Draft ANSI/APA PRR-410 Ballot #1 (Closed January 11, 2010)
Summary of Comments and Proposed Responses

Item	Section		Ballot	
1	1		Approval of Section 1	
Item	**Voter**	**Vote**	**Comments**	**Proposed Responses**
1	Bao	Aw/C	In 1.4, last sentence, either delete "an" or change "boards" to "board" to be consistent.	Editorial
1	Di Lenardo	Aw/C	1.1 Editorial: "An engineered wood rim board is a rectangular-shaped product manufactured from **either**, structural-use panels…."	Editorial
1	Smart (Stochlia)	Aw/C	Section 1.5: Regarding the phrase "…of solid–sawn lumber…" I just wanted to point out that this language differs from Sections 8.1.4 and 9.1.4 of the NDS; however, I do not necessarily object to this language, since it is conservative (i.e., as I understand it, solid-sawn lumber will generally equilibrate to 16% MC at a lower relative humidity than engineered wood).	No action (consent by Mr. Smart)
Item	**Section**		**Ballot**	
2	2		Approval of Section 2	
Item	**Voter**	**Vote**	**Comments**	**Proposed Responses**
2	Di Lenardo	Neg	1.2 Technical: "An engineered wood rim board shall have been qualified as meeting one or more of the referenced product standards listed in Section 2." Also, in this same spirit: Article 3.2.7 requires that SCL meet the requirements of ASTM D5456 Article 3.2.8 requires that Glulam meet the requirements of ANSI/AITC A190.1 or CSA O122 Article 3.2.9 requires that Structural-Use Panels meet the requirements of PS1,PS2, CSA O325…. Comment: We need to be clear on the impact of this specification. *OSB panels* For instance, rim boards that will be sawn from OSB panels that are 1" or 1 1/8" thick, must meet PS2/CSA O325. Hence these panels will need to be span rated 1F32 and 1F48 respectively, before they are sawn into rim board depths. For OSB panels that are 1 ¼" thick, there no current span ratings in PS2/CSA O325, so it would default to a 1F48 requirement to be met. *SCL* For SCL meeting the requirements of ASTM D5456 would imply that the 1", 11/8" and 1 ¼" be qualified as SCL when in fact it would likely be a 1 ½" thickness that is qualified. I suspect that what is meant by 'meeting the requirements of the base panel/SCL/glulam standards' is that "the rim boards shall be sawn from structural-use panels, SCL or glulam that have qualified for their primary structural use at a specific thickness but are being produced at a reduced or increased thickness for the rim board application. The manufacture of the structural-use panel/SCL/glulam destined for rim board applications shall be identical (i.e. wood furnish, binder, adhesives, control values, etc.) and only the thickness shall vary."	The current industry practice is that the wood structural panel rim boards are required to meet a product standard (PS1, PS2, CSA O121, CSA O151, or CSA O325. OSB rim boards are qualified with a span-rating. Similarly, SCL rim boards of different thicknesses are evaluated in accordance with ASTM D 5456 for key properties relevant to rim board applications. No action on Section 1.2 (consent by Mr. Di Lenardo) CSA B111 will be added to Sections 2.2 and 6.2.1.3.

			For Canada, the nailed specimens must use nails complying with CSA B111-1974(R1998). This CSA standard needs to be added to Article 2.2 for later reference in the lateral load test.	
2	Thompson	Aw/C	If the new PS1 standard passes SC ballot, it will become PS1-09 effective December 31, 2009. Should we change the standard listed in 2.2 to read PS1-09?	No substantial technical difference between PS1-07 and PS1-09. No action (consent by Mr. Thompson)
Item	Section		Ballot	
3	3		Approval of Section 3	
Item	Voter	Vote	Comments	Proposed Responses
3	Di Lenardo	Aw/C	Editorial: Article 3.2.6, Rim Board definition, consider refined wording: "A continuously supported, full-depth structural element developed for use with**in** an **engineered** wood floor or roof assembly **performing identical role as header joist or end joist in lumber floor/roof assemblies**. Installed in a bearing **or non-loadbearing wall** ~~or a wall~~ **perpendicular or parallel** to the joist framing to transfer horizontal (shear) and vertical (compression)……	Editorial clarification. The wording will be revised as follows: "A continuously supported, full-depth structural element developed for use within a wood floor or roof assembly performing a similar role as starter or end joist in lumber floor/roof assemblies. Installed in a load bearing or non-load bearing wall perpendicular or parallel to the joist framing to transfer horizontal (shear) and vertical (compression)…"
3	Shi	Aw/C	The definition on the mat-formed panel (3.2.4) may not be accurate. The panels made from wood strips edge-bonded together can also called as wood-based panel, and it does not contain veneers. My understanding on the mat-formed panel is that the panel made from wood elements other than veneer, which are pre-formed into mat after blending with resin and other additives, and then consolidated in a hot press to form the panel product.	The definition is the same as PS2. No action (consent by Dr. Shi)
Item	Section		Ballot	
4	4		Approval of Section 4	
Item	Voter	Vote	Comments	Proposed Responses
4	Cheney	Neg	Section 4.3: Dimensional tolerances - I am concerned that glulam rim is often not appropriate for use with I-joist floor framing because it is difficult to ensure that it will always be taller than the I-joist and carry the vertical load. It is a different issue than seen with sawn lumber or glulam framing where the joist and rim materials have similar shrink/swell relationships and the joist material has some ability to transfer vertical loads. Imagine if a 24 in. deep glulam manufactured at 12% gets paired with a 24 in. deep I-joist manufactured at 5% MC. There are a great many applications where the glulam will wind up being shorter than the I-joist and the I-joist will be loaded. I do not believe that the non-mandatory note in the text draws a tight enough box around the specification to prevent this from happening in application. My concern would be addressed by modifying the depth specification of Section 4.3 with the underlined wording below: **"Depth – Plus 1/8 inch (3.2 mm) or minus 0 inch (measured to 1/32 inch or 0.79**	Therefore, the following wording is suggested to be added: **Depth – Plus 1/8 inch (3.2 mm) or minus 0 inch (measured to 1/32 inch or 0.79 mm) for structural-use panel or structural composite lumber rim boards. Structural glued-laminated timber rim board shall be manufactured at a moisture content and depth to ensure that it meets these same tolerances over a range of application moisture contents of 5 and 16%."**

			mm) for structural-use panel or structural composite lumber rim boards. Structural glued-laminated timber rim board shall be manufactured at a moisture content and depth to ensure that it meets these same tolerances over a range of application moisture contents of 5 and 16%."	
4	Vacca	Neg	Table 1 – the Maximum Thickness should be based on +5% (like the Minimum Thickness) to match the referenced standards PS1-07 and PS2-04 for panel thicknesses greater than 13/16". It is currently setting the plus side as only 0.031", regardless of thickness class.	Persuasive. The maximum thickness in Table 1 will be revised as follows in accordance with the final version of PS1: Performance Category 1: 1.050 inches (26.67 mm) Performance Category 1-1/8: 1.181 inches (30.00 mm) Performance Category 1-1/4: 1.313 inches (33.34 mm)
Item	Section		Ballot	
5	5		Approval of Section 5	
Item	Voter	Vote	Comments	Proposed Responses
5	Bao	Aw/C	Table 2, should the Z value of the C2 be 1,500 lbf? The current figure (1,750) is not consistent with the design value of 300 lbf in Table Annex A. Please check.	Persuasive. The value will be changed to 1,500 lbf.
5	Lau	Aw/C	Delete the following repeated statement in 5.4.4: "using the same panels tested for structural performance (Section 5.2)".	Editorial
5	Thompson	Aw/C	Remove (-) from thickness measurements for consistence throughout standard. 5.2.1: after 1/2 and 12.7. In Table 2 note e: after 1/2 and 12.7.	APA editor suggests no change. No action (consent by Mr. Thompson)
5	Vacca	Aw/C	Section 5.1.2 is somewhat confusing for rim board made from blanks other than structural wood panels. The intent, as I understand, is to have a "total" of at least 200 LF of test material and that it should be taken from more than one billet. I suggest "…a ~~minimum~~ total of at least 200 lineal feet (61,000 mm) taken from a minimum of 2 different billets…"	Persuasive. The wording will be adopted.
Item	Section		Ballot	
6	6		Approval of Section 6	
Item	Voter	Vote	Comments	Proposed Responses
6	Cheney	Neg	6.2.1.2: SPF, as a broad species classification, can include material with specific gravities ranging from 0.38 to 0.50. As stated, the standard would allow testing with material throughout this range. I feel it would be more appropriate to test with material having a specific gravity close to the published average of 0.42. For practicality, a range of 0.03 could be included. My concern would be addressed by adding the underlined language shown below: **The sill plate shall be 2x4 spruce-pine-fir (SPF) with a specific gravity of 0.42 +/- 0.03 complying with grading standards referenced in the code.** Section 6.4.1.1: At present, Table 5 of DCA-6 includes design values for EWP rim board-to-deck ledger attachments with a "stacked washer" bolted configuration. The capacity of the connection will not necessarily be conservatively addressed for all	Persuasive. The suggested wording will be added to Sections 6.2.1.2, 6.4.1.1, and 6.4.1.3 except that only the upper bound specific gravity (0.42 + 0.03 = 0.45) will be specified as follows: **The sill plate shall be 2x4 spruce-pine-fir (SPF) with a specific gravity of no greater than 0.45 (i.e., 0.42 + 0.03) complying with grading standards referenced in the code.** Add "bolt or" to the note.

<table>
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<td>potential rim products by a lag screw-only test method. As long as that configuration is in DCA-6, this standard should include a means to verify the published capacity. My concern would be addressed by adding the underlined language shown below:

“Note: This test method is not intended for <u>bolt or</u> lag screw installation with multiple washer spacers between the head of the lag screw and the ledger.”

6.4.1.3 SPF, as a broad species classification, can include material with specific gravities ranging from 0.38 to 0.50. As stated, the standard would allow testing with material throughout this range. I feel it would be more appropriate to test with material having a specific gravity close to the published average of 0.42. For practicality, a range of 0.03 could be included. My concern would be addressed by adding the underlined language shown below:

The ledger shall be 2x6 spruce-pine-fir (SPF) <u>with a specific gravity of 0.42 +/- 0.03</u> complying with grading standards referenced in the code.</td>
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<tr>
<td>6</td>
<td>Di Lenardo</td>
<td>Neg</td>
<td>Editorial: Art. 6.2.1.2

“…… spruce-pine-fir (SPF) complying with the grading standards referenced in the applicable building code. “

Technical: Art 6.2.1.3.
“Nails used for the assembly shall be in conformance with the sizes specified in ASTM F 1667 for the US and CSA B111 for Canada.”

Technical: The National Building Code of Canada 2010 edition has changed the nailing schedule for rim boards as follows and should replace the current Table 4A.

<table>
<tr><th colspan="5">Nailing</th></tr>
<tr><th>Sheathing to Rim Board or Joist</th><th>Bottom Plate through Sheathing to Rim Board[a]</th><th>Rim Board to Sill Plates (Toe Nail)</th><th>Joist to Sill Plate (Slanted)</th><th>Rim Board to Joist</th></tr>
<tr><td>6 - 6d common (0.113 in. x 2 in.) @ 6 in. o.c.</td><td>3 or 6 - 12d common (0.148 in. x 3-1/4 in.) @ 15.7 in. o.c. or 6 in. o.c. [b]</td><td>6 – 12d common (0.148 in. x 3-1/4 in.) @ 6 in. o.c.</td><td>2 - 8d common (0.131 in. x 2-1/2 in.)</td><td>2 - 8d common (0.131 in. x 2-1/2 in.)</td></tr>
<tr><td>6- 51 mm, common @150 mm o.c.</td><td>3 or 6 - 82 mm, common @ 400 mm o.c. or 150 mm[b] o.c.</td><td>6 - 82 mm, common @ 150 mm o.c</td><td>2-63.5 mm, common</td><td>2-63.5 mm, common</td></tr>
</table>
b. For braced walls in high wind and seismic areas.</td>
<td>Persuasive. The wording will be added to Sections 6.2.1.2 and 6.2.1.3, and Tables A (footnote a) and A1A (footnote a).

Table 4A will be revised to reflect the nailing requirements in accordance with the 2010 NBCC.</td>
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</table>

6	Kaiserlik	Neg	I have cast a negative ballot on this section of the standard based on my concern that if this standard requires conditioning on vertical load tests it will set a precedence for the same in the ASTM standard. While the rectangular cross-section rim boards have sufficient additional capacity such that conditioning will not limit their application as rim boards this may not be the case for I-joist which are covered in the ASTM standard. The 2000 plf, I-joist vertical load capacity, which the industry has used for years may no longer work for certain joist depths when the joists are conditioned. Is the industry prepared to go down this path knowing that the vertical load capacity for some residential joist depths may get reduced?	Negative withdrawn by Mr. Kaiserlik
6	Smart (Stochlia)	Aw/C	The first sentence of Section 6.3.4 states that the bucking capacity of the rim boards need to be calculated "…using the appropriate axial compressive stress and bending modulus of elasticity in the perpendicular to the rim board length direction."; however, it is not clear as to how these "appropriate" stresses are to be derived. I think provisions should be added to this section to specify how to calculate the allowable compression perpendicular-to-grain (Fc-perp) and modulus of elasticity perpendicular-to-grain (Eperp) using the uniform vertical load capacity test results.	Persuasive. Additional wording will be added to reference to ASTM D3501 (axial compressive strength) and D198 (bending MOE). Add references to Section 2.1.
6	Thompson	Aw/C	Same as Section 5: Table 4A footnote a: after 3-1/4, 82, 2, 51, 3-1/4, 82, 2, 51 6.2.2.4: after 0.4 inch and under note 0.4 and 10.2 6.3.2.5: Same 6.3.3: Same 6.4.1.2: Same 6.4.2.4: Same 6.5.2.1: Same 6.5.3: Same	APA editor suggests no change. No action (consent by Mr. Thompson)
Item	Section		Ballot	
9	Annex A		Approval of Annex A	
Item	Voter	Vote	Comments	Proposed Responses
9	Cheney	Neg	Table A1, footnote C: It appears that the lateral load transfer qualified in this test method is intended to cover both the lateral load from the floor sheathing and the lateral load from the wall plate above. (So if the board is a C2 grade, the total load from **both** sources may not exceed 180 plf). Designers often want to design hardware and additional nails to transfer additional capacity through the rim board. From my experience it seems this is not well understood by the designers that use these products and therefore should be clarified in this standard so this information can be highlighted in a manufacturer's literature. This could be addressed by modifying footnote C of Table A1 with the underlined text shown below: **"H = the horizontal (shear) load transfer capacity based on <u>the</u> attachment schedule specified in this standard. <u>This capacity represents the total of the lateral loads introduced into the assembly by both the floor sheathing and any wall plate above the floor platform.</u> H is based…."** Table A1A, footnote C: It appears that the lateral load transfer qualified in this test method is intended to cover both the lateral load from the floor sheathing and the	Persuasive. Footnote c to Table A1 will be revised as follows: "H = the horizontal (shear) load transfer capacity based on <u>the</u> attachment schedule specified in this standard. <u>This capacity represents the total of the lateral loads transferred through the rim board by both the floor sheathing and wall plate above the floor sheathing.</u> H is based…." Footnote c to Table A1A will be revised as follows: "H = the factored horizontal (shear) load transfer resistance based on <u>the</u> attachment schedule specified in this

			lateral load from the wall plate above. (So if the board is a C2 grade, the total load from **both** sources may not exceed 180 plf). Designers often want to design hardware and additional nails to transfer additional capacity through the rim board. From my experience it seems this is not well understood by the designers that use these products and therefore should be clarified in this standard so this information can be highlighted in a manufacturer's literature. This could be addressed by modifying footnote C of Table A1 with the underlined text shown below: **"H = the factored horizontal (shear) load transfer resistance based on the attachment schedule specified in this standard. This capacity represents the total of the lateral loads introduced into the assembly by both the floor sheathing and any wall plate above the floor platform.**	standard. This capacity represents the total of the lateral loads transferred through the rim board by both the floor sheathing and wall plate above the floor sheathing.
9	Thompson	Aw/C	Table A1 and A1A footnote e and f: Same as (5)	APA editor suggests no change. No action (consent by Mr. Thompson)
Item	Section		Ballot	
10	Appendix A		Approval of Appendix A (Non-Mandatory)	
Item	Voter	Vote	Comments	Proposed Responses
10	Di Lenardo	Aw/C	I suggest that we include the Conversion from ASD to LSD that produced the Table A1A values, as follows: (Secretariat note: See next page)	Propose the information be included in the non-mandatory Appendix B. Footnote a to Table A1A will be revised as follows to provide a reference to Appendix B: (a) These design values are applicable standard-term load duration and permitted to be adjusted for other load durations in accordance with the applicable building code. Factors for ASD to LSD conversion are shown in Appendix B.

<u>Comments by Di Lenardo on Item 10 (Affirmative with Comment)</u>

Appendix A (Non-Mandatory)

I suggest that we include the Conversion from ASD to LSD that produced the Table A1A values, as follows:

Proposed
ASD-to-LSD Conversion Factors

1. Horizontal Load Capacities (H)

Note: The conversion factor for rim board horizontal load capacities follows the same procedures used to convert the shearwall values published in Clause 9 of CSA O86-01.

$$\text{LSD:} \quad \phi K_{D,LSD} H_{LSD,standard\text{-}term} \geq \alpha_Q Q \qquad [1]$$

$$\text{ASD:} \quad H_{ASD,short\text{-}term} \geq Q \qquad [2]$$

where
ϕ = resistance factor = 0.7 for nailed shearwalls and rim boards
$K_{D,LSD}$ = LSD load duration factor = 1.15 for LSD short-term loading
α_Q = LSD load factor = 1.5 for wind
Q = applied load
$H_{LSD,standard\text{-}term}$ = LSD specified horizontal load capacity for LSD standard-term load duration
$H_{ASD,short\text{-}term}$ = ASD allowable horizontal load capacity for ASD short-term load duration

From Equations 1 and 2,

$$\phi H_{LSD,standard\text{-}term} = \frac{\alpha_Q}{K_{D,LSD}} H_{ASD,short-term}$$

$$= \frac{1.5}{1.15} H_{ASD,short-term}$$

$$= 1.304\ H_{ASD,short\text{-}term}$$

As a result, the conversion factor for the factored horizontal load capacities, ϕH_{LSD}, is 1.304. Note that the converted ϕH_{LSD} is based on LSD standard-term but not short-term load duration.

2. Uniform Vertical Load Capacities (V)

$$\text{LSD:} \quad \phi K_{D,LSD} V_{LSD} \geq \alpha_D Q_D + \alpha_L Q_L \qquad [3]$$

$$\text{ASD:} \quad K_{D,ASD} V_{ASD} \geq Q_D + Q_L \qquad [4]$$

where
ϕ = resistance factor = 0.95 for compression member
$K_{D,LSD}$ = LSD load duration factor = 1.0 for LSD standard-term loading
V_{LSD} = LSD specified uniform vertical load capacity for standard-term load duration
α_D = LSD dead load factor = 1.25
Q_D = applied dead load
α_L = LSD live load factor = 1.5
Q_L = applied live load
$K_{D,ASD}$ = ASD load duration factor = 1.15 under roof snow load
V_{ASD} = ASD allowable uniform vertical load capacity for ASD normal load duration

Assuming $Q_L/Q_D = \gamma$, from Equations 3 and 4,

$$\phi V_{LSD} = \frac{\alpha_D + \gamma\alpha_L}{K_{D,LSD}(1+\gamma)} K_{D,ASD} V_{ASD} \qquad [5]$$

When calibrated to $Q_L/Q_D = \gamma = 4.0$ in accordance with the practice adopted by CSA O86,

$$\phi V_{LSD} = \frac{1.25 + 4 \times 1.5}{1.0 \times (1+4)} \times 1.15 \times V_{ASD}$$

$$= 1.668\ V_{ASD}$$

For uniform vertical load capacities, a relative humidity effect factor of 0.85 that is applied to sheathing panels to account for the difference in the relative humidity of 80% (the basis for CSA O86) and 65% (the standard relative humidity for ASD) for structural-use panels given in CSA O86 is not required for rimboards due to the location of the rimboard within the wall assembly. Therefore, the conversion factor for the factored uniform vertical load capacities, ϕV_{LSD}, is 1.668.

3. Concentrated Vertical Load Capacities (P)

The conversion factor for the factored concentrated vertical load capacities, ϕP_{LSD}, is the same as the factored uniform vertical load capacities: 1.668.

4. Lag Screw Capacities (Z)

The derivation of lag screw conversion factor follows the same procedures as the factored uniform vertical load capacities, as shown in Equation 5. Therefore, the LSD factored lag screw capacities, ϕZ_{LSD}, are equal to 1.668 times the ASD lag screw capacities.