

IRC - Building



2022 GROUP B PUBLIC COMMENT AGENDA

SEPTEMBER 14 - 21, 2022

KENTUCKY INTERNATIONAL CONVENTION CENTER
LOUISVILLE, KY

2022 Public Comment Agenda

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Proposed Change as Submitted

Proponents: Sue Coffman, representing Washington Association of Building Officials Technical Code Development Committee (sue.coffman@cityoftacoma.org); Hoyt Jeter, representing WABO TCD (hjeter@cityoftacoma.org); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2021 International Residential Code

Revise as follows:

R102.7.1 Additions, alterations or repairs or relocations. ~~Additions, alterations or repairs~~ to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. ~~Additions, alterations, repairs~~ and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the existing building or structure was prior to the ~~addition, alteration or repair~~ or relocation. An existing building together with its ~~additions~~ shall comply with the height limits of this code. ~~Where the alteration causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the International Existing Building Code shall apply.~~

Add new text as follows:

R102.7.2 Repairs, renovations, alterations, or reconstructions. Repairs, renovations, alterations, or reconstructions shall conform to the requirements of the provisions of Chapter 44. Where the renovation, alteration, or reconstruction causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the International Existing Building Code shall apply.

Revise as follows:

[RB] ALTERATION. Any construction, reconfiguration, retrofit or renovation to an existing structure other than *repair* or *addition* that requires a *permit*. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves ~~an~~ a reconfiguration or extension, addition, installation, or change to the equipment or arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

CATEGORIES OF WORK. The nature and extent of construction work undertaken in an existing building, which include repair, renovation, alteration, and reconstruction.

DANGEROUS. Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

MATERIALS AND METHODS REQUIREMENTS. Those requirements in this code that specify material standards; details of installation and connection; joints, penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.

RECONSTRUCTION. The reconfiguration of a space that affects an exit, a renovation or alteration where the work area is not permitted to be occupied because existing means-of-egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive alterations.

REHABILITATION. Any repair, renovation, alteration or reconstruction work undertaken in an existing building.

RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are considered refinishing for the purposes of this definition, and are not renovation.

Revise as follows:

[RB] REPAIR. The reconstruction, replacement, patching, restoration, minor replacement, or renewal of any part materials, elements, components, equipment, or fixtures of an existing building for the purpose of its maintenance, maintaining those materials, elements, components, equipment, or fixtures in good or sound condition, or to correct damage.
For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

WORK AREA. That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended

work must be performed, and portions of the building where work not initially intended by the owner is specifically required by the provisions for the renovation, alteration or reconstruction.

Add new text as follows:

CHAPTER 44 **EXISTING BUILDINGS AND STRUCTURES**

SECTION R4401 **SCOPE**

R4401.1 General. The specific provisions in this chapter shall apply to the repair, renovation, alteration, and reconstruction of existing buildings and structures. These standards shall apply where construction does not fully comply with construction standards in this code for new construction.

SECTION R4402 **CATEGORIES OF WORK**

R4402.1 General. Work in existing buildings and structures shall be categorized as repair, renovation, alteration, and reconstruction, and comply with the requirements in this chapter.

Work of more than one category shall be part of a single work project and related work permitted within a 12-month period shall be considered a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.

SECTION R4403 **COMPLIANCE**

R4403.1 General. Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously approved alternative arrangements than it was before the work was undertaken.

R4403.2 Requirements by category of work. Repairs shall conform with the requirements in Section R4405. Renovations shall conform to the requirements of Section R4406. Alterations shall conform to the requirements of Section 4407 and the requirements for renovations. Reconstructions shall conform to the requirements of Section R4408 and the requirements of alterations and renovations.

R4403.3 Smoke alarms. Regardless of the category of work, smoke alarms shall be provided where required by Section R314.2.2.

R4403.4 Replacement windows. Regardless of the category of work, where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections R4403.4.1 through R4403.4.3, as applicable.

R4403.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

R4403.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

R4403.4.3 Replacement windows for emergency escape and rescue openings. Replacement windows for emergency escape and rescue openings shall comply with Section R310.5.

4403.4.4 Window control devices. Window opening control devices and fall prevention devices shall be installed compliant with the requirements in R312.2 where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
 - 2.1 The window replacement includes replacement of the sash and the frame.
 - 2.2. The window replacement includes the sash only when the existing frame remains.
3. The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere where the window is in its largest opened position.
5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

R4403.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of Section R105.3.1.1.

R4403.6 Features exceeding code requirements. Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.

SECTION R4404 **EVALUATION OF AN EXISTING BUILDING**

R4404.1 General. The building official shall have authority to require an existing building to be investigated and evaluated by a registered design professional in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
 - 1.1. Field surveys.
 - 1.2. Tests (nondestructive and destructive).
 - 1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing and extensive reconstruction shall not be required to be evaluated.

SECTION R4405 **REPAIRS**

R4405.1 Materials and methods. Except as otherwise required herein, repairs shall be done using like materials or methods permitted by this code for new construction.

R4405.1.1 Hazardous materials. Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

R4405.1.2 Plumbing materials and supplies. The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless listed for the specific application.
2. Flexible traps and tailpieces, unless listed for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

R4405.2 Water closets. Where any water closet is replaced with a newly manufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

R4405.3 Electrical. Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted.

Exceptions:

1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.
2. Plug fuses of the Edison-base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.
3. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.

R4405.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

SECTION R4406 **RENOVATIONS**

R4406.1 Materials and methods. Except as otherwise required herein, renovations shall comply with the materials and methods requirements of this code for new construction.

R4406.2 Door and window dimensions. Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

R4406.3 Interior finish. Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

R4406.4 Structural. Unreinforced masonry buildings located in Seismic Design Category D2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing permit is issued. Such parapet bracing and wall anchors shall be of an approved design.

SECTION R4407

ALTERATIONS

R4407.1 Newly constructed elements. Newly constructed elements, components and systems shall comply with the requirements of this code for new construction.

Exceptions:

1. Added openable windows are not required to comply with the light and ventilation requirements of Section R303.
2. Newly installed electrical equipment shall comply with the requirements of Section 4508.5

R4407.2 Nonconformities. Alterations shall not increase the extent of noncompliance with the requirements of Section 4408 or create nonconformity to those requirements that did not previously exist.

R4407.3 Extensive alterations. Where the total area of all of the work areas included in an alteration exceeds 50 percent of the area of the dwelling unit, the work shall be considered to be a reconstruction and shall comply with the requirements of Section 4408.

Exception: Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

R4407.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code for new construction.

R4407.5 Electrical equipment and wiring. Electrical equipment and wiring in alterations shall comply with Sections R4407.5.1 through R4407.5.5.

R4407.5.1 Materials and methods. Newly installed electrical equipment and wiring relating to work done in any work area shall comply with the materials and methods requirements of Chapters 34 through 43.

Exception: Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

R4407.5.2 Electrical service. Service to the dwelling unit shall not be less than 100 ampere, three-wire capacity and service equipment shall be dead front having no live parts exposed that could allow accidental contact. Type "S" fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

R4407.5.3 Additional electrical requirements. Where the work area includes any of the following areas within a dwelling unit, the requirements of Sections R4407.5.3.1 through R4407.5.3.5 shall apply.

R4407.5.3.1 Enclosed areas. Enclosed areas other than closets, kitchens, basements, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

R4407.5.3.2 Kitchen and laundry areas. Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

R4407.5.3.3 Ground-fault circuit interruption. Ground-fault circuit interruption shall be provided on newly installed receptacle outlets where required by Chapters 34 through 43.

R4407.5.3.4 Lighting outlets. Not less than one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and basements where these spaces are used for storage or contain equipment requiring service.

R4407.5.3.5 Clearance. Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

R4407.6 Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with ventilation in accordance with Section R303.

R4407.7 Ceiling height. Habitable spaces created in existing basements shall have ceiling heights of not less than 6 foot 8 inches (2032mm), except that the ceiling height at obstructions shall be not less than 6 foot 4 inches (1930 mm) from the basement or attic floor. Existing finished ceiling heights in nonhabitable basements shall not be reduced.

R4407.8 Stairs. Except as noted otherwise herein, stairs shall comply with the requirements of Section R311.

R4407.8.1 Stair width. Existing basement stairs and handrails not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing handrails.

R4407.8.2 Stair headroom. Headroom height on existing basement stairs being altered or modified shall not be reduced below the existing stairway finished headroom. Existing basement stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R4407.8.3 Stair landing. Landings serving existing basement stairs being altered or modified shall not be reduced below the existing stairway landing depth and width. Existing basement stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

SECTION R4408 **RECONSTRUCTION**

R4408.1 Materials and methods. Except as otherwise required herein, reconstruction shall be done using materials or methods permitted by this code for new construction.

R4408.2 Stairways. Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

R4408.3 Handrails. Every required exit stairway that has four or more risers, is part of the means of egress for any work area, and does not have handrails, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

R4408.4 Guards. Every open portion of a stair, landing or balcony that is more than 30 inches (762 mm) above the floor or grade below, is part of the egress path for any work area, and does not have guards, or in which the existing guards are judged to be in danger of collapsing, shall be provided with guards designed and installed in accordance with Section R312.

R4408.5 Wall and ceiling finish. The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.

R4408.6 Separation walls. Where the work area is in an attached dwelling unit, walls separating dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the dwelling unit that is part of the work area.

Revise as follows:

APPENDIX AJ **EXISTING BUILDINGS AND STRUCTURES** **(Delete all of Appendix J)**

Reason: This proposed code change deletes Appendix Chapter J of the 2021 IRC and moves most of its provisions into the body of the IRC code as a new chapter 44. Definitions from the appendix chapter are also moved into the body of the code as new definitions, or modified if the definitions already existed in the body of the code.

While there are provisions for existing buildings in the IRC, they are scattered throughout different sections of the code and it is sometimes not clear when certain sections apply. There is also a need for clarity surrounding code standards for existing IRC buildings to provide an understanding of when the International Existing Building Code applies vs individual sections within the body of the code.

This proposal consolidates standards for alterations, renovations, reconstructions and repairs into a single chapter, which is referenced in a new section in Chapter R102.7.1. By moving code requirements for existing buildings into a separate chapter within the body of the code, there are distinct requirements that can be specifically applied to the variations options for modifying an existing IRC building, including repairs, renovations, alterations, and reconstructions. This is also contrasted with additions, to which only new code standards apply and the proposed code specifically

addresses additions along with renovations in this section.

In addition to a need for consolidation and clarity of code requirements in the IRC, more reasonable standards are also needed for residential buildings that were built decades ago that potentially have windows, ceiling heights and stairs that don't comply with new code standards.

With many of these spaces potentially already being used for decades as habitable spaces by the homeowner who may not be familiar with building code requirements, the risk of allowing these spaces to be converted to legal habitable space is small. The ability to apply reasonable code standards with a reasonable level of safety gives the homeowner effective use these existing buildings without requiring major reconstruction such as raising the house above the foundation, or other expensive construction techniques that may not add any substantial level of safety to the use of the building.

These proposed provisions also increase the sustainability of our IRC building code because they allows reasonable re-use of buildings. The ability to add additional bedrooms or other habitable spaces to existing buildings enables the homeowner to maximize the use of their home within the same building footprint. This provides additional value to the home without the high cost of new construction.

Although the existing building standards in Appendix J are available as an option for any jurisdiction to adopt, it is a burden to many jurisdictions who have to petition their state building code councils or governing bodies to individually adopt it for their individual jurisdiction. Appendix chapters are therefore infrequently used and most jurisdictions, especially those without a lot capacity for code development, stick to the standard provisions of the state codes and do not adopt optional provisions such as Appendix J. There is a need for the model codes to take the leap and incorporate these requirements into the body of the code, which will therefore be adopted by the states and available to all jurisdictions.

Cost Impact: The code change proposal will decrease the cost of construction

More reasonable standards to allow for existing spaces to be compliant with code requirements will not require extensive costly alterations.

RB7-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The committee disapproved this proposal because they believed the option of using IEBC should remain. In addition, the definitions currently in Appendix J were inconsistent and conflicting with the IEBC (e.g. renovation, rehabilitation). The provisions for existing building currently into the code should be relocated to be grouped in one location. Appendix J should be updated, and then moved into the new existing building chapter. (Vote: 10-0)

RB7-22

Individual Consideration Agenda

Public Comment 1:

IRC: APPENDIX AJ, SECTION AJ106, AJ106.1, AJ110.1.1, AJ110.1.2, AJ110.1.3, AJ110.3, AJ110.2, SECTION AJ107, AJ107.1, AJ107.1.1, AJ107.1.2 (New)

Proponents: Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES SECTION AJ106 DEFINITIONS

AJ106.1 General. ~~For purposes of this appendix, the~~ The terms used in this appendix, and not provided in Chapter 2 of the *International Residential Code*, are defined as follows:

ALTERATION. ~~The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment.~~

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous: Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake aftershock or other environmental loads when such loads are imminent.

REHABILITATION. Any work, as described by the categories of work defined herein, undertaken in an *existing building*. ~~Any repair, renovation, alteration or reconstruction work undertaken in an existing building.~~

REPAIR. ~~The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.~~

WORK AREA. That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code. ~~That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the permit. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the owner is specifically required by these provisions for a renovation, alteration or reconstruction.~~

SECTION AJ107 REPAIRS

AJ107.1 Materials. Materials used during repairs shall comply with this section. ~~Except as otherwise required herein, work shall be done using like materials or materials permitted by this code for new construction.~~

AJ107.1.1 Hazardous materials- New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by this code for new construction shall be used. Like materials shall be permitted for repairs and alterations, provided that unsafe conditions are not created. ~~Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used where this code would not permit their use in buildings of similar occupancy, purpose, and location.~~

AJ107.1.2 Existing materials. Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building official to be unsafe.

Commenter's Reason: New language addressing new and existing materials has been included clarifying when new materials have to be used and when materials matching the existing materials are allowed to be used instead.

Structural definitions have been deleted where already defined in Chapter 2 of the IRC or revised to match definitions already defined in Chapter 2 of the IEBC.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

https://www.cdpassess.com/public-comment/3547/27869/files/download/3681/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx

- This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Because the main body of the code is the default resource used given the present limitations of Appendix AJ, this proposal with floor modifications and public comments will not increase the cost of construction within the IRC. This is a long overdue cleanup that begins to align the Appendix provisions with the requirements of the main body of the code as they are frequently interpreted and used in the field.

Staff Analysis: Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

Public Comment 2:

IRC: APPENDIX AJ, SECTION AJ101, AJ101.1, AJ101.2, AJ101.3, SECTION AJ102, AJ102.1, AJ102.2, AJ102.3, AJ102.3 (New), AJ102.4, AJ102.4.1, AJ102.4.2, AJ102.4.3, AJ102.4.3.1, AJ102.4.4, AJ102.5, AJ102.6, AJ102.7, AJ102.8, AJ102.9, SECTION AJ103, AJ103.1, SECTION AJ104, AJ104.1, SECTION AJ106, AJ106.1, SECTION 202, SECTION AJ107, AJ104.1 (New), AJ107.1, AJ107.1.1, AJ107.1.2, AJ107.2, AJ107.3, SECTION AJ108, AJ108.1, AJ108.2, AJ108.3, SECTION AJ109, AJ105.1 (New), AJ109.1, AJ109.2, AJ109.3, AJ109.4, AJ108.4, AJ109.5, AJ109.5.1, AJ109.5.2, AJ109.5.3, AJ109.5.3.1, AJ109.5.3.2, AJ109.5.3.3, AJ109.5.3.4, AJ109.5.3.5, AJ109.6, AJ109.7, AJ109.8, AJ109.8.1, AJ109.8.2, AJ109.8.3, AJ105.8.4 (New), AJ105.8.5 (New), AJ105.8.6 (New), SECTION AJ106 (New), AJ106.1 (New), SECTION AJ107 (New), AJ107.1 (New), SECTION AJ110, AJ110.1, AJ110.1.1, AJ110.1.2, AJ110.1.3, AJ110.2, AJ110.3, AJ110.4, SECTION AJ111, AJ111.1, TABLE AJ111.1

Proponents: Ardel Jala, representing Washington Association of Building Officials Technical Code Dev Committee (ardel.jala@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES SECTION AJ101 PURPOSE AND INTENT

AJ101.1 General. The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings and structures. ~~These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code.~~ Repairs, alterations, additions, and relocation of existing buildings and structures shall comply with the provisions of this code for new construction, except as modified by this appendix.

AJ101.2 Classification of work. ~~For purposes of this appendix, work in existing buildings shall be classified into the categories of repair, renovation, alteration and reconstruction. Specific requirements are established for each category of work in these provisions.~~

AJ101.3 Multiple categories of work. ~~Work of more than one category shall be part of a single work project. Related work permitted within a 12-month period shall be considered to be a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.~~

SECTION AJ102 COMPLIANCE

AJ102.1 General. ~~Regardless of the category of work being performed, the~~ The work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this code or to any previously approved alternative arrangements than it was before the work was undertaken.

AJ102.2 Requirements by category of work. ~~Repairs shall conform to the requirements of Section AJ107. Renovations shall conform to the requirements of Section AJ108. Alterations shall conform to the requirements of Section AJ109 and the requirements for renovations. Reconstructions shall conform to the requirements of Section AJ110 and the requirements for alterations and renovations.~~

~~AJ102.2~~ **AJ102.3 Smoke detectors alarms.** ~~Regardless of the category of work, smoke detectors~~ Smoke alarms shall be provided where required by Section R314.2.2.

AJ102.3 Carbon monoxide alarms. Carbon monoxide alarms shall be provided where required by Section R315.2.2.

~~AJ102.4 Replacement windows.~~ Where ~~Regardless of the category of work, where~~ an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections AJ102.4.1 through AJ102.4.4, as applicable.

AJ102.4.1 Energy efficiency. Replacement windows shall comply with the requirements of Chapter 11.

AJ102.4.2 Safety glazing. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

AJ102.4.3 Replacement windows for emergency escape and rescue openings. Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is not part of a change of occupancy.

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

AJ102.4.3.1 ~~Control Window opening control devices and fall protection device height.~~ ~~Emergency escape and rescue openings with window opening control devices or fall prevention devices shall be located at a height in accordance with Section R310.1.1 or at as low a height as can be installed within the existing clear opening, complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.~~

AJ102.4.4 ~~Window control devices fall protection.~~ ~~Window fall protection shall be installed in accordance with Section R312.2.~~

~~Window opening control devices or fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:~~

- ~~1. The window is operable.~~
- ~~2. One of the following applies:~~
 - ~~2.1. The window replacement includes replacement of the sash and the frame.~~
 - ~~2.2. The window replacement includes the sash only when the existing frame remains.~~
- ~~3. The bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.~~
- ~~4. The window will permit openings that will allow passage of a 4-inch diameter (102 mm) sphere where the window is in its largest opened position.~~
- ~~5. The vertical distance from the top of the sill of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).~~

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R105.3.1.1.

AJ102.6 Equivalent alternatives. Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this appendix. These provisions are not intended to prevent the use of any alternative material, alternative design or alternative method of construction not specifically prescribed herein, provided that any alternative has been deemed to be equivalent and its use authorized by the *building official*.

AJ102.7 Other alternatives. ~~Where compliance with these provisions or with this code as required by these provisions is technically infeasible or would impose disproportionate costs because of construction or dimensional difficulties, the building official shall have the authority to accept alternatives. These alternatives include materials, design features and operational features.~~

~~AJ102.7~~AJ102.8 More restrictive requirements. Buildings or systems in compliance with the requirements of this code for new construction shall not be required to comply with any more restrictive requirement of these provisions.

~~AJ102.9 Features exceeding code requirements.~~ ~~Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.~~

SECTION AJ103 PRELIMINARY MEETING

AJ103.1 General. If a building permit is required at the request of the prospective permit applicant, the *building official* or his or her designee shall meet with the prospective applicant to discuss plans for any proposed work under these provisions prior to the application for the permit. The purpose of this preliminary meeting is for the *building official* to gain an understanding of the prospective applicant's intentions for the proposed work.

and to determine, together with the prospective applicant, the specific applicability of these provisions.

SECTION AJ104 EVALUATION OF AN EXISTING BUILDING

AJ104.1 General. The ~~building official~~ shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building:
 - 1.1. Field surveys.
 - 1.2. Tests (nondestructive and destructive).
 - 1.3. Laboratory analysis.

Exception: Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

SECTION AJ103AJ106 DEFINITIONS

AJ103.1AJ106.1 General. For purposes of this appendix, the terms used are defined as follows: The terms used in this appendix, and not provided in Chapter 2 of the International Residential Code, are defined as follows:

ALTERATION. The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment

CATEGORIES OF WORK. The nature and extent of construction work undertaken in an existing building. The categories of work covered in this appendix, listed in increasing order of stringency of requirements, are *repair*, renovation, *alteration* and reconstruction.

DANGEROUS.

Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building of structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.

Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

EQUIPMENT OR FIXTURE. Any plumbing, heating, electrical, ventilating, air conditioning, refrigerating and fire protection equipment; and elevators, dumb waiters, boilers, pressure vessels, and other mechanical facilities or installations that are related to building services.

MATERIALS AND METHODS REQUIREMENTS. Those requirements in this code that specify material standards; details of installation and connection; joints; penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.

RECONSTRUCTION. The reconfiguration of a space that affects an exit, a renovation or *alteration* where the work area is not permitted to be occupied because existing means of egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive *alterations* as defined in Section AJ109.3.

REHABILITATION. Any *repair*, renovation, *alteration* or reconstruction work undertaken in an existing building.

RENOVATION. The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are not considered refinishing for purposes of this definition, and are not renovation.

REPAIR. The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.

WORK AREA. That portion of a building affected by any renovation, *alteration* or reconstruction work as initially intended by the *owner* and indicated as such in the *permit*. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the *owner* is specifically required by these provisions for a renovation,

SECTION ~~AJ104~~**AJ107** REPAIRS

~~AJ104.1~~ General. Repairs shall comply with the applicable provisions of the *International Residential Code* for new construction or as permitted by this appendix.

~~AJ104.2~~AJ107-1** Materials.** Except as otherwise required herein, repairs work shall be done using like materials or materials permitted by this code for new construction.

~~AJ104.2.1~~AJ107-1.1** Hazardous materials.** Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

~~AJ104.1.2~~AJ107-1.2** Plumbing materials and supplies.** The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless *listed* for the specific application.
2. Flexible traps and tailpieces, unless *listed* for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

~~AJ104.3~~AJ107-2** Water closets.** Where any water closet is replaced with a newly manufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

~~AJ104.4~~AJ107-3** Electrical.** Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted. shall comply with Chapters 34 through 43.

Exceptions:

- ~~1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.~~
- ~~2. Plug fuses of the Edison base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.~~
- ~~3. For replacement of nongrounding type receptacles with grounding type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.~~

SECTION **AJ108** RENOVATIONS

~~AJ108.1~~ Materials and methods. The work shall comply with the materials and methods requirements of this code.

~~AJ108.2~~ Door and window dimensions. Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

~~AJ108.3~~ Interior finish. Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

SECTION ~~AJ105~~**AJ109** ALTERATIONS

~~AJ105.1~~ General. Alterations to existing buildings shall comply with the provisions of this code for new construction, except as permitted by Sections AJ105.2 through AJ105.8. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. Alterations shall not cause the existing building to become less compliant with the provisions of this code for new construction than the existing building was prior to the work.

~~AJ105.2~~AJ109-1** Newly constructed elements.** Newly constructed elements, components and systems shall comply with the requirements of this code.

Exceptions:

1. Added operable windows are not required to comply with the light and *ventilation* requirements of Section R303.

2. Newly installed electrical equipment shall comply with the requirements of Section ~~AJ109.5~~ AJ105.5.

~~AJ105.3~~ **AJ109.2 Nonconformities.** The work shall not increase the extent of noncompliance with the requirements of Section ~~AJ110~~, or create nonconformity to those requirements that did not previously exist.

AJ109.3 Extensive alterations. Where the total area of all of the work areas included in an *alteration* exceeds 50 percent of the area of the *dwelling unit*, the work shall be considered to be a reconstruction and shall comply with the requirements of these provisions for reconstruction work.

Exception: Work areas in which the *alteration* work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

~~AJ105.4~~ **AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this appendix. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

AJ105.4.1 ~~AJ109.4~~ **Structural-Unreinforced masonry walls.** Unreinforced masonry buildings located in Seismic Design Category D₂ or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

~~AJ105.5~~ **AJ109.5 Electrical equipment and wiring.** Electrical equipment and wiring shall comply with this section.

AJ105.5.1 ~~AJ109.5.1~~ **Materials and methods.** Newly installed electrical equipment and wiring relating to work done in any work area, including in newly installed partitions and ceilings, shall comply with the materials and methods requirements of Chapters 34 through 43.

Exception: Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

AJ105.5.2 ~~AJ109.5.2~~ **Electrical service.** Service to the *dwelling unit* shall be not less than 100 ampere, three-wire capacity and service *equipment* shall be dead front having no live parts exposed that could allow accidental contact. Type "S" fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

AJ105.5.3 ~~AJ109.5.3~~ **Additional electrical requirements.** Where the work area includes any of the following areas within a *dwelling unit*, the requirements of Sections ~~AJ109.5.3.1~~ AJ105.5.3.1 through ~~AJ109.5.3.5~~ AJ105.5.3.5 shall apply.

AJ105.5.3.1 ~~AJ109.5.3.1~~ **Enclosed areas.** Enclosed areas other than closets, kitchens, *basements*, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

AJ105.5.3.2 ~~AJ109.5.3.2~~ **Kitchen and laundry areas.** Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent branch circuit.

AJ105.5.3.3 ~~AJ109.5.3.3~~ **Ground-fault circuit interruption.** Ground-fault circuit interruption shall be provided on newly installed receptacle outlets if required by Chapters 34 through 43.

AJ105.5.3.4 ~~AJ109.5.3.4~~ **Lighting outlets.** Not less than one lighting outlet controlled by a listed wall-mounted device shall be provided in every bathroom, hallway, *stairway*, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and *basements* where these spaces are used for storage or contain equipment requiring service. The wall-mounted control device shall be located near an entrance to the room.

AJ105.5.3.5 ~~AJ109.5.3.5~~ **Clearance.** Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

AJ105.6 ~~AJ109.6~~ **Ventilation.** Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with *ventilation* in accordance with Section R303.

AJ105.7 ~~AJ109.7~~ **Ceiling height.** ~~Habitable spaces created in existing basements shall have~~ Where a habitable attic or habitable space is created in an existing building, ceiling heights shall not be of not less than 6 feet, 8 inches (2032 mm). , except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the basement floor. Existing finished ceiling heights in nonhabitable spaces in basements shall not be reduced. Bathrooms, toilet rooms, and laundry rooms shall have a ceiling height of not less than 6 feet 4 inches (1930 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm), and not less than 50 percent of the required floor area shall have a ceiling height of not less than 6 feet 8 inches (2134 mm).
2. At beams, girders, ducts, or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

~~AJ105.8~~**AJ109.8 Stairs, handrails, and guards.** ~~Stairs, handrails, and guards shall comply with this section.~~

~~AJ105.8.1~~**AJ109.8.1 Stair width.** Existing *basement* stairs and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

~~AJ105.8.2~~**AJ109.8.2 Stair headroom.** Headroom height on existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

~~AJ105.8.3~~**AJ109.8.3 Stair landing.** Landings serving existing *basement* stairs being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

AJ105.8.4 Stair treads and riser. An existing stairway shall not be required to comply with Section R311.7.5 where the existing space and construction does not allow a reduction in pitch or slope. Where risers are added to an existing stair, the tread and riser dimension of the added risers shall match the existing stair.

AJ105.8.5 Stairway Illumination. Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

AJ105.8.6 Handrails and Guards. If a stair or any portion of a stair is altered, a handrail and guard, where required, shall be provided in accordance with Section R311 and R312.

SECTION AJ106

ADDITIONS

AJ106.1 General. Where the existing building with an addition is within the scope of the International Residential Code, the addition shall comply with the applicable provisions of the International Residential Code for new construction or as permitted by this appendix.

SECTION AJ107

RELOCATED BUILDINGS

AJ107.1 General. Residential buildings or structures moved into or within the jurisdiction are not required to comply with the requirements for new construction under the International Residential Code provided they comply with all of the following conditions:

1. The building shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code.
2. Any repair, alteration or change of use undertaken within the relocated structure shall comply with the requirements of this code applicable to the work being performed.
3. Any field fabricated elements shall comply with the applicable requirements of this code.

SECTION AJ110

RECONSTRUCTION

AJ110.1

Stairways, handrails and guards

AJ110.1.1 Stairways. ~~Stairways within the work area shall be provided with illumination in accordance with Section R303.7.~~

AJ110.1.2 Handrails. Every required exit *stairway* that has four or more risers, is part of the means of egress for any work area, and is not provided with not fewer than one *handrail*, or in which the existing *handrails* are judged to be in danger of collapsing, shall be provided with *handrails* designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

AJ110.1.3 Guards. Every open portion of a *stair*, landing or balcony that is more than 30 inches (762 mm) above the floor or *grade* below, is part of the egress path for any work area, and does not have *guards*, or in which the existing *guards* are judged to be in danger of collapsing, shall be provided with *guards* designed and installed in accordance with Section R312.

AJ110.2 Wall and ceiling finish. ~~The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.~~

AJ110.3 Separation walls. ~~Where the work area is in an attached dwelling unit, walls separating dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the~~

~~dwelling unit that is part of the work area.~~

~~**AJ110.4 Ceiling height.** *Habitable spaces* created in existing *basements* shall have ceiling heights of not less than 6 feet, 8 inches (2032 mm), except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~

SECTION ~~AJ111~~ AJ108

REFERENCED STANDARDS

~~**AJ111.1**~~ **AJ108.1 General.** See Table ~~AJ111.1~~ AJ108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

TABLE AJ111.1-AJ108.1 REFERENCED STANDARDS

| STANDARD ACRONYM | STANDARD NAME | SECTION HEREIN REFERENCED |
|------------------|---|---------------------------|
| ASTM F2090—17 | Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms | AJ102.4.3, AJ102.4.4 |
| IEBC—21-24 | International Existing Building Code | AJ102.6 |
| IFC - 24 | International Fire Code | AJ107.1 |
| IPMC-24 | International Property Maintenance Code | AJ107.1 |

Commenter's Reason: This public comment is being submitted in response to the direction given by the IRC-Building Committee to improve Appendix AJ before trying to move its provisions into the body of the code. To that end, we have taken many of the provisions from our originally-proposed Chapter 44 and incorporated them into Appendix AJ. Along the way, we have cleaned up the appendix by deleting unfamiliar terms in the appendix in favor of more familiar terms, clarifying the scope, and updating provisions that have not been updated since the appendix was created. This comprehensive public comment results in an appendix that is a clearer, updated, reasonable, and more usable and enforceable—and therefore, more adoptable. A clean version of the final result of RB7-22 incorporating this public comment, without strike-throughs and underlines, can be viewed via this link:

https://www.cdpaccess.com/public-comment/3211/27823/files/download/3670/RB7_WABO_clean%20%28final%29%20V2.pdf

In developing this public comment, we have collaborated with the FEMA/ATC Seismic Code Support Committee, and this public comment will work in conjunction with their code change proposals and public comments. Attached is a document showing how Appendix AJ is intended to look, if this public comment and all the SCSC proposals and public comments are approved

https://www.cdpaccess.com/public-comment/3211/27823/files/download/3671/WABO_FEMA%20Combined%20Proposals_V2.pdf

OVERVIEW

Relation of Appendix to Code:

The underlying philosophy for this public comment is that the appendix, when adopted, is to be added to the code. It is not a standalone existing buildings code. This is true of the existing appendix, despite its “deemed to comply” provision in the existing AJ101.1. Given that philosophy, the “deemed to comply” language has been deleted, since it could imply that none of the rest of the code applies—which is clearly erroneous, as we would expect items not in the appendix to be regulated by the rest of the IRC. In its place, the appendix now clearly says to comply with the IRC for new construction, except where Appendix AJ modifies those provisions. Carrying this philosophy through results in the deletion of many redundant provisions and definitions (further explanations below).

Reorganization:

This public comment deletes several unnecessary and outdated sections, as follows. Deletion of these sections results in the editorial renumbering of the subsequent sections, as shown in this public comment.

- Section AJ103 (Preliminary Meeting). This section required the building official to meet with a permit applicant, at the applicant's request. The stated purpose of the meeting is for the building official to understand the applicant's intention for the work, and for the building official and the applicant to collaborate on what's required. This requirement is unnecessary, as this is a service that a reasonable building department will provide on request. In addition, many the issues can be handled in other ways other than a meeting.
- AJ104 (Evaluation of an Existing Building). This provision that allows the building official to require an evaluation of the existing building by a registered design professional is tied to “reconstruction.” Aside from the fact that provisions relating to “reconstruction” are being deleted (see below), Section R106.1 already gives the building official this authority.
- Sections AJ108 (Renovations) and AJ110 (Reconstruction). See “Terminology and Definitions” below.

New Sections AJ106 (Additions) and AJ107 (Relocations) have been added to regulate those classifications of work.

SPECIFIC CHANGES

Purpose and Intent (AJ101):

- The scope now refers to repairs, alterations, additions and relocations, consistent with the changes described in “Terminology and Definitions” below.
- The scope also clearly states that the rest of the code applies, where it's not modified by Appendix AJ.

- Sections AJ101.2 (classification of work) and AJ101.3 (multiple categories of work) have been deleted since they are unnecessary. The text in AJ101.2 doesn't do anything. Most of AJ101.3 is clear with the new classifications of work and their definitions. Regarding the 12-month period in AJ101.3, this is something that should be covered by building department procedures and policies for each jurisdiction, and reflect how flexible they want to be. Having a set period of time unnecessarily ties the building official's hands, and encourages gaming of the system

Compliance (AJ102):

- Carbon monoxide alarms are required to be installed, consistent with Section R315.2.2 (AJ102.3).
- The sections relating to replacement EERO windows has been reorganized and modified for clarity and flexibility (AJ102.4.3). The current provisions provide a break on full compliance for replacement windows for emergency escape and rescue openings. This public comment provides flexibility for the vertical height of the window opening control devices and fall protection devices in existing openings. It also clarifies that window opening control devices and fall protection are not required when window replacement is of the glazing only. These changes are consistent with the concept approved by the Committee in RB99-22.
- Sections AJ102.7 (Other Alternatives) and AJ102.9 (Features exceeding code requirements) are deleted because they are unnecessary. AJ102.7 is covered in Chapter 1, and there are never restrictions on exceeding code requirements (AJ102.9).
- This public comment also makes editorial changes to this section, deleting unnecessary verbiage ("regardless of the category of work being performed") and updating the terminology (smoke alarms vs detectors)

Terminology and Definitions (AJ103):

The end result of the changes to the definitions is that only the additional definitions that are needed to apply the provisions of the appendix remain in Section AJ103.

- This public comment deletes the unfamiliar terms "reconstruction," "rehabilitation," and "renovation" from the definitions, along with the sections regulating them. Instead, the appendix now exclusively uses "repair," "alteration," "addition," and "relocation" to refer to the work being done on an existing building. These terms are familiar to users of the I-codes, and more closely correspond with the terms used in Section 107.2.1 of the IRC.
- Unnecessary definitions for "equipment or fixture" and "materials and methods requirements," and "rehabilitation" have been deleted. "Equipment" and "fixtures" are well understood to users of the code. Alternate materials and methods are covered in Chapter 1. "Rehabilitation" was defined, but the term is not used in either the existing appendix or the appendix as modified by this public comment.
- The definition for "dangerous" is being added since it is not defined in Chapter 2. The language is taken from the IEBC.

Repairs (AJ104):

The modifications this public comment makes to the section on repairs are editorial. The change in Section AJ104.1 from "work" to "repair" clarifies the scope of the section is about repair work, not work in general. The modification Section AJ104.3 consolidates the exceptions which required compliance with IRC Chapters 34 through 43 anyway.

Alterations (AJ105):

- New Section AJ105.1 scopes the alterations section, as well as clearly states newly-installed elements need to comply with the code for new construction. The "do no harm" provision is included as well, consistent with Section R102.7.1.
- The existing section on extensive alterations is being deleted because it referred to the deleted section on reconstruction. For further discussion of the technical changes, see the discussion on Reconstruction below.
- AJ105.4 provides a pointer to the sections regulating structural alterations. Note that other code change proposals and public comments would add further structural provisions to the appendix.
- Section AJ105.4.1 on unreinforced masonry walls has been relocated from the deleted section on renovations.
- Substantive changes to Section AJ105.5 on electrical equipment and wiring add a requirement that lighting outlets must be controlled by a wall-mounted switch, located near an entrance to the room, consistent with IRC Section E3903.2 (AJ105.5.3.4). The other changes are editorial, including the clarification that the circuit is a "branch" circuit, consistent with the definitions in IRC Section E3501.1 (AJ105.5.3.2). The exception to AJ105.5.1 isn't really an exception and still refers to the same chapters, so it has been integrated into the main charging language.
- The existing appendix permits a ceiling height of not less than 6 feet 8 inches. This public comment further extends the relief on ceiling height in existing buildings to include existing attics (AJ105.7). Bathrooms, toilet rooms and laundry rooms are allowed to have a ceiling height not less than 6 feet 4 inches, similar to a break these occupiable spaces receive in new construction (R305.1, Exception 3). The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches, consistent with the general requirement. The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction. This concept was supported by the Committee in their approval of RB82-22.
- Section AJ105.8 is expanded to include requirements for stairway illumination (AJ105.8.5) and handrails and guards at stairs (AJ105.8.6). The provision for stairway illumination is relocated from the deleted section on reconstruction. In a substantive change to the current appendix provisions, if the stair is altered, compliant handrails and guards must be installed (AJ105.8.6). This remedies an unsafe condition.

The new section on stair treads and risers (AJ105.8.4) gives a break for stair treads and risers that is consistent with a more general break for existing stairs in IEBC Section 506.3. The concept of the break was supported by the Committee in their approval of RB114-22.

Additions (AJ106):

This is a new section in this appendix. The requirement for additions to comply with new construction is consistent with the principles in Section R102.7.1 and the IEBC.

Relocations (AJ107):

This is a new section in this appendix. The provisions are consistent with how the IEBC treats moved buildings (see IEBC Section 1401.2).

Referenced Standards (AJ108):

- ASTM F2090 is stricken from Table AJ108.1. Section AJ102.4.3 is revised to refer to Section R312.2 which contains the reference to this standard within the body of the code.
- Reference to the International Existing Building Code is updated to the 2024 edition.
- Reference to the International Fire Code and to the International Property and Maintenance Code is added as reference to these codes is added in Section AJ107 Relocated Buildings.

PROVISIONS IN DELETED SECTIONS ON RENOVATIONS AND RECONSTRUCTION

Renovations:

All of the sections in the section on renovations have been deleted without relocating them. The sections on materials and methods and on interior finish are unnecessary because this appendix is only about modifications to the code. The section on door and window dimensions is deleted because “minor reductions” is ambiguous, and unnecessary.

Reconstruction:

Sections on stairway illumination, handrails, and guards have either been moved to new Section AJ105.8, or are already covered by that section. The ceiling height allowance is now located in the Alterations section (AJ105.7).

The sections on wall and ceiling finish and separation walls have been deleted without substitution because they were incomplete, and it is unreasonable to trigger these retroactive requirements for the following reasons:

- The current provisions are incomplete because they only deal with common wall separations as you would find in townhouse-style units (vertical), and not with duplexes with horizontal separations.
- As far as it being unreasonable, the section on wall and ceiling finishes would require additional costs to comply, both to provide the materials, and to comply with permit requirements. It requires an accounting of every wall and ceiling finish in the work area in terms of the actual materials, and then whether they comply with the flame spread and smoke development requirements. In older construction, this could be difficult to determine, and from a plan review standpoint, would likely result in at least two rounds of corrections—the first to request the information, the second to tell them to fix it.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Since the public comment moves these provisions into an optional appendix, there will be no effect on the cost of construction.

Staff Analysis: Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

Public Comment# 3211

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

Add new definition as follows:

LANDING (for stairs and ramps). The minimum required area for a walking surface at the top and bottom of a stair flight or ramp run.

LANDINGS (for doors). The minimum required area of approach on each side of a door.

Reason: The term landing is prolific throughout the model IRC, family of ICC model codes, accessibility codes and standards. Those of us that navigate the codes and standards everyday have different views of what a landing actually is and often use the explanation, I know it when I see it. This code proposal for the definition of a landing is directed at the heart of the term and to provide a simple precise meaning. The reality is a landing is the minimum level area of a walking surface, floor area, that is required at the tops and bottoms of stair flights and ramp runs. They are also the minimum area on both sides of a door/doorway. The walking surface or floor area can be larger than the minimum area required for a landing and when you have connecting stair flights or ramp runs, the minimum areas can overlap, and they can also overlap with a door. However, the landing is required for each door, stair flight and ramp run, and the minimum required is the landing. To be more precise and to encompass the 2 different areas within the code that center around landings being required, we listed landings with 2 term qualifiers (Stairs & Ramps) and (Doors), we see the same split definition currently within the code for the definition of a Riser, (stair) & (plumbing).

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is a definition and is not adding or subtracting any technical requirements within the code which the author believes will increase or decrease cost.

RB24-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal was disapproved because two different definitions for landings would be confusing. The requirements for landings for stairways and ramps are already addressed in Sections R311.7.6 and R311.8.2. (Vote: 10-0)

RB24-22

Individual Consideration Agenda

Public Comment 1:

IRC: SECTION 202

Proponents: Thomas Zuzik Jr, representing NOMMA (coderep@railingcodes.com) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

LANDING (for stairs and ramps). The required area of approach for a walking surface at an elevator or at the top and bottom of a stair flight or ramp run.

LANDINGS (for doors). The minimum required area of approach on each side of a door.

Commenter's Reason: When the original proposal was presented at the committee action hearings, the committee felt that splitting the definition into doors, and then stairs and ramps, was confusing. The reasoning was that a door is not required to have a landing specifically, but a floor or landing, of which you would only have a landing if a stair, ramp or elevator shared their required landing area with the floor area on either side of a

door. Additionally, elevators do have landings and were included into this public comment revising the proposal into one definition covering all 3 locations.

Those opposed to adding a definition for a landing into the model building code at the committee action hearings, felt no need, as it was noted as easily understood by those that testified, and inspect and enforce the model codes as currently written.

However, their statements, that those that enforce it, understand and see no need, leaves out the majority of designers, contractors and sub-contractors to start with that have to work with the wording of the model code once adopted, and to many of them, not having a clear definition for such a common term is a common conversation of disagreement as to what this area of the floor's function is.

The simple fact that as noted already, most that see no need for this definition are also those that instruct and teach about the model codes, ergo the most highly educated on the entire model code, compared to those that don't have this level of knowledge working through understanding the model codes and implementing them truly not seeing what the top 5% see and read into, thus leaving out the bottom 95%.

By approving the modification by public comment for code change RB24-22 will insert a definition that is widely searched for by a major majority and is currently not available, into the model code.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This is a definition and is not adding or subtracting any technical requirements within the code which the author believes will increase or decrease cost

Public Comment# 3142

Proposed Change as Submitted

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Add new definition as follows:

LANDING. The required area of approach used to directly access an adjacent door, stair, or ramp.

Reason: Landings are required throughout the code at doors, stairs and ramps but are not clearly understood in many cases as a walking surface. Egress from doors, stairs, and ramps may often be into a yard, a lawn, driveway or landscaped path. This definition purposefully allows the size, shape, and surface requirements of the landing to regulated by the code as suits the location.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The definition will not affect the cost of construction but may result in changes to the interpretation of existing requirements that will.

RB25-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal was disapproved because requirements for landings for stairways and ramps are already addressed in Sections R311.7.6 and R311.8.2. This is a common term that is understood sufficiently. (Vote: 10-0)

RB25-22

Individual Consideration Agenda

Public Comment 1:

IRC: R202

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Replace as follows:

2021 International Residential Code

R202 LANDING. ~~The required area of approach used to directly access an adjacent door, stair, or ramp.~~ The required walking surface used to directly access, or that is directly accessed from, an adjacent stair, ramp, exterior door or elevator.

Commenter's Reason: A definition of landing will provide a much better understanding and allow for consistent interpretation of the code. A landing is but a portion of a floor or may not be a floor at all if it is not at a floor level but rather only an intermediate platform between levels or at an exterior door. Stairways include landings by their definition within the code.

[RB]STAIRWAY. One or more flights of stairs, either interior or exterior, ***with the necessary landings and connecting platforms*** to form a continuous and uninterrupted passage from one level to another. ***<emphasis added>***

This modification addresses the committee action and testimony to the original definition proposed:

1. "Everyone knows what a landing is" ???
2. You move to and from landings not just approach
3. Includes elevators that also have landings
4. The landing is only the required area of walking surface

Hearing testimony clearly disputes one committee member's opinion that "everyone knows what a landing is". Maybe so but the point is everyone

does not agree. What is the difference between a landing and a floor? There is clearly a lack of agreement, a difference that is not understood. An entire floor is not a landing, but the code uses the term "floor-or-landing" interchangeably due to the lack of a definition for either floor or landing. Where the code requires a "floor-or-landing" as in "**R311.7.6 Landings for stairways**. There shall be a floor or landing at the top and bottom of each stairway....", does this give the jurisdiction the option to require a floor instead of a landing? Again what's the difference? Whatever it is... it is widely interpreted.

Landings are typically required at various changes in elevation that are covered by inclusion of stairs or ramps in the definition. Elevators have been added because the area outside an elevator door is also referred to as a landing. Landing is a common term used in the elevator industry and ASME A17.1/CSA B44 Safety Code for Elevators and Escalators includes a definition for landings for elevators.

"landing, elevator or material lift: that portion of a floor, balcony, or platform used to receive and discharge passengers or freight"

Landings may be located between flights of stairs but are not a part of a flight of stairs however they are required at the top and bottom. (Or is that a floor or platform that is required?) When a landing coincides with a floor level there is no way to distinguish what portion of the floor is a landing. Because landings at floors are a part of a stairway by definition, the limit of the landing is what defines where the stairway ends and where the floor, or yard or deck begins. It is important to define landing because the width, depth, and headroom of landings that are part of stairways are regulated within Section 311.7. A landing may be a portion of a mezzanine or of a loft and the end of the landing should define the end of a stairway that connects the mezzanine or loft to another level often with another stairway or ramp.

It is quite simple, without a definition of a landing in the IRC you cannot determine where a floor begins and a stairway ends or if there is a floor level required at all. Headroom, width, ceiling height, etc. are regulated differently in stairways than hallways or lofts. A definition is needed.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change only defines the difference between a floor and a landing that will aid in consistent enforcement without change to materials or their use in construction.

Public Comment# 3296

RB44-22

Proposed Change as Submitted

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

R301.7 Deflection. The allowable deflection of any structural member under the *live load* listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

Revise as follows:

TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS^{b, c}

Portions of table not shown remain unchanged.

| STRUCTURAL MEMBER | ALLOWABLE DEFLECTION |
|---|----------------------|
| All other structural members <u>excluding guards and handrails.</u> | $L/240$ |

Note: L = span length, H = span height.

- For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2.1(1).
- For cantilever members, L shall be taken as twice the length of the cantilever.
- For aluminum structural members or panels used in roofs or walls of sunroom additions or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed $L/60$. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed $L/175$ for each glass lite or $L/60$ for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom additions or patio covers, the total load deflection shall not exceed $L/120$.
- Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of $H/180$.
- Refer to Section R703.8.2. The dead load of supported materials shall be included when calculating the deflection of these members.

Reason: This proposal eliminates guards and handrails from the IRC allowed deflection table and removes the requirement that conflicts with the long accepted standards related to Guards and Handrails.

Guards and handrails are structural members listed in Table R301.5. However without a specific listing for allowable deflection in Table R301.7 they are caught in the catch all of "All other structural members" by default. It is our belief that guards and handrails fall in this category as an unintentional oversight. The allowances in this table are intended for elements of the building's envelope and core structure, e.g., floor, ceilings, roof, and walls to limit vibration and prevent cracking of applied finishes. As stated in R301.7 the deflection allowances in the table are to be considered under the required live load, which for these elements are uniformly distributed live loads. However, the loads on guards and handrails are concentrated loads to correlate with their function that is uniquely different from floors, walls, etc.

The default "All other..." allowed deflection of only $L/240$ is simply not enforceable nor is it being enforced. $L/240$ is over restrictive for the length of any guard system, as guards are not susceptible to the same kind of loading as floors, nor does regulating deflection of length address deflection of height which is a critical parameter when applying the required load to the top of the guard. Any horizontal deflection of the guard system as the user experiences it is dependent upon the vertical support when the required live load is applied to the top of a guard system. Height may not be a factor in deflection of a handrail system depending upon how it is mounted as with a rail mounted to a wall with brackets. However, in any case it is plain to see $L/240$ does not factor in height of the guard.

Guards are commonly made of many different materials, wood, steel, aluminum, miscellaneous metals, glass, composites, plastics, etc. each having unique properties affecting deflection. Guards and handrails of each of these materials have been manufactured based upon the requirements of long accepted standards:

ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*,

ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*,

ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*.

These standards represent current practice for testing the deflection of manufactured guard systems and their approval by ICC-ES acceptance criteria as well as other product evaluators that use the same ASTM Tests. Such approved products are common throughout the built environment. If enforced $L/240$ would eliminate these products without any evidence contrary to their serviceability. Furthermore in the supporting statement of RB61-13, Cole Graveen PE, SE, the proponent stated:

"It should be noted that if the current deflection limit of $L/240$ for All other structural members is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with $L/240$. The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed $L/240$ when both the bending deflection of the post and the rotation of the support is considered."

RB61-13 suggested that $L/240$ be replaced with the requirements set forth in the standards cited above that are used to approve product by the ICC. RB61-13 was disapproved. This proposal however simply eliminates guards and handrails from the IRC allowed deflection Table R301.7 and removes any conflict with the long accepted standards.

We will also propose an amended version of RB16-13 with a substitution for L/240 in an attempt to harmonize the IRC with the long existing standards cited above and as the proponent it is our intention to ask that it be heard first.

- Bibliography:**
1. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009
 2. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2017 (updated 2021)
 3. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
 4. ASTM E985-00 E1, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
 5. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
 6. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine
 7. Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relation to Guards and Climbing in the Built Environment, Prepared for National Ornamental & Miscellaneous Metals Association (NOMMA), Prepared by NAHB Research Center, Inc., December 2007
 8. Horizontal Static Forces Exerted by Men Standing in Common Working Positions on Surfaces of Various Traction - Including Coefficients of Friction Between Various Floor and Shoe Materials, K. H. E. Kroemer, et al, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, January 1971
 9. RB61-13, 2013 Code Development Cycle of the 2015 International Residential Code

Cost Impact: The code change proposal will decrease the cost of construction

Based upon the premise that the code will be enforced as written this will at the very least prevent a landslide of re-evaluation and testing subsequent to obsolescence of many guard and handrail products, all at an undetermined increase in cost.

RB44-22

Public Hearing Results

Committee Action:

As Submitted

Committee Reason: This proposal was approved because the L/240 deflection limit is not needed for guards. Safety is addressed by the current loading requirements. (Vote: 10-0)

RB44-22

Individual Consideration Agenda

Public Comment 1:

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com) requests Disapprove

Commenter's Reason: By adding a specific exemption for guards and handrails, this change removes all requirements for deflection of guards and handrails without suggesting any alternative. That results in an unsafe condition where structural members providing safety from falling may move more than expected by the occupant causing loss of balance and a possible fall.

We recognize that the current interpretation where guards and handrails may end up being considered "all other structural members" could cause overly restrictive designs. However, currently there are published alternate deflection requirements for guards and handrails in the standards and Acceptance Criteria mentioned by the proponent (ASTM E985, ASTM D7032, ICC-ES AC 273). Guards and handrails meeting these requirements should be able to be accepted by the Building Official using an Alternate Materials and Methods approach.

However, by giving a complete exemption to guards and handrails, they will not have to meet ANY standards, and the Building Official will have no authority to enforce any deflection limits. We do not think that is appropriate.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
No change to code.

Public Comment# 3510

Proposed Change as Submitted

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

Add new text as follows:

R301.9 Framing Member Splices. Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

Revise as follows:

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.4.1 Rafter size. Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance with Section R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1). Rafter splices shall comply with Section R301.9.

Reason: This proposal adds language to address members spliced between bearing walls. The clear spans and loads provided in all IRC tables assume a continuous condition between supports. Although a continuous member can be achieved by splicing two members together, the splice must be properly designed to transfer forces across the spliced connection and avoid a hinge condition. Where splices have not been properly designed, members (especially rafters) have displayed visible out-of-plane deformation. In these situations, the members have required repair or replacement to stop and reverse the deformation process.

This proposal clarifies that framing member splices between bearing walls need to be engineered and references section R301.1.3. Engineered design.

"Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for buildings and structures, and parts thereof, included in the scope of this code."

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/>.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is a clarification change only; the intent is to clarify Rafter splices need to be engineered which is what required currently but it is not addressed in the code text.

RB45-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal was disapproved because this is already addressed adequately in the wood sections. Splices have to be engineered or should be prohibited; so they should not be promoted by including this in Chapter 3. This does not address all splices, some are not

Individual Consideration Agenda

Public Comment 1:

IRC: R301.9, R502.3, R802.4.1, R802.5

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R301.9 Framing Member Splices. ~~Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.~~

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall ~~comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3.

R802.4.1 Rafter size. Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. ~~Joist Rafter splices shall comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance with Section R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1). ~~Rafter Ceiling joist splices shall comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3.

Commenter's Reason: The Committee raised the concern that adding a generic splice section in Chapter 3 could lead to unintentionally requiring or promoting splices beyond the specific problematic framing conditions. In response, this public comment eliminates the generic splice section and relocates the proposed language into the three specific sections that address floor joists, rafters, and ceiling joists. This relocation of text will limit these specific splice requirements only to the three areas intended to be addressed by this proposal.

The allowable framing table spans in the IRC assume members are continuous between their supports. Without that continuity, the table spans and framing sizes are inadequate to support the required loads and result in localized and visible deflections. These deflections cause both cosmetic damage such as cracked gypsum board, and more functional damage such as racked doors that do not close or broken plumbing where it has been run through deflected floor joists. A continuous member can be achieved by using a single solid member or by using a splice that transfers the full member section capacity between pieces. This proposal addresses the spliced condition and typical field splice practices that are frequently inadequate to support the required loads.

The opposing testimony raised a concern that the proposed language could be interpreted to allow bearing walls only to be considered a vertical support. Where a splice occurs over a vertical support, the support provides the necessary restraint against deflection and meets the intent of the prescriptive framing table spans. Vertical supports include any IRC allowable bearing surface or support element, including but not limited to: girders, trusses, bearing walls, etc.

The final concern raised was that splices have not been an issue and this is unnecessary language. Field splices are frequently used to extend framing members that are too short to reach the bearing point (see photograph).

Where a splice occurs between vertical supports, the splice must transfer the full section capacity between pieces for the framing to achieve the expected performance based on the prescriptive framing tables. Specific member splice requirements will depend on the member size, material grade, and environmental exposure (interior, exterior, etc) and must be designed in accordance with accepted engineering practices. As roof pitches become increasingly steep longer rafter spans are required. As modern floor plans increase open spaces, longer ceiling and floor joist spans are required. As a result, field splices are regularly identified as deficient and the cause of framing performance issues or failures.



Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. These are existing requirements. There was a lot of confusion about the continuity of Joists, Rafters, and Ceiling joists. All the prescriptive provisions in the IRC are based on continuous Joists, Rafters, and Ceiling joists. This proposal provides clarification to the code users on the existing requirements without affecting the cost.

Public Comment# 3080

Proposed Change as Submitted

Proponents: Glenn Mathewson, representing Self (glenn@glenmathewson.com)

2021 International Residential Code

Revise as follows:

R303.8 Exterior stairway illumination. Exterior *stairways* shall be provided with an artificial light source located at the top landing of the *stairway*. Exterior *stairways* providing access to a *basement* from the outdoor *grade* level shall be provided with an artificial light source located at the bottom landing of the *stairway*.

Exception: A light source shall not be required at the top of exterior stairways less than 30 inches (762 mm) in total rise.

Reason: This section was considerably revised in the 2015 edition to only require illumination at the top of exterior stairways. Using an exterior stairway in the dark is a conscience choice of the occupant and with an assumption of risk they must make themselves aware of. It is not the job of the local government to mandate protection from this hazard. However, the top of a stairway is often an opening in a required guard. There is always a fall hazard at this opening, but in the dark it is greater. Therefore the minimum required lighting for exterior stairways is only a light source at the top landing. This change has remained with no challenge in the 2018 and 2021 edition.

This proposed exception addresses decks that are low to the ground and do not require guards. A small stairway from these decks do not create more of a fall hazard from the deck when there are no required guards. A multilevel deck, with a few steps between is not a greater fall hazard of the upper deck than if no stair existed between the two. Therefore, if it is reasonable to not require guards for fall protection it is also reasonable to not provide a light for fall protection.

For a risk assessment comparison, Section R303.7 for interior stairway lighting only requires a switch at the top and bottom of interior stairways with 6 or more risers. At a conventional riser height of 7 ¾ inches, a five riser stairway could be 38 ¾ inches high. If it is reasonable for an occupant to ascend or descend an interior stairway at this height without access to a switch and therefore without light, then it is reasonable for a 30 inch high exterior stairway much less frequently used in the evening to also have no light.

Cost Impact: The code change proposal will decrease the cost of construction

Exterior floor surfaces such as decks and porches with stairways less than 30 inches in height will be less expensive to construction without a required light. There is no requirement for the operation or type of lighting, so the most conservative choice would be using low voltage lighting. This lighting does not typically require a licensed electrician to install. In the least, this proposal will reduce the cost of construction for certain deck and porch designs by perhaps a couple hundred dollars. However, it is difficult to assume what type of lighting requirements are being interpreted by building authorities with the current provision. If non-permanent solar lighting is being accepted, such as plastic "post cap lights" the cost reduction could be under \$50.

RB79-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal was disapproved because stairways are the most unsafe areas in a dwelling, so lighting is needed. Safety needs to consider guests as well as family members. (Vote: 9-0)

RB79-22

Individual Consideration Agenda

Public Comment 1:

IRC: R303.8

Proponents: Glenn Mathewson, representing Self (glenn@glenmathewson.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R303.8 Exterior stairway illumination. Exterior *stairways* shall be provided with an artificial light source located at the top landing of the *stairway*. Exterior *stairways* providing access to a *basement* from the outdoor *grade* level shall be provided with an artificial light source located at the bottom landing of the *stairway*.

Exception: A light source shall not be required at the top of exterior stairways less than 30 inches (762 mm) in total rise and not serving as the required grade-level access for the required egress door.

Commenter's Reason: The committee disapproved the proposal because "stairways are the most unsafe areas in a dwelling". I do not disagree with this statement. This was also the emotional response expressed by the opposition that eliminated the opportunity to have a genuine and professional conversation about risk assessment and risk tolerance in American backyards. With this public comment, I will continue the effort to have that conversation.

The committee also stated that "Safety needs to consider guests as well as family members". The need to have safe access from the public way to the required egress door was the nature of this statement. Delivery personnel or other visitors to the private home are likely to approach on a path from the public way to the front door. This door is typically designed as the required egress door in section R311.2. This door requires access to grade. If this access is via a stairway, it is presumable that this will be the access the public will use. In recognition of this concern, we have modified the exception to not apply to the stairways that are serving the required grade level access. This will provide one stairway from grade with access to the egress door that has lighting readily available, while still providing more design freedom and affordability in the additional exterior stairways. Generally these will be located in the private backyards, and this is the overall intent of this entire proposal.

The following are examples of risk tolerance currently provided in the IRC for the benefit of our fellow Americans.

- 1) Traversing and interior stairway up to five risers (and more than 30 inches of total rise) without access to a light switch on the top and bottom. This results in traversing the stairway without illumination.
- 2) A deck up to 30 inches above grade with no fall protection (guards) at the perimeter and no lighting to alert an occupant of the fall hazard.
- 3) An exterior door with up to two risers (one tread) down to the exterior landing on a balcony with no grade level access. NO illumination is required outside the door, but your body is still traversing two risers and up to 15.5 inches of height.

Many decks are built less than 30 inches and without guards. If an owner were to chose to build a small flight of stairs with a few steps to grade, this could be a simple upgrade that would increase the safety of the deck by providing a safer path down than leaping 29 inches. However, the IRC would now require this owner to also install a light. What makes a deck 29 inches above grade with no guards, no lights, and no stairs LESS of a risk than a deck 12 inches above grade with no guards, no lights, and one single tread with two 6 inches risers to grade?

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction. This proposal and public comment modification will decrease the cost of construction when a homeowner chooses not to install lighting that would no longer be required.

Public Comment# 3199

Proposed Change as Submitted

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

2021 International Residential Code

R311.3 Floors and landings at exterior doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served. Landings shall have a dimension of not less than 36 inches (914 mm) measured in the direction of travel. The slope at exterior landings shall not exceed $\frac{1}{4}$ unit vertical in 12 units horizontal (2 percent).

Exception: Exterior balconies less than 60 square feet (5.6 m²) and only *accessed* from a door are permitted to have a landing that is less than 36 inches (914 mm) measured in the direction of travel.

R311.3.1 Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall be not more than $1\frac{1}{2}$ inches (38 mm) lower than the top of the threshold.

Exception: The landing or floor on the exterior side shall be not more than $7\frac{3}{4}$ inches (196 mm) below the top of the threshold provided that the door does not swing over the landing or floor.

Where exterior landings or floors serving the required egress door are not at *grade*, they shall be provided with access to *grade* by means of a *ramp* in accordance with Section R311.8 or a *stairway* in accordance with Section R311.7.

Revise as follows:

R311.3.2 Floor elevations at other exterior doors. At exterior ~~Doors—doors~~ other than the required egress door, the exterior side shall be provided with landings or floors not more than $7\frac{3}{4}$ inches (196 mm) below the top of the threshold.

Exception: ~~A top~~ An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

R311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over exterior stairs and landings.

Revise as follows:

R311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each *stairway*. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

~~Exception~~ Exceptions:

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs.
2. At an enclosed garage, the top landing at the stair shall be permitted to be not more than 7 3/4 inches (196 mm) below the top of the threshold.
3. At exterior doors, a top landing is not required for an exterior stairway of not more than two risers, provided that the door does not swing over the stairway.

R311.7.8 Handrails. *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers*.

Reason: This proposal started as question – Can the landing or steps into a garage be the same as permitted for exterior doors or not?

The following are current requirements - There is a requirement for landings at exterior doors (R311.3) and a requirement for landings at the top and bottom of stairways (R311.7.6). The required egress door has to open directly into a public way, yard or court (R311.1), so it has to be an exterior door. Egress is not permitted through a garage (R311.1).

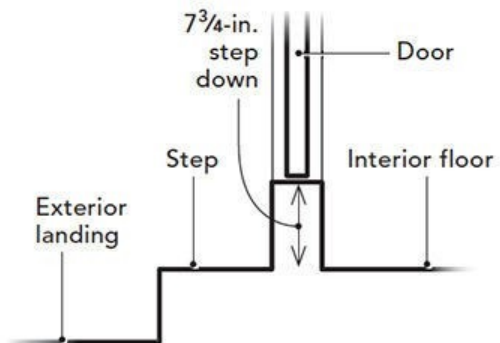
Interior doors not have requirements for landings, so going out to a single step or multiple steps would be covered by the stairway landing requirement in Section R311.7.6. The current exception clarifies that steps into a garage are considered interior stairways.

The modifications –

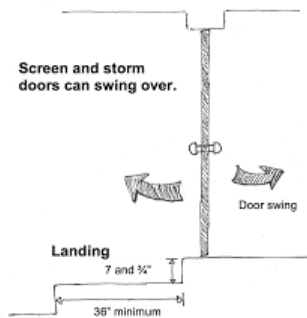
R311.3.2 – This is a requirement for a landing or floor at both sides of an exterior doorway. This section has 'exterior' in the title, and is a subsection of 'exterior doors', but does not have 'exterior' in the text. Since titles are not part of the text, this could be read as all door, or it could be read to allow a 7-3/4" drop between the floor and the threshold on both sides of the door. The modification to the body of the text would limit this to exterior doors and the exterior side for the step down. The current exception is for a stairway landing, not a door landing, so this needs to be more specific

to door landings to match the requirement in the main paragraph. "Floor" is added to address balconies and decks.

This is what is permitted with current text for exterior doors other than the means of egress doorway. While perhaps there should be a threshold limit (not proposed here), the current allowances is a serious tripping hazard.



Was this not the intended allowance?



R311.7.6 – This is the section for stairway landings. Interior doors do not have a doorway landing requirement in the IRC. The new exception #2 allows for a garage access door to swing out over a landing that is a step down, similar to an exterior door. The current exception #1 says the door has to swing in. Exception 3 for stairway landings at exterior stairways is added so that R311.3.2 and R311.7.6 are coordinated for landings at exterior doors with steps – literally this is the same landing space, but from two different requirements.

This is an example of the R311.7.6 with the current Exception 1.



This is an example of R311.7.6 new exception 2 – allowing for a step down to a landing or floor in a garage – the door can swing in or out. This is currently permitted for exterior doors (R311.3.2)





This is an example of R311.7.6 new exception 3 – which is equal to the intent of R311.3.2 exception.





This proposal is submitted by the ICC Building Code Action Committee (BCAC)..

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 and 2021 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/>.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

RB100-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal was disapproved because a 7-3/4" high threshold is needed to help at exterior doors with snow and water intrusion. (Vote: 10-0).

RB100-22

Individual Consideration Agenda

Public Comment 1:

IRC: R311.3.2

Proponents: Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R311.3.2 Floor elevations at other exterior doors. ~~At the~~ Exterior doors other than the required egress door, ~~the exterior side~~ shall be provided with landings or floors not more than $7\frac{3}{4}$ inches (196 mm) below the top of the threshold.

Exception: An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

Commenter's Reason: The testimony and committee reason were all against not loosing the 7-3/4" threshold at exterior doors due to water and snow infiltration. That portion has been removed from the change with the above deletion. The rest of the language at this section is strictly a clarification that Section R311.3.2 is applicable to exterior doors. This was in the title, but not in the text.

The original intent of this proposal was to allow for a step or landing in step down at a door into a garage similar to what is permitted at an exterior door. That remains as submitted. There was no testimony against this idea.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

Public Comment# 3093

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2021 International Residential Code

SECTION R312 GUARDS AND WINDOW FALL PROTECTION

Revise as follows:

R312.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter. Opening Limitations shall be determined without any force applied to the sphere.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of stairs shall not have openings that allow passage of a sphere $4\frac{3}{8}$ inches (111 mm) in diameter.

Reason: This code change simplifies any current and future debates by prescriptively clarifying that there is no force or load test on the sphere directly within the text of the IRC and is intended as written to be a simple dimensional measurement for pass or fail only.

The Misconception

For as long as the sphere measurement method for opening limitations in guards has been in the model codes and adopted by jurisdictions there has been a back room and front room debate as to the process.

It has been well established that the 4-inch, 4.375-inch and 6-inch sphere dimension is a dimensional measurement and not a load test.

Even with this, questions continue to be discussed across multiple local jurisdictions, forums and other forms of communication questioning if you are to take the correct dimensionally sized sphere and apply a force to shove it through the in-fill of guards and pool barriers, and what that force level should be. The direction of these debates goes on within many jurisdictions and amongst the building enforcement industry less and less as time passes, but as with anything as new eyes enter the field, this discussion returns to the debate floor.

Standards & Criteria

For years, fabricators within the guard industry used the in-fill (part C) method for load testing in-fill in ASTM E935-00 to the loads specified in the R301.5 table of the IRC and some also applied the cone test (part D) methodology published in ASTM Standard E935-00, the part D cone test in E935-00 and prior versions was a methodology to verify the in-fill spread of balusters, however this has never been required in or by the model IRC or IBC codes. When the Part D test methodology was removed from the standard and not included in the ASTM E935-13 edition, and furthermore was not replaced with any other similar in-fill load test directed at in-fill spread specifically, any pathway moving forward was removed as the newer standard signifies progress.

ICC-ES AC-273-17, Acceptance Criteria for Handrails and Guards, in sections 4.2.1, 4.2.4 & 4.5 directs and points to follow the 1sqft area method in Section 10.4 in ASTM E935-13, with no spread test on in-fill under load. Furthermore, the 1 square foot area is also repeated in ASTM D7032 Section 6.2.2 In-Fill Load Test for the Wood-Plastic Composite and Plastic Lumber.

The guard industry follows established engineering practices and when engineers are presented to review projects and prepare project calculation packages and sealed drawings, per the requirements set forth within the IRC, loads being applied to the 4-inch sphere are not within the requirements, nor is there a test method spelled out to follow for physical testing a load on the sphere directly. With the deletion of Part D of ASTM E935-00 in ASTM E935-13, the only similar in-fill spread testing method was removed. Why it was removed is not known to this author, but one can extrapolate or assume it was because the model codes, nor ASCE-7 provide a direction or requirement for this type of load being applied to guard in-fill. With the lack of a requirement, the Part D test method was deleted to streamline the standard to follow the model codes and ASCE-7.

What has been followed by engineers and industry is to apply the loads with designated safety factors designated in the test standards, acceptance criteria and within the code over a 1sqft area and then **MEASURE** for if a 4-inch sphere would pass through the in-fill without a load applied to the sphere directly, a simple measurement. This code change proposal removes any straying into whether inspectors should be carrying a certified fish-scale with an attachment method for 3 sizes of spheres for testing in-fill spreading and removes any mystery number pulled from the sky for improvised field test hanging 50-lbs kettle bells or even requesting a special inspection without a standard for the engineers to follow.

NON-Applicable theories and information not in the Model Codes, Current Standards or ES Acceptance Criteria

To further extrapolate on a small and limited number of posts on forums that theorize applying a load directly to the sphere, we will theories how does one define the load? The requirements within the model 2021 IRC Table R301.5, under Guard in-fill components with note f, directs you to use a normal load of 50 pounds on an area equal to 1 square foot.

Now with the only in-fill load listed within the IRC in table R301.5 being for an area equal to 1 square foot established.

How does one extrapolate a number from this, we stipulate that it is not the intent of the code, nor listed in R301.5 for in-fill, however there are still inspectors who inject this undesignated structural failure test as being required by code and to use the 50 pounds listed for a 1 square foot area, on the sphere directly! We know the IRC does not specify this so,

Even if you pull from the sky and hypothesize a load should be applied to a sphere, which is only a portion of the 1 square foot area. Continuing with this unsupported hypothesis that the area of the sphere is somehow connected, what number do you use? Do you use the area of a 4-inch circle, or do you use half the surface area of a 4-inch sphere, both are an area measurement of the sphere?

If we first start a theory with using 1 square foot covers both non-contact and contact area of the in-fill area, and then input the area of a 4-inch diameter circle which is approximately 12.57 square inches, then divide the area of the circle by the area of 1 square foot, 144 square inches, we get 8.73%, and 8.73% of 50 pounds equals 4.367 lbs. Thus, we have extrapolated a hypothetical force for the sphere in direct proportion of 50 pounds on the area of 1 square foot to be equivalent to 4.367 pounds for the area of the circle.

However, some will argue that the actual number should be half the surface area of the sphere. If we follow this direction and start with a 4-inch sphere has an approximate surface area of 50.27 square inches, and since the 1 square foot area is not doubled for front and back, we need to remove the back half of the sphere and divide the sphere's surface area by 2. This reduces the surface area to 25.135 square inches. Next we divide the 25.135 square inches by 144 square inches, and we get 17.5% and applying this percentage to the 50 pounds, we extrapolate 8.75 pounds applied to a theoretical testing device not specified in any current testing standard or Acceptance Criteria published in the 2021 IRC Part IX - Referenced Standards or prior model IRC codes as a requirement.

We have walked through theories hypothesizing a 4-inch sphere's load, and we haven't even touched the surface as do these values change for each sphere designated in the exceptions? The simple thing is to return to reality and remember that none of these theories are actual code language within the IRC. For those inspectors that question that a guard's in-fill meets the requirements of the IRC, they can request that the owner supply engineering documents be provided establishing compliance with the code adopted in their jurisdiction, and the reality is none of these theories will be reviewed as they have never been a part of the model IRC.

The reason statement submitted for this proposal has walked through more than a few theories, however the defining facts are that the most current editions of ASTM E935 and ICC ES-AC273, and all published editions of the model IRC do not provided direction or a standard to follow for testing a load directly applied on any sphere for a measurement for guards.

Bibliography: ASTM Editions: ASTM E935-13e1, ASTM E935-00 & E935-83

ASTM E935-xx Current edition approved Aug. 1, 2021. Published September 2021. Originally approved in 1983. Last previous edition approved in 2013 as E935-13e1.

ICC ES AC273 Current edition editorially revised May 2021. Originally approved in 2004. Last previous edition approved in June 2017.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No cost change, as this code change just clarifies that the dimensional measurement is not a load test.

RB118-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The committee agreed that guidance is needed for application of the force applied to the sphere used to test the opening limitations on guard openings, however, the concluded that this proposal needs further work. This proposal as written is may not be interpreted as intended, and the proposed text might make interpretations worse. The committee suggested it might be better located within the structural

Individual Consideration Agenda

Public Comment 1:

IRC: R312.1.3

Proponents: Thomas Zuzik Jr, representing NOMMA (coderep@railingcodes.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R312.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter. The opening limitation measurement for compliance ~~Opening Limitations~~ shall be determined without any force applied to the sphere.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of stairs shall not have openings that allow passage of a sphere $4\frac{3}{8}$ inches (111 mm) in diameter.

Commenter's Reason: In addition to the reason statement in the original proposal the following information is being provided.

- During the committee action hearings, one opposition testimony brought to the attention that the wording should be directed at the compliance measurement for the opening limitation, which is what this modification by public comment addresses directly.
- Additional opposition testimony was stating that in order to measure the opening limitation for compliance an inspector must apply a physical load to the guard's infill to obtain a level of resistance before taking the measurement for opening limitation compliance.
 - By doing this, the inspector is performing a physical load test which is not specified as a requirement within R312.1.3 Opening Limitations, thus going beyond what the code stipulates.
 - An inspector doing this and then citing R312.1.3 for noncompliance is issuing a false statement, in that if the infill under load seems to be questionable the inspector should be citing that they need proof that the guard complies with the code, citing Table R301.5 for infill load, not R312.1.3 Opening Limitations.

All required guards must meet all the requirements specified in the model IRC for minimum compliance. Thus, the loads within Table R301.5 are an integral part in addition to the minimum requirements set in R312.1 for guards. Thus, many inspectors routinely cite section R312.1.3 for loose guard infill and the correct code section to cite is Live Load Table R301.5, guard in-fill components^f which is the load test for the stability requirement within the IRC.

The correct route for an inspector to verify compliance for a questionable live load requirement is through an engineer's report.

This proposal does not remove an inspectors' ability to properly verify all the requirements for an installed guard system. The proposal does clarify that R312.1.3 Opening Limitations are a measurement taken in the field without any loads applied to the infill.

During the committee action hearings, opposition testimony questioned how the proposal states no cost increase if an engineer is required to verify compliance for the questioned loads? In either case, questioning that the infill underload is deflecting more than the code allows, can only be answered by an engineer review. The proponent of the proposal during the committee action hearings was not stating that an engineer's report is required for all projects, only that the opposition testimony questioning the infill's stability could not have a definitive conclusion without an engineer's report.

Lastly, it was mentioned during the committee action hearings that specifying into the model code clarifying that a load is not to be applied is not normal. However, the proponent stipulates this is not the case, as the code mentions many times that loads are not to be applied concurrently at the same time, and we stipulate this is no different for this proposal.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No cost change, as this code change just clarifies that the dimensional measurement is not a load test.

Proposed Change as Submitted

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2021 International Residential Code

Add new text as follows:

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly not exceeding 44 inches (1118 mm) in height shall be constructed in accordance with Sections R502.11.1 or R502.11.2 or shall be designed in accordance with accepted engineering practice to support the guard assembly. Trusses and I-joists are prohibited as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.

R502.11.1 Conventional edge framing. The framing at the edge of the floor shall consist of a solid or built-up wood member having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 with a roll brace aligned with each guard post.

502.11.2 Timber edge framing. The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 at intervals of 48 inches (1219 mm) or less.

502.11.3 Roll bracing. Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

Reason: The Problem:

Guards are required to transfer the outward and downward loads applied at the top of the guard to the structure. If the structure fails, the guard cannot perform its defined function to minimize the possibility of a fall. Many floor systems (both conventional and engineered) are not being designed and constructed to resist guard loads at the edge of walking surfaces where guards are required. Manufacturers and designers of engineered floor systems (e.g., trusses and I-joists) and plan reviewers are commonly unaware of guard attachment requirements and do not ensure that framing is adequate to support guards. Inadequate framing is commonly encountered with costly reinforcement (and possibly redesign) needed at the time of guard installation.

In current practice where inadequate framing is encountered, flooring or ceilings are ripped out to install blocking to harden the edge beam for attachment of the guard. Such fixes are not engineered and, in many cases, occur after the rough inspection. The problem will persist unless a solution can be codified.

A Collaborative Formed:

The SMA surveyed our membership and found the problem to be chronic across the nation and assembled a task group representing manufacturers of, trusses, I-joists, framing and post connection hardware, and guard components as well as, home builders, guard fabricators, guard installers, stairbuilders, and others from industry at large, some 18 participants in all. About half of the team are engineers, and about half have extensive involvement in code and standard development. Meeting biweekly since early fall of 2021 this team has worked together to develop consensus upon an engineered solution presented here with two prescriptive options suitable for inclusion in the 2024 IRC.

A Prescriptive Solution:

By recommendation of the manufacturers of I-joists and trusses and consensus of the entire task group this proposal prohibits the use of I-joists and trusses *as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member*. This is based upon the limited embedment of fasteners in the thickness of the joist and truss materials, open areas/voids, and surfaces where fasteners cannot be used that would weaken the component or connections between the truss/I-joist components.

Both top mount and side mount guards are suitable provided there is sufficient material to engage threaded fasteners and the edge beam/joist is not subject to rotation or torsion. Based upon calculation of the loads transferred to the structure from the top of the guard, two options are provided. (Calculations may be reviewed at the link below.)

R502.11.1 Conventional edge framing, describes the minimal thickness to resist withdrawal of fasteners and height of the edge beam/joist as that of a common double 2 x 10. Blocking/roll bracing is aligned with the post locations to resist rotation and eliminate torsion induced by guard loads.

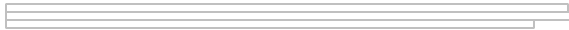
R502.11.2 Timber edge framing, provides specifications to allow use of a thicker timber or glulam which is sized to resist torsion allowing roll

bracing to be spaced at a maximum distance of 48 inches on center to alleviate the need for precise alignment of the post with the roll bracing or a joist.

Although the minimum guard height in the IRC is 36 inches it is not unusual that portions of the guard, post caps, or finials extend above the guard height. We agreed that a height of 44 inches would be reasonably conservative to use for the purpose of calculating the edge beam size and roll bracing requirements. To restrict outward movement of the top of the edge beam, specific nailing of the floor sheathing is called out at the location of roll bracing. Floor sheathing must be continuous for a minimum distance from the open edge to assure the structural integrity of the bracing and edge beam. The nailing requirements for attachment of the blocking used as roll bracing to the joists prevents uplift of the blocking, and the minimum length allows it to fit into one joist bay where joist spacing is taken from the open edge of the edge beam. These details are specified in **R502.11.3 Roll Bracing**.

This proposal has been clearly and carefully constructed to be understood and enforced without figures referenced in the code text. We have included drawings to aid understanding among the many proposals to be considered in this cycle. The drawings submitted would however be suitable for inclusion in the commentary.

Engineering Calculations supporting this proposal can be found at this link: <https://stairways.org/guard-calculations/>



Cost Impact: The code change proposal will decrease the cost of construction

This proposal will decrease the cost of construction due to the elimination of necessary after-the-fact demolition and repair to install blocking at each post location. An average job with guards has three or more posts with 1 to 2 hours each for blocking plus repairs to finish surfaces estimated at approximately \$400 - \$800 in extra charges per 3 post job. This does not include any engineering fees if applicable.

RB173-22

Public Hearing Results

Committee Action:

As Submitted

Committee Reason: The committee concluded that the proposal provides a prescriptive solution to correct the requirements of guards transferring the outward and downward loads applied at the top of the guard to the structure and the effect of the structure failing on the guard. The committee encourages the proponent to look into adding clarifying diagrams and adding engineering products to the conventional edge framing during the public comment phase (Vote: 5-4).

RB173-22

Individual Consideration Agenda

Public Comment 1:

IRC: R502.11, R502.11.1, 502.11.2, 502.11.3

Proponents: David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly ~~not exceeding 44 inches (1118 mm) in height~~ shall be constructed in accordance with Sections R502.11.1 or R502.11.2 for guard assemblies not exceeding 44 inches (1118mm) in height or shall be designed in accordance with accepted engineering practice to support the guard assembly. Where T-trusses and I-joists are used prohibited as edge framing members supporting guards, except where the effects of the guard loads shall be specifically considered in the design of the edge member.

R502.11.1 Conventional edge framing. ~~Where a roll brace is aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a solid or built-up ~~wood~~ member of lumber, structural glued laminated timber, or structural composite lumber having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~with a roll brace aligned with each guard post.~~

R502.11.2 Timber edge framing. ~~Where a roll brace is not aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) structural glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 at intervals of 48 inches (1219 mm) or less.

R502.11.3 Roll bracing. Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

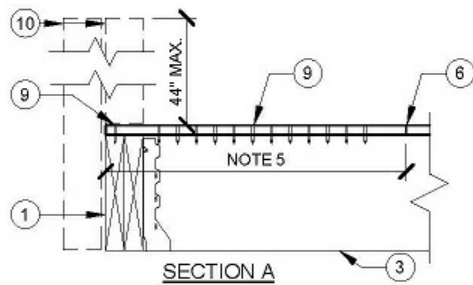
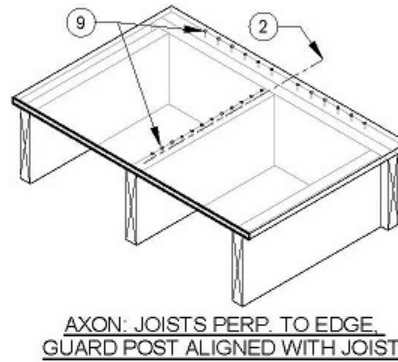
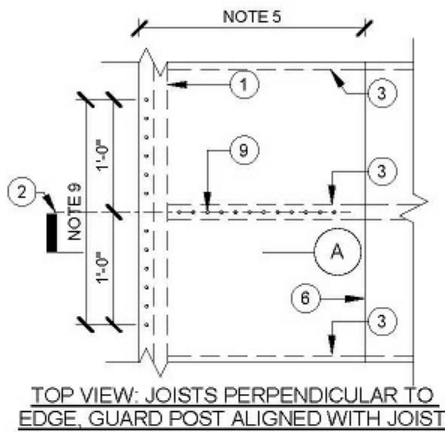
Commenter's Reason: The Committee approved this proposal because it provides a prescriptive solution for floor framing supporting guards that will resist required design loads applied to the top of the guard and ***corrects a serious deficit*** in the current requirements for floor framing ***that void the warranties of engineered floor systems and allows the potential failure of the floor and connected guard assembly/system.*** However the Committee specifically requested clarification by public comment. The changes included in this modification are described below. They address not only the Committee's request but also those issues raised in testimony, further collaboration of industry and editorial changes to aid in understanding.

1. Moving the text "*not exceeding 44 inches (1118 mm) in height*" and adding the words "*for guard assemblies*" to the moved phrase eliminates a possible interpretation that R502.11 would not allow engineered design for guards in excess of 44 inches in height, which is certainly not the intent.
2. Subsequent to the CAH, with recent input from truss and I-joist manufacturers participating in the task group, the inference of conditional prohibition was rephrased to more clearly state that "*Where trusses and I-joists are used as edge framing members supporting guards the guard loads shall be specifically considered in the design of the edge member.*"
3. Questions from the committee and testimony inquired as to the difference between the application of R502.11.1 and R502.11.2. The purposeful application of each section has been clarified by moving the text related to the *alignment of roll bracing with the guard posts* to the beginning of both sections to clearly establish and differentiate the dependent condition for use of each section.
4. Some of the Committee members questioned that it was not clear that R502.11.1 does not preclude the use of Structural Composite Lumber. To clarify this the phrase "*...member of lumber, structural glued laminated timber, or structural composite lumber*" has been substituted for "*wood*" to specifically include these options. Structural composite lumber would include: LVL, PSL, LSL, or OSL. The drawings included for the commentary have also been clarified.
5. Editorial changes include correction of the section titles and references to include "R" and adding "structural" prior to glued laminated timber to use the accepted terminology as in the code and related standard ANSI A190.1 *Product Standard for Structural Glued Laminated Timber*.
6. Please note the addition of many of the task group members as proponents of this public comment.

In the original published version of the monograph the drawings submitted with the proposal for inclusion in the commentary were not printed with the proposal. Although they were and continue to be accessed at the link provided in the reason statement they were requested by the committee to be included for the commentary. In the version of the proposal now available online the drawings have been included however the quality is poor. The drawings have been resubmitted with this proposal with the change to the drawing notes to clarify that in addition to lumber, structural composite lumber is included as described in point 3 above.

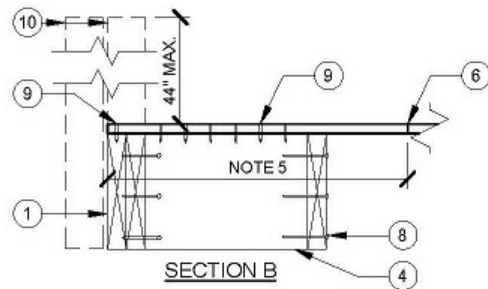
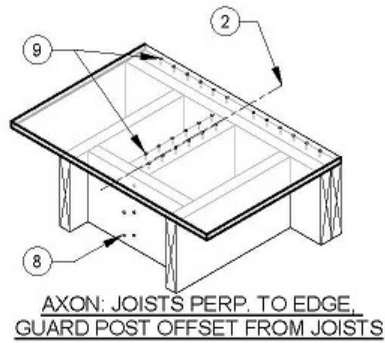
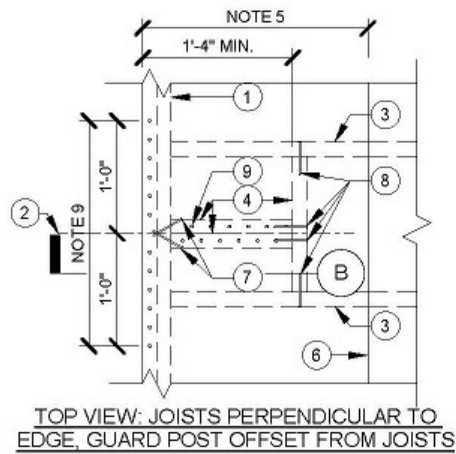
The committee requested a better understanding of only the cost differential between current deficient construction of floors supporting guards and one that complies with the proposal without consideration of the corrective measures cited in the original cost impact statement. Please see the revised cost impact statement included in this public comment. Related to cost it is worthwhile to note that 2 x 8 floor systems are not precluded however a prescriptive solution is not offered here. It was our intent to provide a prescriptive that could be simply done with available materials and nails. Special hardware options similar to those provided for the hardening of 2 x 8 deck systems are not excluded and could be used to resist the additional rotation.

It cannot be emphasized strongly enough that ***this proposal corrects a dangerous deficit to building safety. Current code actually requires nullification of manufacturers' warranties*** as it is not possible to connect guard posts to voids in a floor system that has not been engineered for guard connection. Current code does not provide a hardened floor system that is capable of resisting the required guard design load applied to the top of the guard. Specifically when guards and/or blocking are added subsequent to engineering of a floor system and are not included in the engineered design it not only nullifies the engineered solution and any warranty of serviceability but could result in the failure of the guard system to serve its defined purpose to "*...minimize the possibility of a fall from the walking surface to a lower level*".



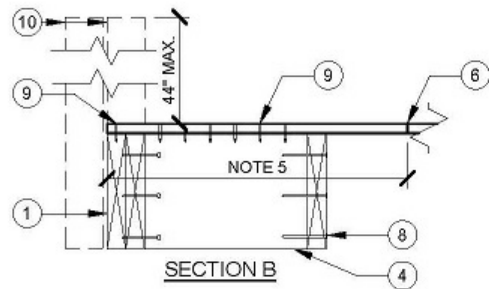
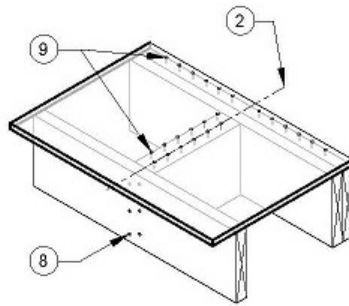
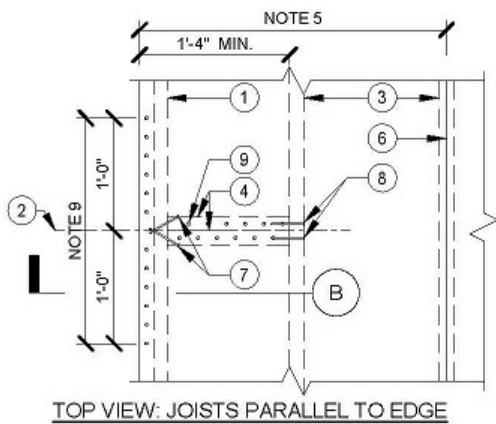
NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



NOTES:

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10. TOP- OR SIDE-MOUNTED GUARD POST.

Your approval of this public comment will correct a serious deficit in the code and improve building safety.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. An edge member of 16 linear feet would be comparable to the 3 post example cited in the original cost impact statement.

Prices below are based on an internet search on 5/28/22 that provided the following prices for 16 foot members:

2x10 Perpendicular Joist Header three Posts

2x10x16 Double Header +\$28.00 (Single Joist Addition)

2x10 Bridging +\$0 (3- scrap cut-offs)

Nails for toenail Fasteners +\$2; Joist Hangers +\$58

SCL Substitution for 2x10x16 Double Header +\$250, Hangers +\$58

SLT Substitution for 2x10x16 Double Header +\$330, Joist Hangers +\$58

2x10 Parallel Joist Header three Posts

Open Web Truss = -\$75; I- Joist = -\$65

2x10x16 Double Header +\$56.00

2x10 Bridging +\$7.00

Nails for toenail Fasteners +\$2; Joist Hangers +\$0

SCL Substitution for 2x10x16 Double Header +\$250, Joist Hangers +\$0

SLT Substitution for 2x10x16 Double Header +\$330, Joist Hangers +\$0

The options underlined are the most expensive material substitutions. The labor differential is negligible when considered in the original design from the start. It would be conservative to assume less than a \$500.00 increase in materials. Compared to the costs of \$400 - \$800 to inadequately remedy the building safety deficit allowed in the code as identified in the proposal, **it would be conservative to indicate there would be no impact on the cost of construction.**

Public Comment# 3052

Public Comment 2:

IRC: R502.11, R502.11.1, 502.11.2, 502.11.3, R502.11.3 (New), R502.11.4 (New), R502.11.6 (New)

Proponents: Marvin Strzyzewski, representing Truss Engineering Company (marvins@mii.com); Jay Jones, representing Truss Plate Institute (jpjones@tpinst.org) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

R502.11 Floor framing supporting guards. The framing at the open edge of a floor supporting a required guard assembly ~~not exceeding 44 inches (1118 mm) in height~~ shall be constructed in accordance with Sections R502.11.1 ~~or~~ R502.11.2, R502.11.3, or R502.11.4 for guard assemblies not exceeding 44 inches (1118 mm) in height or shall be designed in accordance with accepted engineering practice to support the guard assembly. ~~Where trusses and I-joists are used, prohibited as edge framing members supporting guards, except where the effects of the guard loads shall be specifically considered in the design of the edge member.~~

R502.11.1 Conventional edge framing. ~~Where a roll is aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a solid or built-up ~~wood~~ member of lumber, structural glued laminated timber, or structural composite lumber having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~5, with a roll brace aligned with each guard post.~~

~~502.11.2~~ **R502.11.2 Timber edge framing.** ~~Where a roll brace is not aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) structural glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~5~~ at intervals of 48 inches (1219 mm) or less.

~~502.11.3~~ **R502.11.5 Roll bracing for lumber edge members.** Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

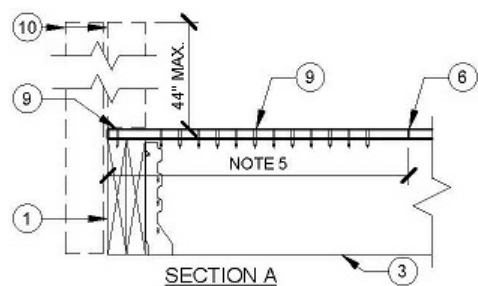
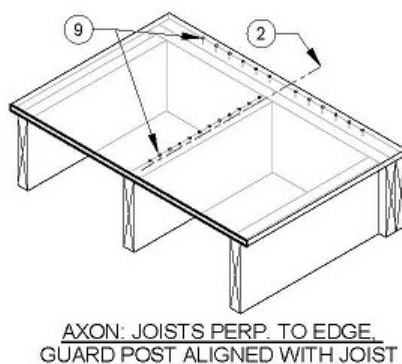
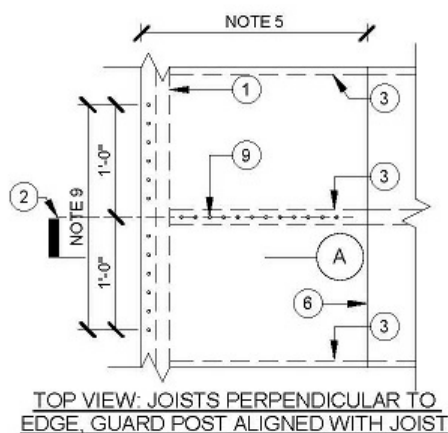
R502.11.3 Truss edge framing for Top Mount Guard Post. Where trusses are used as the floor edge framing member supporting top mount guards, the truss shall have a double top chord and double 4x2 vertical webs spaced 24 inches (610 mm) o.c. The truss shall have a minimum net width of 3-1/2 inches (90 mm) and a minimum net depth of 12 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.6 with a roll brace aligned with each guard post or at intervals of 24 inches (610 mm) or less.

R502.11.4 Truss edge framing for Side Mount Guard Post. Where trusses are used as the floor edge framing member supporting side mounted guards, the trusses shall have a double top chord and 4x4 vertical webs spaced 24 inches (610 mm) o.c. The trusses shall have a minimum net width of 3-1/2 inches (90 mm) and a minimum net depth of 12 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.6 with a roll brace aligned with each guard post. Guard posts shall be fastened only at 4x4 locations on the edge truss.

R502.11.6 Truss roll bracing. Each roll brace shall be a truss matching the depth of the edge member, shall fit between the edge truss and the common truss, and shall have a minimum length of 12.5 inches (317 mm). Roll braces shall be connected to the edge and common truss at each

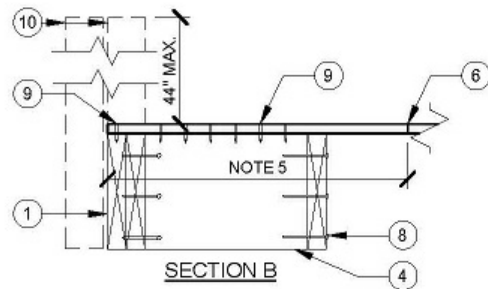
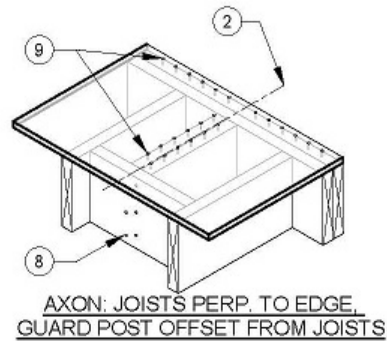
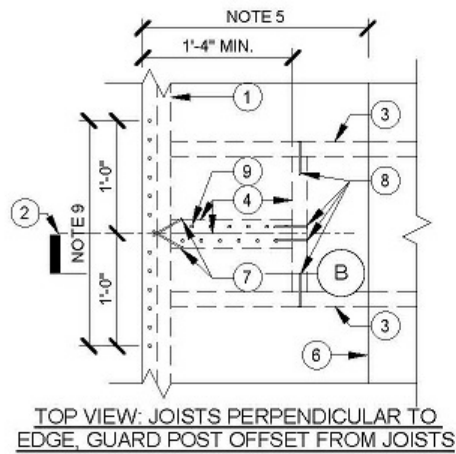
corner on each face with one 16d common nail, toe nailed. The bottom of the roll brace shall be connected to the bottom of the edge and common truss with a 3.125-inch x 7-inch (76 mm x 179 mm) 20-gauge steel strap with six (6) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(2) or R502.11.6(6) or 3.125 inch x 9 inch (76 mm x 229 mm) 20-gauge steel strap with six (6) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(4). When a side mount post connection is required the roll brace shall be connected to edge truss with a 3.125-inch x 5-inch (76 mm x 127 mm) 20-gauge steel strap with five (5) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(6). Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge truss and shall be fastened to the edge truss with 8d common nails at 3 inches (76 mm) on center along the length of the floor opening, and to each roll brace with eight (8) – 8d common nails, four (4) nails in two rows. Floor sheathing shall be nailed to the common truss with 8d common nails at 3 inches (76 mm) o.c. within 24 inches of each guard post, and 6 inches (152 mm) o.c. o.c. for the balance of the span. Floor sheathing connection in accordance with Figure R502.11.6(1), Figure R502.11.6(3) or Figure R502.11.6(5).

Commenter's Reason: The proponents of these comments agree that there is a need for adequate guard post connection. We have added a prescriptive method to include open webbed metal plate connected wood trusses to stair opening edge framing.



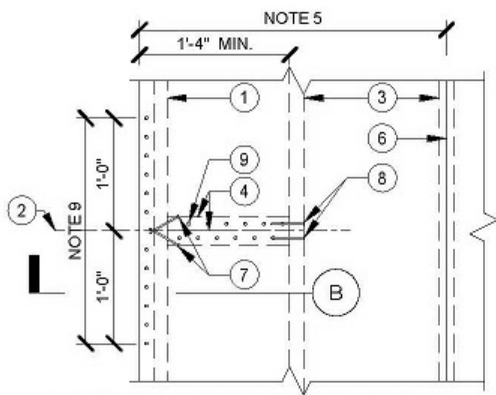
NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.

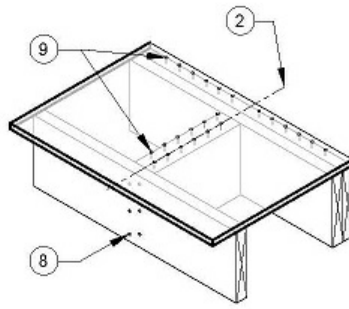


NOTES:

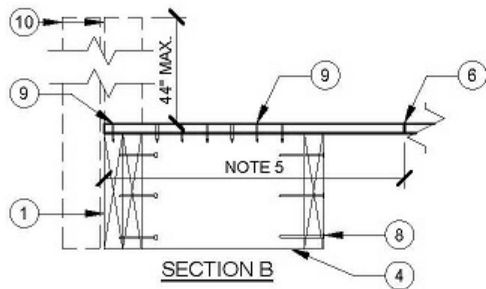
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10. TOP- OR SIDE-MOUNTED GUARD POST.



TOP VIEW: JOISTS PARALLEL TO EDGE



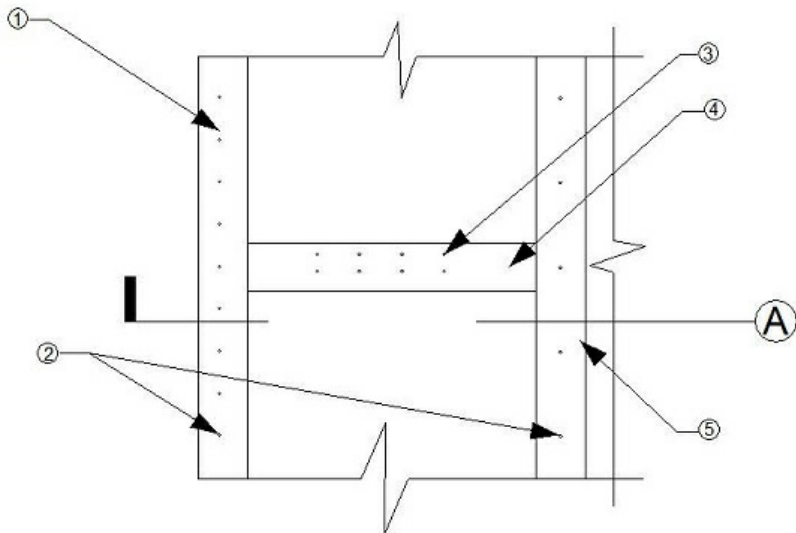
AXON: JOISTS PARALLEL TO EDGE



SECTION B

NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
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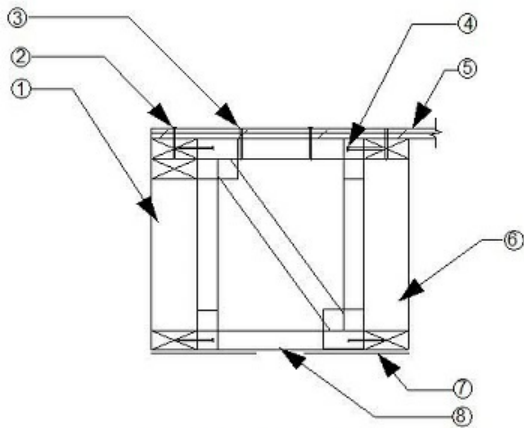


PLAN VIEW - COMMON TRUSS PARALLEL WITH EDGE TRUSS

TOP MOUNT CONNECTION

- NOTES:
- 1 EDGE TRUSS
 - 2 8d COMMON NAILS 3 INCH o.c. IN TO THE EDGE TRUSS
 - 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
 - 4 ROLL BRACE
 - 5 COMMON TRUSS

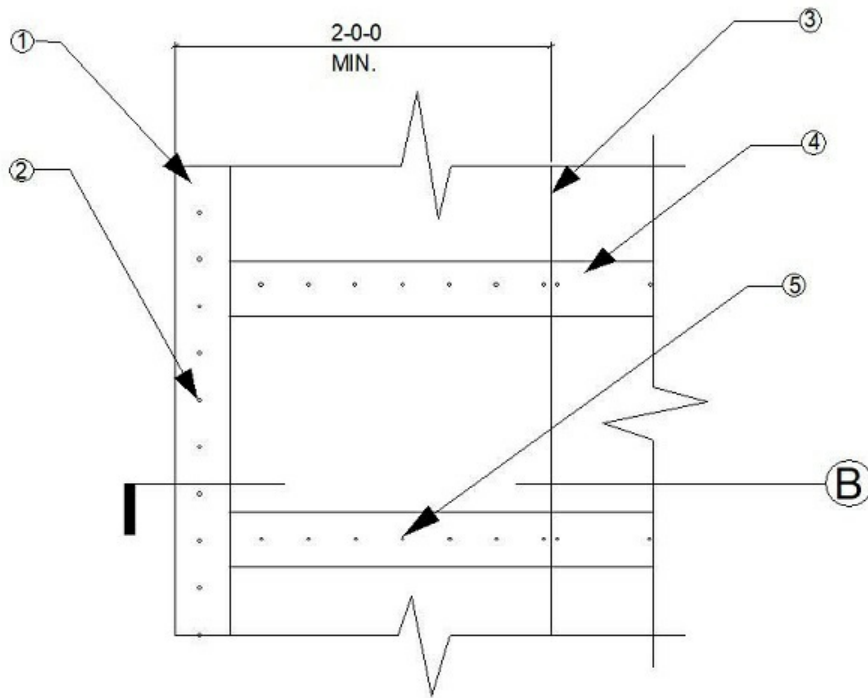
Figure R502.11.6(1)



SECTION-A TOP MOUNT CONNECTION

- NOTES:
- 1 EDGE TRUSS
 - 2 8d COMMON NAILS 3 INCH o.c. IN TO EDGE TRUSS
 - 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
 - 4 (1) 16d COMMON TOE-NAIL IN EACH CORNER OF ROLL BRACE TO EACH FACE
 - 5 FLOOR SHEATHING
 - 6 COMMON TRUSS
 - 7 3-1/8 INCHx 7 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS PER MEMBER
 - 8 ROLL BRACE

Figure R502.11.6(2)



PLAN VIEW - COMMON TRUSS PERPENDICULAR TO EDGE TRUSS

NOTES:

1 EDGE TRUSS

2 8d COMMON NAILS 3 INCH O.C.

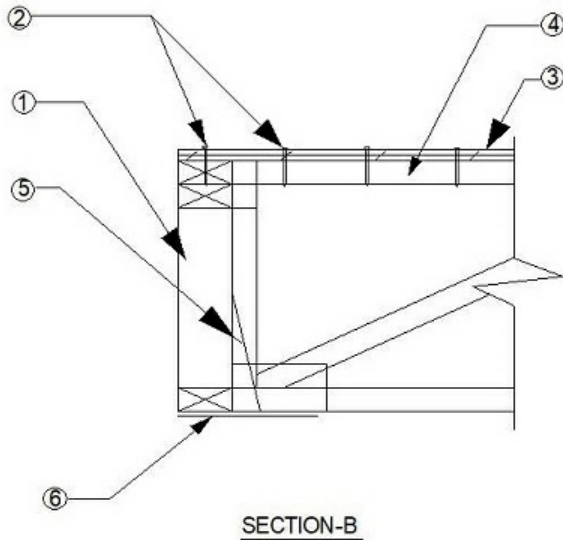
3 SHEATHING JOINT

4 COMMON TRUSS

5 8d COMMON NAILS 3 INCH O.C. FOR THE FIRST 24 INCHES THEN 6 INCHES

O.C.

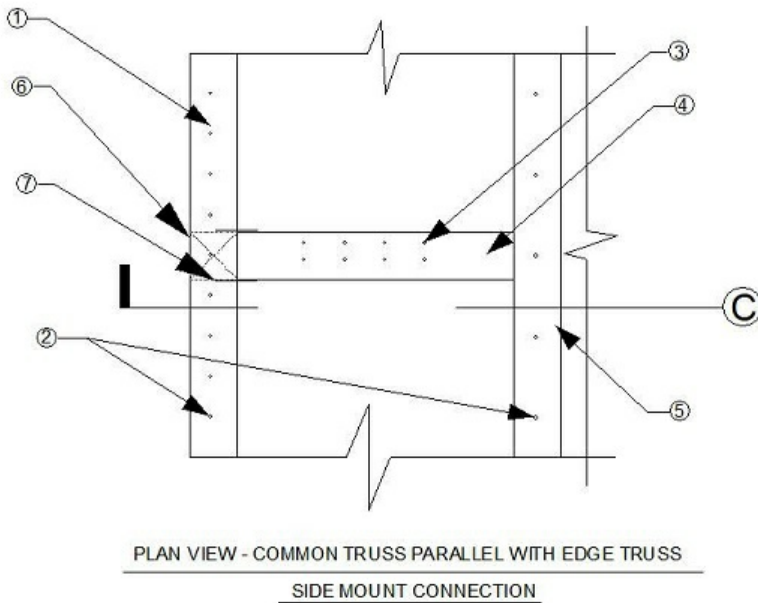
Figure R502.11.6(3)



NOTES:

- 1 EDGE TRUSS
 - 2 8d COMMON NAILS 3 INCH o.c. IN TO TRUSSES
 - 3 FLOOR SHEATHING
 - 4 COMMON TRUSS
 - 5 TOP MOUNTED TRUSS HANGER
 - 6 3-1/8 INCHx 9 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS
- PER MEMBER

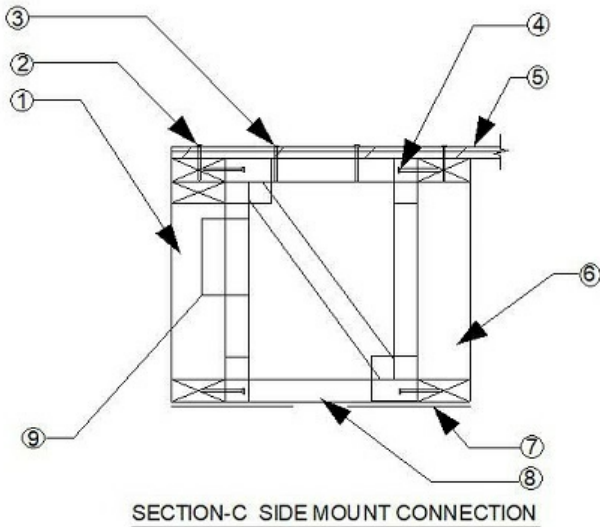
Figure R502.11.6(4)



NOTES:

- 1 EDGE TRUSS
- 2 8d COMMON NAILS 3 INCH o.c. IN TO THE EDGE TRUSS
- 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
- 4 ROLL BRACE
- 5 COMMON TRUSS
- 6 EDGE OF ROLL BRACE SHALL ALIGN WITH EDGE OF 4x4 VERTICAL
- 7 3-1/8 INCHx 5 INCHx 20 STRAP WITH (5) 8d COMMON NAILS PER MEMBER PER FACE

Figure R502.11.6(5)



NOTES:

- 1 EDGE TRUSS
- 2 8d COMMON NAILS 3 INCH o.c. IN TO EDGE TRUSS
- 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
- 4 (1) 16d COMMON TOE-NAIL IN EACH CORNER OF ROLL BRACE TO EACH FACE
- 5 FLOOR SHEATHING
- 6 COMMON TRUSS
- 7 3-1/8 INCHx 7 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS PER I
- 8 ROLL BRACE MEMBER
- 9 3-1/8 INCHx 5 INCHx 20 ga STEEL STRAP WITH (5) 8d COMMON NAILS PER MEMBER

Figure R502.11.6(6)

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction

It is our estimate that the increased cost should be very similar to that shown in the original proposal of \$400-\$800. This includes the increase in cost of the edge truss versus the common truss that is being replaced in addition to the roll braces. The upper bound cost would be lower if guard post locations were on the construction documents.

Public Comment# 3434