ICCPC

2022 GROUP B PROPOSED CHANGES TO THE I-CODES ROCHESTER COMMITTEE ACTION HEARINGS

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ICC INTERNATIONAL CODE COUNCIL®

2021-2022 Code Development Cycle, Group B (2022) Proposed Changes to the 2021 *International Codes*

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ICCPC Code Change Proposals

The following code change proposals are labeled as Performance code change proposals because they are proposals for changes to sections in chapters of the International Code Council Performance Code that are designated as the responsibility of the ICCPC Development Committee (see page xii of the Introductory pages of this monograph). However the changes included in this Group B code development cycle are to sections of the code that have been prefaced with a [S], meaning that they are the responsibility of a different IBC Code Development Committee—IBC-Structural Committee [S].

The committee assigned for each code change proposal is indicated in a banner statement near the beginning of the proposal.

PC1-22

ICCPC: [BS] 501.3, [BS] 501.3.4

Proponents: David Collins, representing Self (dcollins@preview-group.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3 Performance requirements. Minimum design loads and forces shall be equal to, or greater than the design loads and forces determined in accordance with ASCE 7 unless substantiated by other approved methods outlined in this code.

[BS] 501.3.4 Expected loads. Structures, or portions thereof, shall be designed and constructed taking into account expected loads, and combination of loads, associated with the event(s) magnitude(s) that would affect their performance, including, but not limited to:

1. Dead loads.
2. Live loads.
3. Impact loads.
4. Explosion loads.
5. Soil and hydrostatic pressure loads.
6. Flood loads (mean return period).

    6.1 Small: 100 years

    6.2 Medium: 500 years

    6.3 Large: Determined on a site-specific basis

    6.4 Very Large: Determined on a site-specific basis

7. Wind loads (mean return period).

    7.1 Small: 300 years

    7.2 Medium: 700 years

    7.3 Large: 1700 years

    7.4 Very Large: 3000 years

8. Windborne debris loads.
9. Snow loads (mean return period).

    9.1 Small: 25 years

    9.2 Medium: 50 years

    9.3 Large: 100 years

    9.4 Very Large: 500 years

    Snow loads shall Include but not be limited to consideration for drifting, unbalanced loads, impact loads and ice damming.

10. Rain loads. See Table 501.3.4.

11. Earthquake loads.

    11.1 Small: 43 years (mean return period)

    11.2 Medium: 72 years (mean return period)

    11.3 Large: Two-thirds of the intensity of very large loads

    11.4 Very large: The Risk-Targeted Maximum Considered Earthquake defined in Chapter 21 of ASCE 7.

12. Ice loads, atmospheric icing (mean return period).

    12.1 Small: 25 years

    12.2 Medium: 50 years

    12.3 Large: 100 years

    12.4 Very Large: 200 years

13. Hail loads.

14. Thermal loads.

15. Loads due to Coastal Storm Surges and Tsunamis.

Reason Statement: In 1998, the president of the AIA established a Blue Ribbon Panel to examine the future of the architectural profession and its relationship to codes and standards as part of AIA's public policies.
We stand for protecting communities from the impact of climate change. Global warming and man-made hazards pose an increasing threat to the safety of the public and the vitality of our nation. Rising sea levels and devastating natural disasters result in unacceptable losses of life and property. Resilient and adaptable buildings are a community's fires line of defense against disasters and changing conditions of life and property. This is why we advocate for robust building codes and policies that make our communities more resilient.

A key finding of the Blue Ribbon Panel was the need to direct the architect's practices toward higher performing buildings, while meeting and exceeding the standards adopted in our communities. AIA's 2019 and 2020 Codes and Standards Committee began that effort by reviewing the ICC's Performance Building Code that has remained largely unchanged since its initial publication in 2003.

This effort has led to the development of a series of changes intended to improve the usefulness of the International Code Council Performance Code for Buildings and Facilities (ICCPC). Many of these changes are proposed to clarify and coordinate the ICCPC with the family of I-Codes that have been advanced since the initial effort to create this performance based code. Some findings are best addressed in the guide for the use of the ICCPC. AIA has already reached out to the ICC staff to facilitate that effort following the completion of these code change.

A significant part of the proposed changes in Group A consolidate various requirements on the same subject that are currently located in different parts of the code for no apparent reason. Doing so left some things unsaid in one part that are stated in another without reference. Design and evaluation of performance designs and the disparate elements of a building aren't done independently, but are a part of a comprehensive examination of the involved systems and materials associated with the design. In the Group A hearings we submitted Code Changes PC1, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17 and PC18 that were all approved.

In addition, ICC's Board of Directors has authorized a study currently being performed by Bryan Meachum, Ph.D., P.E. (CT&MA), CEng. (UK), EUR ING, FIFireE, FSFPE, to evaluate the future of the ICCPC. To date the results appear encouraging. To that end we have prepared a series of changes that take the next step in Group B changes to improve the code for all to use.

This change is proposed to continue the effort to make the Performance Code better.

As a baseline calculation for structural design using the ASCE 7 is the focus of the IBC and should be referenced here as well. In Section 501.3.4, expected loads are listed and should be modified as follows: Section 501.3.4 of the ICCPC addresses expected loads that a structure may be subjected to. Item 9 specifies snow loads. By this change the snow loads are expanded to include snow drifting, unbalanced snow loads, impact loads from falling or sliding snow or ice, loads from ice damming, etc. More damage is caused by those items than from the basic snow load itself. Also Item 15 is being added to include loads due to coastal storm surges and tsunamis, which are not currently addressed in the ICCPC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Any design for structural loads should consider these specific aspects of snow loads. Inclusion of coastal storm or tsunami exposure should be included as well. No additional cost would be incurred by providing the additional direction.

PC2-22

ICCPC: [BS] 501.3.5

Proponents: Robert Pekelnicky, representing FEMA Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3.5 ~~Safety factors~~ Target Reliabilities. The design of buildings and structures shall consider appropriate factors of safety to provide ~~adequate performance from~~ the target reliabilities stipulated in Chapter 1 of ASCE 7 considering:

1. Effects of uncertainties resulting from construction activities.
2. Variation in the properties of materials and the characteristics of the site.
3. Accuracy limitations inherent in the methods used to predict the stability of the building.
4. Self-straining forces arising from differential settlements of foundations and from restrained dimensional changes due to temperature, moisture, shrinkage, creep and similar effects.
5. Uncertainties in the determination of the expected loads.

Reason Statement: The current provision does not specify a quantitative factor of safety, instead providing an unenforceable statement on “adequate performance.” Furthermore, the term factor of safety is out of date with current strength design which uses different load and resistance factors to adjust the demand and capacity to achieve a specific reliability of not failing. By referencing the target reliabilities in Chapter 1 of ASCE 7, this creates a quantitative mechanism to affirm a performance-based design is providing the minimum performance of the IBC and the structural engineering standards referenced therein.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this change is simply providing quantitative metrics to establish the same performance as the prescriptive standards referenced in IBC, there should be no cost impact of the change. Correlating these aspects of the two codes may actually reduce cost due to misunderstanding or misapplication of the codes.

PC3-22

ICCPC: [BS] 501.3.5

Proponents: Robert Pekelnicky, representing FEMA Seismic Code Support Committee (rpekelnicky@degenkolb.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 501.3.5 Safety factors. The design of buildings and structures shall consider appropriate factors of safety to provide adequate performance from:

1. Effects of uncertainties resulting from construction activities.
2. Variation in the properties of materials and the characteristics of the site.
3. Accuracy and limitations inherent in the methods used to predict the stability of the building , load effects and capacities of members and their connections.
4. Self-straining forces arising from differential settlements of foundations and from restrained dimensional changes due to temperature, moisture, shrinkage, creep and similar effects.
5. Uncertainties in the determination of the expected loads.
6. The level of quality control and quality assurance in construction.

Reason Statement: The proposal lists two addition places where variability occurs that the IBC referenced structural standards consider when developing their load and resistance factors or safety factors to achieve the intended performance. The level of quality control is taken into account in several ways in the standards, by specifying a maximum construction tolerances, quality assurance and quality control provisions, and as a consideration in determining the resistance factors. Since the performance standard is intended to operate without the need for additional standards, it is important that the design professional executing a performance-based design think about how design and construction quality assurance may impact the reliability of their design.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this change is simply identifying sources of variability that are considered by the prescriptive standards, consideration of these items in a performance-based design should not result in an increase in construction cost.

PC4-22

ICCPC: [BS] 902.1, [BS] 902.3.1, [BS] 902.3.2, [BS] 902.3.3, [BS] 902.3.4

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 902.1 Objective. To safeguard people from injury and ~~property~~ to protect the building, facilities, equipment, processes materials, and contents from damage that could result from external moisture entering the building.

[BS] 902.3.1 Water penetration. Roofs and exterior walls shall prevent the ~~penetration of water that could cause damage to building elements~~ unwanted penetration and accumulation of moisture or water that causes damage to the building, facilities, equipment, processes, materials, or contents and shall provide a means for any unwanted penetration of water or moisture to dissipate.

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[BS] 902.3.2 Building elements in contact with the ground. Walls, floors and structural support elements in contact with the ground shall not absorb or transmit moisture in quantities that could cause damage to the building ~~elements~~ facilities, equipment, processes, materials, or contents.

[BS] 902.3.3 Concealed spaces and cavities. Concealed spaces and cavities in buildings or facilities shall be constructed in a way that prevents ~~external moisture from causing degradation of building elements~~ unwanted penetration and accumulation of moisture or water that causes damage to the building, facilities, equipment, processes, materials, or contents and shall provide a means for any unwanted penetration of water or moisture to dissipate without causing damage.

[BS] 902.3.4 Moisture during construction. Excess moisture present at the completion of construction shall be capable of being dissipated without permanent damage to building elements.

Reason Statement: To expand the required safeguards to the equipment, processes, materials, and contents of the building because these elements of the building are interconnected with the building itself and the performance of the building.

Bibliography: U.S. Environmental Protection Agency (2013). "Moisture Control Guidance for Building Design, Construction and Maintenance." EPA 402-F-13053. Accessed January 4, 2022. https://www.epa.gov/sites/default/files/2014-08/documents/moisture-control.pdf.

Cost Impact: The code change proposal will increase the cost of construction
The broad nature of the existing content in this section could be interpreted to not include some features of the building. The more precise language proposed here addresses building features that may not have been included previously under the original requirement and thus may have a modest cost increase.

Whether or not this requirement influences the cost of construction, the application of this requirement should influence operation and maintenance costs once the building is occupied. By establishing a scope to include not only the building but also the facilities to deliberately prevent damage to it and equipment, processes, materials, or contents within them, will not be an additional cost of business within the facilities due to external moisture. According to the U.S. EPA, unwanted external moisture can cause any number of problems and costs, when not prevented. EPA's *Moisture Control Guidance for Building Design, Construction and Maintenance* provides information regarding health impacts from dampness in buildings, the damage moisture can cause to the building, and guidance to avoid them.

PC5-22

ICCPC: [BS] 903.1

Proponents: David Collins, representing Self (dcollins@preview-group.com); Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 903.1 Objective. To safeguard people against illness or injury and to protect the building, facilities, equipment, processes, materials, and contents from damage that could result from accumulation of internal moisture, and to protect an occupancy from damage caused by free -flowing water from another occupancy in the same building or facility. Each occupancy shall be evaluated as to the types of illness or injury they need to be protected from and the level of contaminants that will be allowed.

Reason Statement: This change will expand the required safeguards to the equipment, processes, materials, and contents of the building because these elements of the building are interconnected with the building itself and the performance of the building. Each occupancy group has its own type of occupant. I-2 Occupancy Groups have very different occupants than, say, a typical B Occupancy Group. Therefore, the use of the space should determine the types of illnesses or injuries that the occupants should be protected from, as some may be more serious than others based on the occupant group.

Bibliography: National Institute for Occupational Safety and Health (2013). "Indoor Environmental Quality: Dampness and Mold in Buildings." Accessed January 4, 2022. https://www.cdc.gov/niosh/topics/indoorenv/mold.html.

Cost Impact: The code change proposal will increase the cost of construction
The broad nature of the existing content in this section could be interpreted to not include some features of the building. The more precise language proposed here addresses building features that may not have been included previously under the original requirement and thus may have a modest cost increase. Whether or not this requirement influences the cost of construction, the application of this requirement should influence operation, maintenance, and health insurance costs once the building is occupied.

The National Institute for Occupational Health and Safety (NIOSH) states in its "Dampness and Mold Assessment Tool for Schools and General Buildings":

The health of those who live, attend school, or work in damp buildings has been a growing concern through the years due to a broad range of reported building-related symptoms and illnesses. Research has found that people who spend time in damp buildings are more likely to report health problems such as these:

- Respiratory symptoms (such as in nose, throat, lungs)
- Development or worsening of asthma
- Hypersensitivity pneumonitis (a rare lung disease caused by an immune system response to repeated inhalation of sensitizing substances such as bacteria, fungi, organic dusts, and chemicals)
- Respiratory infections
- Allergic rhinitis (often called “hay fever”)
- Bronchitis
- Eczema

Not only are building occupants affected by moisture and dampness, but the durability of the building structure itself can be seriously affected by moisture within the building. The IBC, IMC, IECC, and other I-Codes recognize the potential cost impact of poor designs for moisture management can have, the ICCPC should do no less.

PC6-22

ICCPC: [BS] 903.2

Proponents: Ronald Geren, representing The American Institute of Architects (ron@specsandcodes.com); Paul Karrer, representing The American Institute of Architects (paulkarrer@aia.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC-STRUCTURAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Code Council Performance Code

Revise as follows:

[BS] 903.2 Functional statement. Buildings shall be constructed to avoid the likelihood of:

1. Fungal growths or the accumulation of contaminants on linings and other building elements caused by the use of water, including condensation from chilled lines.
2. Free water overflow penetrating to an adjoining occupancy.
3. Damage to building elements being caused by the use of water, including condensation from chilled lines.

Reason Statement: The previous section, Section 902, addresses external moisture, and if performance is achieved, then no water from external sources will enter the building, thus preventing fungal growth. However, Section 903, which addresses internal moisture, is concerned with issues created by free water from within the building. Since "free water" is not defined, it could be interpreted to mean water that is leaking from sources within the building, such as plumbing piping, fixtures, and equipment. However, water can be also be created by condensation without a single leak within the building. Water from condensation can create as much damage as a leak.

Cost Impact: The code change proposal will increase the cost of construction
This requirement would require some additional insulation around piping that would create surface temperatures at or below the dew point. Designers would obviously include insulation around chilled supply lines, but some waste lines may not be considered. The cost of insulation to protect these additional lines would be negligible compared to the overall cost of a construction project. The added insulation, which is a relatively low cost material, is much less expensive than retrofitting insulation and repair or replacement of damaged materials.