Book review

Understanding Bridge Collapses

Björn Åkesson. Taylor & Francis. 2008, ISBN 978-0415436236, £60.99, 280 pp.

It is the nature of bridges that, while collapses are fortunately infrequent, when they do occur, they come with disastrous, catastrophic and usually fatal consequences. The role a bridge performs is mostly unnoticed until it is no longer there and then public awareness, concern and, indeed, blame leap into overdrive.

Björn Åkesson's book develops this premise by studying in detail 20 examples from bridge engineering history spanning over 150 years. There are collapses such as Tay and Tacoma Narrows, which are probably as well known outside the profession as within it, and others such as the Sgt Aubrey Cosens VC Memorial Bridge in Ontario, Canada, which might even test the mastermind specialist subject of experienced bridge engineers.

Each collapse has a dedicated chapter, enabling the reader to dip in to study a particular example rather than reading cover to cover. Each chapter starts with a brief history of what the crossing was intended to achieve in socio-economic terms, and includes its design and construction (and its working life if it got that far!). The case studies are very well illustrated with contemporary photographs, albeit only in black and white, and a good selection of clear and easy to understand diagrams. The reasons behind each collapse are uncovered with forensic detail, often laying bare the inaccurate or overoptimistic assumptions taken by designers or contractors on the path to disaster.

Causes of failure cited in the book are as diverse as the ages of bridges taken as examples: the inappropriate use of materials such as the River Dee failure in 1847, the lack of understanding of wind loading and excitation such as Tay and Tacoma respectively, the spate of steel box girder collapses of the early 1970s (Cleddau, West Gate and Rhine are analysed in detail), through to more improbable causes such as ship impact at Almö, Sweden, and fire damage at Stephenson's Britannia Bridge.

Perhaps the most appealing skill of the author is in taking the reader from a fascinating account of the practical engineering challenges of design and construction seamlessly into a very detailed structural analysis and detailed assessment of the failure mechanisms, complete with calculations and formulae to support his theses. In condensing 20 bridge failures into less than 250 pages of well-illustrated text, there has to be some degree of brevity and omission, but the readability of the book does not suffer unduly and any allegation of superficiality can easily be dismissed. The reader whose taste buds have been whetted and wants to learn more of a particular example can turn to a comprehensive bibliography of 167 references.

Björn Åkesson is a Swedish consulting engineer and a former lecturer at Chalmers University of Technology in Gothenburg. The book, therefore, is not in his native language and the translation includes the occasional error or misinterpretation. More often than not, however, such minor mistakes are a source of amusement rather than irritation and should not detract from what is a well-written and fascinating study into a subject which should be close to the heart of any practising bridge engineer and of more than a casual curiosity to the interested observer.

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