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Proposed Change 2030

Code Reference(s):	NBC20 Div.B 9.31.2.3. (first printing)
Subject:	Accessibility, Visitability and Adaptability of Dwelling Units
Title:	Reinforcing Stud Walls in Washrooms for the Future Installation of Grab Bars: Structural Strength
Description:	This proposed change introduces performance-based requirements and prescriptive pathways for material selection when reinforcing stud walls of washrooms in dwelling units for the future installation of grab bars.
Related Proposed Change(s):	PCF 1882, PCF 1884, PCF 1958, PCF 2031

This change could potentially affect the following topic areas:

- | | |
|--|---|
| <input type="checkbox"/> Division A | <input checked="" type="checkbox"/> Division B |
| <input type="checkbox"/> Division C | <input checked="" type="checkbox"/> Design and Construction |
| <input type="checkbox"/> Building operations | <input checked="" type="checkbox"/> Housing |
| <input checked="" type="checkbox"/> Small Buildings | <input checked="" type="checkbox"/> Large Buildings |
| <input type="checkbox"/> Fire Protection | <input checked="" type="checkbox"/> Occupant safety in use |
| <input checked="" type="checkbox"/> Accessibility | <input type="checkbox"/> Structural Requirements |
| <input type="checkbox"/> Building Envelope | <input type="checkbox"/> Energy Efficiency |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input type="checkbox"/> Plumbing |
| | <input type="checkbox"/> Construction and Demolition Sites |

General information

See the summary for subject Accessibility, Visitability and Adaptability of Dwelling Units.

Problem

Stud walls in washrooms are often reinforced with materials such as solid lumber blocking, plywood or oriented strandboard (OSB) sheathing to allow grab bars to be installed in locations other than attached directly to the studs while still complying with the NBC requirements for structural strength (which stipulate that grab bars, where provided, must resist 1.3 kN applied horizontally and vertically).

However, the NBC does not provide guidance for designers or builders in terms of how to select the reinforcing materials and methods of attaching the material to the studs, so that grab bars attached to the reinforcing material comply with the applicable requirements for structural strength.

This situation can create a problem for designers and builders who may not have the resources to demonstrate that their material selection and method of attaching the material to the studs allows grab bars to meet the requirements for structural strength and provides an appropriate level of safety to users.

Justification

This proposed change introduces a performance-based requirement and prescriptive compliance options that would allow the reinforcement of stud walls in washrooms to support grab bars and meet the NBC requirements for structural strength. The compliance options address the following:

- reinforcement material and its thickness, and
- method of attaching the material to the stud walls where wood studs are provided.

By introducing a performance-based requirement for reinforcing washroom walls in a way that allows grab bars to meet NBC requirements for structural strength, the proposed change would also provide designers with flexibility in terms of material selection and the method of attaching the material to different types of stud walls.

By providing prescriptive options in conjunction with the performance-based requirement, this proposed change would also reduce the cost and inconvenience for designers and builders who may not have the resources to show that their material selection or method of mounting to the studs is adequate.

Both the performance-based requirement and prescriptive options would limit the probability that a grab bar would detach from the wall during use and cause a fall or fall-related injury to users.

PROPOSED CHANGE

NBC20 Div.B 9.31.2.3. (first printing)

[9.31.2.3.] 9.31.2.3. Grab Bars

[1] 1) Where ~~re~~ provided, grab bars shall be capable of resisting a load of not less than 1.3 kN applied vertically or horizontally.

[2] --) Where stud walls in a dwelling unit are reinforced to support the present or future installation of grab bars between the studs, the reinforcement shall be designed to allow grab bars to comply with Sentence (1), using an appropriate

[a] --) combination of reinforcement material and thickness, and

[b] --) method of attaching the reinforcement material to the studs.
(See Note A-9.31.2.3.(2).)

[3] --) Options for compliance with Clause (2)(a) include but are not limited to

[a] --) solid lumber having a minimum thickness of 38 mm (see Note A-9.31.2.3.(3)(a)), and

[b] --) OSB or plywood sheathing having a minimum thickness of 25.4 mm (see Note A-9.31.2.3.(3)(b)).

[4] --) Where the stud walls have wood studs and the combination of reinforcement material and thickness conforms to Clause (3)(a), options for compliance with Clause (2)(b) include those listed in Table 9.31.2.3.

Table [9.31.2.3.]
Compliance Options for the Attachment of Solid Lumber to Wood Studs
Forming Part of Sentence 9.31.2.3.(4)

Fastener Type	Minimum Length of Fastener, mm	Minimum Number of Fasteners to Connect each piece of Material to the Studs ⁽¹⁾		Minimum Spacing, mm ⁽²⁾	
		End-fastened	Toe-fastened	Fastener Spacing	Edge Spacing
<u>Nails ⁽³⁾</u>	<u>63</u>	<u>5</u>	<u>4</u>	<u>32.0</u>	<u>19.0</u>
<u>No. 8 wood screws</u>	<u>76</u>	<u>3</u>	<u>3</u>	<u>44.0</u>	<u>25.4</u>
<u>No. 10 wood screws</u>	<u>89</u>	<u>3</u>	<u>2</u>	<u>50.8</u>	<u>25.4</u>

Notes to Table [9.31.2.3.] :

- (1) The minimum number of fasteners applies to each end of each piece of lumber used as reinforcement.
- (2) Smaller fastener and edge spacings may be acceptable for certain types of lumber.
- (3) The values provided in this Table have been determined based on nails having a nominal diameter of 3.25 mm.

- [5] --)** Where the reinforcement material is attached to wood studs and the combination of reinforcement material and thickness conforms to Clause (3)(b), options for compliance with Clause (2)(b) include attaching the reinforcement material
- [a] --) with No. 10 or No. 12 wood screws that have a minimum length of 50.8 mm, and
 - [b] --) using a minimum of 3 screws per stud spanned by the material.
(See Note A-9.31.2.3.(5).)
- [6] --)** Where the reinforcement material is installed behind other materials, gaps are not permitted between the reinforcement and the outer materials. (See Note A-9.31.2.3.(6).)
- [7] --)** Where a grab bar having a minimum of two flanges is provided in accordance with Sentence (1), options for fastening wood screws per flange of the grab bar to the wall include the use of a minimum of 3 No. 10 or No. 12 wood screws that penetrate at least
- [a] --) 32 mm into solid lumber, or
 - [b] --) 25.4 mm into OSB or plywood.

Note A-9.31.2.3.(2) Compliance Options for Reinforcements for Grab Bar Installation.

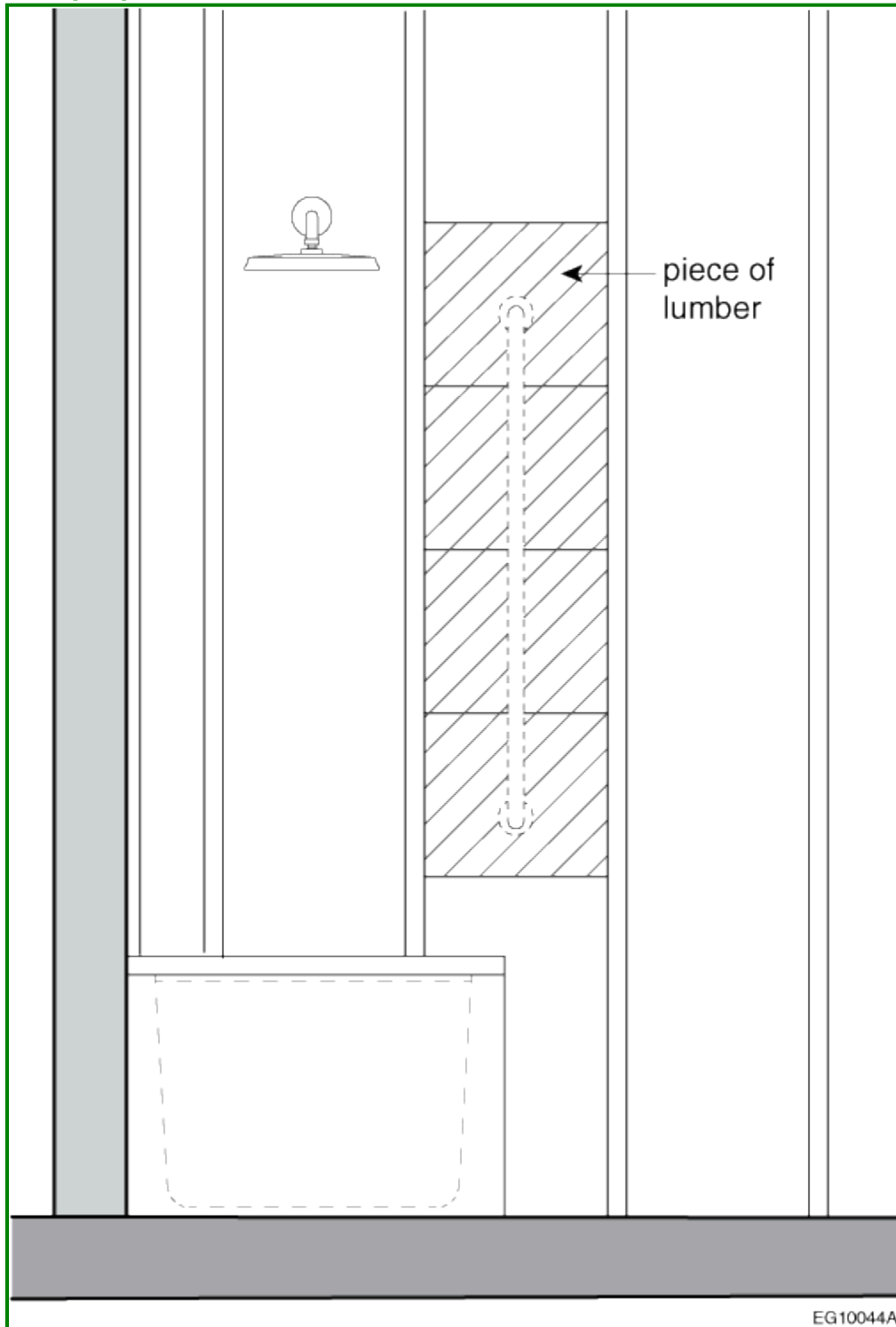
Sentence 9.31.2.3.(2) is intended to provide designers with the flexibility to choose the material used to reinforce the stud walls in washrooms, the thickness of the material, the type of studs, and the method of attaching the material to the studs. Designers may use any combination of material and thickness, stud type, and method of attachment, as long as they demonstrate that the combination allows grab bars to comply with the requirement of Sentence 9.31.2.3.(1) grab bars to resist a load of at least 1.3 kN applied horizontally and vertically.

Sentences 9.31.2.3.(3) and (5) provide prescriptive options for designers who do not wish to use the performance-based requirement set out in Sentence 9.31.2.3.(2). Sentence 9.31.2.3.(3) addresses the material and thickness, and Sentences 9.31.2.3.(4) and (5) address the method of attaching the material to the studs, in the case of wood studs.

Note A-9.31.2.3.(3)(a) Lumber Reinforcement.

Multiple pieces of lumber may be used as reinforcement to achieve the desired wall coverage, as illustrated in Figure A-9.31.2.3.(3)(a).

Figure [A-9.31.2.3.(3)(a)]
Multiple pieces of lumber used as reinforcement

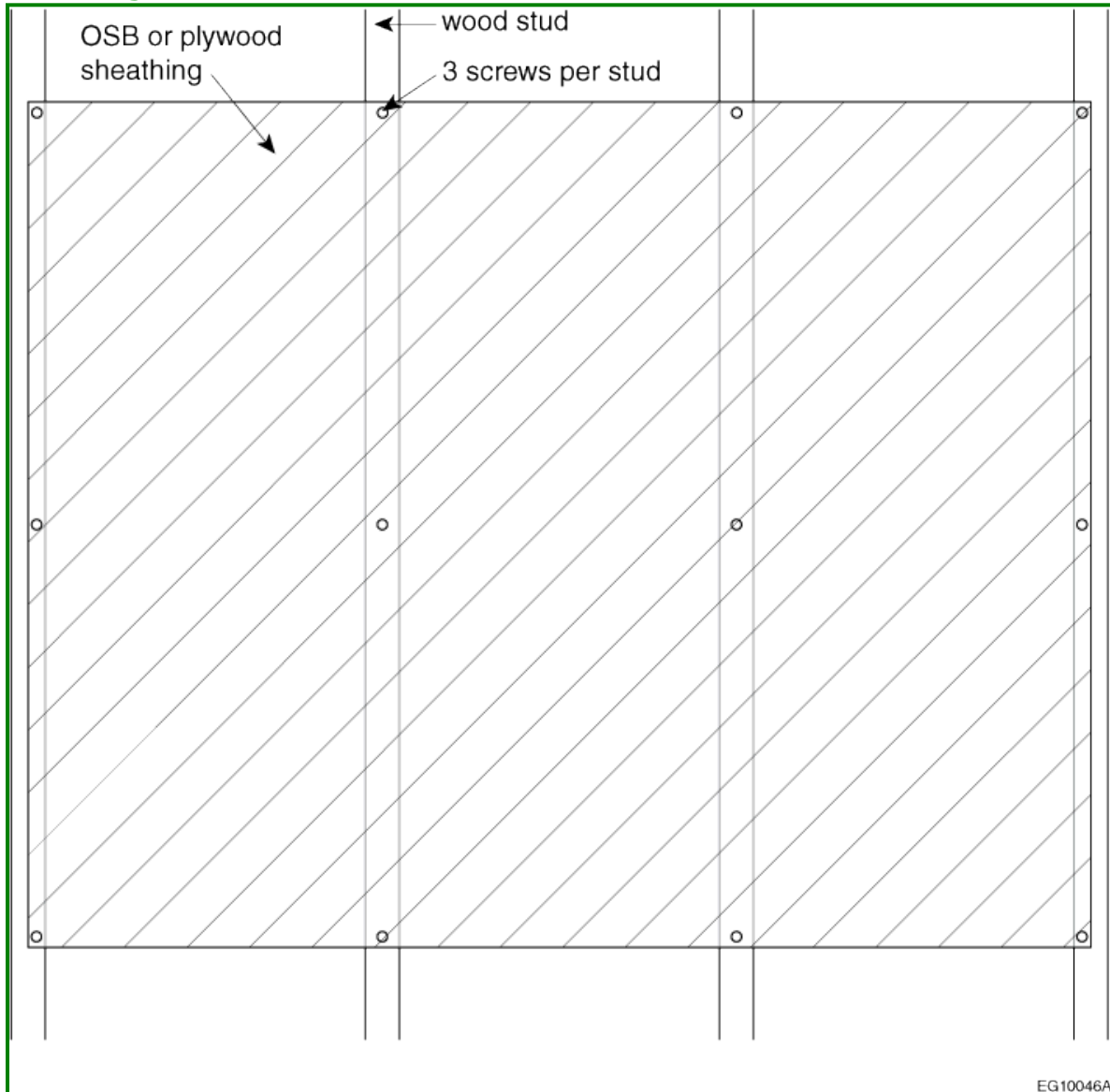


Note A-9.31.2.3.(3)(b) Minimum Thickness of Sheathing.

The minimum thickness of OSB or plywood sheathing can be achieved by using a single piece of 25.4 mm sheathing or by combining two sheets (one 9.5 mm thick and one 15.9 mm thick, or both 12.7 mm thick) with adhesive.

Note A-9.31.2.3.(5) Attachment of Sheathing to Wood Studs.

Figure A-9.31.2.3.(5) illustrates an example of an acceptable configuration for attachment of OSB or plywood sheathing to wood studs with a minimum of 3 screws per stud.

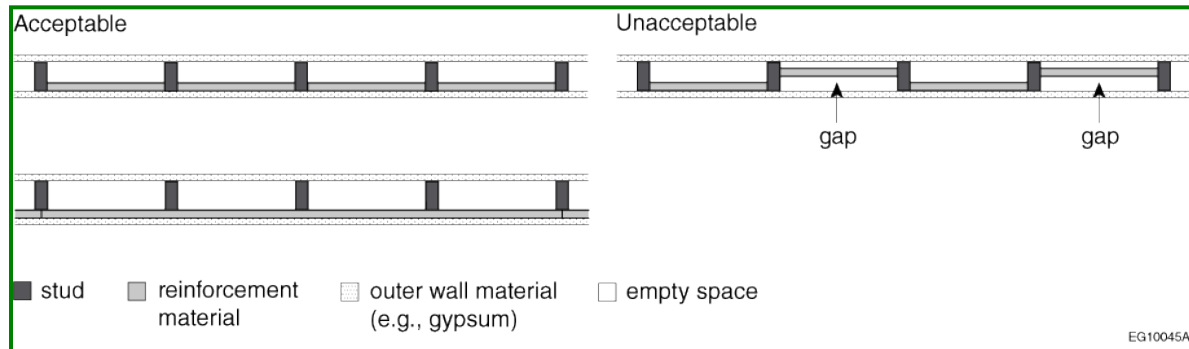
Figure [A-9.31.2.3.(5)]**Example of an acceptable configuration for the attachment of OSB or plywood sheathing to wood studs****Note A-9.31.2.3.(6) Contact Between Reinforcement and Other Materials in the Wall.**

Since the structural strength calculations that support Article 9.31.2.3. assume that the reinforcement material is in full contact with the outer wall material (e.g., gypsum) that it is installed behind, gaps between these materials are not permitted. Figure A-9.31.2.3.(6) illustrates examples of wall assemblies with acceptable and unacceptable configurations of the reinforcement material with respect to the outer wall material. In

the unacceptable configuration, there are gaps between some of the pieces of reinforcement material and the outer wall material that they are installed behind.

Figure [A-9.31.2.3.(6)]

Top view of examples of wall assemblies with acceptable and unacceptable configurations of the reinforcement material with respect to the outer wall material



Impact analysis

Financial Impact

This proposed change, on its own, does not introduce new costs because the NBC does not presently require the reinforcement of washroom walls.

In cases where washroom walls are reinforced (e.g., to comply with building codes in Nova Scotia, Ontario, Quebec and BC), designers typically have to demonstrate that their selection of materials and the method of attachment to the studs would allow grab bars to meet the NBC requirements for structural strength. Thus, the performance-based requirement is consistent with current practice. By introducing prescriptive options, the costs to designers, builders and owners may be reduced by removing the need to demonstrate compliance with the performance-based requirement.

The proposed change does not yet provide options for steel studs; in this case, the designer would need to demonstrate compliance with the performance-based requirements, consistent with current practice in the provinces that already require some form of reinforcement to washroom walls where stud walls are provided.

The proposed change also does not address masonry walls, which require different approaches to the installation of grab bars.

Impact on Safety

This proposed change, on its own, does not affect washroom safety because it does not require the installation of grab bars. However, where grab bars are installed using reinforcement (as opposed to the wall studs), the proposed change would make it easier for designers and builders to select materials that support grab bars in compliance with the NBC requirements for structural strength.

Impact on the Provinces and Territories

Multiple provinces require that washroom walls in dwelling units be reinforced to support the future installation of grab bars. Ontario and Nova Scotia require reinforcement in all dwelling units, Quebec requires reinforcement to washroom walls in all dwelling units in multi-unit residential buildings, and BC and Alberta require reinforcement in dwelling units designated as adaptable. However, none of these provinces and territories provide prescriptive options for the reinforcement materials or method of attachment to the studs. By providing prescriptive options, this proposed change would reduce the costs for designers, builders and owners should they not wish to demonstrate that their selection of reinforcement materials allows grab bars to meet the NBC requirements for structural strength.

Enforcement implications

The performance-based requirements can be evaluated by reviewing the supporting calculations.

The prescriptive options can be evaluated using visual inspection and a tape measure.

Who is affected

Designers and builders would have compliance options for reinforcing washroom walls to support grab bars that comply with the NBC requirements for structural strength.

Homeowners would be less likely to encounter grab bars installed using reinforcement that does not provide adequate structural strength.

Authorities having jurisdiction would need to become familiar with and enforce this proposed change.

OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

NBC20 Div.B 9.31.2.3. (first printing)

[9.31.2.3.] 9.31.2.3. ([1] 1) [F20-OS3.1]

[9.31.2.3.] -- ([2] --) [F20-OS2.1]

[9.31.2.3.] -- ([2] --) [F30-OS3.1] [F20-OS3.1]

[9.31.2.3.] -- ([3] --) [F20-OS2.1]

[9.31.2.3.] -- ([3] --) [F30-OS3.1] [F20-OS3.1]

[9.31.2.3.] -- ([3] --) no attributions

[9.31.2.3.] -- ([4] --) no attributions

[9.31.2.3.] -- ([4] --) [F20-OS2.1]

[9.31.2.3.] -- ([4] --) [F30-OS3.1] [F20-OS3.1]

[9.31.2.3.] -- ([5] --) no attributions

[9.31.2.3.] -- ([5] --) [F20-OS2.1]

[9.31.2.3.] -- ([5] --) [F30-OS3.1] [F20-OS3.1]

[9.31.2.3.] -- ([6] --) [F20-OS2.1]

[9.31.2.3.] -- ([7] --) [F20-OS2.1]

[9.31.2.3.] -- ([7] --) no attributions

[9.31.2.3.] -- ([7] --) [F30-OS3.1] [F20-OS3.1]