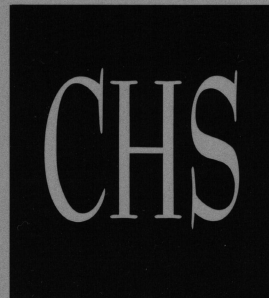


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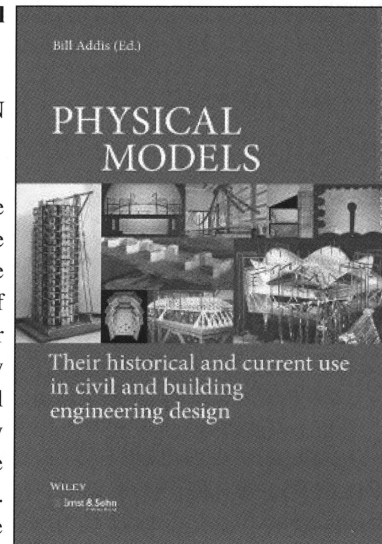
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Book reviews

Physical Models: Their historical and current use in civil and building engineering design

Bill Addis Berlin: Ernst & Sohn, 2020, 1114 pp., 896 ills., ISBN 978-3433032572. £70.

The volume, edited by Bill Addis, brings together an impressive selection of contributions on design and research methods. The so-called physical models are very valuable in building practice but relatively rarely used. Although these structural models of different scales could be used for visualisation, they are rather intended to be used to define their optimal form. This is done by examining geometric relationships to simulate physical processes inside and outside of models, or by experimentally investigating the behaviour of loaded models of the future structures thoughtfully made of imitated building materials. Historically, physical models were the only way to investigate such aspects in complex constructions before numerical modelling was implemented.



The topic is explored and presented in a wide range of papers in chronological order. The volume is divided into five sections, each covering one historical period. For example, the first section describes traditional building materials used until the end of the nineteenth century, such as wood, stone and iron, and the common design methods of the time – catenary and thrust line. Most of the papers in the two subsequent sections are focused on the composite material, reinforced concrete, that became widespread at the beginning of the twentieth century. Altogether, the work provides a comprehensive compilation of the history of the development of physical models in various countries from ancient times to the present.

During his extensive academic and professional career as an engineer, and as a contemporary witness who is familiar with model-based design methods, Addis deals with the historical development of physical models and contributes a number of essays to the book. Together with the co-authors, he has created an insightful treatise on this topic, which, in addition to the history of development, also provides outlooks on related fields and areas of application of physical models. One example is the use of different building materials and applications in different types of constructions. World recognized experts who devoted special attention to the topic, such as Eduardo Torroja, Heinz Hossdorf, and Frei Otto, are also the subject of individual investigations. In addition to essays on specific case studies such as the Basento Bridge in Italy by Sergio Musmeci or the Multihalle in Mannheim by Frei Otto, the book also provides the reader with the scientific-theoretical point of view, by articles covering the measurement methods and required equipment.

The majority of papers are focused on historical development and describe the displacement and inevitable decline in the application of physical models caused by technical progress and the concomitant tendency of increasing computer power. Although numerical models make the use of physical models seem superfluous, the last section of the book is devoted to contemporary field reports with physical models. The authors, all from different disciplines, give detailed descriptions of their experiences and

emphasize that the tried-and-trusted method should not only continue to be used, but that in combination with numerical models can certainly lead to valuable synergy.

The topic is treated comprehensively in terms of practical aspects – with numerous case studies included – as well as the theoretical ones. Thus, the volume represents an important work on construction history for this subject area. The layout and organisation of the contents are clearly structured. Above all, the index at the end of the book makes it simple to navigate through specific topics. The detailed descriptions and accompanying illustrations are convincing and contribute to a clear understanding of the subject. The examples provided inspire the reader to do some experimenting of his own.

In contrast to numerical models, which, despite the advanced development of computers and CAD programmes, lead to optimal but also simple and frequently trivial solutions in terms of design, the use of physical models has several advantages. Comparable to free-hand drawing, the use of these types of models offers creative and artistic freedom. The tactile perception arising through direct contact with the physical models during construction involves fine motor skills, while at the same time the building process of the designed structure is simulated. Design and spatial inconsistencies in the project can be identified and resolved immediately. By tweaking the model, first impressions of the load-bearing behaviour can be acquired through observing visible deformations. Yet the model can be subjected to a detailed investigation by means of controlled load tests using appropriate measuring equipment. Another significant advantage of physical models is their use as a mean of communication. In this way, the design idea can be conveyed to construction specialists as well as to clients who are not trained experts.

Today, physical models are the privilege of a few large and well-funded projects. They have the possibility of commissioning specialised institutes to build and study the models. In order to spread the use of physical models, it would be expedient, given their various advantages, to integrate this field of knowledge into the training programmes for architects and engineers. Visiting museums and organised events dedicated to the subject, could be an important part of acquiring theoretical and historical knowledge. But in an era dominated by digitalisation, the subject would be better absorbed if students could have their own personal experiences carrying out practical applications on their design projects. At the same time, one could expect that this practice would lead to unconventional and unique solutions. It would certainly be exciting to see what our built environment would look like in the future if physical models were an integral part of the education of building professionals.

Vladimir Korensky

The American Construction Industry: Evolution and Potential

Brian Bowen London
978-0-36765-438-2. 1

Building has always been a matter of materials available and by the funds available and by the funds available from country to country. To understand how building has changed to its advantage if they know those countries, and also at. Who were the immigrants did they want? How were the materials available often we have little good come to look at building

Therefore it is welcome world's largest economic circumstances from the with Europe and also a number of compact across that continent. rather different building technology

This study therefore principally for historical on building history. In were more such countries However it does not to learn about the history

The book's origin as a chapter that considers something that might classical times to the the book with a chapter century America with that most early immigrants Ages to the classical period also suspects that the occasional lapses into text into a main story

The material is arranged the New Republic to