



Steel Structures: Design using FEM

By Rolf Kindmann, Matthias Kraus

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This book presents the design of steel structures using finite element methods (FEM) according to the current state of the art in Germany and the rest of Europe. After a short introduction on the basics of the design, this book illustrates the FEM with a focus on internal forces, displacements, critical loads and modal shapes. Next to finite element procedures for linear calculations considering the stress states of normal force, biaxial bending and warping torsion, non-linear calculations and the stability cases of flexural buckling, lateral torsional buckling and plate buckling are concentrated on significantly. In this context, design procedures for stability according to the standard Eurocode 3 is introduced and discussed. In addition, important fundamental issues are covered, such as the determination of cross-section properties as well as the elastic and plastic cross-section resistance. Complementary, finite element procedures for cross sections are dealt with, which will have an increasing importance in future. This book has evolved within the teaching activities of the authors in the lecture Computer-oriented Design of Steel Structures on the Master's Program Computational Engineering at the University of Bochum. It covers the total variety of demands needed to be discussed for the safe, economic and modern design of steel structures.

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Editorial Review

From the Back Cover

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This book has evolved within the teaching activities of the authors in the lecture “Computer-oriented Design of Steel Structures” on the Masters’ Programme “Computational Engineering” at the University of Bochum. It covers the total variety of demands needed to be discussed for the safe, economic and modern design of steel structures.

About the Author

University Professor Dr.-Ing. Rolf Kindmann studied civil engineering at the University of Bochum. Between 1974 and 1989 he worked at the university for six years as a researcher and then for ten years at Thyssen Engineering in different positions, lastly as division manager of all engineering departments. From 1990 to 2013 he was a full professor and the head of the Institute of Steel and Composite Structures at the University of Bochum. In 1991 he founded Schürmann - Kindmann and partners, Consulting Engineers (SKP) in Dortmund. Professor Dr. Kindmann is a licensed checking engineer for steel and concrete structures and of design in railway engineering.

Dr.-Ing. Matthias Kraus studied civil engineering at the Technical University of Darmstadt. In 2001 he changed to the University of Bochum as researcher, where he received his doctoral degree in 2005 and then worked as chief engineer at the Institute of Steel and Composite Structures. Since 2010 Dr. Kraus has worked at Schürmann - Kindmann and Partners, Dortmund, as chief engineer. He also has adjunct lecturships at the University of Bochum.

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