



# Engineering design in wood



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Clauses <a href="#">5.3.2.3</a> , <a href="#">11.8.1</a> , <a href="#">12.6.5.1.2</a> , and <a href="#">A.5.4.5.1.3</a> Tables <a href="#">12.11</a> , <a href="#">12.21H</a> , and <a href="#">A.20</a> Figures <a href="#">12.11</a> and <a href="#">12.16</a>	Δ

  

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## Δ Preface

This is the eleventh edition of CSA O86, *Engineering design in wood*. It is presented in limit states design (LSD) format and supersedes the previous editions published in 2014, 2009, 2001, 1994, 1989, 1984, 1980, 1976, 1970, and 1959, including their Supplements.

Editions of CSA O86 published in 1959, 1970, 1976, 1980, and 1984 were all developed using working stress design (WSD) theory. The last WSD version, CSA CAN3-O86-M84, *Engineering design in wood (working stress design)*, existed concurrently with the first (1984) and second (1989) LSD versions, *Engineering design in wood (limit states design)*. The WSD version was withdrawn on publication of the 1994 LSD edition.

Three LSD editions were published in 1984, 1989, and 1994 with the CSA designation O86.1. Supplements to each of these editions were published in 1987, 1993, and 1998, respectively. Although the 2001 edition was also based on the LSD method, the O86 designation was reinstated.

Significant changes in this edition include the following:

- editorial changes and some reformatting and restructuring of all clauses for clarity of layout, especially Clauses [11](#) and [12](#);
- revisions to design provisions for vibration serviceability of joisted floor systems;
- revisions to add Structural Face-Glued Lumber grade-stamped NLGA SPS 5 and SPS 6 wood products, and Face-Glued/Finger-Joined Lumber “Vertical Stud Use Only” grade-stamped NLGA SPS 5 and SPS 6 wood products;
- modification of Table [6.6](#) to revise specified strengths for Hem-Fir beams and stringers;
- modification of Table [6.8](#) to include 38 mm × 64 mm (2 in × 3 in) dimension under the Tension Specified Strengths;
- modification of Table [9.3](#) to add W24 rated oriented strand board (OSB);
- revisions to clarify shear resistance of members with notches;
- revisions to the  $K_{Zc}$  factor for sawn lumber;
- revisions to the application of system factor,  $K_H$ ;
- corrections to the limit of the length of the notch on the compression side;
- updates to cross-laminated timber (CLT) terminology and symbols;
- deletion of shear form factor for CLT;
- revisions to maximum nail diameter for shearwalls, and new references for nails;
- revisions to diaphragm configuration diagrams;
- revisions to  $N_u$  for shearwall and diaphragm;
- revisions to wood member thickness for nail and wood screw joints;
- revisions to Clause [11.9](#) for the design of CLT shearwalls and diaphragms for platform-type construction;
- revisions to requirements and added references to dowels in various clauses;
- addition of Table [A.22](#) for ASTM nails; and
- editorial revisions to Annex [B](#), on fire resistance of large cross-section wood elements for clarity.

This Standard was prepared by the Technical Committee on Engineering Design in Wood, under the jurisdiction of the Strategic Steering Committee on Construction and Civil Infrastructure, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

**Notes:**

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- 3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
- 4) *To submit a request for interpretation of this Standard, please send the following information to [inquiries@csagroup.org](mailto:inquiries@csagroup.org) and include “Request for interpretation” in the subject line:*
  - a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
  - b) *provide an explanation of circumstances surrounding the actual field condition; and*
  - c) *where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.*

*Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at [standardsactivities.csa.ca](http://standardsactivities.csa.ca).*
- 5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to [inquiries@csagroup.org](mailto:inquiries@csagroup.org) and include “Proposal for change” in the subject line:*
  - a) *Standard designation (number);*
  - b) *relevant clause, table, and/or figure number;*
  - c) *wording of the proposed change; and*
  - d) *rationale for the change.*



# CSA 086:19

## *Engineering design in wood*

### 1 Scope

#### 1.1 General

This Standard provides criteria in accordance with the *National Building Code of Canada*, for the structural design and evaluation of structures or structural elements made from wood or wood products, including:

- a) graded lumber;
- b) glued-laminated timber;
- c) cross-laminated timber (CLT);
- d) unsanded plywood;
- e) oriented strand board (OSB);
- f) composite building components;
- g) shearwalls and diaphragms;
- h) timber piling;
- i) pole-type construction;
- j) prefabricated wood I-joists;
- k) structural composite lumber;
- l) permanent wood foundations;
- m) plank decking;
- n) nail-laminated decking; and
- o) structural connections.

#### 1.2 Exclusions

This Standard does not include design of timber bridges.

#### 1.3 Design method

This Standard employs the limit states design method.

#### 1.4 Terminology

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a Clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.