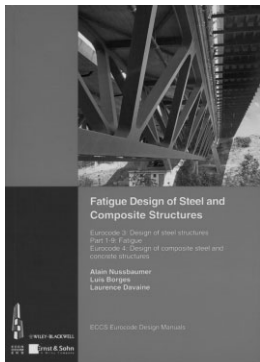


Books

Fatigue Design of Steel and Composite Structures –



Eurocode 3: Design of Steel Structures; Part 1-9: Fatigue;

Eurocode 4: Design of Composite Steel and Concrete Structures,

Alain Nussbaumer, Luis Borges, Laurence Davaine, 311 pages, 250 figures,

ECCS-European Convention for Constructional Steelwork 2011, Wiley-Blackwell, Ernst & Sohn, 55 €, ISBN: 978-3-433-02981 7

The European Convention for Constructional Steelwork (ECCS) has issued a design manual on the specific subject of fatigue. Since fatigue and fracture cannot be separated, they are actually two aspects of the same behaviour. The book addresses both phenomena according to EN 1993 part 1-9 and 1-10. The book follows the general rules of ECCS Eurocode Design Manuals and presents design guidance according to the background stated in the Eurocodes 3 (part 1-9) and 4. Detailed examples follow the standards that have already considered the lessons learnt from poor performance of some steel structures in the past.

The book divides into 6 chapters with three annexes. In their introduction (chapter 1), the authors give basic information about fatigue design, concepts, codes of practice and description of the structures used in the examples (road bridge, chimney and crane supporting structures). In chapter 2 “application” range and limitations, the authors give an overview on materials and external environmental and traffic loading conditions as well as on corrosion and stress range limitation. Main content of the book is related to “determination of stresses and stress ranges” (chapter 3), “fatigue strength” (chapter 4), “reliability and verification” (chapter 5) and “brittle fracture” (chapter 6). Three annexes contain essential information on standards for steel construction (annex A), fatigue detail tables with commentary (annex B) and maximum permissible thickness tables, mainly originating from the Eurocode EN 1993, part 1-9 and 1-10.

After introducing load models and damage equivalent factors, the book presents the calculation of relevant stresses as nominal and geometric stresses, includes stress concentration factors and misalignment for bolted and welded structures. The book incorporates fatigue strength curves and discusses their different influences, as e.g. size effects, post weld treatment or particular cases as web breathing and fatigue testing. The estimation of the reliability follows the Eurocode strategies as the safe life method and damage tolerant method, but makes

allowance for the application of methods like infinite life design, published e.g. by the International Institute of Welding in example 2, “chimney”.

The book was written under the supervision of the ECCS editorial committee with such notable members as *Luís Simões da Silva*, *António Lamas*, *Jean-Pierre Jaspart*, *Rejdar Bjorhovde* and *Ulrike Kuhlmann*. As the Chairman of the ECCS TC 6 Fatigue, *Mladen Lukic* wrote in his foreword, this manual outlines all secrets of fatigue and fracture verifications in a logical, readable and extended way. The book will be an excellent support for both, designer seeking advice or guidance and even for experts in the field of fatigue.

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R. Helmerich