AGENDA

UBC COMMISSION
STRUCTURAL ADVISORY COMMITTEE

June 30, 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 April 7, 2022 meeting
3. Review proposed amendment to IBC Section 1809.13

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.

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Division of Occupational and Professional Licensing, 160 East 300 South, Salt Lake City UT 84111, Phone 530-6628 or toll-free in Utah only 866-275-3675

MINUTES

UTAH
UNIFORM BUILDING CODE COMMISSION
STRUCTURAL ADVISORY COMMITTEE
MEETING

April 7, 2022 3:00

CONVENED: 3:05

ADJOURNED 3:38

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

COMMITTEE MEMBERS:
Jeremy Achter
Oliver Burt
John Saunders
Tyler Wright

Josh Blazzard, Commission Liaison (excused)
Patrick Tomasino
Brent Maxfield

VISITORS:
James Williams

MINUTES

A motion was made by John Saunders to approve the minutes from the February 3, 2022 meeting as written. The motion was seconded by Patrick Tomasino and passed unanimously.

REVIEW PROPOSED AMENDMENT TO IBC SECTION 1905.1.9

Those present discussed the proposed amendment for this section. James Williams spoke to those present and asked that his proposal be modified by moving the word "piles" before the word "and". The committee agreed with the recommendation. A motion was made by Brent Maxfield to approve the proposed amendment as modified. The motion was seconded by Tyler Wright and passed unanimously.

REVIEW CURRENT AMENDMENTS FOR CHAPTER 16

The committee reviewed the recommended changes to the current amendments for this chapter that were approved at previous meetings. No further changes were recommended.

The meeting adjourned at 3:53.

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.

UTAH DEPARTMENT OF COMMERCE
DIVISION OF OCCUPATIONAL AND PROFESSIONAL LICENSING
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REQUEST FOR CODE AMENDMENT

Requesting Agency/Person: AE URBIA / James M Williams	Date: 6-16-2022
Street Address: 909 W South Jordan Parkway	
City, State, Zip: South Jordan, Utah, 84095	
Contact Person: James M Williams PE, CE, SE AIA	Phone: 801-830-1979
Code to be Amended: IBC 2021 (Include edition)	
Section: 1809.13 Footing seismic ties.	
Section Title: 15A-30108 amendments to Chapter 17 through 18 of IBC	

AMENDMENT:

Type proposed amendment in rule change form. (Using strikeout on portions being removed and underline on all new wording.)

1. Include the entire section you wish to amend.
2. Attach additional sheets if necessary.

1809.13 Footing seismic ties. Where a structure is assigned to *Seismic Design Category* D, E, or F, individual spread footings founded on soil defined in Chapter 20 of ASCE 7 as *Site Class* E or F shall be interconnected by ties. Unless it is demonstrated that equivalent restraint is provided by reinforced concrete beams within slabs on grade or reinforced concrete slabs on grade~~,~~. t~~T~~ies shall be capable of carrying, in tension or compression, a force equal to the lesser of the product of the larger footing design gravity *load* times the seismic coefficient, SDS, divided by 10 and 25 percent of the small footing design gravity load.

Exception: Structures with concrete or masonry wall systems that are 2-stories or less and constructed on shallow foundations, need not have footing seismic ties regardless of the *Seismic Design Category* and *Site Class* provided the geotechnical investigation report indicates that there is negligible risk of lateral spreading, no potential for flow failure, no bearing capacity loss, and differential settlement of site soils or improved site soils due to liquefaction do not exceed 0.002L for Risk Categories I or II, 0.0013L for Risk Category III and 0.0005L for Risk Category IV.

where:

L = Column spacing in inches.

Purpose or Reason for the amendment:

Providing footing seismic ties in large office / warehouse and similar tilt-up concrete buildings can be cost prohibitive and is not justified for buildings with very little settlement due to liquefaction (on the order of approximately 1 inch), and no lateral spreading. Approximately 1 inch of settlement will not compromise the structural integrity of these buildings. The cost of these footing seismic ties can easily exceed $1M for a typical project. That is money spent with no benefit to the owner. That additional cost will prevent developers from building, especially with the current economical environment.

There is a very similar exception in ASCE 7, but it is not well known and is interpreted differently, by different plan examiners and engineers. There is no consistency in the enforcement, and often time, no common sense. An exception is needed that is easy to find, and easy to enforce.

The following is a more technical reason, justification, and example for the amendment:

ASCE 7 is a referenced standard of the IBC. Section 12.13.8.2 of ASCE 7 provides the requirements for foundation ties for spread footings founded on Site Class E or F soils. Section 12.13.9 provides requirements for foundations on liquefiable sites and has the following exception: "Structures on shallow foundations need not be designed for the requirements of this section where the geotechnical investigation report indicates that there is negligible risk of lateral spreading, no bearing capacity loss, and differential settlements of site soils or improved site soils do not exceed one-fourth of the differential settlement threshold specified in Table 12.3-3." (Note: Table 12.3-3 is a typo and the correct reference is Table 12-13-3 Differential Settlement Threshold).

For single story structures with concrete or masonry wall systems, and Risk Category I or II, the Differential Settlement Threshold is 0.0075L. One-fourth of 0.0075L is 0.002L. As an example for a column spacing of 50 feet, one-fourth of the Differential Settlement threshold is 1.2 inches. So if the differential settlement due to liquefaction does not exceed 1.2 inches then footing seismic ties are not required...provided that there is little risk of lateral spreading and no reduction in the bearing capacity of the soil. The allowable settlement of 1.2 inches still provides a factor of safety of 4 with respect to the differential settlement threshold. Buildings in this Risk Category with the 50 foot column spacing can easily withstand 1.2 inches of settlement as a result of liquefaction from a major earthquake with no compromise to the structure.

Single-story structures with concrete or masonry wall systems, include tilt-up concrete office / warehouse facilities. Many of these buildings are 40 feet tall and have large mezzanines. The mezzanine can be as large as two-thirds of the main floor area. In essence this two-thirds of the building with a mezzanine acts like a 2-story building as far as the structure is concerned. If the Differential Settlement Threshold is acceptable for a building with a mezzanine as described above, there is no reason why it would not be acceptable if the mezzanine were as large as the building footprint. Therefore there is no reason why the single-story structures with concrete or masonry wall system

shouldn't be increased to include a second level since structurally it acts the same as a large mezzanine. In fact a building with a true second level will perform better than a building with just a mezzanine because all of the walls would be equally braced.

Cost or Savings Impact of Amendment:

This exception will have a large savings impact for tilt-up concrete office / warehouse buildings being built in any of the valley areas throughout the state that have soils with potential liquefaction and meet the conditions of the exception. Footing seismic ties for typical tilt-up office/warehouse buildings can cost between $500k to over $1M and double that for larger buildings.

In many cases the provision for footing seismic ties has not been enforced equally. If enforced without the exception, the added cost, especially in the current economic environment could cause many project to go on hold and for developers to look at other state to build in.

Compliance Costs for Affected Persons (APerson@ means any individual, partnership, corporation, association, governmental entity, or public or private organization of any character other than an agency.) (You must break out the impact cost to State Budget, Local Government and you must state aggregate cost to other persons {cost per person times number of persons affected}):

Signature:	Date: 6-16-2022

For Division Use:

Date Received:	
Committee Action: ☐ Approved ☐ Denied ☐ Approved with revisions ☐ Referred to: ☐ Tabled	**UBC Commission Decision for Hearing:** ☐ Approved for hearing ☐ Denied ☐ Approved with revisions ☐ Referred to: ☐ Tabled
Date Filed:	Public Hearing Date:
UBC Commission Decision for Adoption: ☐ Approved ☐ Denied ☐ Approved with revisions ☐ Referred to: ☐ Tabled	Effective Date:

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June 28, 2022

2021 IBC 1809.13 Footing Seismic Ties, Proposed Exception

Summary – In Support

I apologize that I will not be able to attend your committee meeting due to previous travel plans. Because I am unable to attend, I wanted to provide this additional summary in support for this proposed code change.

Please note that I am one of 14 members of the national ICC General Code Development Committee and have served on this committee for the 2021 and 2024 building codes and do not take code changes lightly. I do believe this proposed code change is very important to the State of Utah, developers, contractors, and business owners.

Please do read the entire proposed code change, the detailed reason for the amendment and the technical justification, etc.

Section 1809.13 requires footing seismic ties for individual spread footings located on sites classified as site class E or F (and for sites subject to liquefaction).

Please note that there are sites in Utah of site class E or F and identified as having liquefaction. For some of these sites the differential settlement associated with liquefaction caused by a major earthquake are very small, less than 1.25 inches, which will not affect the structural integrity of the building. There are other sites with differential settlement due to liquefaction that will be greater than 1.25" and could be much higher, as much as 12 inches or more. The proposed exception is only addressing sites with very small differential settlement. This same range of differential settlement (1.25") could also occur in buildings on a site class D without liquefaction.

The proposed exception is to eliminate the requirement for foundation ties of spread footings for certain buildings subject to a very small amount of differential settlement due to seismic liquefaction, provided certain conditions are met.

This proposed exception is similar, but much more restrictive to the exception found in ASCE 7 Section 12.13.9 which provides the requirements for foundations on liquefiable sites, including an exception to eliminate the footing seismic ties for spread footings if certain criteria are met.

The proposed exception to eliminate seismic ties for spread footings, is limited to buildings which meet the following conditions:

2-story buildings, with masonry or concrete walls

Negligible risk of lateral spreading

No potential for low failure

No bearing capacity loss

And differential settlement due to liquefaction less than 1/4th of the Differential Settlement Threshold which is equal to 0.25(0.0075)L, or 0.002L for Risk Categories I or II. (L = the column spacing in inches).

This is providing a factor of safety of 4, for the differential settlement Threshold. The type of buildings we are addressing can easily tolerate this minimal amount of differential settlement between columns which are typically more than 50 feet on center. This is a commonsense issue and greatly needed for the industrial office/warehouse building sector in Utah.

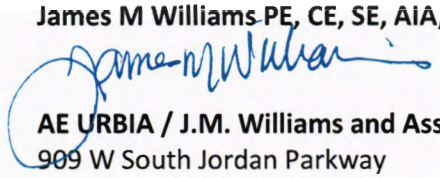
Please note that we did have a tilt-up warehouse building in which a worker drove a crane through a column after the building was completed. The column anchor bolts were completely shear off. The column was bent to approximately a 30-degree angle and was left hanging from the roof assembly. The roof structure was left sagging 12 inches or more, but the roof did not collapse, and it was able to be repaired afterward. Some of the open web steel trusses were replaced in order to maintain warrantees. This is only to demonstrate how much movement could be tolerated without causing a collapse for this type of construction.

Footing Seismic Ties are expensive for these large warehouse buildings and are justified in many cases, but there are exceptions where there is no benefit whatsoever for installing them and no return on the cost of investment for them. For large warehouse buildings the cost for footing seismic ties can range from $500k to $2M or more depending on the size of the building.

Please support this commonsense code change.

Respectfully yours,

James M Williams PE, CE, SE, AIA, LEED AP



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