing Polyisocyanurate Insulation Manufacturers Association (PIMA) to amend the NC State Building Code, Volume 2018 NCECC – Section C501.1.1, C503.1, C503.3.1, Ch. 6 [CE] as follows:

C501.1.1 Additions, alterations, or repairs: General.
Additions, alterations, or repairs to an existing building, building system or portion thereof shall comply with one of the following:

1. Section C502, C503 or C504
2. The requirements of ANSI/ASHRAE/IESNA 90.1.
3. The 2009 NCECC if the building or structure receive a certificate of occupancy prior to January 1, 2012, is not classified as Group R occupancy per the NC Building Code, and, in the case of an addition, the addition does not increase the building area of the existing building to more than one hundred fifty percent (150%) of the building area as it was in existence on December 31, 2011.

Unaltered portions of the existing building or building supply system shall not be required to comply with this code.
C503.1 General. Alterations to an existing building, building system or portion thereof shall ~~conform to~~ comply with the ~~provisions~~ requirements of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall not create an unsafe or hazardous conditions or overload existing building systems.

~~Exception: Alterations complying with ANSI/ASHRAE/IESNA 90.1~~

Exception: The following alterations to conditioned spaces need not comply with the requirements for new construction:

5. *Roof recover* ~~and roof replacement such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the alteration.~~

C503.3.1 Roof replacement. Roof replacements shall comply with the Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the building thermal envelope and contains insulation entirely above the roof deck.

Chapter 6 [CE] Referenced Standards

NCECC		International Codes Council, Inc. 500 New Jersey Ave., N.W. Washington, D.C. 20005
Standard Reference number	Title	Referenced in code section number
2009 NCECC	2009 North Carolina Energy Conservation Code	C501.1.1

Commercial Super Committee: Motion to accept. No second. Denied
No action taken by the Building Code Council.

Item B – 6 Request from Jeffrey Mang of Hogan Lovells, representing Polyisocyanurate Insulation Manufacturers Association (PIMA) to amend the 2018 NC State Existing Building Code, Section 101.12 and 708.1.1 as follows:

101.12 Energy conservation.
Additions, alterations, or repairs to an existing building, building system or portion thereof shall comply with this code or one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1.
2. The 2009 NCECC if the building or structure receive a certificate of occupancy prior to January 1, 2012, is not classified as Group R occupancy per the NC Building Code, and, in the case of an addition, the addition does not increase the building area of the existing building to more than one hundred fifty percent (150%) of the building area as it was in existence on December 31, 2011.

Per G.S. 143-138 (b18), no energy conservation code provisions shall apply to any structure for which the primary occupancy classification is Group F, S, or U. This exclusion shall apply to the entire building area.

708.1.1 Building envelope. Building envelope assemblies that are part of the *alteration* shall comply with Sections R402.1.2 or R402.1.4, Sections R402.2.1 through R402.2.15, R402.3.1, R402.3.2, R402.4.3 and R402.1.4 of the *North Carolina Energy Conservation Code* for *residential buildings* and Section C402 of the *North Carolina Energy Conservation Code* for *commercial buildings.*

Exceptions: The following *alterations* to conditioned spaces need not comply with the requirements for new construction:

1. Storm window installed over existing fenestration.

2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are insulated. Roof systems requiring air space for ventilation shall retain the ventilation space required.

3. Construction where the existing roof, wall or floor cavity is not exposed.

4. Roof recover and ~~roof replacement such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the *alteration.*~~ Roof replacements shall comply with the Table C402.1.3 or C402.1.4 of the *North Carolina Energy Conservation Code* where the existing roof assembly is part of the building thermal envelope and contains insulation entirely above the roof deck.

5. Surface-applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain.

6. Air barriers shall not be required for *roof recover* and roof replacement where the *alterations* or renovations to the building do not include *alterations,* renovations or *repairs* to the remainder of the building envelope.

7. *Alterations* that replace less than 50 percent of the luminaires in a space, provided that such *alterations* do not increase the installed interior lighting power.

8. For *commercial buildings,* replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed.

Commercial Super Committee: Motion to accept. Second. Denied
No action taken by the Building Code Council.

Item B – 7 Request from Terry Cromer representing the NC Association of Electrical Contractors to amend the NC Electrical Building Code as follows:

410.2 Definition.
Closet Storage Space. The volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or to the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater; for a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod. See Figure 410.2.

Exception:
Where a shelf is not present in the area of wall above the closet's entrance opening or doorway extending from the top of such opening or doorway vertically to the ceiling, including the area of ceiling extending perpendicular from the area of wall directly above the closet's entrance opening or doorway to a horizontal distance of 300 mm (12 in.) shall not be defined as closet storage space. See Figure 410.2 Exception.

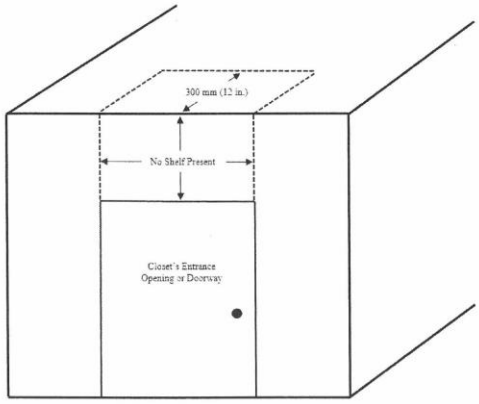

Figure 410.2 Exception Closet Storage Space Exception

Item B – 7 replaces Item C – 2.

Residential Super Committee: Motion made to move to Committee: Second. Accepted.
Building Code Council: Motion. Second. Granted.
Commercial Super Committee: Motion to move Committee. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 8 Request by Terry Cromer, representing the NC Association of Electrical Contractors to amend the NC State Electrical Code as follows:

410.16 Luminaires in Clothes Closets.
(C) Location. The minimum clearance between luminaires installed in clothes closets and the nearest point of a closet storage space shall be as follows:
(1) 300 mm (12 in.) for surface-mounted incandescent or LED luminaires with a completely enclosed light source installed on the wall above the door or on the ceiling.
(2) 150 mm (6 in.) for surface-mounted fluorescent luminaires installed on the wall above the door or on the ceiling.
(3) 150 mm (6 in.) for recessed incandescent or LED luminaires with a completely enclosed light source installed in the wall or the ceiling.
(4) 150 mm (6 in.) for recessed fluorescent luminaires installed in the wall or the ceiling.

(5) Surface-mounted fluorescent or LED luminaires shall be permitted to be installed within the closet storage space where identified for this use.
(6) LED luminaires with a completely enclosed light source or fluorescent luminaires shall be permitted to be installed within the area defined in 410.2 Exception.

Residential Super Committee: Motion made to move to Committee: Second. Accepted.
Building Code Council: Motion. Second. Granted.
Commercial Super Committee: Motion to move Committee. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 9 Request by Jonathan Leonard representing the NC Fire Code Revisions Committee to amend the NC Fire Code 2019, Section 314.4 as follows:

314.4 Vehicles. Liquid- or gas-fueled vehicles, boats or other motorcraft shall not be located indoors except as follows:

1. Batteries are disconnected.
   Exception: Alternative-Fueled vehicles in which manufacturer prohibits disconnection of power supply
2. Fuel in fuel tanks does not exceed one-quarter tank or 5 gallons (19L) (whichever is least).
   Exception: Diesel fueled vehicles-maximum fuel amount permitted shall be 20 gallons.
3. Fuel tanks and fill openings are closed and sealed to prevent tampering and the release of vapors.
4. Vehicles, boats or other motorcraft equipment are not fueled or defueled within the building.

Colin Triming from the Charlotte FD spoke on this proposal on behalf of Jonathan Leonard.

Commercial Super Committee: Motion to accept. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 10 Request by Jonathan Leonard representing the NC Fire Code Revisions Committee to amend the 2018 Fire and Building Code, Section 1010.1.9.11 as follows:

[BE] 1010.1.9.11 Stairway doors.
Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. Stairway discharge doors shall be openable from the egress side and shall only be locked from the opposite side.

2. This section shall not apply to doors arranged in accordance with Section 403.5.3 of the International Building Code.

~~3. In stairways serving not more than four stories, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.~~

3. Stairway exit doors are permitted to be locked from the side opposite the egress side, provided that they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building and upon activation of the fire alarm if present.

4. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single exit stairway where permitted in Section 1006.3.2.

5. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the dwelling unit is from a single exit stairway where permitted in Section 1006. 3.2.

~~6. In other than highrise, stairways serving floors above a 3 hour horizontal building separation, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon activation of the building fire alarm system.~~

Colin Triming from the Charlotte FD spoke on this proposal on behalf of Jonathan Leonard.

Commercial Super Committee: Motion to accept. Second. Accepted.
Building Code Council: Motion. Second. Granted.

Item B – 11 Request by Leon Skinner representing the City of Raleigh Development Services to amend the 2018 NC Residential Code – Section R-305.1 Exception 1 as follows:

R305.1 Minimum height. Habitable space, hallways, bathrooms, toilet rooms, laundry rooms and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm).

Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm), and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).
   1.1 Where unfinished attics and/or storage areas meeting the requirements of exception #1 a minimum of one Emergency Escape and Rescue Openings meeting all the requirements of R-310 shall be installed.

It was noted that the Volume should be 2018 instead of 2012. Change made.

Residential Super Committee: Motion to Accept. Second. Denied.
No action taken by the Building Code Council.

Part C – Notice of Rulemaking Proceedings and Public Hearing

The following Petitions for Rulemaking have been granted by the Council. Notice of Rulemaking proceedings has been made. The Public Hearing was held March 13, 2018 and the Final Adoption meeting may take place on or after June 12, 2018. The written public comment period expires on April 16, 2018.

Item C - 1 Request by Terry Cromer representing the N.C. Association of Electrical Contractors, Inc. to amend the 2017 North Carolina Electrical Code Amendment 320.23(A) as follows:

320.23 In Accessible Attics. Type AC cables in accessible attics or roof spaces shall be installed as specified in 320.23(A) and (B).

~~**(A) Cabled Run Across the Top of Floor Joists.** Where run across the top of floor joists, or within 2.1 m (7 ft) of the floor or floor joists across the face of ceiling rafters or studding, the cable shall be protected by guard strips that are at least as high as the cable, unless the cables are physically considered outside any floored area. Where this space is not accessible by permanent stairs or ladders, protection shall only be required within 1.8 m (6 ft) of the nearest edge of the scuttle hole or attic entrance where cables are run across the top of floor (ceiling) joists.~~

Replace with:

320.23 In Accessible Attics. Type AC cables in accessible attics or roof spaces shall be installed as specified in 320.23(A) and (B).

(A) Cables Run Across the Top of Floor Joists.
The cable shall be protected by guard strips that are at least as high as the cable where one of the following applies:

1. Where this space is accessible by permanent stairs or ladders, protection shall be required where run across the top of floor joists, or the area directly over a permanent floor and not exceeding 2.1 m (7 ft) vertically from the floor.

2. Where this space is not accessible by permanent stairs or ladders, protection shall be required within 1.8 m (6 ft) horizontally of the nearest edge of the scuttle hole or attic entrance where run across the top of any flooring, or flooring or ceiling joists. Protection is not required where run across the face of overhead roofing trusts or rafters.

Exception: For the purpose of this section, pull-down type stairs are not to be considered as permanent stairs or ladders.

Terry Cromer spoke in favor of this amendment.

Item C – 2 Request by Terry Cromer representing the N.C. Association of Electrical Contractors, Inc. to amend the 2017 North Carolina Electrical Code Amendment 410.2 as follows:

410.2 Definition.
Closet Storage Space. The volume bounded by the side and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or to the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater; for a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod. See Figure 410.2.

Exception: The area above the door including wall or ceiling space the width of door shall not be considered storage space.

Item was withdrawn. Replaced with Item B-7.

Item C – 3 Request by Michael Rettie representing NC BIA to amend the 2018 NC State Building Code Section 202 and the NC State Fire Prevention Code Section 202 as follows:

Section 202 – Definitions

~~**OPEN AIR CAMP CABIN.** A Single story residential building that has three walls consisting of at least twenty percent (20%) screened openings with a maximum height of 44 inches above the finished floor to the bottom of the openings has no heating or cooling system, is occupied for no more than 150 days within any rolling 365 day time span.~~

OPEN AIR CAMP CABIN. A single-story residential building meeting all of the following:

1. Consists of a single room;
   Exception: The building may also contain toilet/bathing rooms arranged to not interrupt the free flow of air through the building.
2. Has a maximum sleeping capacity of 10 which will be permanently posted within the cabin adjacent to the main entry doorway.
3. Has three exterior walls with a minimum of twenty percent (20%) screened opening area in each wall with a maximum height of 44 inches above the finished floor to the bottom of the openings;
4. Has no heating or cooling system;
5. Is occupied for no more than 150 days within any rolling 365-day time span; and
6. A maximum of two such cabins may be located in a single structure. The two cabins must be separated by a fire wall complying with Section 706.

Item was withdrawn.

Item C – 4 Request by Leon Skinner representing the NC Residential Code Standing Committee to amend the NC State Building Code, Volume 2018 NC Residential Code – Appendix H as follows:

Appendix H ~~PATIO COVERS~~ Tiny Houses

(The provisions contained in this appendix are adopted as part of this code.)

SECTION AH101
GENERAL

AH101.1 Scope.
This appendix shall be applicable to tiny houses used as single family dwelling units. Tiny houses shall comply with this code except as otherwise stated in this appendix. Tiny houses built off-site of closed-construction and shipped to its site of installation shall be constructed, inspected, and labeled as a modular home in accordance with NC General Statute 142-139.1. Tiny houses build on-site shall be open-construction and shall be inspected by the local building official having jurisdiction over the site.

SECTION AH102
DEFINITION

AH102.1 General
The following word and term shall, for the purposes of this appendix, have the meaning shown herein. Refer to Chapter 2 of this code for general definitions.

EGRESS ROOF ACCESS WINDOW. A skylight or roof window designed and installed to satisfy the emergency escape and rescue opening requirements in Section R310.2.

LANDING PLATFORM. A landing provided as the top step of a stairway accessing a loft.

LOFT. A floor level located more than 30 inches (762 mm) above the main floor and open to it on at least one side with a ceiling height of less than 6 feet 8 inches (2032 mm), used as a living or sleeping space.

TINY HOUSE. A dwelling that is 400 square feet (37 m^2) or less in floor area excluding lofts.

SECTION AH103
CEILING HEIGHT

AH103.1 Minimum ceiling height. Habitable space and hallways in tiny houses shall have a ceiling height of not less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms, and kitchens shall have a ceiling height of not less than 6 feet 4 inches (1930 mm). Obstructions shall not extend below these minimum ceiling heights including beams, girders, ducts, lighting and other obstructions.

> **Exception:** Ceiling heights in lofts are permitted to be less than 6 feet 8 inches.

SECTION AH104
LOFTS

AH104.1 Minimum loft area and dimensions. Lofts used as a sleeping or living space shall meet the minimum area and dimension requirements Sections AH104.1.1 through AH104.1.3.

> **AH104.1.1 Minimum area.** Lofts shall have a floor area of not less than 35 square feet (3.25 m^2).
>
> **AH104.1.2 Minimum dimensions.** Lofts shall be not less than 5 feet (1524 mm) in any horizontal dimension.
>
> **AH104.1.3 Height effect on loft area.** Portions of a loft with a sloping ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft.
>
> > **Exception:** Under gable roofs with a minimum slope of 6 units vertical in 12 units horizontal (50-percent slope) portions of a loft with a sloped ceiling measuring less than 16 inches (406 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft.

AH104.2 Loft access. The access to and primary egress from lofts shall be any type described in Sections AH104.2.1 through AH104.2.4.

AH104.2.1 Stairways. Stairways accessing lofts shall comply with this code or with Sections AH104.2.1.1 through AH104.2.1.5.

AH104.2.1.1 Width. Stairways accessing a loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The minimum width below the handrail shall not be less than 20 inches (508 mm).

AH104.2.1.2 Headroom. The headroom in stairways accessing a loft shall be not less than 6 feet 2 inches (1880 mm), as measured vertically, from a sloped line connecting the tread or landing platform nosings in the middle of their width.

AH104.2.1.3 Treads and risers. Risers for stairs accessing a loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas;

1. The tread depth shall be 20 inches (508 mm) minus 4/3 of the riser height,

2. The riser height shall be 15 inches (381 mm) minus ¾ of the tread depth.

AH104.2.1.4 Landing Platforms. The top tread and riser of stairways accessing lofts shall be constructed as a landing platform where the loft ceiling height is less than 6 feet 2 inches (1880 mm) where the stairway meets the loft. The landing platform shall be 18 inches to 22 inches (457 to 559 mm) in depth measured from the nosing of the landing platform to the edge of the loft, and 16 to 18 inches (406 to 457 mm) in height measured from the landing platform to the loft floor.

AH104.2.1.5 Handrails. Handrails shall comply with Section R311.7.8.

AH104.2.1.6 Stairway guards. Guards at open sides of stairways shall comply with Section R312.1.

AH104.2.2 Ladders. Ladders accessing lofts shall comply with Sections AH104.2.1 and AH104.2.2.

AH104.2.2.1 Size and capacity. Ladders accessing lofts shall have a rung width of not less than 12 inches (305 mm) and 10 inches (254 mm) to 14 inches (356 mm) spacing between rungs. Ladders shall be capable of supporting a 200 pound (75 kg) load on any rung. Rung spacing shall be uniform within 3/8-inch (9.5 mm).

AH104.2.2.2 Incline. Ladders shall be installed at 70 to 80 degrees from horizontal.

AH104.2.4 Ships ladders. Ships ladders accessing lofts shall comply with Sections R311.7.12.1 and R311.7.12.2. The clear width at and below handrails shall be not less than 20 inches (508 mm).

AH104.2.5 Loft Guards. Loft guards shall be located along the open side of lofts. Loft guards shall not be less than 36 inches (914 mm) in height or one-half of the clear height to the ceiling, whichever is less.

SECTION AH105
EMERGENCY ESCAPE AND RESCUE OPENINGS

AH105.1 General. Tiny houses shall meet the requirements of Section R310 for emergency escape and rescue openings.

Exception: Egress roof access windows in lofts used as sleeping rooms shall be deemed to meet the requirements of Section R310 where installed such that the bottom of the opening is not more than 44 inches (1118 mm) above the loft floor, provided the egress roof access window complies with the minimum opening area requirements of Section R310.2.1.

Michael Rettie spoke on behalf of the NC Building Inspector's Association and their concerns regarding the term "Tiny House" and some of the language in the amendment. He would like to see it move forward with the language being addressed.

David Smith of the Standing Committee requested a new Ad-Hoc Committee approval from the Council.

Item was withdrawn until the language becomes clearer.

Item C – 5 Request by Leon Skinner representing the City of Raleigh to amend the NC State Building Code, Volume 2018 NC Mechanical Code – Section 306.5 as follows:

306.5 Equipment and appliances on roofs or elevated structures. Where equipment and appliances requiring periodic maintenance are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Exception: Where permanent means of access is technically infeasible, wall-mounted equipment and appliance maintenance, replacement and repairs that are over 16 feet can be serviced by motorized equipment *upon approval*.-The owner/tenant shall provide a maintenance service and cleaning schedule contract which shall be renewed annually.

Leon Skinner spoke in favor of this amendment explaining the item and the background.

Item remains open for written comments.

Item C – 6 Request by Leon Skinner representing the City of Raleigh to amend the NC State Building Code, Volume 2018 NC Fire Code – Section 1013.6.1 as follows:

1013.6.1 Equipment and appliances on roofs or elevated structures. Where equipment and appliances requiring periodic maintenance are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope). Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Exception: Where permanent means of access is technically infeasible, wall-mounted equipment and appliance maintenance, replacement and repairs that are over 16 feet can be serviced by motorized equipment *upon approval*.-The owner/tenant shall provide a maintenance service and cleaning schedule contract which shall be renewed annually.

It was noted the Section number was incorrect on the Agenda. This was a typographical error and the number has been corrected in the Minutes.

Item remains open for written comments.

Item C – 7 Request by Daniel Priest representing the NC Building Code Council to amend the NC State Building Code, Volume 2018 Administrative Code and Policies, Section 106 as follows:

106.3 Permit Application.
106.3.1 Information required. A permit application shall be filed with the Inspection Department on a form furnished for that purpose. The Inspection Department shall make available a list of information which must be submitted with the building permit application, including a complete building code summary (*see* Appendix A of the Administrative Code and Policies). The Inspection Department's building code summary shall be in the exact format as, and contain only the information in, Appendix B of the Administrative Code and Policies. The Inspection Department shall only modify its building code summary as set forth in section 103.5 Modifications, or as necessary to reflect any changes by the Office of State Fire Marshal to Appendix B which have been approved of by the Building Code Council.

Daniel Priest spoke in favor of and gave some background for the amendment.

Michael Rettie spoke in favor of this amendment.

Robert Privot asked that it be explained that 106.3.1 is for Commercial and not family dwellings. Daniel Priest responded explaining that information is already there.

Cliff Isaac addressed the 2018 Appendix B1 form should be B instead of B1.

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
(EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)

(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: _____

Address: _____ Zip Code _____

Owner/Authorized Agent: _____ Phone # (_____) _____ - _____ E-Mail _____

Owned By: ☐ City/County ☐ Private ☐ State

Code Enforcement Jurisdiction: ☐ City_____ ☐ County_____ ☐ State

CONTACT: _____

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural				(___)___	
Civil				(___)___	
Electrical				(___)___	
Fire Alarm				(___)___	
Plumbing				(___)___	
Mechanical				(___)___	
Sprinkler-Standpipe				(___)___	
Structural				(___)___	
Retaining Walls >5' High				(___)___	
Other				(___)___	

("Other" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC BUILDING CODE: ☐ New Building ☐ Shell/Core ☐ 1st Time Interior Completions ☐ Addition ☐ Phased Construction – Shell Core

2018 NC EXISTING BUILDING CODE: (check all that apply) ☐ Prescriptive ☐ Alteration Level I ☐ Historic Property ☐ Repair ☐ Alteration Level II ☐ Change of Use ☐ Chapter 14 ☐ Alteration Level III

CONSTRUCTED: (date) _____ **CURRENT OCCUPANCY(S)** (Ch. 3): _____

RENOVATED: (date) _____ **PROPOSED OCCUPANCY(S)** (Ch. 3): _____

OCCUPANCY CATEGORY (Table 1604.5): **Current:** _____ **Proposed:** _____

BASIC BUILDING DATA

Construction Type: (check all that apply) ☐ I-A ☐ I-B ☐ II-A ☐ II-B ☐ III-A ☐ III-B ☐ IV ☐ V-A ☐ V-B

Sprinklers: ☐ No ☐ Partial ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D

Standpipes: ☐ No Class ☐ I ☐ II ☐ III ☐ Wet ☐ Dry

Primary Fire District: ☐ No ☐ Yes **Flood Hazard Area:** ☐ No ☐ Yes

Special Inspections Required: ☐ No ☐ Yes

GROSS BUILDING AREA TABLE

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
3rd Floor			
2nd Floor			
Mezzanine			
1st Floor			
Basement			
TOTAL			

ALLOWABLE AREA

Primary Occupancy Classification(s):

Assembly	☐ A-1	☐ A-2	☐ A-3	☐ A-4	☐ A-5
Business	☐				
Educational	☐				
Factory	☐ F-1 Moderate	☐ F-2 Low			
Hazardous	☐ H-1 Detonate	☐ H-2 Deflagrate	☐ H-3 Combust	☐ H-4 Health	☐ H-5 HPM
Institutional	☐ I-1	☐ I-2	☐ I-3	☐ I-4	
I-1 Condition	☐ 1	☐ 2			
I-2 Condition	☐ 1	☐ 2			
I-3 Condition	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Mercantile	☐				
Residential	☐ R-1	☐ R-2	☐ R-3	☐ R-4	
Storage	☐ S-1 Moderate		☐ S-2 Low	☐ High-piled	
	☐ Parking Garage	☐ Open	☐ Enclosed	☐ Repair Garage	
Utility and Miscellaneous	☐				

Accessory Occupancy Classification(s): _____

Incidental Uses (Table 509)**:** _____

This separation is not exempt as a Non-Separated Use (see exceptions).

Special Uses (Chapter 4 – List Code Sections): _____

Special Provisions: (Chapter 5 – List Code Sections): _____

Mixed Occupancy: Select one Separation: Select one Exception: _____

Select one

$$\frac{\textit{Actual Area of Occupancy A}}{\textit{Allowable Area of Occupancy A}} + \frac{\textit{Actual Area of Occupancy B}}{\textit{Allowable Area of Occupancy B}} \leq 1$$

_____ + _____ + ... = _____ ≤ 1.00

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2[4] AREA	(C) AREA FOR FRONTAGE INCREASE[1,5]	(D) ALLOWABLE AREA PER STORY OR UNLIMITED[2,3]

[1] Frontage area increases from Section 506.2 are computed thus:

a. Perimeter which fronts a public way or open space having 20 feet minimum width = _____ (F)
b. Total Building Perimeter = _____ (P)
c. Ratio (F/P) = _____ (F/P)
d. W = Minimum width of public way = _____ (W)

[2] Unlimited area applicable under conditions of Section 507.

[3] Maximum Building Area = total number of stories in the building x D (maximum3 stories) (506.2).

[4] The maximum area of open parking garages must comply with Table 406.5.4. The maximum area of air traffic control towers must comply with Table 412.3.1.

[5] Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE
Building Height in Feet (Table 504.3)			
Building Height in Stories (Table 504.4)			

[1] Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING		DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
		REQ'D	PROVIDED (W/_____* REDUCTION)				
Structural Frame, including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
Interior							
Nonbearing Walls and Partitions Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists							
Floor Ceiling Assembly							
Columns Supporting Floors							
Roof Construction, including supporting beams and joists							
Roof Ceiling Assembly							
Columns Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/ Sleeping Unit Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

PERCENTAGE OF WALL OPENING CALCULATIONS

Fire Separation Distance (Feet) from Property lines	Degree of openings Protection (Table 705.8)	Allowable area (%)	Actual shown on plans (%)

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ Yes ☐ No
Exit Signs: ☐ Yes ☐ No
Fire Alarm: ☐ Yes ☐ No
Smoke Detection Systems: ☐ Yes ☐ No
Carbon Monoxide Detection: ☐ Yes ☐ No

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: _____

- ☐ Fire and/or smoke rated wall locations (Chapter 7)
- ☐ Assumed and real property line locations (if not on the site plan)
- ☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
- ☐ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
- ☐ Occupant loads for each area
- ☐ Exit access travel distances (1017)
- ☐ Common path of travel distances (Tables 1006.2.1 & 1006.3.2(1))
- ☐ Dead end lengths (1020.4)
- ☐ Clear exit widths for each exit door
- ☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
- ☐ Actual occupant load for each exit door
- ☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
- ☐ Location of doors with panic hardware (1010.1.10)
- ☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
- ☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
- ☐ Location of doors equipped with hold-open devices
- ☐ Location of emergency escape windows (1030)
- ☐ The square footage of each fire area (202)
- ☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
- ☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS
(SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES		# OF ACCESSIBLE SPACES PROVIDED			TOTAL # ACCESSIBLE PROVIDED
	REQUIRED	PROVIDED	REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	
TOTAL						

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE		WATERCLOSETS			URINALS	LAVATORIES			SHOWERS /TUBS	DRINKING FOUNTAINS	
		MALE	FEMALE	UNISEX		MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE
SPACE	EXIST'G										
	NEW										
	REQ'D										

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, etc., describe below)

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: Select one

Exempt Building: Select one Provide code or statutory reference:

Climate Zone: Select one

Method of Compliance: Select one
(If "Other" specify source here)_____

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)
- Description of assembly: _____
- U-Value of total assembly: _____
- R-Value of insulation: _____
- Skylights in each assembly: _____
  - U-Value of skylight: _____
- total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)
- Description of assembly: _____
- U-Value of total assembly: _____
- R-Value of insulation: _____
- Openings (windows or doors with glazing)
  - U-Value of assembly: _____
  - Solar heat gain coefficient: _____
  - projection factor: _____
  - Door R-Values: _____

Walls below grade (each assembly)
- Description of assembly: _____
- U-Value of total assembly: _____
- R-Value of insulation: _____

Floors over unconditioned space (each assembly)
- Description of assembly: _____
- U-Value of total assembly: _____
- R-Value of insulation: _____

Floors slab on grade
- Description of assembly: _____
- U-Value of total assembly: _____
- R-Value of insulation: _____
- Horizontal/vertical requirement: _____
- slab heated: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN
(PROVIDE ON SHEET 1 OR 2 OF THE STRUCTURAL SHEETS)

DESIGN LOADS:

Importance Factors: Wind (I_W) _____
Snow (I_S) _____
Seismic (I_E) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Basic Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: ☐ A ☐ B ☐ C ☐ D

Provide the following Seismic Design Parameters:

Occupancy Category (Table 1604.5) ☐ I ☐ II ☐ III ☐ IV

Spectral Response Acceleration S_S _____ %g S_1 _____ %g

Site Classification (ASCE 7) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Data Source: ☐ Field Test ☐ Presumptive ☐ Historical Data

Basic structural system (check one)

☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum

Analysis Procedure: ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic

Architectural, Mechanical, Components anchored? ☐ Yes ☐ No

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐

SOIL BEARING CAPACITIES:

Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS

MECHANICAL DESIGN
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone

winter dry bulb: _____
summer dry bulb: _____

Interior design conditions

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System

Unitary
- description of unit: _____
- heating efficiency: _____
- cooling efficiency: _____
- size category of unit: _____

Boiler
- Size category. If oversized, state reason.: _____

Chiller
- Size category. If oversized, state reason.: _____

List equipment efficiencies: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS

MECHANICAL DESIGN
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone

winter dry bulb: _____
summer dry bulb: _____

Interior design conditions

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System

Unitary
- description of unit: _____
- heating efficiency: _____
- cooling efficiency: _____
- size category of unit: _____

Boiler
- Size category. If oversized, state reason.: _____

Chiller
- Size category. If oversized, state reason.: _____

List equipment efficiencies: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS

ELECTRICAL DESIGN
(PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Select one

Lighting schedule (each fixture type)

lamp type required in fixture
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs. allowed (whole building or space by space)
total exterior wattage specified vs. allowed

Additional Prescriptive Compliance

- ☐ 506.2.1 More Efficient Mechanical Equipment
- ☐ 506.2.2 Reduced Lighting Power Density
- ☐ 506.2.3 Energy Recovery Ventilation Systems
- ☐ 506.2.4 Higher Efficiency Service Water Heating
- ☐ 506.2.5 On-Site Supply of Renewable Energy
- ☐ 506.2.6 Automatic Daylighting Control Systems

Part D – Final Adoption

The following Petitions for Rulemaking have been granted by the Council. Notice of Rulemaking proceedings and Public Hearing has been made. The Public Hearings were held on December 12, 2017. The Final Adoption meeting took place on March 13, 2018. The Council will give no further consideration to Petitions that are disapproved. Petitions that are approved will proceed through the Rulemaking process.

Item D – 1 Request by Robert Privott and Buddy Hughes of the NC Home Builders Association, LOGIX, Inc., to amend the 2012 Residential Code, Section R404.1.2.3.6.1 as follows:

R404.1.2.3.6.1 Stay-in-place forms. Stay-in-place concrete forms shall comply with this section.

1. Surface burning characteristics. The flame-spread index and smoke developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.

2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.

3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an approved exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.

4. Termite hazards. In areas where hazard of termite damage is ~~very~~ moderate – heavy in accordance with Figure R301.2 (6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with one of the following conditions:

4.1. Where in addition to the requirements in Section R318.1, ~~an approved~~ a method of protecting the foam plastic and structure from subterranean termite damage is provided.
4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood.

4.3. On the interior side of basement walls.

David Smith explained the proponents of this item have withdrawn the petition.

Item D – 2 Request by Robert Privott and Buddy Hughes, representing the NC Home Builders Association, LOGIX, Inc., to amend the 2018 Residential Code, Section R318.4.5.1 as follows:

R318.4.5.1 Inspection and treatment gaps.
Foam plastic in contact with the ground shall not be continuous to the bottom of the weather-resistant siding. A clear and unobstructed 2-inch (51mm) minimum inspection gap shall be maintained from the bottom of the weather-resistant siding to the top of any foam plastic. A minimum 4-inch (102 mm) treatment gap shall be provided beginning not more than 6 inches (152 mm) below grade. The top and bottom edges of the foam plastic installed between the inspection gap and the treatment gap shall be cut at a 45-degree (0.79 rad) angle. See Appendix O. ~~For additional requirements for ICF foundations see Section R404.1.3.3.6.1.~~
Exception: For ICF foundations see Section R404.1.3.3.6.1

David Smith explained the proponents of this item have withdrawn the petition.

Item D – 3 Request by Robert Privott and Buddy Hughes, representing the NC Home Builders Association, LOGIX, Inc., to amend the 2018 Residential Code, Section R404.1.3.3.6.1 as follows:

R404.1.3.3.6.1 Stay-in-place forms. Stay-in-place concrete forms shall comply with this section.

1. Surface burning characteristics. The flame-spread index and smoke developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.

2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.

3. Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an approved exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.

4. Deleted. ~~Termite protection. In areas where the probability of termite infestation is "very heavy" as indicated by Table R301.2(1) or Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundations walls in accordance with Section R318.4.~~
Termite hazards. In areas where hazard of termite damage is ~~very~~ moderate – heavy in accordance with Figure R301.2(6), foam plastic insulation shall be

permitted below grade on foundation walls in accordance with one of the following conditions:

4.1. Where in addition to the requirements in Section R318.1, ~~an approved~~ a method of protecting the foam plastic and structure from subterranean termite damage is provided.

4.2. The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood.

4.3. On the interior side of basement walls.

5. Flat ICF wall system forms shall conform to ASTM E 2634.

David Smith explained the proponents of this item have withdrawn the petition.

Item D – 4 Request by Cliff Isaac representing the NC Department of Insurance to amend the NC State Building Code, Volume 2018 NC Residential Code as follows:

R301.1.4 Notice of Usage. When an area of a dwelling other than a crawlspace is unfinished and not habitable it shall be plainly identified by a label attached to a wall, ceiling, or other conspicuous location that identifies the allowed use of the area. The label shall also state that altering the area to an area of living, sleeping, or eating and cooking would require a permit and compliance with the North Carolina Residential Code for One and Two Family Dwellings.

Residential Super Committee: Gary Embler made motion to deny. Second. Denied. No action taken by the Building Code Council.

Item D – 5 Request by Leon Skinner representing the City of Raleigh to amend the 2018 NC Plumbing Code – Section 403.1.1 (exception 2) and 2018 NC Building Code – Section 2902.1.1 (exception 2) as follows:

In buildings that contain dwellings or sleeping units that have a pool dedicated to the residents, a percentage reduction of the total required fixtures provided for a pool and pool deck without bleachers and grandstands may be taken equal to the percentage of ~~total~~ residential units whose entries fall within a 500 ~~feet~~ foot horizontal travel distance of the pool deck. In multi-story structures, the residential units located not more than one story above or below the pool and pool deck may be included in the percentage. Travel from the pool to the required toilet facilities shall be on an accessible route.

Commercial Super Committee: Motion to accept. Second. Accepted.
Building Super Committee: Motion to approve. Second. Adopted.

Part E – Reports

- **Chairman's Report**
  Chairman Robbie Davis made sure everyone was on track with any renewal of ethics requirements. He addressed the revised Super Committee list and will send out new ones to the Board members.

- **Ad-Hoc Committee Reports**
  None

- **Standing Committee Reports**
  Electrical, Building, and Residential Committees met on March 12, 2018.

- **Staff Reports**
  Cliff Isaac reported that he has visited over 47 departments throughout the state "building bridges" and discussing House Bill 155 and House Bill 252 statute changes and to clarify any issues. He has created a 5-Star plan that will provide more guidance and assistance to inspectors bringing statute changes through the Qualifications Board for inspections/inspectors. He will email the PowerPoint to Council members.

- **Public Comments**
  None

Adjourned.