AGENDA

UBC COMMISSION
STRUCTURAL ADVISORY COMMITTEE

March 3, 2022 3:00 pm
This agenda is subject to change up to 24 hours prior to the meeting.

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1. Roll call
2. Approve the minutes from the February 3, 2022 meeting
3. Review current amendment to IBC Section 1905.1.9
4. Review current amendments for Chapter 16

Next Scheduled Meeting: as needed

Please call Sharon at 530-6163 or email ssmalley@utah.gov if you do not plan on attending this meeting.

In compliance with the Americans with Disabilities Act, individuals needing special accommodations (including auxiliary communicative aids and services) during this meeting should notify Dave Taylor, ADA Coordinator, at least three working days prior to the meeting.
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MINUTES

UTAH
UNIFORM BUILDING CODE COMMISSION
STRUCTURAL ADVISORY COMMITTEE
MEETING

February 3, 2022 3:00

CONVENED: 3:21 ADJOURNED 4:06

STAFF:
Steve Duncombe, Bureau Manager
Sharon Smalley, Board Secretary

COMMITTEE MEMBERS:
Jeremy Achter
Oliver Burt (absent)
John Saunders (absent)
Tyler Wright

Josh Blazzard, Commission Liaison
Patrick Tomasino
Brent Maxfield

VISITORS:
Robert Moyle

MINUTES	Following the discussion on the content of meeting minutes, a motion was made by Jeremy Achter to approve the minutes from the December 2, 2021 meeting as written. The motion was seconded by Brent Maxfield and passed unanimously.
REVIEW CURRENT AMENDMENT TO IBC SECTION 1905.1.9	The committee agreed to postponed the discussion on this item until the March meeting so that Mr. Williams could attend and join the in on the discussion of this current amendment.

The meeting adjourned at 4:06.

Note: These minutes are not intended to be a verbatim transcript but are intended to record the significant features of the business conducted in this meeting. Discussed items are not necessarily shown in the chronological order they occurred.

P_{roof} = Design roof snow loads, Pf or Ps, psf
For the purpose of this section, snow load shall be assumed uniform on the horizontal projection without including the effects of drift or sliding. The Importance Factor, I, used in calculating
calculation Pf may be considered 1.0.

(3) In IBC, Section 1605.1 a new exception 4 is added as follows:
"4. ASCE 7-16 Section 2.3.6 Equation 6 shall be modified to 1.2D + Ev + Eh + L +f2S and 1.2D + Ev + Emh + L +f2S with f2 = (0.20 +0.025(A-5)) where the roof snow load exceeds 30 pounds per square foot (1.44kN/m^2). Where A = Elevation above sea level at the location of the structure (ft/1000). f2 = 0 for roof snow loads of 30 pounds per square foot (1.44kN/m^2) or less."

~~(2)~~(4)In IBC, Section 1605.2, in the portion of the definition for the value of f2, the words "and 0.2 for other roof configurations" are deleted and replaced with the following: "f2 = 0.20 + .025(A-5) for other configurations where roof snow load exceeds 30 psf; f2 = 0 for roof snow loads of 30 psf (1.44kN/m2) or less.
Where A = Elevation above sea level at the location of the structure (ft./1,000)."

~~(3)~~(5)In IBC, Sections 1605.3.1 and 1605.3.2, exception 2 in each section is deleted and replaced with the following: "2. Flat roof snow loads of 30 pounds per square foot (1.44 kNm2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 pounds per square fo ccordance with the following in load coml s calculated below, shall be combined wi
S = (0.20 + 0.025(A-5))Pf is greater than or equal to 0.20 Pf.
Where:
S = Weight of snow to be used in combination with seismic loads A = Elevation above sea level at the location of the structure (ft./1,000) Pf = Design roof snow load, psf.
For the purpose of this section, snow load shall be assumed uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 for use in the formula for Ws"

I don't think these apply to the 2021 IBC. The intent is that the new amendments 2 and 3 above should replace these two.

~~(4)~~(6)IBC, Section 1608.1, is deleted and replaced with the following: "1608.1 General. Except as modified in Sections 1608.1.1~~,~~ and 1608.1.2, ~~and 1608.1.3,~~ design snow loads shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof load shall not be less than that determined by Section 1607. Where the minimum live load, in accordance with Section 1607, is greater than the design roof snow load~~, pf,~~ the live load shall be used for design, but it may not be reduced to a load lower than the design roof snow load. Drifting need not be considered for design roof snow loads, ~~pf,~~ less than 20 psf."

~~(5)~~(7)A new IBC, Section 1608.1.1, is added as follows: "1608.1.1 Ice dams and icicles along eaves. Section 7.4.5 of Chapter 7 of ASCE 7 referenced in IBC Section 1608.1 is deleted and replaced with the following: 7.4.5 Ice Dams and Icicles Along Eaves. Where ground snow loads exceed 75 psf, eaves shall be capable of sustaining a uniformly distributed load of 2pf on all overhanging portions. No other loads except dead loads shall be present on the roof when this uniformly distributed load is applied. All building exits under down-slope eaves shall be protected from sliding snow and ice."

~~(6)A new IBC, Section 1608.1.2, is added as follows: "1608.1.2 Thermal factor. The value for the thermal factor, Ct, used in calculation of pf shall be determined from Table 7.3-2 in ASCE 7.~~

Utah 2021 IBC Amendment Proposals

Chapter 16 of IBC

Proposed that this amendment below would replace the current Amendment (2) for Chapter 16 of the IBC.

(2) In IBC, Section 1605.1, shall have an exception 4 added with the following: "4. ASCE 7-16 Section 2.3.6 Equation 6 shall be modified to 1.2D + Ev + Eh + L + f2S and 1.2D + Ev + Emh + L + f2S with f2 = (0.20 + 0.025(A-5)) where the roof snow load exceeds 30 pounds per square foot (1.44kN/m2). Where A = Elevation above sea level at the location of the structure (ft/1,000)." f2 = 0 for roof snow loads of 30 pounds per square foot (1.44kN/m2) or less.

Propose that Amendment (3) for Chapter 16 of IBC be revised as noted below.

(3) In IBC, *Section 1605.1*, Exception 2 ~~in each section~~ shall be deleted and replaced with the following: "2. *Where the allowable stress design load combinations of ASCE 7 Section 2.4 are used,* flat roof snow loads of 30 pounds per square foot (1.44 kN/m2) *or less* and roof live loads of 30 pounds per square foot (1.44 kN/m2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 pounds per square foot (1.44 kN/m2), the snow loads may be reduced in accordance with the following in load combinations including both snow and seismic loads. S as calculated below, shall be combined with seismic loads.

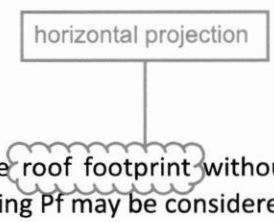
$S = (0.20 + 0.025(A-5))P_{roof}$, where S shall be greater than or equal to $0.20P_{roof}$.

Where:

S = Weight of snow to be used in combinations with seismic loads.

A = Elevation above sea level at the location of the structure (ft/1,000)

P_{roof} = Design ~~flat~~ roof snow loads, *Pf or Ps*, psf.



For the purpose of this section, snow load shall be assumed uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 ~~for use in the formula for Ws~~.

8

Propose that Amendment (9) for Chapter 16 of IBC be revised as noted below.

8

(9) A new IBC, Section 1613.1.1, is added as follows: "1613.1.1 Effective Seismic Weight. In ASCE 12.7.2 and 12.14.8.1 as referenced in Section 1613.1, Definition of W, Item 4 is deleted and replaced with the following:

4. Where flat roof snow load, Pf, exceeds 30 psf *(1.44 kN/m2)*, the snow load included in the effective seismic weight shall be calculated in accordance with the following equation: Ws = (0.20 + 0.025(A-5))Pf >= 0.20Pf.

WHERE:

Ws = Weight of snow to be included as effective seismic weight.

A = Elevation above sea level at the location of the structure (ft./1,000)

Pf = Design *flat* roof snow load, psf.

horizontal projection

For the purpose of this section, snow load shall be assumed to be uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 for use in the formula for Ws."

Is

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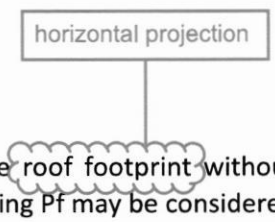
$S = (0.20 + 0.025(A-5))P_{roof}$, where S shall be greater than or equal to $0.20P_{roof}$.

Where:

S = Weight of snow to be used in combinations with seismic loads.

A = Elevation above sea level at the location of the structure (ft/1,000)

P_{roof} = Design ~~flat~~ roof snow loads, *Pf or Ps*, psf.



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WHERE:

Ws = Weight of snow to be included as effective seismic weight.

A = Elevation above sea level at the location of the structure (ft./1,000)

Pf = Design *flat* roof snow load, psf.

horizontal projection

For the purpose of this section, snow load shall be assumed to be uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 for use in the formula for Ws."

Is

Effective 7/1/2019

15A-3-107. Amendments to Chapter 16 of IBC.

(1) In IBC, Table 1604.5, Risk Category III, in the sentence that begins "Group I-2 Condition 1," a new footnote c is added as follows: "c. Type II Assisted Living Facilities that are I-2 Condition 1 occupancy classifications in accordance with Section 308 shall be Risk Category II in this table."

(2) In IBC, Section 1605.2. in the portion of the definition for the value of f2. the words "and 0.2 for other roof configurations" are deleted and replaced with the following: Replaced with a new amendment (2). See attachment.
f2 = 0 for roc
Where A = Elevation above sea level at the location of the structure (ft./1,000)."

(3) In IBC, Sections 1605.3.1 and 1605.3.2, exception 2 in each section is deleted and replaced with the following: "2. Flat roof snow loads of 30 pounds per square foot (1.44 kNm2) or less need not be combined with seismic loads. Where flat roof snow loads exceed 30 pounds per square foot (1.44 kNm2), the snow loads may be reduced in accordance with the following in load combinations including both snow and seismic loads. S as calculated below, shall be combined with seismic loads.
S = (0.20 + 0.0 Replaced with a new amendment (3). See attachment.
Where:
S = Weight of snow to be used in combination with seismic loads
A = Elevation above sea level at the location of the structure (ft./1,000)
Pf = Design roof snow load, psf.
For the purpose of this section, snow load shall be assumed uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 for use in the formula for Ws".

(4) IBC, Section 1608.1, is deleted and replaced with the following: "1608.1 General. Except as modified in Sections 1608.1.1, 1608.1.2, and 1608.1.3, design snow loads shall be determined in accordance with Chapter 7 of ASCE 7, but the design roof load shall not be less than that determined by Section 1607. Where the minimum live load, in accordance with Section 1607, is greater than the design roof snow load, pf, the live load shall be used for design, but it may not be reduced to a load lower than the design roof snow load. Drifting need not be considered for roof snow loads, pf, less than 20 psf."

design and

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(6) A new IBC, Section 1608.1.2, is added as follows: "1608.1.2 Thermal factor. The value for the thermal factor, Ct, used in calculation of pf shall be determined from Table 7.3-2 in ASCE 7. Exception: Except for unheated structures, the value of Ct need not exceed 1.0 when ground snow load, pg, is calculated using Section 1608.2.1."

6 (7) A new IBC, Section 1608.1.3 is added as follows: "1608.1.3 Drifts on adjacent structures. Section 7.7.2 of ASCE 7 referenced in IBC, Section 1608.1, is deleted and replaced with the following: 7.7.2 Adjacent structures. At lower adjacent structures, the requirements of Section 7.7.1 shall be used to calculate windward and leeward drifts. The resulting drift is permitted to be truncated." 1608.1.2

7 (8) A new IBC, Section 1608.2.1 is added as follows: "1608.2.1 Utah ground snow loads. Section 7.2 of ASCE 7 referenced in IBC, Section 1608.1 is modified as follows:

(a) In paragraph 1, 7.2-8 is deleted and replaced with 7.2-9.

(b) On Figure 7.2-1, remove CS and other ground snow load values in the state of Utah. Add red shaded region for the state of Utah with the following note: See note for Utah.

(c) The following is added to the Note on Figure 7.2.1: See Table 7.2-9 for Utah.

(d) Add Table 7.2-9 as follows: 7.2-9

TABLE 7.2-9
GROUND SNOW LOADS FOR SELECTED LOCATIONS IN UTAH

City/Town	County	Ground Snow Load (lb/ft2)	Elevation (ft)
Beaver	Beaver	35	5886
Brigham City	Box Elder	42	4423
Castle Dale	Emery	32	5669
Coalville	Summit	57	5581
Duchesne	Duchesne	39	5508
Farmington	Davis	35	4318
Fillmore	Millard	30	5138
Heber City	Wasatch	60	5604
Junction	Piute	27	6030
Kanab	Kane	25	4964
Loa	Wayne	37	7060
Logan	Cache	43	4531
Manila	Daggett	26	6368
Manti	Sanpete	37	5620
Moab	Grand	21	4029

Monticello	San Juan	67	7064
Morgan	Morgan	52	5062
Nephi	Juab	39	5131
Ogden	Weber	37	4334
Panguitch	Garfield	41	6630
Parowan	Iron	32	6007
Price	Carbon	31	5558
Provo	Utah	31	4541
Randolph	Rich	50	6286
Richfield	Sevier	27	5338
St. George	Washington	21	2585
Salt Lake City	Salt Lake	28	4239
Tooele	Tooele	35	5029
Vernal	Uintah	39	5384

Note: To convert lb/ft2 to kN/m2, multiply by 0.0479. To convert feet to meters, multiply by 0.3048.
1. Statutory requirements of the Authority Having Jurisdiction are not included in this state ground snow load table.
2. For locations where there is substantial change in altitude over the city/town, the load applies at and below the cited elevation, with a tolerance of 100 ft (30 m).
3. For other locations in Utah, see Bean, B., Maguire, M., Sun, Y. (2018), "The Utah Snow Load Study," Utah State University Civil and Environmental Engineering Faculty Publications, Paper 3589, http://utahsnowload.usu.edu/, for ground snow load values.

(9) A new IBC, Section 1613.1.1, is added as follows: "1613.1.1 Effective Seismic Weight. In ASCE 12.7.2 and 12.14.8.1 as referenced in Section 1613.1, Definition of W, Item 4 is deleted and replaced with the following:
4. Where flat roof snow load, Pf, exceeds 30 psf, the snow load included in the effective seismic weight shall be calculated, in accordance with the following equation: Ws = (0.20 + 0.025(A-5))Pf >= 0.20 Pf
WHERE:
Ws = Weight of snow
A = Elevation above sea level at the location of the structure (ft./1,000)
Pf = Design roof snow load, psf.
For the purposes of this section, snow load shall be assumed uniform on the roof footprint without including the effects of drift or sliding. The Importance Factor, I, used in calculating Pf may be considered 1.0 for use in the formula for Ws."

Replaced with a new amendment (8). See attachment.

Amended by Chapter 20, 2019 General Session

<< Previous Section (15A-3-106) Download Options PDF | RTF | XML Next Section (15A-3-108) >>

State Senate

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Legislative Research and General Counsel

Title 15A. State Construction and Fire Codes Act
15A-3-108 amendments to Chapter 17 through 18 of IBC.
Proposed changes for the 2021 IBC

(3) A new IBC, 1905.1.9, is added as follows: "1905.1.9 ACI 318, Section 19.3.1.1. "Modify ACI 318, Table 19.3.1.1 to read as follows: In the portion of the table designated as "Condition," the following Exposure category and class is deleted and replaced with the following: "F0: Concrete elements not exposed to freezing and thawing cycles to include footing and foundation elements that are completely buried in soil."

Comments & Questions:

Table 19.3.2.1 – Requirements for concrete by exposure class

Please note that for Exposure class F0 (which now specifically includes footing and foundation elements), the maximum water/cement ratio in NA, and the minimum concrete compressive strength f'c = 2,500 psi. For additional requirements, no air entrainment is required.

Is this the intent that footings and foundations for commercial buildings, (which would also include basement construction and below grade parking garages) could have low strength, 2,500 psi concrete and an unlimited water/cement ratio, and no air entrainment?

I believe this has unintended consequences of allowing a concrete mix design in a commercial building that has no durability characteristics. This will result in concrete deterioration such as spalling, pop-outs, plastic shrinkage cracks, drying-shrinkage cracks, crazing, delamination, etc. This will greatly increase the cost of future concrete repairs for below grade parking garages, buildings with basements and foundations. Less cement, more water, and no air entrainment, means no durability and is in direct violation to Chapter 19 of ACI.

Deteriorated concrete is what contributed to the recent collapse of the apartment building in Miami this last year. Many existing below grade parking garages in Utah have also had similar concrete deterioration due to the lack of durable concrete.

A minimum concrete compressive strength greater than 2,500 psi should be required for durability.
A maximum water/cement ratio should also be required for durability.
Air entrainment should also be required for durability.

The bottom of footings are typically set at frost depth. The footing concrete above the frost depth is subjected to moisture from the ground due to landscaping, snow, rain, drainage and runoff, etc. and is exposed to some freezing.

I believe the intent of this proposed change was to allow for a concrete strength of less than 3,500 psi to be used for footings and foundations, specifically 3,000 psi concrete. Or others may have wanted 2,500 psi so they would not have to have testing done. An engineer could design for 2,500 psi to avoid testing, but the minimum compressive strength for concrete should be 3,000 psi for durability (if the community is against the code prescribed 3,500 psi).

I believe this code amendment should be revised to not eliminate the durability requirements intended by the building code. Maybe footings and foundations should be considered an F1 exposure class and the minimum compressive strength should be changed to 3,000 psi, leaving the minimum requirements for a water/cement ratio of 0.55 and an air entrainment of 6% + or – 1%? Or should this proposed change simply be omitted?

The proposed change as written appears to save money, but it will in fact cost much more money for future repairs and maintenance.

Sincerely,

James M Williams PE, CE, SE, AIA, LEED AP
UNIFIED CODE ANALYSIS COUNCIL - UT
ICC GENERAL CODE DEVELOPMENT COMMITTEE