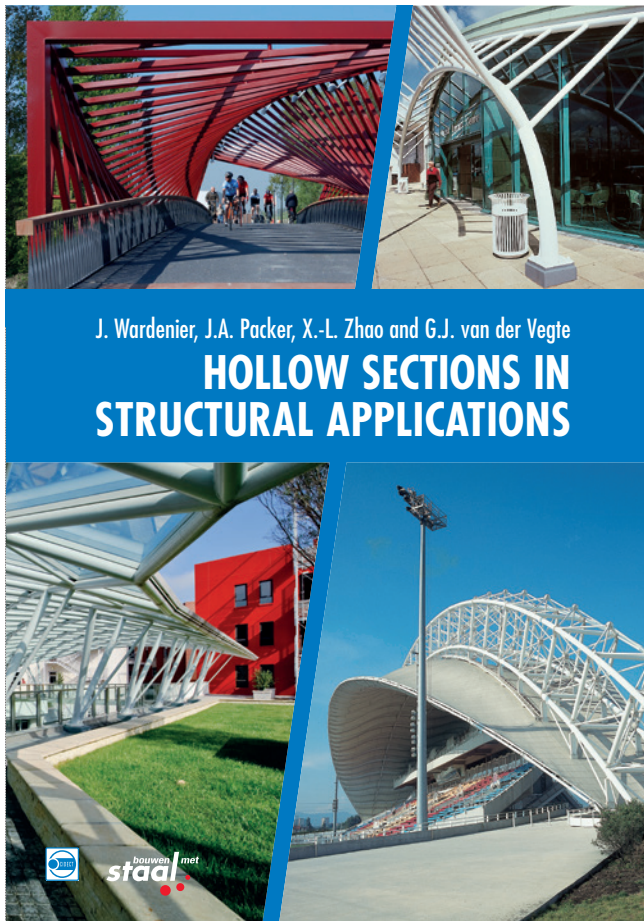


HOLLOW SECTIONS IN STRUCTURAL APPLICATIONS (2nd edition)

J. Wardenier, J. A. Packer, X-L. Zhao and G.J. van der Vegte

ISBN 978-90-72830-86-9, format A4, 240 p.

The second edition of this CIDECT book gives the background to design with structural hollow sections in general and in particular for joints to hollow sections. It has incorporated the recently revised design recommendations for hollow section joints of the International Institute of Welding (IIW, 2009) and CIDECT (2008 and 2009). Both are consistent with each other and are the basis for the Draft ISO standard for Hollow Section Joints (ISO 14346) and may be the basis for future revisions of the Eurocode 3 (EN 1993-1-8), AISC (ANSI/AISC 360) and CISC recommendations.



This book is written particularly for teachers and students in structural and civil engineering, explaining the important principles for the behaviour of tubular steel structures. Since the design of steel structures is covered in basic lectures, this book only considers the special items related to the use of hollow sections, in particular joints. Most attention is paid to the basic understanding, for example failure modes and analytical models.

Besides the static design recommendations and background for hollow section joints, information is given for member design in Chapter 2, composite structures in Chapter 4 and fire resistance in Chapter 5. These chapters fully comply with the latest versions of the Eurocodes (EN 1993 and EN 1994). Further, fatigue design of hollow section joints is covered in Chapter 14.

In addition to being invaluable for a specialist course on 'Tubular Steel Structures', parts of the book would be excellent for more introductory-level courses on steel behaviour and design.

The material included is an international consensus of knowledge on the topic: as such it is an ideal reference book too for all structural design engineers involved in tubular structures.

bouwen met
staal



Printed and distributed by Bouwen met Staal

P.O. Box 190, 2700 AD Zoetermeer, The Netherlands
website www.bouwenmetstaal.nl
email cor@bouwenmetstaal.nl

Copyrights

Comité International pour le Développement
et l'Etude de la Construction Tubulaire

HOLLOW SECTIONS IN STRUCTURAL APPLICATIONS (2nd edition)

by: J. Wardenier, J. A. Packer, X-L. Zhao and G.J. van der Vegte

Contents

1 Introduction

History, developments, Designation, Manufacturing

2 Properties of hollow sections

Mechanical properties, dimensions and dimensional tolerances, Geometric properties, Drag coefficients, Corrosion protection, Use of internal void, Aesthetics

3 Applications

Buildings, halls, Bridges, Barriers, Offshore structures, Towers and masts, Special applications

4 Composite structures

Introduction, Design methods, Axially loaded columns, Resistance to bending, Bending and compression, Shear, Load introduction, Special composite members

5 Fire resistance of hollow section columns

Introduction, Unfilled hollow section columns, Concrete filled hollow section columns, Water filled hollow section columns, Joints

6 Design of hollow section trusses

Truss configurations, Joint configurations, Limit states, Limitations on materials, General design considerations, Truss analysis

7 Behaviour of joints

General introduction, Failure criteria, Failure modes, Joint parameters

8 Welded joints between circular hollow sections

Introduction, Modes of failure, Analytical models, Experimental and numerical verification, Basic joint strength formulae, Evaluation to design rules, Other types of joints, Design charts, Relation to the previous recommendations of IIW (1989) and CIDECT (1991), Concluding remarks

9 Welded joints between rectangular hollow sections

Introduction, Modes of failure, Analytical models, Experimental and numerical verification, Basic joint strength formulae, Evaluation to design rules, Other types of joints or other load conditions, Design charts, Concluding remarks

10 Welded joints between hollow sections and open sections

Introduction, Modes of failure, Analytical models, Experimental verification, Evaluation to design rules, Joints predominantly loaded by bending moments

11 Welded overlap joints

Introduction, Modes of failure, Analytical models for RHS overlap joints, Analytical models for CHS overlap joints, Analytical models for overlap joints with an open section chord, Experimental and numerical verification, Joint strength formulae

12 Welded I beam-to-CHS or RHS column moment joints

Introduction, Modes of failure, Analytical models, Experimental and numerical verification, Basic joint strength formulae, Concluding remarks

13 Bolted joints

Flange plate joints, End joints, Gusset plate joints, Splice joints, Beam-to-column joints, Bracket joints, Bolted subassemblies, Purlin joints, Blind bolting systems, Nailed joints

14 Fatigue behaviour of hollow section joints

Definitions, Influencing factors, Loading effects, Fatigue strength, Partial factors, Fatigue capacity of welded joints, Fatigue capacity of bolted joints, Fatigue design

15 Design examples

Uniplanar truss of circular hollow sections, Uniplanar truss of square hollow sections, Multiplanar truss (triangular girder), Multiplanar truss of square hollow sections, Joint check using the joint resistance formulae, Concrete filled column with reinforcement

16 References

Symbols