

Review



David Brown finds the second edition of this comprehensive guide to be a valuable addition to a designer's resources, thanks in large part to the many worked examples, which are easy to identify, comprehensive and instructive.

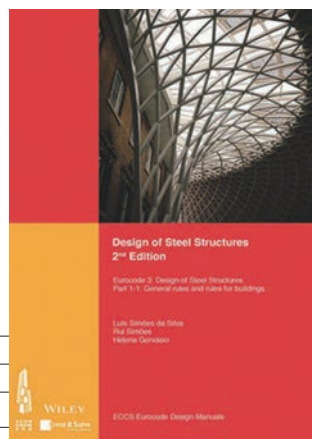
Design of Steel Structures (2nd ed.) Eurocode 3: Design of Steel Structures, Part 1-1: General Rules and Rules for Buildings

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The second edition of this comprehensive guide is much more than a reprint with corrections; new content on the elastic critical buckling moment and substantial new content on torsion has been added.

For many practising designers, the particular value of this publication will be the comprehensive numerical worked examples, conveniently highlighted with a grey background, which demonstrate the application of the Eurocode. For those wanting a deeper understanding, the theoretical background to many of the EC requirements is given. This background can appear rather academic and a little daunting, particularly in the new sections on torsion, so the practical application demonstrated in the examples is very welcome.

Although introductory pages cover general topics such as the EC structure, limit states and material specification, the majority of the publication is devoted to structural analysis and member verification, following the sections of BS EN 1993-1-1. There is no information on the resistance of connection components, such as bolts or welds, as these fall into a different part of EC3.

The section of the guide covering analysis considers the results of different models, with considerable emphasis on the influence of connection stiffness within the

analysis model. This section is interesting, but divorced from pragmatic UK practice, where the binary choice is made between nominally pinned and nominally rigid. In some examples, readers will notice other features that diverge from UK practice – steel sections that change classification along their length, for example. The guide does a good job of describing alternative national practices where these exist, such as the classification of sections under combined axial load and bending.

This reviewer considered the examples covering frame stability to be particularly helpful, showing the consideration of second-order effects in two different combinations of actions, using the simplified approach described in the design standard.

The remainder of the guide is devoted to member verification, treating each part thoroughly, each section illustrated by numerical examples. In addition to many examples covering the verification of individual members, the publication also includes several much more substantial examples, including a braced multistorey frame, a plastically designed portal frame and the application of the 'general method' to a tapered member. Some of the examples illustrate the use of finite-element analysis, or at the other extreme use approximate

methods of hand analysis, so reflect a strong educational emphasis rather than methods commonly employed in design practice.

Some of the detail within the publication is not reflected in UK practice: S235 steel, IPE profiles and the modelling of frames with semi-continuous connections are certainly not common in the UK, but this does not detract from the principles demonstrated in the examples, which serve as useful models when completing EC verifications for the first time. A third iteration of this guide is the 'UK version', in which a UK foreword describes the places within the guide where UK practice or direction in the UK National Annex will make a significant change.

For this reviewer, the addition of the new appendices on torsion (notably the solutions to differential equations) and the coefficients required for the manual calculation of the elastic critical buckling moment are not particularly valuable. The complexity of torsion is perhaps left to a specialist guide, and the calculation of the elastic critical buckling moment perhaps best completed with one of the several software programmes freely available.

To most practising designers, the real value in this publication is the many worked examples, which are easy to identify, comprehensive and instructive. For these examples alone, the guide is a valuable addition to a designer's resources.

David Brown

David Brown is an Associate Director at the Steel Construction Institute, responsible for a number of technical publications on steel design, covering connections, portal frames, multistorey frames, brittle fracture and Eurocode design. He is a regular presenter of courses and webinars, and contributor of technical articles to *New Steel Construction*.