

BOOK REVIEWS

Movement Control in the Fabric of Buildings

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REFERENCE: Rainger, P., *Movement Control in the Fabric of Buildings*, Batsford Academic and Educational Ltd., London, and Nichols Publishing Company, New York, 1983, hardback, 216 pp., \$46.50.

In the preface the author states that building failures are often the result of a failure to make use of authoritative guidance due "to the sheer volume of the guidance available." *Movement Control in the Fabric of Buildings* is a case in point. It is an authoritative textbook which will be valuable for serious students of building technology and investigators determining the cause of building failure. But it is not the "handy reference during design" which the author hoped it would be. It is not organized in a way which facilitates a designer finding a ready solution to a design or detailing problem amidst the sheer volume of guidance it contains.

Inadequate design for movement in the fabric of buildings is seldom catastrophic, but often contributes to structural damage, decreased weather resistance, and injury to a designer's reputation. The book discusses basic causes of building movement, movement characteristics of common materials, general design strategies, and principals of joint design. It then discusses design for movement control in building elements, including foundations, substructures, pavement and retaining walls, structural frameworks, masonry walls, claddings and facings, roofing, floor systems, and finishes. There are many tables, charts, and architectural detailed drawings.

Despite thorough coverage of the above topics, the book has only limited discussion of several significant types of building movement. I did not find a single mention of seismic movement, for example. When one considers the potential size and consequences of seismic movement, this is a major shortcoming. Movement in plumbing and mechanical systems is virtually overlooked. Discussion of movement in metal and wood structural systems is limited, apparently expressing a British preference for concrete and masonry.

Other differences in British and North American construction practice are also evident. Formulae and tables are in metric units, and designers without experience with that system may find them difficult to use. References to materials which are not common here will also limit the book's use. For instance, a table listing movement in wood (timber, as the book calls it) due to moisture includes Scots pine, European spruce, teak, and English oak, species which are not readily available at the neighborhood lumberyard.

It is unfortunate that British and other foreign industry standards are not more widely available in this country. However, without access to the full text of the many British standards and British Research Establishment reports mentioned in the book, it is unwise to base critical building design decisions on the book's abbreviated references.

The book is written in a "foreign" English. The following sentence gives an example of its grammar: "This is an area which may affect the building designer, since expansion joints in pipes can be space consuming, roller support to a heating pipe to allow freedom of movement" (p. 204). The use of stream of consciousness in technical writing is certainly provocative, but I believe it is an idea whose time has not yet come.

The foggy prose is offset by clearly illustrated details based on British construction practices. They are a source for design solutions which may be unfamiliar, but potentially useful, to a careful North American designer.

In summary, this is not a book that typical architects or engineers would find useful in their own bookcases. It should, however, be included in university and technical libraries, where it would be available for browsing, research, and investigations.

"Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment"

Reviewed by K. G. W. Inn, Center for Radiation Research, National Bureau of Standards, Gaithersburg, MD 20899.

REFERENCE: "Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment," NCRP Report No. 76, National Council on Radiation Protection and Measurements, 1987.

Since the birth of the nuclear age in the 1940s, uses of radioactive materials have been developed for national defense, the generation of electricity, medical diagnostic techniques, industry, and consumer products. Unfortunately, the use of nuclear materials has also meant their occasional release into the environment. It is necessary to be able to evaluate the potential impact of releases of radioactive materials on the environment, ecology, and people. In the absence of a thorough, long-term study of a release, numerical models are relied upon to predict the potential radionuclide transport through the environment to people. The purpose of this NCRP Report is to "review the current status of the application of radionuclide transport models from the point of discharge to the environment to the point of intake by man."

The Report (283 pages) is divided into eight chapters which, after the introduction, discuss atmospheric, surface water, and groundwater transport models. Usage factors for predicting exposure to humans, model uncertainties, application of the models to environmental assessment, and conclusions and recommendations follow. Two appendices are also provided: the first a discussion of the applicability of models for routine releases to the accident situations, and the second a glossary of terms used in the Report. Over 400 references are cited, reflecting the depth and breadth of the material covered in the Report.

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Chapter 2 briefly covers a variety of atmospheric transport models; these extend from the local to the global arena. Related topics of wet and dry deposition, resuspension, terrestrial transport and bioaccumulation in food products, and a data base for terrestrial transport bioaccumulation models are also briefly covered in this chapter. Special attention is given to tritium and carbon-14 in brief subsections of this chapter.

Assessment of radionuclides released to surface waters is discussed in Chapter 3. Following the discussion of surface water models, the critical parameters of the models, data bases, verification and validation of the models, bioaccumulation factors, and the variability and uncertainties for a variety of key radionuclides are presented.

Assessment of radionuclides released to groundwater is covered in Chapter 4. General discussion in this chapter covers the models, key parameters, and evaluation and validation methods.

Dietary and inhalation factors are briefly developed in Chapter 5 along with the effects of shielding by buildings, homes, and vehicles.

Uncertainties associated with model predictions are discussed in Chapter 6. It is recognized that the models discussed in the preceding text do not lend themselves to precise accounting of the uncertainties during evaluation. However, analysis of parameter imprecision provides a stochastic mechanism for combining the large variability in each of the model's key parameters.

Application of models for environmental assessment is covered in Chapter 7. Environmental assessment models are compared to research models. The authors emphasize that environmental assessment models are useful for screening and are intentionally conservative for human health protection.

Conclusions and recommendations are found in Chapter 8. Recommendations emphasize that additional effort be devoted to model validation and simplification. The Report concludes that (1) models are available to address all significant pathways of radiological exposure to humans, (2) assessment models are essential for *a priori* evaluations and planning, (3) further development of models and improvement in data bases should be pursued selectively, (4) some models are more complete than others, depending on specific needs, and (5) additional work is needed to improve confidence in the results of the models.

The Report reflects the tremendous progress made in the understanding of transport processes in the environment. It is encouraging that the models discussed in this Report are even semi-quantitative, given the complexity of the environmental systems. The authors should be congratulated for the excellent Report on such a broad subject. The authors' ability in maintaining a rational perspective over the volumes of research which had to be compiled, compared, evaluated, and recast into readable form is stellar. Not only are the models presented and discussed but their assumptions and limitations are mentioned to give the reader a sense of their applicability.

Considerable emphasis is placed on the need to compare the models against actual situations. This is reflected in a significant concern with model verification and validation, and the variability and uncertainties related to the key components of the models. The recommendation of a stochastic mechanism for realistically evaluating the uncertainties of model calculations is one of the Report's most significant contributions. The evaluation of the uncertainty components and their effect on the total uncertainty helps pinpoint critical areas for future study and establish priorities for research emphasis.

Discussions of the various models are uneven; some models are presented in reasonable detail, while others are politely mentioned and given cursory attention. Furthermore, the discussions on bioaccumulation in food products (Chapter 2) and bioaccumulation factors (Chapter 3) may have been better combined into a separate chapter because they are sufficiently related and require significant development of their merits. The combination of the kinetic presentation in Chapter 2 and the thermodynamic data in Chapter 3 would have helped to draw the information into a more comprehensive presentation. These are, however, minor criticisms when compared to the enormity of the task charged to the writing committee and the skill displayed in accommodating so much of the necessary information.

In the final analysis, the Report is well written, extremely informative, and the recommendations are timely and important for future scientific direction. The Report will certainly be useful to all, since a considerable amount of information is condensed and integrated from several areas of study. A careful reader will certainly learn how associated areas of research may bear more directly on his studies than suspected.