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Subject: Timberlinx design values	

The Timberlinx connector was tested according to CSA Standard O86.1-94 *Engineering Design in Wood* at Intertek Testing Services under the supervision of Quaile Engineering Ltd, Newmarket, ON. This testing resulting in certification of the Timberlinx connector by the National Research Council Canada. A CCMC evaluation report (CCMC 13091-R) forms the basis for the design values presented in this technical bulletin. Values for both limit states design and allowable stress design are included.

The design of engineered structures is within the scope of expertise of licensed engineers, architects, or other licensed professionals. These design values are intended for use in conjunction with competent engineering design, accurate fabrication, and adequate supervision of construction. Those using the Timberlinx product assume all liability arising from its use.

Product Description

Timberlinx is a simple, concealed, and adjustable fastening system that can provide strength and stiffness to any heavy-timber or log connection. It consists of a long steel tube with a slot at each end that allows insertion of expansion anchors. The expansion anchor is 100-mm long and consists of two cast-iron sleeves that push apart when two wedge nuts are drawn together by turning a bolt. Details of the installation process are contained in the Timberlinx Installation Manual. Additional product information is available at: http://www.timberlinx.com.

Loading Description and General Notes

Loading descriptors are as follows:

- *Tension parallel to grain*: The Timberlinx tube is installed parallel to grain of both members in the connection. Tension load is applied parallel to the axis of the tube.
- *Tension perpendicular to grain*: The Timberlinx tube is installed perpendicular to grain of at least one member in the connection. Tension load is applied parallel to the axis of the tube.
- *Shear parallel to grain*: The Timberlinx tube is installed perpendicular to grain of both members in the connection. Load is applied transverse to the axis of the tube.
- *Shear perpendicular to grain*: The Timberlinx tube is installed parallel to grain of at least one member in the connection. Load is applied transverse to the axis of the tube.

General notes applicable to both limit states design and allowable stress design with Timberlinx:

1. Standard-term loading includes dead load plus snow load or occupancy live load.
2. Short-term loading includes wind and earthquake loads.
3. Design values are for dry service conditions, no fire retardant treatment, and 140-mm x 140-mm (6-in x 6-in) white pine timber or denser material
4. Connectors shall be spaced no less than 65 mm (2-1/2 in) on center.
5. Edge distance shall be no less than 38 mm (1-1/2 in) for tubes installed parallel to grain.
6. Tubes shall be equally embedded into the two timber members. The hole for the tube shall be 29 mm (1-1/8 in) diameter. Holes for the expansion anchors shall be no larger than 29 mm (1-1/8 in) diameter.

Limit States Design

Design values for limit states design, which are used with factored loads, are contained in Table 1.

Table 1 — Limit States Design Values for Timberlinx, Tension and Shear Loading

Load Configuration	Standard-term Loading				Short-term Loading			
	Single Connector		Two Connectors		Single Connector		Two Connectors	
	(kN)	(lb)	(kN)	(lb)	(kN)	(lb)	(kN)	(lb)
Tension parallel to grain	12.0	2700	17.4	3910	13.7	3080	20.0	4500
Tension perpendicular to grain	11.2	2520	17.4	3910	12.9	2900	20.0	4500
Shear parallel to grain	16.4	3690			18.9	4250		
Shear perpendicular to grain	7.3	1640			8.4	1890		

Allowable Stress Design

Design values for allowable stress design, which are used with service-level loads, are contained in Table 2. The values in Table 2 are derived by a soft-conversion of those in Table 1 for a live load to dead load ratio of 3.0.

Table 2 — Allowable Stress Design Values for Timberlinx, Tension and Shear Loading

Load Configuration	Standard-term Loading				Short-term Loading			
	Single Connector		Two Connectors		Single Connector		Two Connectors	
	(kN)	(lb)	(kN)	(lb)	(kN)	(lb)	(kN)	(lb)
Tension parallel to grain	8.3	1870	12.1	2720	9.5	2150	13.9	3130
Tension perpendicular to grain	7.8	1740	12.1	2720	8.9	2000	13.9	3130
Shear parallel to grain	11.4	2570			13.1	2960		
Shear perpendicular to grain	5.1	1140			5.8	1310		