

Einar Strømmen: Theory of bridge aerodynamics

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This competently written book covers basic material on: time series, their spatial structure, and their simulation, with primary application to the description of wind fields; elements of stochastic structural dynamics, with application to wind-induced response calculations; the determination of wind-induced internal forces; and calculations pertaining to aerodynamic instabilities, including static divergence, galloping, and flutter.

The author makes a commendable effort to introduce the reader to some aerodynamics and aeroelastic concepts. Nevertheless, the emphasis is decidedly on response computations to given aerodynamic loads and/or self-excited forces, with flow physics and their theoretical and intuitive understanding having in most cases a distinctly secondary role in the economy of the book. For example, the Reynolds number is dealt with in just a few lines; references are provided to standard texts, however. Throughout most of the text compu-

tational approaches are developed elegantly and concisely in matrix calculus terms.

Due acknowledgment is made to Scanlan's path breaking work, with a nice appendix on the experimentally-based estimation of the six basic aerodynamic derivatives called by some wind engineers Scanlan derivatives. In addition to bridges, the book also covers chimneys susceptible to vortex-shedding and aeroelastic response. On the other hand, as pointed out by the author, certain special topics are not covered, in spite of their importance for suspension or cable-stayed bridge design. These include dampers and rain- and wind-induced vibration.

A few minor typographical errors are noted. Horizontal is spelled with a z , not an s as in Fig. 7.9. In reference 26 *roll* should be *role*. In reference 20, *Windwirkung* and *Bauwerken* start with upper case letters. But in this reviewer's opinion it is perhaps the book's title itself that falls short of the quality exhibited in this otherwise commendable work. *Theory of bridge aerodynamics* is not quite what the text offers the reader. Rather, the reviewer believes that a title like *Bridge response to aerodynamic loading*, while less compact, would have described more accurately the subject matter of the book.

This said, the book is an altogether strong contribution to the field and a service to the profession. The author is to be congratulated for his capable effort.

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