DESIGNERS' GUIDES TO THE EUROCODES

**DESIGNERS' GUIDE TO EN 1993-1-1
EUROCODE 3: DESIGN OF STEEL
STRUCTURES**

**GENERAL RULES AND RULES FOR
BUILDINGS**

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GENERAL RULES AND RULES FOR BUILDINGS

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Preface

With the UK poised to adopt the set of structural Eurocodes it is timely to produce a series of guides based on their technical content. For the design of steel structures, *Eurocode 3: Design of Steel Structures*, Part 1.1: *General Rules and Rules for Buildings* (EN 1993-1-1) is the master document. It is, however, complemented by several other parts, each of which deals with a particular aspect of the design of structural steelwork.

General

This text concentrates on the main provisions of Part 1.1 of the code, but deals with some aspects of Part 1.3 (cold-formed sections), Part 1.5 (plated structures) and Part 1.8 (connections). It does this by presenting and discussing the more important technical provisions, often by making specific reference to actual sections of the code documents. In addition, it makes comparisons with the equivalent provisions in BS 5950, and illustrates the application of certain of the design procedures with a series of worked examples. When dealing with loads and load combinations it makes appropriate reference to the companion Eurocodes EN 1990 and EN 1991.

Layout of this guide

The majority of the text relates to the most commonly encountered design situations. Thus, the procedures for design at the cross-sectional, member and frame level for various situations are covered in some detail. Chapters 1–11 directly reflect the arrangement of the code (i.e. section numbers and equation numbers match those in EN 1993-1-1), and it is for this reason that the chapters vary greatly in length. Guidance on design for the ultimate limit state dominates Part 1.1; this is mirrored herein. In the case of Chapters 12–14, the section numbering does not match the code, and the arrangement adopted is explained at the start of each of these chapters.

All cross-references in this guide to sections, clauses, subclauses, paragraphs, annexes, figures, tables and expressions of EN 1993-1-1 are in *italic type*, which is also used where text from EN 1993-1-1 has been directly reproduced (conversely, quotations from other sources, including other Eurocodes, and cross-references to sections, etc., of this guide, are in roman type). Expressions repeated from EN 1993-1-1 retain their numbering; other expressions have numbers prefixed by D (for Designers' Guide), e.g. equation (D5.1) in Chapter 5.

The Eurocode format specifically precludes reproduction of material from one part to another. The 'basic rules' of the EN 1993-1-1 therefore provide insufficient coverage for the complete design of a structure (e.g. Part 1.1 contains no material on connections, all of which is given in Part 1.8). Thus, in practice, designers will need to consult several parts of the code.

It is for this reason that we have elected to base the content of the book on more than just Part 1.1. Readers will also find several references to the National Annex, normally without stating quite what is given there. This is necessary because the timetable for producing National Annexes is such that they cannot be written until after the relevant Eurocode has been published (by CEN) – specifically they should appear no later than 2 years from the so-called date of availability. Since the Eurocode is not regarded as complete for use in actual practice until its National Annex is available – indeed, countries are required to publish the code plus its companion National Annex as a single document – full transfer to the use of Eurocode 3 within the UK will not be immediate. However, Eurocode 3 will become increasingly dominant in the next few years, and appropriate preparation for its usage (and for the withdrawal of BS 5950) should now be underway.

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L. Gardner
D. A. Nethercot

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