GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: __________ (DCA USE ONLY)

CODE: 2024 International Building Code SECTION: 1613.7

PROPONENT: Stephen Richards, Structural Engineers Association of Georgia (SEAOG) DATE: 12/12/2025

EMAIL: srichards@uzuncase.com

ADDRESS: Uzun+Case, 1230 Peachtree St NE, Atlanta, GA 30309

TELEPHONE NUMBER: (678)553-5249 FAX NUMBER: (678)553-5201

CHECK ONE:
- ☐ Revise section to read as follows:
- ☒ Delete section and substitute the following:
- ☐ Add new section to read as follows:
- ☐ Delete without substitution:

~~LINE THROUGH MATERIAL TO BE DELETED:~~ <u>UNDERLINE MATERIAL TO BE ADDED</u>

☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:

<u>**1613.7 Determination of Seismic Spectral Response Acceleration Parameters for Site Class DE or E sites.** For sites classified as Site Class DE or E, the values of S_{MS}, S_{M1}, S_a and PGA_M determined in accordance with Section 11.4.3 or Section 11.8.3 of ASCE 7 shall not be less than the corresponding values determined for Site Class D.</u>

REASON/INTENT:

The previous version of this amended section was added out of an abundance of caution since an irregularity in the new seismic provisions was noted and still being studied.

Since then, the ASCE 7 Seismic Subcommittee has been working internally and with multiple industry groups to assess and understand the change in design to the Central and Eastern United States (CEUS). The results of the study generally support the code updates of ASCE 7-22 and explain that the seismological and geological properties of the CEUS are significantly different than the Western United States (WUS). Prior editions of the ASCE 7 standard extrapolated the ground motion models of the WUS, and that has been corrected in the latest models and standards, resulting in a significant decrease in the seismic design parameters.

What the study did find is some sites classified as DE or E had lower long-period accelerations than sites classified as D, as a result of the updated ground motion model extrapolating beyond the 2020 recommendations of its original developer. The committee’s recommendation was to introduce a conservative limit, to match Site Class D, which similarly matches a limit applied to soil amplification factors in the previous edition of the standard.

Note: These provisions have a passing ballot from the Seismic Subcommittee of ASCE 7 but are still to be balloted by the ASCE 7 Main Committee. The intent of this ballot is to submit for consideration and begin the adoption process. It is expected that the ballot will have passed the ASCE 7 Main Committee by July of 2026, to be incorporated into a future ASCE 7 Supplement. Provided the Main Committee does not introduce substantive changes and the ballot passes, we recommend adopting this amendment prior to the release of the official supplement so that these changes can be incorporated into the design of Georgia projects.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
The net impact of the proposed amendment varies depending on the size of the project. The proposed amendment will result in slightly larger design forces than an unmodified ASCE 7-22 for flexible (large/tall) structures on soft soils, but removing the cost associated with procuring a site-specific analysis (as required by the current amendment) will be beneficial, particularly for small projects where that represents a higher percentage of the overall construction costs.

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

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THAN DECEMBER 15TH. The proposed code change shall be submitted for review to the State Codes Advisory Committee at their quarterly meeting in January. An incomplete form will be sent back to the proponent for completion. An amendment submitted after the submittal deadline date will be returned to the proponent.

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60 Executive Park South, NE
Atlanta, Georgia 30329-2231

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: __________ (DCA USE ONLY)

CODE: 2024 International Building Code SECTION: 1613.8

PROPONENT: Stephen Richards, Structural Engineers Association of Georgia (SEAOG) DATE: 12/12/2025

EMAIL: srichards@uzuncase.com

ADDRESS: Uzun+Case, 1230 Peachtree St NE, Atlanta, GA 30309

TELEPHONE NUMBER: (678)553-5249 FAX NUMBER: (678)553-5201

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☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:

1613.8 Site-Specific MCE_R Response Spectrum for Site Class DE or E sites. For sites classified as Site Class DE or E, the site-specific MCE_R determined in accordance with 21.2.3 and 21.2.3.1 of ASCE 7 shall not be taken as less than 80% of the MCE_R response spectrum obtained from the USGS Seismic Design Geodatabase for Site Class D.

REASON/INTENT:

The previous version of this amended section was added out of an abundance of caution since an irregularity in the new seismic provisions was noted and still being studied.

Since then, the ASCE 7 Seismic Subcommittee has been working internally and with multiple industry groups to assess and understand the change in design to the Central and Eastern United States (CEUS). The results of the study generally support the code updates of ASCE 7-22 and explain that the seismological and geological properties of the CEUS are significantly different than the Western United States (WUS). Prior editions of the ASCE 7 standard extrapolated the ground motion models of the WUS, and that has been corrected in the latest models and standards, resulting in a significant decrease in the seismic design parameters.

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FINANCIAL IMPACT OF PROPOSED AMENDMENT:
The net impact of the proposed amendment varies depending on the size of the project. The proposed amendment will result in slightly larger design forces than an unmodified ASCE 7-22 for flexible (large/tall) structures on soft soils, but removing the cost associated with procuring a site-specific analysis (as required by the current amendment) will be beneficial, particularly for small projects where that represents a higher percentage of the overall construction costs.

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GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ________________ (DCA USE ONLY)

CODE: 2024 International Building Code SECTION: Chapter 35

PROPONENT: Stephen Richards, Structural Engineers Association of Georgia (SEAOG) DATE: 12/12/2025

EMAIL: srichards@uzuncase.com

ADDRESS: Uzun+Case, 1230 Peachtree St NE, Atlanta, GA 30309

TELEPHONE NUMBER: (678)553-5249 FAX NUMBER: (678)553-5201

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DESCRIPTION:

CHAPTER 35
REFERENCED STANDARDS

*Revise Chapter 35 'Referenced standards' to add the following:

ACEC/GA		
ACEG/SEAOG- SI GL 01-24	Georgia Special Inspections Guidelines http://seaog.org/Special_Inspection_Documents	1704.2.1, GA Amendments
ACI		
318—25	Building Code Requirements for Structural Concrete	
ASCE/SEI		
7—22	Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplements 1 ~~and 2~~ <u>,2 and 3</u>	

REASON/INTENT:
The purpose of this amendment is to add supplement 3 of ASCE 7 to the Referenced Standards. Supplement 3 addresses an unconservative error in the calculation of spectral accelerations of very large/tall building and nonbuilding structures, such as above-ground storage tanks (natural periods greater than 10s).

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
This amendment would result in a cost increase for the affected structures since correcting this issue would result in a larger seismic force. The effect of this change would be limited to very tall buildings or very large above-ground storage tanks (generally greater than 240 feet in diameter).

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

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GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ______________ (DCA USE ONLY) PAGE 1 OF 3

CODE: 2024 International Building Code SECTION: Chapter 35

PROPONENT: Stephen Richards, Structural Engineers Association of Georgia (SEAOG) DATE: 12/12/2025

EMAIL: srichards@uzuncase.com

ADDRESS: Uzun+Case, 1230 Peachtree St NE, Atlanta, GA 30309

TELEPHONE NUMBER: (678)553-5249 FAX NUMBER: (678)553-5201

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DESCRIPTION:

ASCE/SEI *American Society of Civil Engineers Structural Engineering Institute, 1801 Alexander Bell Drive, Reston, VA 20191*

7—22: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

202, Table 1504.2, 1504.8, 1602.1, 1603.1.4, Table 1604.3, 1604.5, Table 1604.5, 1604.8.2, 1604.9, 1605.1, 1605.1.1, 1605.2, 1606.3, 1607.9.1, 1607.9.1.1, 1607.9.1.2, 1607.10, 1607.12, 1608.1, 1608.2, Figure 1608.2(1), 1608.3, 1609.1.1, 1609.2, 1609.3, 1609.5, 1609.6.1, 1609.6.3.1, 1609.6.3.2, 1609.7, 1611.1, 1611.2, 1612.2, 1613.1, 1613.2, 1613.3, 1613.4, 1613.5, 1613.6, 1614.1, 1615.1, 1705.13, 1705.13.1.1, 1705.13.1.2, 1705.13.4, 1705.14.1.1, 1705.14.1.2, 1705.14.2, 1705.14.3, 1705.14.4, 1709.5, 1709.5.3.1, 1802.1, 1803.5.12, 1806.1, 1808.3, 1808.3.1, 1809.13, 1809.14, 1809.14, 1810.3.1.1, 1810.3.6.1, 1810.3.8, 1810.3.9.2, 1810.3.9.4, 1810.3.9.4.1, 1810.3.9.4.2, 1810.3.11.2, 1810.3.12, 1902.1, 1902.1.1, 2202.2.1, 2202.2.1.1, 2202.2.1.2, 2202.2.2, 2204.2.1, 2204.2.2, 2206.1.1.1, 2209.2, 2211.1, 2212.1, Table 2304.6.1, Table 2306.3(3), Table 2308.11.4, 2404.1, 2505.1, 2505.2, 2506.2.1

8—21: Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members

1604.3.3, 2205.1, 2211.

19—22: Structural Applications of Steel Cables for Buildings

2214.1

24—~~14~~ 24: Flood Resistant Design and Construction

1202.4.2, 1202.4.4, 1612.2, 1612.4, 2702.1.8, 3001.3

REASON/INTENT:

The purpose of this amendment is to bring the referenced version of ASCE 24: Flood Resistant Design and Construction into alignment with Supplement 2 of ASCE 7, which is already included as a Georgia amendment. ASCE 24-24 was not yet published at the time of the previous amendment cycle, and it is intended to be used in tandem with ASCE 7 Supplement 2. Without this update, there are a number of gaps between design standards that can cause confusion.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
There should be no financial impact as the result of this amendment. As currently specified, it is expected that design professionals would recognize the gap during the design process and would likely utilize the updated edition to complete their design. This amendment would bring the design standards into alignment and reduce confusion.

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GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ____________ (DCA USE ONLY) PAGE 1 OF 3

CODE: 2024 International Building Code SECTION: Table 1704.2

PROPONENT: Stephen Richards, Structural Engineers Association of Georgia (SEAOG) DATE: 12/12/2025

EMAIL: srichards@uzuncase.com

ADDRESS: Uzun+Case, 1230 Peachtree St NE, Atlanta, GA 30309

TELEPHONE NUMBER: (678)553-5249 FAX NUMBER: (678)553-5201

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DESCRIPTION:

TABLE 1704.2 MINIMUM SPECIAL INSPECTOR QUALIFICATIONS			
Category of Testing and Inspection	**Minimum Qualifications (refer to key at end of Table)**		
	Shop Testing or Inspection	**Field Testing or Inspection**	**Review Testing, Certification & Lab Reports**
1705.1 Special Cases			
Work of unusual or special nature		A, B, O	
1705.2, 1705.11, 1705.12 & 1705.13 ~~& 1705.14~~ Steel Construction			
1705.20 Sealing of Mass ~~Concrete~~ Timber	A, C		

(Remainder of Table 1704.2 remains unchanged)

REASON/INTENT:
Correct editorial typos resulting from updates to the previous amendment, based on section numbering changes in the 2024 IBC.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
There is no cost impact. Required qualifications remain unchanged.

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GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ____________ (DCA USE ONLY)

CODE: 2024 International Building Code SECTION: 1204.1

PROPONENT: AIA Georgia (Dee Leclair, AIA) DATE: 12/15/2025

EMAIL: dleclair@ssoe.com

ADDRESS: 100 Peachtree ST, NW, Atlanta, GA 30303

TELEPHONE NUMBER: (404)788-3390 FAX NUMBER: ( ) -

CHECK ONE:
- X Revise section to read as follows:
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DESCRIPTION:

Revise as follows:

1204.1 General. Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section 1204.2 or shall be provided with artificial light in accordance with Section 1204.3. Exterior glazed openings shall open directly onto a public way or onto a yard or court in accordance with Section 1205.

<u>**1204.1.1 Group R occupancies.** For Group R occupancies, habitable spaces for living and sleeping shall be provided with natural light in accordance with Section 1204.2 and artificial light in accordance with Section 1204.3.</u>

1204.2 Natural light. The minimum net glazed area shall be not less than 8 percent of the floor area of the room served.

1204.2.1 Adjoining spaces. For the purpose of natural lighting, any room is permitted to be considered as a portion of an adjoining room where one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room or 25 square feet (2.32 m), whichever is greater.

> **Exception:** Openings required for natural light shall be permitted to open into a sunroom with thermal isolation or a patio cover where the common wall provides a glazed area of not less than one-tenth of the floor area of the interior room or 20 square feet (1.86 m),whichever is greater.

1204.2.2 Exterior openings. Exterior openings required by Section 1204.2 for natural light shall open directly onto a public way, yard or court, as set forth in Section 1205.

Exceptions:

1. Required exterior openings are permitted to open into a roofed porch where the porch meets all of the following criteria:
   1.1. Abuts a public way, yard or court.
   1.2. Has a ceiling height of not less than 7 feet (2134 mm).
   1.3. Has a longer side at least 65 percent open and unobstructed.
2. Skylights are not required to open directly onto a public way, yard or court.

1204.3 Artificial light. Artificial light shall be provided that is adequate to provide an average illumination of not less than 10 footcandles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

1204.4 Stairway illumination. Stairways within dwelling units and exterior stairways serving a dwelling unit shall have an illumination level on tread runs of not less than 1 footcandle (11 lux). Stairways in other occupancies shall be governed by Chapter 10.

REASON/INTENT:
The proposed changes aim to ensure that all spaces intended for human occupancy, including sleeping units and dormitories, are provided with natural light. Natural light has numerous benefits, including improving occupants' health and well-being, reducing energy consumption, and enhancing the overall quality of indoor environments. By specifying the requirements for natural light and exterior glazed openings, the proposal ensures consistency and clarity in the code.

Justification: The justification for this proposal is based on the following key points:

1. **Safety:**
   a. **Enhanced Visibility:** Natural light enhances visibility in indoor spaces, reducing the risk of accidents and injuries caused by inadequate lighting.
   b. **Emergency Situations:** In case of power outages or emergencies, natural light provides a reliable source of illumination, aiding in safe evacuation and reducing panic.
2. **Welfare:**
   a. **Quality of Life:** Natural light contributes to a more pleasant and inviting environment, improving the overall quality of life for occupants.
   b. **Productivity and Comfort:** Adequate natural lighting has been linked to increased productivity and comfort, benefiting both residential and commercial spaces.
3. **Energy Efficiency:** Natural light reduces the reliance on artificial lighting, leading to lower energy consumption and reduced carbon footprint. This aligns with sustainability goals and supports energy-efficient building practices.
4. **Code Consistency:** The proposal clarifies and standardizes the requirements for natural light in various types of spaces, ensuring that the code is easy to understand and apply. This reduces ambiguity and helps designers and builders comply with the code more effectively.

See attached for back-up materials.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost impact of the proposed changes is anticipated to be minimal to moderate. While there may be initial costs associated with incorporating larger glazed areas or additional windows in new constructions or renovations, these costs are offset by the long-term benefits of improved occupant health and reduced energy consumption. Additionally, the proposal does not mandate specific types of glazing or construction methods, allowing for flexibility in achieving compliance in a cost-effective manner. About $1400, see justification below.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimated cost: 2. X 4 1/2” YES 45 TU with 1” Low E glass runs about $80.00 per sq ft installed, preliminary pricing.

Estimated sleeping unit within dormitories (larger), 250 SF, code requires min. 8% of the floor area = 20 SF x $80/SF = $1,600

Estimated sleeping unit within dormitories (smaller), 180 SF, code requires min. 8% of the floor area = 14.4 SF x $80/SF = $1,152

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The Department of Community Affairs
Codes and Industrialized Buildings Section
60 Executive Park South, NE
Atlanta, Georgia 30329-2231

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ____________ (DCA USE ONLY) PAGE 1 OF 5

CODE: 2024 International Building Code SECTION: 1901.3

PROPONENT: Michael W. Brown (Simpson Strong-Tie) DATE: 12/12/2025

EMAIL: mibrown@strongtie.com

ADDRESS: 2600 International Street, Columbus, Ohio 43228

TELEPHONE NUMBER: (614) 403-3285 FAX NUMBER: ( ) -

CHECK ONE:
- ☒ Revise section to read as follows:
- ☐ Add new section to read as follows:
- ☐ Delete section and substitute the following:
- ☐ Delete without substitution:

~~LINE THROUGH MATERIAL TO BE DELETED:~~ <u>UNDERLINE MATERIAL TO BE ADDED</u>

☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:
Chapter 19: Concrete

Section 1901: General

1901.3 Anchoring to concrete. Anchoring to concrete shall be in accordance with ACI 318 as supplemented in Section 1905, and applies to cast-in (headed bolts, headed studs and hooked J- or L-bolts), post-installed expansion (torque-controlled and displacement-controlled), undercut, screw, and adhesive anchors.

<u>**Exception:** Seismic qualification of post-installed concrete anchors shall be permitted to be in accordance with ACI 355.2 for post-installed expansion, undercut, and screw anchors and in accordance with ACI 355.4 for post-installed adhesive anchors.</u>

Chapter 35: Referenced Standards

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331-3439

<u>355.2-22 Post-Installed Mechanical Anchors in Concrete - Qualification Requirements</u>

<u>355.4-19 (21) Qualification of Post-Installed Adhesive Anchors in Concrete</u>

REASON/INTENT:

The purpose of this code amendment is to counteract new overly conservative requirements for seismic testing and load-rating of post-installed concrete anchors. These conservative and stringent seismic qualification protocols were added into the most recent versions of ACI 355.2 and ACI 355.4, which were published in November of 2024. The ACI 355.2 standard governs the qualification of post-installed mechanical anchors, while the ACI 355.4 standard governs the qualification of post-installed adhesive anchors. The new 2024 versions of the ACI 355 testing standards have also eliminated the current simulated seismic testing regime that has been successfully used by these standards for the last two decades to load-rate anchors that resist earthquake-induced forces. The revisions made to the seismic testing regime within these standards have been shown to significantly reduce the capacity of post-installed anchors. ACI 355.2 and ACI 355.4 are currently not referenced directly by this building code, but they are instead referenced by ACI 318, which is referenced directly by this code for concrete design, including anchorage to concrete. This code amendment will directly reference the previous versions of the ACI 355 testing standards in the Chapter 35 of this building code, specifically for the seismic qualification of post-installed anchors in concrete.

The following are specific reasons that the new anchor testing criteria should not be imposed in this code:

1. The revised seismic testing parameters included within the new ACI 355 qualification standards are overly restrictive due to the reasons below.

a. **Incorrect application:** The wider concrete cracks specified in the new ACI 355 standards are only considered to occur near the edges of plastic hinge zones within lateral-force resisting systems in concrete frame buildings, yet they are applied to all post-installed anchors within any concrete element located anywhere in the structure.

b. **Misaligned with the original intent of the testing regime:** The new testing protocols come from European design methodology and anchor qualification methods. In Europe, a three-tier seismic qualification exists. Low hazard and risk structures do not require any cyclic testing (the lowest tier), in the US this has been called ASPC0. ASPC stands for 'Anchor Seismic Performance Category'. The middle tier is called "C1" in Europe (ASPC1 in the US), which corresponds to the current seismic testing regime used in US building codes today. The most severe tier in Europe is called "C2" (ASPC2 in the US) and has rigorous testing requirements that are required for a limited subset of buildings that are under higher seismic hazard and risk levels only. However, this highest tier, ASPC2, has been implemented within the new ACI test standards as the only method for seismic qualification, and is required in all structures Seismic Design Category C and above.

Proponents and researchers involved with developing the ASPC2 testing regime integrated into the new ACI 355 qualification standards never intended this protocol to 'replace' the ASPC1 regime. Per Marhenholtz and Wood, *"Principally, the integration of the C2 performance category in the U.S. design standards is feasible. However, one critical issue to be discussed and further explored is when is it appropriate to use C1 or C2 anchors. To date, the European approach is inconclusive in this sense…"* and *"The European design requirements can be considered very stringent due to the generally lower peak ground acceleration requiring C1 or even C2 qualified anchors" (Reference 1)*. As such, the ASPC2-only approach within the new ACI 355 standards is not appropriate, overly conservative, and uncalibrated to the design standards referenced in the US model building code, which have yet to adopt this three-tier approach.

d. **Not driven by a real-world need:** There does not appear to be a demand from industry, designers, owners, or building officials for a change in the seismic qualification of post-installed anchors in the United States. Marhenholtz and Wood, who were researchers involved in the development of the C2 testing protocols in Europe, state in their ACI Structural Journal article, *"On the other hand, the current ACI 355 seismic qualification is generally perceived to be sufficient as United States building authorities did not ask for more rigorous qualification requirements, and it is used by many U.S. and international designers and specifiers" (Reference 1).*

2. It is inappropriate to apply the new seismic qualification testing protocols to a wide range of building types and anchor applications.

a. **Based on simulation of one type of building:** The justification of the cyclic loading and crack width protocols in the new qualification standards were derived from 2D-frame analytical models of concrete special moment frames and ordinary moment frames coupled with concrete shearwalls *(Reference 2)*. Other building types like steel-framed structures, light-framed construction, metal building systems, or low-rise pre-cast or tilt-up structures were not considered. Yet, the new testing requirements are applied to all anchor applications in all building types.

b. **Based on simulation of one seismic hazard:** The selected seismic hazard assumed in the research used to develop the new seismic testing protocols was located in the Los Angeles basin with comparatively high spectral acceleration values of 2.01g for S and 0.61g for S . Per Marenholtz et al., *"While it is recognized that a variety of seismic conditions exist throughout the world, the significant seismic hazard of the selected site is anticipated to conservatively represent demands at many locations" (Reference 2).* The application of this hazard to all sites in Seismic Design Categories C and above is too broad and overly conservative.

c. **Large cracks only occur in limited locations:** The research simulations showed that large cracks of 0.032" only occur in or near plastic hinge zones in these concrete buildings *(Reference 2)*. But even within concrete frame buildings, the vast majority of anchors are installed away from plastic hinge zones, and ACI 318 already excludes the use of anchors within plastic hinge zones. Per Marhenholtz and Wood, *"However, it is noted that the 0.8 mm (0.032") width crack represents a maximum value not generally to be anticipated and the structural analysis may result in smaller crack widths" (Reference 1).* Therefore, the wider crack width criteria is not appropriate in most applications.

3. There will be a significant reduction in the capacity of post-installed concrete anchors, which will result in increased construction costs and potentially impractical design solutions.

a. **Reduced Capacities:** Application of the new seismic testing requirements will result in a reduction in capacity of post-installed concrete anchors in all buildings that are Seismic Design Category C and above, regardless of the application.

While there is currently no published data in the United States of new capacities tested to the 2024 versions of the ACI 355 standards, equivalent capacity reductions in Europe shed light on what reductions to expect. Please refer to *Reference 1* for additional information and capacity comparisons based on anchor type and size.

A design example based on a US-sold adhesive anchor product that has completed third-party testing with both the previous version of ACI 355.4 and the new 2024 version has been developed to provide a US-product based data point. Please refer to the attached document "ASPC 1 vs ASPC 2 – Design Example" for this information.

b. **Increased costs:** This reduced anchor capacity will result in increased costs of anchorage construction, due to both a reduced supply of available anchors that meet the new requirements, and a need to install larger, longer, and/or a higher quantity of anchors compared to what would be required under current qualification standards.

c. **Impact on current design practices:** The reduction in the capacity of anchors that have been successfully used for years will require designers to revise existing anchor solutions due to the overly conservative qualifications. In some cases, the new solutions may be impractical or inappropriate due to other design and construction constraints.

4. A 3-tiered system has not been adopted in the U.S.: While a 3-tiered approach including this more conservative testing regime was proposed to the ASCE 7-22 Seismic Subcommittee last cycle, the ASCE 7-22 standard only references existing seismic qualification and design standards (namely ACI 355.2-19 and ACI 318-19) that align with ASPC1 level qualification testing. There are ongoing efforts within the ASCE 7 standard committee and the ACI 318 standard committee to potentially adopt a tiered approach in the future.

5. The ACI 355 standards are referenced in ACI 318. Since these new test requirements are located in standards that were part of ACI 318-25 by reference only, the full ACI 318 committee may not have considered the effects that the revisions to the newly published ACI 355 standards would have on the industry, and how they might need to be coordinated with the existing seismic requirements for concrete anchorage design within Chapter 17 of ACI 318. Due to the late publication of the ACI 355 standards, there was not adequate time for the ACI 318-25 committee to deliberate on these matters, and as such, the design assumptions within ACI 318 are not currently aligned with the 2024 versions of the ACI 355 testing standards. Notably, the public comment draft of ACI 318-25 referenced ACI 355.2-19 and ACI 355.4-19, not the 2024 version of the ACI 355 standards. Ultimately, the 2024 versions of the ACI 355 standards were incorporated by reference into ACI 318-25 after the public comment window closed.

6. The requirements are not based on real-world observations. Oftentimes, building code changes typically occur due to examples of failures in the field, or when recurring substandard conditions are found in the industry. The proponents are not aware of real-world failures of currently qualified, properly installed anchors that would justify the need for these new severe qualification requirements.

In summary, the implementation of the severe seismic testing regime within the 2024 versions of the ACI 355 standards is unnecessarily conservative and is not implemented in a way that is compatible with other design standards that are referenced in the building code. It is strongly recommended to keep the seismic qualification of post-installed concrete anchors the same as it currently is today, to allow time for a rational and compatible 3-tiered approach to be developed, that will apply the highest level of testing only where necessary, as well as be calibrated to the design assumptions within ACI 318 and ASCE 7, in a future version of the building code. As a practical matter in the short term, since this building code amends the 2024 International Building Code (IBC) by adopting ACI 318-25 by reference instead of ACI 318-19 (which is the ACI 318 version referenced in the 2024 IBC), the changes imposed by this new seismic qualification criteria will affect construction in the state of Georgia prior to most other states in the country; and there are currently very few, if any, post-installed anchor products being sold in the US market that have this qualification and certification at this time.

Bibliography:

1. Philipp Mahrenholtz, Richard L. Wood, *European Seismic Performance Categories C1 and C2 for Post-Installed Anchors*, ACI Structural Journal, Volume 117, Issue 6 (2020). 10.14359/51728071. https://www.concrete.org/publications/internationalconcreteabstractsportal/m/details/id/51728071

2. Philipp Mahrenholtz, Richard L. Wood, Rolf Eligehausen, Tara C. Hutchinson, Matthew S. Hoehler, *Development and validation of European guidelines for seismic qualification of post-installed anchors*, Engineering Structures, Volume 148 (2017). ISSN 0141-0296. https://pmc.ncbi.nlm.nih.gov/articles/PMC5714297/

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

If this amendment is not approved, costs of post-installed anchor solutions within Seismic Design Category C and above will increase significantly. If this amendment is approved, costs will remain the same as previous versions of the code; but since this proposal prevents an otherwise increase in costs, the proponents consider this proposed amendment to result in a cost decrease ($0 minimum decrease).

A design example was performed using a 1/2" diameter adhesive anchor in 5000 psi concrete, having a tension load of 6500 lbs and a shear load in one direction of 1000 lbs. In this case the 1/2" anchor would require an embedment of 8" under current seismic qualification. Under the new qualification requirements that are imposed by ACI 318-25 and its reference to the new 2024 versions of the ACI 355 testing standards, the 1/2" anchor with 8" embedment would be overstressed by 300%, and instead a 3/4" anchor with 5.25" embedment would be required to achieve the same capacity. This will require a 100% increase in adhesive volume for the larger diameter anchor, along with a 60% increase in steel threaded rod material. If this amendment is not approved, additional labor (installed) costs and construction time will also apply in most cases, due to a combination of larger holes and/or deeper embedment depths to drill, or an increase in the quantity of anchors required to achieve sufficient design capacity. Additionally, refer to the Design Example attached to this proposal for further details and information.

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: __________________ (DCA USE ONLY) PAGE ______ OF ______

CODE: ______________________________ SECTION: ______________________________

PROPONENT: Andrey Perevalov DATE: 03.12.2025

EMAIL: vus5015@yahoo.com

ADDRESS: Canada, 3590 Kaneff Cress, Mississauga

TELEPHONE NUMBER: 416 553-6018 FAX NUMBER: ( ) -

CHECK ONE:

☐ ~~Revise section to read as follows:~~

x☐ Add new section to read as follows:

☐ ~~Delete section and substitute the following:~~

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☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:

Proposal for Radioactivity Regulation Chapter in Georgia Building Code

REASON/INTENT:

Many developed countries have already recognized the importance of this issue and have implemented relevant standards and guidelines. These regulations often focus on building materials derived from mineral components, which may contain naturally occurring radioactive materials (NORM). For example, the European Commission's Radiation Protection Report 112 (RP-112), Israeli Standard SI 5098, and the Finnish Radiation and Nuclear Safety Authority's Guide ST 12.2 offer structured approaches for evaluating and limiting radionuclide concentrations in construction materials.

Unfortunately, Georgia currently lacks equivalent regulations at both the federal and provincial levels. There are no provisions specifically addressing the assessment of radioactivity in buildings or the content of natural radionuclides in construction materials, despite well-documented health risks associated with prolonged exposure to radiation—particularly radon gas.

I strongly believe that the Georgia Building Code should include a dedicated section to regulate this issue. This new chapter should outline:

- Measurement protocols
- Acceptable exposure limits
- Guidance on material selection and building design

to ensure public health and safety in the built environment.

This chapter should consist of three essential components:

1. Radon gas concentration in buildings, particularly public facilities such as schools and hospitals.
2. Overall radioactivity level control in buildings.
3. Limits on natural radionuclides content in building materials.

While the first component—radon gas concentration—is partially addressed through EPA guidelines (which recommend a maximum indoor level of 200 Bq/m³), the second and third components remain entirely unregulated under the current Georgia Building Code.

Addressing these gaps is crucial for aligning Georgia with international best practices and ensuring the long-term health of building occupants.

In the past, while working at the National Building Research Institute in Israel, I had the opportunity to contribute to the development of Israel's national standard addressing radioactivity in building materials. Drawing on that experience, I would be pleased to offer my expertise and actively participate in the creation and development of a similar standard—or a dedicated chapter within the Georgia Building Code—to help ensure safe and healthy building practices across Georgia.

This issue is important, as a potential accident could have serious consequences. Hypothetically, if an incident were to occur (as outlined in my previous submission) and the radioactivity level in a building exceeded internationally accepted limits, residents or owners could seek legal action against the builder. Without specific regulations in the Georgia Building Code, the builder could deny responsibility, leaving residents or owners with no choice but to escalate claims to the government.

I would like to explain my concern regarding the absence of radioactivity monitoring requirements in the Georgia Building Code throughout the construction process.

While many countries have established regulatory frameworks to detect and limit radioactive contamination in construction materials and completed structures—often developed in response to serious incidents—Georgia currently lacks a comprehensive standard or guideline to address this important public safety issue.

To underscore the significance of this gap, I have included three well-documented international cases from my research that clearly demonstrate the urgent need to implement radioactivity monitoring standards within the Georgia Building Code.

1982, Taiwan. Between 1982 and 1984, radioactive steel previously used in a nuclear reactor was inadvertently recycled and used in the construction of apartment buildings and shops in northern Taiwan (Taipei). The contaminated material contained Cobalt-60 (^60Co), a radioactive isotope. As a result, over 2,000 residential and commercial units were affected.

An estimated 6,242 to 7,271 individuals (figures vary by source) are believed to have been exposed to long-term, low-level radiation. The average excess cumulative equivalent dose received by the affected population was approximately 47.8 mSv, with reported doses ranging from less than 1 mSv to as high as 2,363 mSv.

((Hwang, et al., 2009)), ((Hwang, et al., 2008)).

Hwang, S.-L., Guo, H.-R., Hsieh, W.-A., Hwang, J.-S., Lee, S.-D., Tang, J.-L., et al. (2009, July 03). "Cancer risks in a population with prolonged low dose-rate gamma-radiation exposure in radiocontaminated buildings, 1983-2002". *International Journal of Radiation Biology.* , 82 (12): 849–58.

Hwang, S.-L., Hwang, J.-S., Yang, Y.-T., Hsieh, W. A., Chang, T.-C., Guo, H.-R., et al. (2008, August). Estimates of Relative Risks for Cancers in a Population after Prolonged Low-Dose-Rate Radiation Exposure: A Follow-up Assessment from 1983 to 2005. *Radiation Research.*, 170 (2): 143–148.

1983, Ciudad Juárez, Mexico. A serious radiation contamination incident occurred when a hospital, unable to afford continued use of its teletherapy unit, transferred the equipment to a commercial storage facility without properly indicating the associated radiation hazards. A junior hospital staff member, unaware of the danger, dismantled the unit and removed its Cobalt-60 (^60Co) source, which contained approximately 6,000 radioactive pellets.

The source, with an estimated activity of 300 Ci (11,100 GBq), was subsequently sold to a scrap yard. Each pellet, sealed in a small capsule, was capable of delivering an absorbed dose of 25 rad/h (0.25 Gy/h). The pellets were scattered widely, as the contaminated scrap metal was moved by cranes and mixed with other metals. This material was then unknowingly delivered to two foundries in Mexico, where it was used to produce steel rods for the construction industry.

Before the contamination was discovered, approximately 4,500,000 kg of steel rods had been produced and over 600,000 kg of contaminated steel was shipped to the United States. The incident only came to light months later, when a truck carrying contaminated tables triggered radiation monitors at the Los Alamos Nuclear Center.

To grasp the magnitude of the disaster:

An aerial radiation survey of 470 km² had to be conducted.

17,636 buildings were inspected for radioactive contamination.

814 buildings were found to be significantly contaminated with ^60Co and were partially or entirely demolished.

Approximately 4,000 individuals were exposed to elevated levels of radiation from this non-natural radioactive source.

MINISTERIO DE ENERGIA Y MINAS.(1984). Accidente de contaminación con 60Co. COMISION NACIONAL DE SEGURIDAD NUCLEAR Y SALVAGUARDIAS, Mexico. CNSN-IT-001.

1989, Kramatorsk, Ukraine. A small capsule containing highly radioactive Cesium-137 (^137Cs) was discovered embedded in a concrete wall of an apartment building in Kramatorsk, in the former Ukrainian SSR. The capsule was likely part of a measurement device, possibly a level gauge, and had an estimated gamma radiation dose rate of 18 Gy/year at its surface.

It is believed that the capsule was lost in the late 1970s and inadvertently mixed with raw materials used in the production of concrete panels. One of these contaminated panels was later installed in a residential building during the early 1980s.

By the time the source was discovered, six residents had died from leukemia, and seventeen others had received varying doses of radiation exposure. The incident remains one of the most tragic examples of orphan radioactive sources causing severe and unintentional harm in civilian settings.

(Makarovska, O. (2005). "Overview of radiological accidents involving orphan radioactive sources of ionizing radiation worldwide". Kyiv. SECURITY AND NONPROLIFERATION(ISUUE 2(8)), p.18. Available from http://www.ntc.kiev.ua/download/arh/BTN/8.pdf [accessed 25 November 2016]).

In most documented cases involving orphan radioactive sources—defined as radioactive sources that are no longer under regulatory control, either because they were never regulated or have been lost, stolen, abandoned, or otherwise separated from authorized oversight—contamination has been detected at the scrap yard stage or during transport to foundries.

However, there is no comprehensive data on how many orphan sources may have gone undetected and been melted into steel products worldwide. This uncertainty is largely due to the fact that not all foundries are equipped with radiation monitors capable of detecting gamma-emitting radionuclides in incoming scrap metal.

30 cases of radioactive sources accidentally melted in metal making mills have been reported in the US since 1983.

As the use of radioactive materials continues to expand across industrial, mining, agricultural, and medical sectors, the risk of such incidents is expected to rise.

In response to past accidents, some countries have implemented multilevel monitoring systems to detect and prevent radioactive contamination throughout the construction process. These systems are designed to protect the public from harmful radiation exposure and typically include:

- Limits on radioactivity levels in raw construction materials
- Regulations defining maximum allowable radiation levels in newly built structures
- Mandatory screening of imported metal products for radioactive contamination

Such standards serve as critical safeguards to prevent radioactive materials from unintentionally entering the construction supply chain and posing risks to human health and safety.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

Implementation of this chapter will entail certain financial expenditures—primarily periodic testing of building materials during construction—by building companies. However, these measures will safeguard both the companies and the government from liability in the event of any incident involving elevated levels of radioactivity in newly constructed buildings.

GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM INSTRUCTION SHEET

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Atlanta, Georgia 30329-2231