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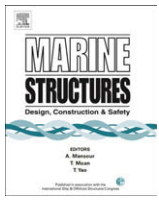

Book review

The history of the theory of structures, Karl-Eugen Kurrer (From arch analysis to computational mechanics), 1st ed., Ernst & Sohn (2008). pp. 848, 119 Euro (Publisher's homepage), ISBN: 978-3-433-01838-5

This is a massive book, written by a knowledgeable and enthusiastic engineer. It spans from ancient Greece to modern finite element-based computational mechanics. The material is presented topically rather than in a strict chronological order. However, the 12 chapters move basically with the axis of time

1. The tasks and aims of a historical study of theory of structures
2. Learning from the history of structural analysis: 11 introductory essays
3. The first fundamental engineering science disciplines: theory of structures and applied mechanics
4. From masonry arch to elastic arch
5. The beginnings of a theory of structures
6. The discipline-formation period of theory of structures
7. From construction with iron to modern steelwork
8. Member analysis conquers the third dimension: the spatial framework
9. Reinforced concrete's influence on theory of structures
10. From classical to modern theory of structures
11. Twelve scientific controversies in mechanics and theory of structures
12. Perspectives for theory of structures

In addition the book comprises short biographies of more than 175 important engineers and scientists. It also includes a foreword by professor Ekkehard Ramm.

As I read the first two chapters of the book, I began to wonder who the intended readership is? Historians or engineers? It is obviously important for the author to establish the history of the theory of structure as an independent "historical discipline" in its own right, not to be equated with structural analysis or strength of materials. To the extent that both "steelwork science" and reinforced concrete occupy a large number of pages, this is perhaps justifiable, but since the dispute between Terzaghi and Fillunger (about soil mechanics issues) is also included, it seems to me that the all embracing *structural engineering* might have been more appropriate. Most facets of this term are dealt with in the book.

The chosen format means that the same problems and the same people often crop up more than once. For instance, the controversy between Mohr and Müller–Bresslau is dealt with several times. In spite of this I am still somewhat confused as to the exact nature of their disagreement. This is in fact an example of a more general criticism: I was frequently left wondering as to what exactly was the difference between various approaches and solutions, and who should really be credited for what. This of course also reflects on the different terminologies and preferences. However, I cannot help feeling that some points get lost in a very rigorous reference to the many people involved in some of the important issues. The flow of the tale is somewhat hampered by historical rigour.

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Equations and examples are often used to explain and/or underline the narrative. This is a difficult balance between too much and not enough. Sometimes the examples/derivations are not all that clarifying, and sometimes they are unnecessarily detailed and almost superfluous.

On the whole the language is rather difficult. English is not my mother tongue, but I normally have few problems comprehending an English text, especially if it deals with a familiar theme. In this text however I gave up on several occasions. Here is a small sample: subsection 3.2.1 (page 158) entitled "On the topicality of the encyclopaedic" starts with the following sentence: "As the purpose of the reversal of the purpose-means relationship constituting modern engineering is no longer evident, we lose the core of the encyclopaedic." I believe this will be a stumblingblock for the average engineer. In my view, this is not an easy read.

At the end the book contains a useful collection of some 175 short biographies, most of them famous and well-known names. However, a fair number of the names was unknown to me. On the other hand some well-known individuals were missing, and I was surprised to find that the Bernoullies, Euler, Galileo, Kirchhoff, Leonhardt, Newton, Poisson, Rayleigh and Ritz, to mention some famous names, were not included. All of them are mentioned in the text, some quite extensively, but none of them in the brief biographies. This is unfortunate since such brief biographies will often be used for quick reference.

In his last chapter, the author has some interesting thoughts on the schism between architects and structural engineers, and subsection 12.1 (page 694) starts with the statements: "In the following it will be explained that

\- beauty and utility in building are compatible
\- the chance for aesthetics is embodied in structural analysis
\- computer-aided graphical analysis could help to reduce the animosity between architects and structural engineers in the design of the load-bearing structure."

He also makes a plea for "the historico-genetic teaching of theory of structures".

Most civil engineering syllabuses are under pressure to include new topics, and it is hard to see how the unfortunate and mutual distrust between architects and engineers can be alleviated unless one can come up with a new program in "architectural engineering" or "engineering architecture". With the teaching of mechanics and structural analysis being under pressure in most civil engineering programs it is hard to see how time could be found to dwell on the historical aspects of the theory of structures, interesting though it may be.

In spite of some critical comments, I would like to finish on a positive note. The book certainly contains a wealth of interesting information, and I believe that every department of structural engineering ought to have a copy on its shelves.

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