

Connecticut Code Chronicle

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2024 IRC Adds Prescriptive Edge Framing Rules for Guard Posts

By Jeff Remas

The 2024 IRC introduces a new set of provisions in Section R502.11 that directly address a problem inspectors and builders have been running into for years: guards are only as strong as the floor edge framing they are attached to. The “Key Changes” commentary explains the issue plainly: guards have to transfer outward and downward forces at the top of the guard into the floor framing, and when that connection fails, the guard cannot protect people. The same commentary notes that many floor systems, including engineered systems, are not designed and constructed to resist guard loads at the open edge, and the deficiency is often discovered late, during guard installation, when reinforcement or redesign becomes expensive and disruptive.

What the new code section requires, and what it does not do

R502.11 is not a new guard requirement; it is a new framing requirement for floors that already need guards. It applies to the “open edge of a floor supporting a required guard assembly,” and it creates a prescriptive path when the guard assembly does not exceed 44 inches (1118 mm) in height. If the guard assembly exceeds 44 inches, the code does not say guards are prohibited; it says the edge framing must be designed using accepted engineering practice.

The same section also addresses a common blind spot with engineered floor products. The final language is not a blanket ban on trusses or I joists at the edge; instead, it requires that when trusses and I joists are used as edge framing members supporting guards, the effects of the guard loads must be specifically considered in the design of the edge member. The commentary behind the code change ties that requirement to real constructability issues at the edge, limited fastener embedment into an I joist web, and voids or metal plate areas in trusses where fasteners either cannot be installed or cannot develop the needed capacity.

Two prescriptive edge framing options, based on post alignment

R502.11 sends you to one of two edge framing options, depending on whether roll bracing can be aligned with each guard post.

Under R502.11.1, Conventional edge framing, the prescriptive option is allowed when a roll brace is aligned with each guard post. In that case, the framing at the edge of the floor must be a solid or built-up member of lumber, structural glued laminated timber, or structural composite lumber, with a minimum net width of 3 inches (76 mm) and a minimum net depth of 9 1/4 inches (235 mm). The illustrations and accompanying

requirements treat this as a “hardened” floor edge; the detail shows a minimum 3-inch by 9.25-inch edge member, a minimum 9.25-inch joist, and a minimum 2-foot width of continuous floor sheathing at the edge.

Under R502.11.2, Timber edge framing, the prescriptive option is used when a roll brace is not aligned with each guard post. Because the bracing cannot be placed at every post location, the code requires a heavier edge member that can resist torsion and distribute load. The edge member must be at least a 6-inch by 10-inch sawn timber, or at least a 5 1/8 inch by 9 1/4 inch structural glued laminated timber, and it still must be braced by roll bracing, but now the roll bracing is permitted at intervals of 48 inches (1219 mm) or less.

The “Key Changes” commentary explains the intent behind the two options in practical terms. When the framing is adequate, and the floor edge cannot rotate, both top-mounted and side-mounted guards can work. The prescriptive approach is aimed at preventing rotation and torsion at the floor edge, either by adding blocking that braces individual joists against rolling or by using a beam-type edge member that can resist torsion while allowing bracing to be spaced farther apart.

Roll bracing is now defined, and it is not optional

R502.11.3 defines “roll bracing” in a way that is inspectable. Each roll brace must be a joist or blocking that matches the depth of the edge member and extends perpendicular to the edge member at least 16 inches (406 mm) from the edge. Where blocking is used, it must have end connections with not fewer than six 16d common nails, which match the nail callouts shown in the illustrations.

This section also puts real teeth into the sheathing and nailing requirements, because the load path is not just the post to the edge member, it is the entire edge assembly working together. The floor sheathing must be continuous for at least 24 inches (610 mm) from the edge. It must be fastened to each roll brace with not fewer than twelve 10d common nails, and it must be fastened to the edge member with at least twelve 10d common nails within 12 inches (305 mm) of the roll brace. The illustrations reinforce this with notes calling for a minimum of twelve 3-inch by 0.148-inch nails along the sheathing line at the edge, and they show additional toe-nailed connections at blocking where applicable.

Why did the code choose 44 inches

The commentary explains why the prescriptive path stops at 44 inches even though the IRC’s minimum guard height is 36 inches. In real construction, posts, caps, and finishes often extend above the minimum, so the code writers used 44 inches as a

Connecticut Code Chronicle

conservative maximum guard height for the purpose of developing a prescriptive edge member size, roll bracing, and nailing package. The prescriptive details are written around that upper bound. Once guard height goes beyond that, the code does not try to guess the right details; it pushes the design into an engineered approach.

The enforcement takeaway

This is one of those code changes that should reduce field conflicts, because it moves the problem forward in the timeline. The “Code Change Details” narrative describes a pattern that building departments see constantly: inadequate edge framing is discovered at guard installation, after finishes are in place, and the fix often requires demolition to install blocking and harden the edge. The code change argues that the problem persists unless it is codified, and the cost discussion explicitly ties the change to eliminating after-the-fact rework. The committee’s stated reason for approval was that the proposal provides a prescriptive solution that makes the guard load transfer requirements enforceable, even while the proposal’s path through public comment included

clarifications to improve interpretation and alignment between the subsections.

The preceding article first appeared on [The Building Code Forum](#) and is used with permission of the author. Jeff Remas can be found through his [LinkedIn page](#)

[Editorial comment] Where can we find illustrations or examples of what the new requirements mean? Fortunately, a lot of information is available, and companies such as Simpson Strong-Tie have developed connectors to help. The following are some links to helpful articles that show various *presumptively* compliant solutions:

[Fine HomeBuilding Magazine](#)

[Journal of Light Construction](#)

You can also refer to Simpson Strong-Tie literature, but their solutions will naturally show only those that use their products. Remember, we can’t design the deck for the applicant, we can only review their design for code compliance. However, we can point them to sources they can use for guidance.

New IRC Changes for Alternate Materials

The IRC for 2024 includes significant changes regarding the authority of building officials to approve new and alternate materials and methods. The provision has been relocated in Chapter 1, and more specific criteria for approving alternate materials and methods have been added. In the 2021 IRC, this provision was found in section R104.11, which provided (in part):

... The building official shall first find that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code.

Section R104.11.1 went on to provide (in part) that:

... Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*.

Connecticut did not amend either R104.11 or R104.11.1 in adopting the 2021 IRC. However, in adopting the 2021 IRC Connecticut added a new subsection, 104.11.2, which reads:

R104.11.2 Research reports. Submission to the local *building official* of a valid research report prepared by an *approved* evaluation service that supports the efficacy of

use of any material, appliance, *equipment* or method of construction not specifically provided for in this code, or that demonstrates compliance with this code, may be deemed evidence of compliance with this code.

In the 2024 IRC, section R104.11 is gone. The provisions addressing approval of alternate materials and methods have been moved up to section R104.2.2 and expanded for clarity. The new language is as follows:

R104.2.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved.

R104.2.2.1 Approval authority. An alternative material, design or method of construction shall be approved where the *building official* finds that the proposed alternative is satisfactory and complies with Sections R104.2.2 through R104.2.2.6.2, as applicable.

R104.2.2.2 Application and disposition. Where required, a request to use an alternative material, design or method of construction shall be submitted in writing to the *building official* for approval. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not approved.

R104.2.2.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

R104.2.2.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all the following, as applicable:

1. Quality.
2. Strength.
3. Effectiveness.
4. Durability.
5. Safety, other than fire safety.
6. Fire safety.

R104.2.2.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Such tests shall be performed by a party acceptable to the *building official*.

R104.2.2.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections R104.2.2.6.1 and R104.2.2.6.2.

R104.2.2.6.1 Evaluation reports. Evaluation reports shall be issued by an *approved agency* and use of the evaluation report shall require approval by the *building official* for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the *building official's* recognition of the *approved agency*. Criteria used for the evaluation shall be

identified within the report and, where required, provided to the *building official*.

R104.2.2.6.2 Other reports. Reports not complying with Section R104.2.2.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The *building official* is authorized to require design submittals to be prepared by, and bear the stamp of, a *registered design professional*.

What changed? A careful reading of the 2021 provisions leaves requirements for tests or reports to substantiate that proposed alternate materials or methods comply with the intent of the code as optional, to be submitted only when the building official thinks it's necessary. Obviously, this is an invitation for confrontation, because tests and evaluation reports cost money, and neither applicants, owners, contractors, nor suppliers want to spend money on testing when they can just print up fancy brochures proclaiming that their new product is the greatest thing since the invention of sliced bread.

The 2024 provisions remove the optional character of tests and reports for proposed alternate materials and methods. Subsection 104.2.2.4 spells out six explicit criteria that any proposed alternate has to satisfy. It is important to note that a proposed alternate must satisfy *all six* of these criteria. Subsections R104.2.2.5 and R104.2.2.6 require tests and/or evaluation reports to document claims of equivalent performance. Fancy sales brochures can no longer be used as a substitute for performance-based evaluation data. The new, reorganized language gives the building official more "teeth" when requiring specific performance data for evaluating proposed alternate materials and methods.

Investigating An Investigation

Believe it or not, the title of this brief article is a statement that a police officer actually made when asked what authority he had to demand that a citizen answer his questions. Asked by what authority he was detaining an individual, the officer said, "I'm investigating an investigation." I was reminded of it when my YouTube algorithm for some reason sent me a link to this [YouTube Short](#).

The code inspector in the video made a statement on the witness stand that summarizes the problem we sometimes face: "How can we check for violations if we are denied entry?"

That's a fair question. Most of us, I hope, know the answer but for those who either don't know or have forgotten, the answer is simple: Get a warrant.

How do we do that? If you don't already have it, the form on which to apply for an administrative search warrant can be downloaded from the State's web site, [here](#).

Complete the form, submit it to the Superior Court, and if you have shown reasonable proper cause, a judge should issue the warrant. This will start a 10-day time window within which you must conduct the inspection. You have to show the one-page warrant at the time you show up to perform the inspection, and within 48 hours after the inspection you must deliver to the property owner or tenant a full and complete copy of the warrant application and a copy of all affidavits upon which the warrant is based.

The Connecticut Fire Marshals Association has on their web site a helpful, annotated copy of an application for an administrative search warrant that can be used as a guide. You can download that document as a PDF [here](#).

The State's Attorney's Office has prepared a 63-page document that provides an in-depth review of search warrants. [That document](#) includes a list of the State's Attorney's Offices around the state. Contact the office closest to your municipality for

Connecticut Code Chronicle

assistance in completing the application, and for submitting the application to the Superior Court.

Going through the process to obtain and to act on an administrative search warrant takes time and effort. It's an important step. If we don't follow the process, the result is likely to be the same as what happened to the code official in the video: you'll go to court, a judge will give you a slap on the wrist, and whatever

issues you hoped to resolve won't be addressed. Worse, any evidence you documented in your warrantless search will not be allowed to be used as evidence — ever. That's not helpful.

Don't be the guy in that video. If a property owner or tenant doesn't consent to your entering their property, jump through the hoops and obtain a search warrant.

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The editor is a licensed architect and a licensed building official, with more than 40 years of experience. I offer non-structural plan review services for projects of any size, with special rates for municipal building departments.

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What topics would you like to see discussed in future issues? It helps all of us if we can all be on the same page, to avoid those "But I never have to do that in [town]" complaints.

Send me an e-mail if you think of any issues that affect all building officials, everywhere.