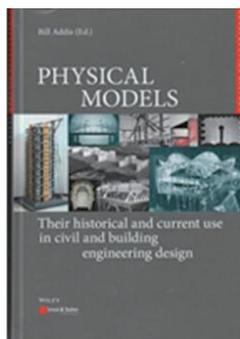


## BOOK REVIEW - Z. CYWIŃSKI<sup>1</sup>

### **BILL ADDIS (ED.): PHYSICAL MODELS • THEIR HISTORICAL AND CURRENT USE IN CIVIL AND BUILDING ENGINEERING DESIGN**

**ERNST & SOHN, BERLIN 2021-01-14**



This impressive book, edited within the Construction History Series of Karl-Eugen Kurrer and Werner Lorenz, represents a very successful compilation of papers written by several prominent authors from the UK (13), Germany (9), Spain (3), Italy (2), as well as – Belgium, Japan, Switzerland and the USA (each – 1). As the Series editors state: “It gives a home for the publication of important works reflecting the full diversity of this subject”. As a matter of fact, the Construction History became presently a very dynamic domain of science showing own, original approach to the examination of various civil and structural engineering problems. It supplements visually traditional research. Bill Addis, the book editor, explains in detail: “The book concerns the history of using physical models in the design and development of civil and building engineering projects including Robert Stephenson’s Britannia Bridge in the 1840s; the masonry Aswan Dam in the 1890s and the

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Builder Dam in the 1930s; tidal flow in the estuaries and wind and seismic loads on structures from the 1890s; the acoustics of several halls and the design of thin concrete shell roofs from the 1920s; the dynamic behaviour of tall buildings from the 1930s, and many cable-net and membrane structures in the 1960s. Individual designers featured include Eduardo Torroja, Pier Luigi Nervi, Heinz Hossdorf, Heinz Isler, Frei Otto, Sergio Musmeci and Mamoru Kawaguchi. The book concludes with overviews of the current use of physical models alongside computer models, for example in boundary layer wind tunnels, seismic engineering, hydrology, soil mechanics and airflow in buildings.” The character and the content of this book is reflected already by its front cover illustration. It shows such figures like the models of a high-rise building in the UK (1932); a sports hall in Saudi Arabia; a mono cable suspension bridge over the Rhine in Emmerich (*F. Leonhardt* – 1961); a water-bath construction (UK); the walls of a cinema (ETH Zürich – 1930); the acrylic resin envelope of a library in Basel (1964); the reinforced concrete hangars (*L. Nervi* – 1935), as well as – the acoustic model of a concert hall in Krakow (Ingarden & Ewy Architects), and a model of a flood barrier on the Thames (the UK).

Concerning the formal book arrangement, at first it contains the Foreword of the mentioned Series editors, the Foreword of Werner Sobek, and the Preface of Bill Addis. Then, the detailed book content follows – grouped in 5 Sections enclosing 39 Chapters. In the end, there are 7 Appendices referring directly to Vitruvius (c. 30-15 BC), Galileo (1638), Euler (1766), Telford (1801), Reynolds (1888), as well as – to the Builder (1846) and the Civil Engineer and Architects Journal (1847). There follow brief biographies of authors and of the Series editors. Finally, the information on the book series and the book index is given. Altogether, there are XXXII + 1113 pages, 753 figures, 6 tables, and 1991 references; the price is 139,- Euro.

It can be noticed that nowadays the physical modelling of structures embodies a representative approach to identify their essence and to point out the respective structural design possibilities. It can notably influence their overall analysis – considering the engineering computation and the architectural configuration. All that brings up a simultaneously fascinating and comprehensive view on the relevant state-of-the-art and on the fresh, modern understanding of the nature of civil engineering structures. Therefore, the book can be greatly recommended worldwide to specialists of civil, structural, and architectural engineering including those in Poland. However, it must be added that such knowledge is here not a *terra incognita*. After WW2 many model experiments and relevant structural designs were made in Poland but their reporting abroad was very difficult. For instance, the reviewer can point at the very popular photoelastic investigations performed in Warsaw by *J.T. Pindera*: *Zarys elastooptyki* (Outline of photoelasticity), PWT, Warszawa 1953, or the model research practised at the Gdańsk University of Technology (e.g. for the goblet one-column roofs 18x18 m of the former Katowice railway station, the shell dome of the Majdanek Holocaust Monument, or the hydraulic engineering examination of the Vistula dam in Włocławek – together with own, original production of electrical resistance strain gages. For the Polish readers, the latter statement should be an additional cause to study that magnificent book.

Zbigniew Cywiński  
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Honorary Professor Emeritus



Zbigniew Cywiński (born February 12, 1929) - a professor, habilitated doctor, civil engineer (1953), and master of technical sciences specializing in bridge construction (1955). Academic teacher at Gdańsk University of Technology (1953–2000), University of Baghdad (1965–1966), University of Mosul (1970–1973) and the professor at the University of Tokyo (1987–1988) and UNESCO expert at the Somali Ministry of Education (1979–1980). He obtained a doctorate (1964), habilitation (1968) and a professorship (1978) in the field of structure mechanics (statics, dynamics, stability and theory of thin-walled bars: generalization of the Vlasov theory and the so-called Cywiński Paradox). His stay in Japan, included a series of lectures at the other six imperial universities (Fukuoka, Hiroshima, Kobe, Osaka, Nagoya, and Hokkaido in Sapporo), and resulted in a deeper interest in bridges, especially in the aesthetics of bridges, and more broadly - in use of modern construction needs. This concerned the cultural landscape - determined by ethics, the environment, and sustainable development, and the fulfillment of current requirements in the education of engineers. Author of 750 publications - many of them written in English and German. Dean of the Faculty of Civil Engineering, Gdańsk University of Technology (1984–1987, 1993–1996 and 1996–1999) and a member of reputable scientific societies in Poland and abroad, incl. International Association for Bridge and Structural Engineering (1972–2012) and the American Society of Civil Engineers (1992–2009). Currently, an emeritus professor at the Gdańsk University of Technology.

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