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CCMC 12978-R

CCMC

*EVALUATION
REPORT*

DIVISION	06099
Issued	2000-06-20
Re-evaluated	2004-01-05
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Stavebolt (standard model)

Building with Logs, Limited
Box 132
Midhurst, Ontario
L0L 1X0

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Fax: (705) 721-4798
www.stavebolt.com

Plant: D & M Welding and Machine
Highway 93
Hillsdale, Ontario
L0L 1V0

1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that "Stavebolt (standard model)" can serve as a tensile connector for heavy timber construction in compliance with the intent of the National Building Code of Canada (NBC) 1995.

2. Opinion

Subject to the limitations and conditions stated in this report, test results and assessments provided by the proponent show that "Stavebolt (standard-model)" complies with CCMC's Technical Guide for Tensile Connectors for Timber, MasterFormat number 06099, dated 1999-10-18, and provides a level of performance equivalent to that required in:

- NBC 1995, Part 4 and Part 9, when designed in accordance with CSA O86-01, "Engineering Design in Wood."

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Ruling No. 00-09-80-(12978-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 7 November, 2000 pursuant to s.29 of the Building

Code Act, 1992 (see Ruling for terms and conditions).

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

3. Description

"Stavebolt (standard model)" is a timber connector consisting of a steel pipe. One end of the pipe has a receiving thread that allows a tie-bolt to be fastened to the device; through the other end, two holes are drilled to permit the insertion of stitch

bolts, which lock the pipe into the end of the receiving timber. The tie bolt inserted into the threaded end of the device permits the fastening of one timber member to another (see figures 1 and 2).

A standard anti-corrosive finish (zinc, with a protective and hardening over-coating of yellow di-chromate) is applied to the steel pipe device.

The steel pipe device, "Stavebolt (standard model)," is manufactured by Building with Logs, Limited. All related hardware is available in the required grade, size and finish from most commercial hardware suppliers.

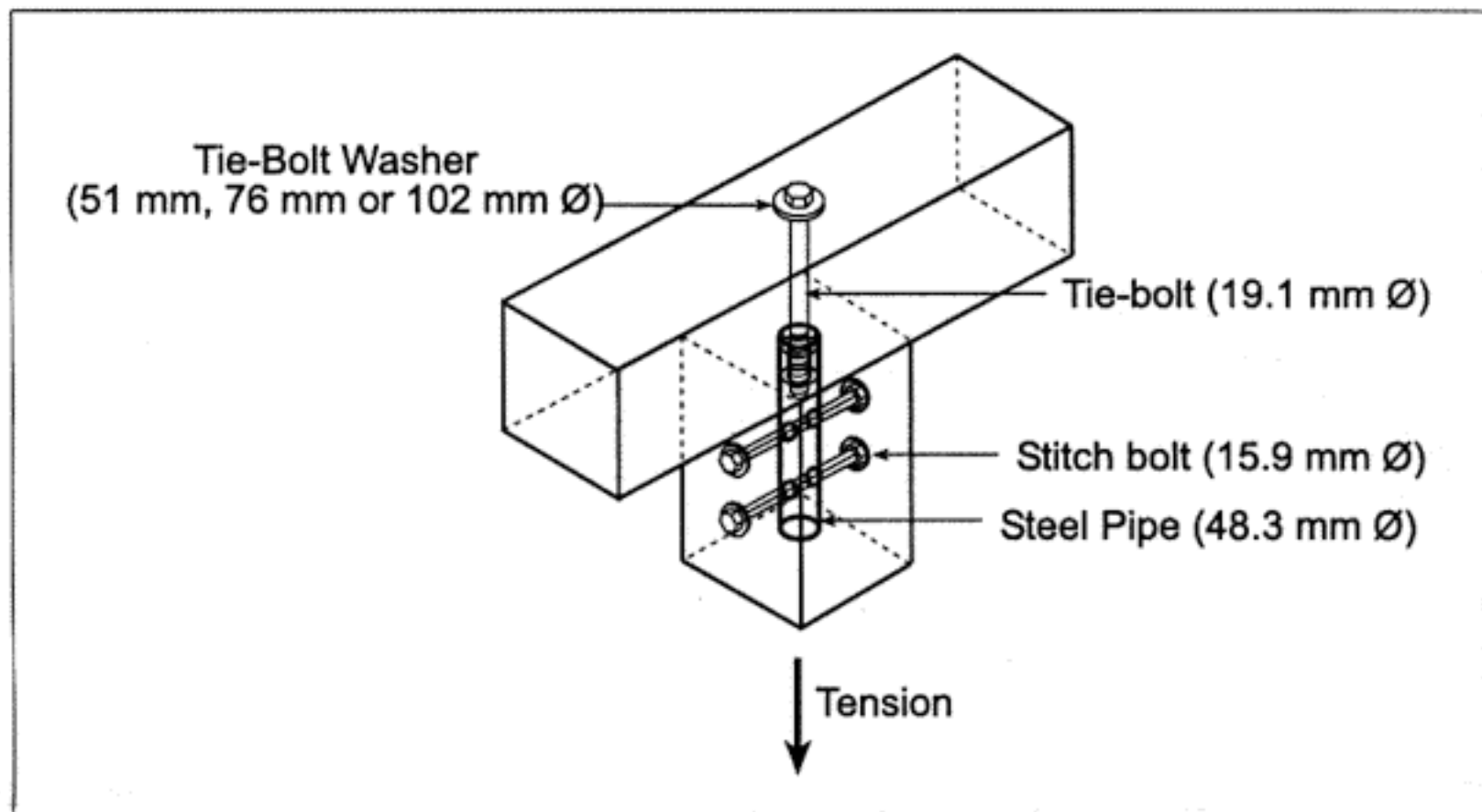


Figure 1. "Stavebolt (standard model)" assembly

4. Usage and Limitations

"Stavebolt (standard model)" may be used as a tensile connector for post and beam and truss connections, provided that it is installed and maintained according to the manufacturer's current instructions.

The pipe assembly is an alternative to traditional wood mortise and tenon joinery used to connect timber.

"Stavebolt (standard model)" is intended to carry tensile loads (loads parallel to its axis) only. It is not currently being evaluated for its ability to carry shear loads (loads perpendicular to its axis). Therefore, in beam-to-post connections, the beam should rest on a shoulder, as shown in Figure 2.

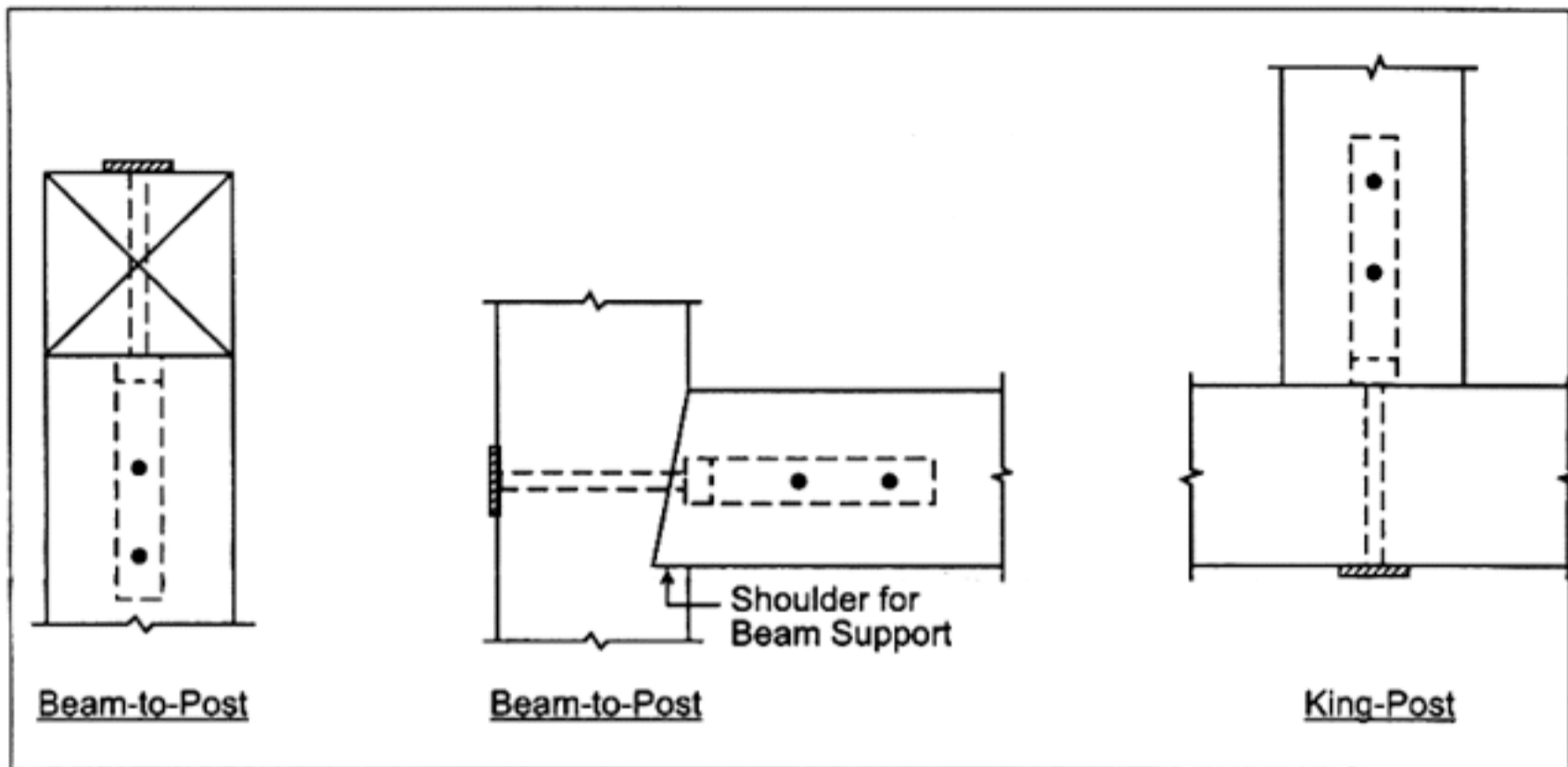


Figure 2. "Stavebolt (standard model)" applications

The design values provided in this report are valid for the wood species, the hardware specifications and the applications shown in Figures 1 and 2 and in Table 1. The values are applicable for a "Stavebolt (standard model)" installed in a member that is 203 x 203 mm or larger, with stitch bolts bearing on a minimum of 76 mm of wood on each side of the pipe.

Bolts must be fastened and locked with washers and nuts in accordance with the manufacturer's installation manual. The grade and size of all related hardware must conform to the manufacturer's installation manual.

The connector shall display no fracturing in the protective coating. Where "Stavebolt (standard model)" is exposed to a marine or a high humidity environment, the user should consult the manufacturer to determine an appropriate anti-corrosive coating. All hardware coatings should be compatible with the pipe anti-corrosive finish.

Structural members that are assembled with the evaluated connector must be designed in

accordance with CSA O86-01, "Engineering Design in Wood" and with NBC 1995, by a professional engineer licensed to practice, under provincial or territorial legislation.

Shrinkage issues in sawn lumber penetrated by the tie-bolt should be addressed, and related hardware adjustment should be determined in consultation with the manufacturer.

"Stavebolt (standard model)" must be identified with the phrase "CCMC # 12978-R."

5. Performance

Testing was conducted at an independent laboratory recognized by CCMC.

Ten "Stavebolt (standard model)" specimens were tested to verify the actual capacity versus the design capacity.

"Stavebolt (standard model)" design values are summarized in Table 1.

**Table 1. Factored Tensile Resistance of "Stavebolt (standard model)"
(steel pipe: 48.3 mm diameter and 279.4 mm length)**

Wood species	Factored tensile resistance (kN) ⁽¹⁾					
	Tie-bolt washer 51 mm diameter 4 mm thick		Tie-bolt washer 76 mm diameter 6 mm thick		Tie-bolt washer ⁽²⁾ 102 mm diameter 9.5 mm thick	
	Standard term load ⁽³⁾	Short term load ⁽⁴⁾	Standard term load ⁽³⁾	Short term load ⁽⁴⁾	Standard term load ⁽³⁾	Short term load ⁽⁴⁾
White pine Northern species	4.7	5.4	11.7	13.5	20.9	24.0
Spruce-pine-fir	7.1	8.2	17.8	20.4	31.6	36.4
Spruce-pine glulam	7.8	9.0	19.4	22.4	34.6	39.8
Douglas-fir Sawn timber and glulam	9.4	10.8	23.5	27.0	41.8	48.1

Notes to Table 1:

- (1) Factored tensile resistance is calculated in accordance with CSA O86-01, "Engineering Design in Wood," considering dry service conditions and no fire retardant treatment.
- (2) The 102 mm diameter heavy duty plate washer must be installed with two (2) cut washers under the nut.
- (3) Standard term loading includes dead plus snow loading or use and occupancy loading.
- (4) Short term loading includes wind and earthquake loads.

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Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC's Registry of Product Evaluations, of which this report is part.

Readers are advised to confirm that this report has not been withdrawn or superseded by a later issue by referring to <http://irc.nrc.gc.ca/ccmc>, or contacting the Canadian Construction Materials Centre, Institute for Research in Construction, National Research Council of Canada, Montreal Road, Ottawa, K1A 0R6; Telephone (613) 993-6189, Fax (613) 952-0268.

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