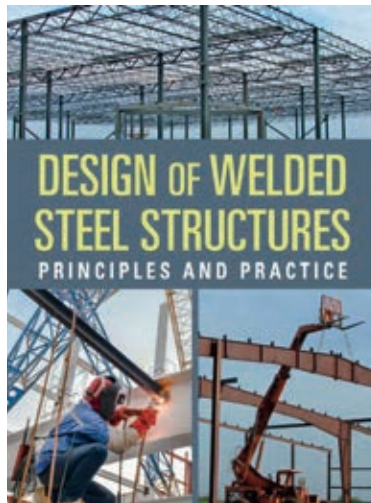


Review



This holistic introduction to the design, fabrication and welding of steel structures is both a useful textbook for students and reminder for experienced designers, concludes **Thomas Cosgrove**.

Design of Welded Steel Structures: Principles and Practice



Authors: Utpal K. Ghosh
Publisher: CRC Press
Price: £95.00
ISBN: 978-1-498-70801-2

The author is to be congratulated on this succinct and unique introduction to so vast a subject based on his experience of over 60 years.

This book is principally aimed at the structural steel design engineer. However, the publication does not focus exclusively on structural analysis and design. The related areas of **materials, welding, fabrication** and **inspection** have also been covered in conjunction with **structural analysis and design**. There is no focus on code compliance nor a heavy mathematical treatment of design issues as the emphasis throughout is on concepts and basic understanding. This aids the overall objective of advising the structural engineer on achieving cost-effective and practical structural design of welded steel structures by integrating the relevant areas and welding operations. It also makes it useful background reading for anyone wishing to sit the Chartered Membership Examination.

Most of the typical building types and bridges, including their applied loading, that are likely to be fabricated from welded structural steelwork are introduced and explained. In addition, Mr Ghosh rightly stresses that a welded structural member or connection that has been designed to carry its applied loading but cannot be fabricated or inspected easily is not a practical cost-effective solution. This rule

can be applied to all welded structures.

With such a succinct introduction in so vast a domain there are simplifications and omissions. However, these do not affect the usefulness of the publication for the structural steel design engineer, whether as an introduction for the student or as a reminder for the experienced designer.

The book has 16 chapters, each dealing with a clear topic, all of which start with an abstract that serves as an introduction to its contents. Each chapter in turn concludes with a bibliography of relevant references, many of which are the classic references for that topic. The general presentation is easy to follow, with clear diagrams. The 16 chapters are roughly separated into four parts.

Chapters 1 to 6 inclusive cover the basics of arc welding. Apart from the common aspects of welding processes, manual metal arc (MMA), metal active gas (MAG) and submerged-arc welding (SAW), plus avoiding brittle fracture and distortion control, this first part also covers common defects, their remedial measures (and avoidance) and quality control in relation to arc welding. However, the role of the Responsible Welding Coordinator (RWC) in a manufacturer's Weld Quality Manufacturing System (WQMS) is not addressed.

Chapters 7 to 9 deal with the analysis and

design of welded steelwork structures, with Chapter 9 focusing on fatigue.

Chapters 10 to 15 focus on the detailed design of joints and connections.

The last chapter addresses costs in connection with the welding of steelwork.

However, in a mature manufacturing sector like steelwork, with many off-site fabrication facilities, where the fabricated steelwork is typically delivered to and erected on a construction site, the greater risks to a successful project are often associated with site activities. One of the tried and trusted approaches to managing these risks is to "weld in the shop and bolt on site".

This balanced approach to structural steel design is not sufficiently stressed. Chapter 12 on portal frames, for example, uses many details associated with short-span continuous (welded) portals for both the shop and site. This is useful from an educational point of view but these details are very unlikely to be used in modern portal frames, particularly in a multi-bay "hit and miss" frame where an individual span may be in the order of 50–60m.

Similarly, the chapter on trusses and lattice girders using rolled sections serves as a useful historical reference; however, this form of construction is seldom used today. In contrast, the chapters on bridges and plate girders, as well as the one on lattice girders and hollow sections, are more relevant.

The publication is to be recommended as a holistic introduction to the design, fabrication and welding of steel structures by an engineer with practical experience in many different countries. Anyone wishing to take the subject further is advised to start with the references at the end of each chapter and then move onto codes and standards.

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Thomas is Fabrication and Welding Manager at BCSA Ltd. His career spans senior engineering roles including Technical Director Steelwork, SIAC group, as well as research and advisory roles at the SCI and BCSA. He has participated on several BSI and CEN committees; lectured on steel design and welding, and marked the Institution's Chartered Membership Examination.