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Building Maintenance Technology

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Foreword

Some six years ago I was privileged to meet Lee How Son and George Yuen, when I was engaged as a United Nations Consultant to advise Ngee Ann Polytechnic, Singapore, on the development of building courses. Since then I have been closely involved with the authors as an External Examiner and I soon became very impressed by their thorough understanding of the technological aspects of building maintenance, the high standard of excellence that they achieved in their lecturing and examining work, and their dedication and enthusiasm. Hence I was delighted when they agreed to write a book on this subject in the *Macmillan Building and Surveying Series*.

There can be no doubt as to the immense importance of this subject to architects, surveyors, contractors, maintenance personnel, building owners and many other related professions. In addition, the text has been skilfully produced to provide a wealth of information in a systematic and readily assimilated format, supported by numerous high quality and very informative diagrams, aimed to assist the many students concerned with this subject in a most helpful and enlightening way.

The numerous building defects, many of them with major implications for the building owner, which occur daily, bear testimony to the great need for an authoritative and detailed exposition of this subject. Lee How Son and George Yuen have accomplished this task in a truly workmanlike and very professional manner, identifying the defects, their characteristics and causes, and the remedial measures required to rectify the problems that can arise, in this lucid yet detailed exposition.

I believe that this book will have a universal appeal and that it will, in the fullness of time, become the recognised text in this important and developing area of building work. Any book which assists in the improved maintenance of buildings must be of great value, and this

text will help significantly in this task by providing a sound technological base and a better understanding of the underlying problems and their prevention or cure.

Professor IVOR H. SEELEY
Series Editor for the *Macmillan Building and Surveying Series*

Preface

In *The Seven Lamps of Architecture*, John Ruskin wrote: 'When we build, let us think that we build forever'. This statement may well have been true in the nineteenth century. But in the context of modern times, it is hard to believe that we can ever create Ruskin's Utopia of maintenance-free buildings.

Surprisingly, building maintenance has been a much neglected sector of the building industry universally. Because of its non-glamorous nature, it is unlikely to attract the attention of the different parties in the building process compared with new construction. Architects, for example, seldom have an extended interest in the buildings they designed beyond their defects liability period, nor do they retain a long-term responsibility for their maintenance. Owners, on the other hand, usually attempt to keep maintenance expenditure to the minimum, in the popular belief that maintenance costs invariably erode profits.

Admittedly, maintenance commences with the service life of the building and is the accepted responsibility of the owners. But it is also necessary to incorporate maintenance considerations at the design stage so that potential maintenance complications can be arrested at their source. Furthermore, the contractor has a duty of care in ensuring that he complies with specifications, drawings and instructions and supervises the progress of the construction diligently. In other words, effective building maintenance requires a conscious effort undertaken collectively by all parties of interest in the building.

While accurate figures are hard to come by, it has been estimated that the annual costs of building maintenance and repair in some developed countries already account for at least half of the total building market. This is the result of a gradually growing realisation that the existing building stock represents sizeable economic resources that must be managed and maintained efficiently to prevent their premature failure and to extend their useful life.

This scenario reinforces the importance of building maintenance. There is evidence of its increasing awareness by government departments, universities, polytechnics and professional bodies associated with building in the number of conferences and seminars and the amount of documentation on maintenance related issues all over the world. Nevertheless, the main problem now lies in giving increased emphasis to the teaching of building maintenance technology at both degree and diploma levels.

Building maintenance technology essentially deals with the study of the occurrence of building defects and the remedies which such defects would require. It involves the application of the principles of the physical sciences to the process of determining the effects on building performance produced by both human and environmental factors. This book is an attempt to present as logically as possible the events that occur from the onset of symptoms of defects to their ultimate rectification. One outstanding feature of our book is the generous use of illustrative diagrams which we believe should help the reader along. Most of these diagrams are extracted or adapted from authoritative sources which we have acknowledged separately.

It is also intentional on our part to exclude aspects of building maintenance management in this book since the subject matter is sufficient to warrant a separate text.

Finally, it should be made known that this book is the culmination of our many months of motivated research and documentation. Although both of us have been involved in the teaching of building maintenance technology in a polytechnic in Singapore for many years and have practical experience in building diagnostics and estate management, this is our first attempt at writing. However, it is hoped that our efforts will go some way towards producing a single comprehensive textbook on the subject that both building students as well as practitioners will find useful. It is also our hope that the book will provide the yeast for more research and documentation on the area of building maintenance technology.

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Finally, it must be mentioned that it is truly impossible to name all the people who influenced and contributed to the preparation of this book without overlooking some. To all these people we express our sincere gratitude.

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