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CSA S16:24
National Standard of Canada

Design and construction of steel structures

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R. Radonjic	Pittsburgh Steel Group, Mississauga, Ontario, Canada *Category: Producer Interest*	

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J. Singh	National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario, Canada	*Non-voting*
M. Smith	Entuitive, Toronto, Ontario, Canada	*Non-voting*
E. St-Onge	Hydro-Québec, Montréal, Québec, Canada	*Non-voting*
M. Tancredi	Ferroeng Group Inc., St. George, Ontario, Canada	*Non-voting*
K. Tousignant	Dalhousie University, Halifax, Nova Scotia, Canada	*Non-voting*
R. Tremblay	École Polytechnique de Montréal, Montréal, Québec, Canada *Category: General Interest*	
D. Van Ee	Van Ee Engineering / Steelcon Fabrication, Beeton, Ontario, Canada	*Non-voting*
A. Voth	Read Jones Christoffersen Ltd., Toronto, Ontario, Canada	*Non-voting*
S. Walbridge	University of Waterloo, Waterloo, Ontario, Canada	*Non-voting*
Y. H. Wan	WSP Canada Inc., Oakville, Ontario, Canada	*Non-voting*
E. J. Whalen	Canadian Institute of Steel Construction (CISC-ICCA), Markham, Ontario, Canada	*Non-voting*
T. Whitney	Bush, Bohlman & Partners LLP, Vancouver, British Columbia, Canada	*Non-voting*

L. Wiebe	McMaster University, Hamilton, Ontario, Canada *Category: General Interest*	
T. Y. Yang	The University of British Columbia, Vancouver, British Columbia, Canada	*Non-voting*
S. D'Addese	CSA Group, Toronto, Ontario, Canada	*Project manager*

In addition to the members of the Technical Committee on Design and Construction of Steel Structures, the following people made a valuable contribution to the development of this Standard:

Kenton McBride – Hilti North America
Ali Ahrabi – Hilti Canada

Preface

This is the tenth edition of CSA S16, *Design and construction of steel structures*. It supersedes the previous limit states editions published in 2019, 2014, 2009, 2001, 1994, 1989, 1984, 1978, and 1974. These limit states design editions were preceded by seven working stress design editions published in 1969, 1965, 1961, 1954, 1940, 1930, and 1924. The 1969 working stress design edition was withdrawn in 1984, from which point the design of steel structures in Canada has been carried out using limit states design principles.

The following are the major changes to this edition:

a) Minor changes were made to the Scope to bring it into line with the Terms of Reference for the Technical Committee on Design and Construction of Steel Structures.
b) The requirement for designers to consider and specify construction live loads has been included for sheet steel deck and structural members supporting the deck. Reference has been made to CSSBI 12M for determining provisions for deck supporting the plastic concrete, with the option of designing structural members supporting the deck in accordance with the loading provisions of CSA S269.1.
c) Except for planar frames in low-rise buildings under certain conditions, P-Δ effects are to be taken into account by performing a second-order analysis. The U_2 factor approach only gives accurate results for simple structures when lateral loads and stability effects are uniformly distributed among the frames in the direction of load and the structure has limited torsional response.
d) The application of gross and net areas has been clarified for the capacity checks of members and connections in tension, compression, and shear.
e) The symbols for effective net area when determining the tension load transmitted by welds have been modified to indicate that shear lag effects are considered.
f) The methodology for determining the capacity of concentrically and eccentrically loaded hollow structural section tension members with plates in slotted holes has been unified. As the length of the plate in the slotted hole decreases, the member capacity transitions from the net section fully developed through a reduction due to shear lag to a failure governed by block shear tear-out.
g) The default parameter for determining the factored axial compression resistance is n = 1.34. The value of n = 2.24 can be used under certain circumstances.
h) Elastic analysis is now used to determine the shear resistance of rectangular and square hollow structural section Class 3 and 4 members and fabricated closed box-shapes for which local wall buckling can occur.
i) Shear area definitions are provided for determining the shear resistance of hollow structural section members and concrete-filled hollow structural section members where local wall bucking is prevented.
j) Provisions for providing lateral and rotational restraint to beams in Gerber construction have been clarified. Where restraint is provided by bolted connections to the beams, the effect of holes for fasteners on strength is to be considered.
k) When combining the factored resistance of fillet welds oriented in multiple directions in the same shear plane, the multi-orientation reduction factor, M_w, is used regardless of whether the strength-enhancement factor is applied.
l) When determining the capacity of welds for hollow structural section members, the geometric properties are to be determined in accordance with CSA W59.
m) In addition to the capacity when modelled as a column, a requirement has been added to check the factored bearing resistance of bearing stiffeners, B_r.

