ADVANCED BUILDING MEASUREMENT

Macmillan Building and Surveying Series

Series Editor: Ivor H. Seeley

Emeritus Professor, Trent Polytechnic

Advanced Building Measurement, second edition Ivor H. Seeley

An Introduction to Building Services Christopher A. Howard

Applied Valuation Diane Butler

Asset Valuation Michael Rayner

Building Economics, third edition Ivor H. Seeley

Building Maintenance, second edition Ivor H. Seeley

Building Quantities Explained, fourth edition Ivor H. Seeley

Building Surveys, Reports and Dilapidations Ivor H. Seeley

Building Technology, third edition Ivor H. Seeley

Civil Engineering Contract Administration and Control Ivor H. Seeley

Civil Engineering Quantities, fourth edition Ivor H. Seeley

Civil Engineering Specification, second edition Ivor H. Seeley

Computers and Quantity Surveyors Adrian Smith

Contract Planning and Contractual Procedures B. Cooke

Contract Planning Case Studies B. Cooke

Environmental Science in Building R. McMullan

Introduction To Valuation D. Richmond

Principles of Property Investment and Pricing W. D. Fraser

Quantity Surveying Practice Ivor H. Seeley

Structural Detailing P. Newton

Urban Land Economics and Public Policy, fourth edition

P. N. Balchin, J. L. Kieve and G. H. Bull

1980 JCT Standard Form of Building Contract, second edition

R. F. Fellows

ADVANCED BUILDING MEASUREMENT

IVOR H. SEELEY

BSc(Est Man), MA, PhD, FRICS,
CEng, FICE, FCIQB, MIH

*Chartered Quantity Surveyor
Emeritus Professor of Trent Polytechnic,
Nottingham*

Second Edition

M
MACMILLAN

© Ivor H. Seeley 1989

All rights reserved. No reproduction, copy or transmission of this publication may be made without written permission.

No paragraph of this publication may be reproduced, copied or transmitted save with written permission or in accordance with the provisions of the Copyright Act 1956 (as amended), or under the terms of any licence permitting limited copying issued by the Copyright Licensing Agency, 33–4 Alfred Place, London WC1E 7DP.

Any person who does any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

First edition 1982
Reprinted 1985, 1986
Second edition 1989

Published by
MACMILLAN EDUCATION LTD
Houndmills, Basingstoke, Hampshire RG21 2XS
and London
Companies and representatives
throughout the world

British Library Cataloguing in Publication Data
Seeley, Ivor H. (Ivor Hugh), 1924–
Advanced building measurement. — 2nd ed
1. Great Britain. Buildings. Construction.
Standard method of measurement
I. Title
692'.3

ISBN 978-0-333-48543-9 ISBN 978-1-349-20102-0 (eBook)
DOI 10.1007/978-1-349-20102-0

The only place where
success comes before work is in a dictionary'
Vidal Sassoon

This book is dedicated to those numerous quantity surveyors and quantity surveying graduates and students in the United Kingdom and from other countries who over the years have given me the benefit of their ideas and views and who have, in so doing, contributed to the preparation of this book.

CONTENTS

Measurement examples ix

Preface xi

Acknowledgements xiii

1 PRELIMINARIES, PREAMBLES, CO-ORDINATED PROJECT INFORMATION AND USE OF COMPUTERS IN BILL PRODUCTION 1

General introduction; Scope of Preliminaries Bill and introductory information; Preliminary information; Contractual aspects; Employer's requirements; Contractor's general costs; Works by nominated sub-contractors, goods and materials from nominated suppliers and works by statutory authorities; Prime cost and provisional sums and direct works; Day-works; General summary; Preambles; Typical preamble clause headings; Specimen preamble clauses — Excavating and filling; Structural steel framing; Co-ordinated project information; Use of computers in bill production.

2 SUBSTRUCTURES 26

Measurement procedures; Excavating and filling — generally: Site preparation; Excavating; Earthwork support; Disposal of water and excavated material; Filling; Surface treatments; Sloping site excavation and associated works; Piling; Underpinning; Worked examples.

3 BRICKWORK, BLOCKWORK AND MASONRY 47

Brickwork and blockwork — General requirements; General brickwork and blockwork; Brick and block facework; Other classes of work; Damp-proof courses and sundries to brickwork and blockwork; Masonry — measurement requirements; Description of masonry; Measurement procedures; Rubble walling; Worked examples.

4 REINFORCED CONCRETE 63

Categories; Measurement of reinforced concrete; *In situ* concrete; Reinforcement; Formwork; Sequence of measurement of reinforced concrete floors and roofs; Measurement of reinforced concrete staircase; Precast concrete; Precast concrete/composite decking; Pre-stressed concrete work; Worked examples.

5 STRUCTURAL STEELWORK 83

General introduction; Principles of measurement of structural steel framing; Fabrication of framing; Fittings, connections and special bolts; Surface preparation and treatment; Measurement procedure for structural steel framing; Worked example.

6 WOODWORK AND METALWORK 91

Timber particulars; Carpentry/timber framing; Flooring and roof boarding; Linings and cas-

ings; Composite items — Fitments; Doors and adjoining screens; Windows; Glazed screens; Staircases; Worked examples.

7 FINISHINGS **107**

Sequence of measurement; General principles of measurement — Ceilings; Walls; Floors; Other finishings; Skirtings and similar members; Painting and decorating; Worked example.

8 MECHANICAL SERVICES **121**

General background; Measurement procedures; Approach to measurement; Other measurement aspects; Worked example.

9 ELECTRICAL SERVICES **135**

General background; Measurement procedures; Detailed measurement; Worked example.

10 ALTERATION WORK AND REVISION NOTES **146**

Extent of work; Measurement of demolition, alterations and repair work — Demolishing structures/shoring; Alterations; Repairing and renovating concrete, brick, block and stone; Sequence of measurement; Worked example; Revision notes — General aspects; Weaknesses in specific work sections.

Bibliography **162**

Index **163**

MEASUREMENT EXAMPLES

- (1) Stepped foundations
- (2) Piling (bored cast in place concrete piles, preformed concrete piles and interlocking steel piles)
- (3) Underpinning
- (4) Brick chimney shaft
- (5) Masonry (stone surround to door opening, stone balustrade and plain ashlar facing)
- (6) Reinforced concrete suspended floors
- (7) Reinforced concrete staircase and balcony
- (8) Prestressed precast concrete bridge
- (9) Structural steelwork
- (10) Doors and adjoining lights
- (11) Fixed benching
- (12) Finishings
- (13) Mechanical services
- (14) Electrical services
- (15) Alterations

PREFACE

This book provides a logical extension to the worked examples contained in *Building Quantities Explained*. It is intended to assist students in the later years of degree and higher diploma and certificate courses in quantity surveying and building, and those studying for the later examinations of the appropriate professional bodies, such as RICS, CIOB, IAAS and ASI.

The book was titled *Advanced Building Measurement*, rather than *Advanced Quantities*, to match the appropriate subject heading of most of the relevant examinations. The main objective has been to produce a good selection of worked examples, supported by comprehensive explanatory notes, and covering a reasonable range of constructional components that the candidate may face in the examination. It will be appreciated that however large the book it could not cover every conceivable type of work but it is hoped that the range selected will prove reasonably comprehensive and helpful to the student. In the first instance it was the intention to produce a loose-leaf book with large folded pull-out drawings but the high cost of production prevented its implementation.

The measurement examples in the second edition follow closely the principles outlined in SMM7 and the Code of Procedure for Measurement of Building Works. Particular attention has been paid to securing accuracy in dimensions, ample use of waste calculations and locational notes, adequate descriptions, a logical sequence of items and a good standard of presentation, all of which are important criteria in which students should endeavour to achieve proficiency. A number of dimensioned and bill diagrams have been included to illustrate their nature and use. To make the examples more realistic some take off and query lists have been incorporated.

Apart from describing the measurement procedures and providing worked examples, a chapter has also been included on Preliminaries and Preambles, as examination questions are set from time to time on these particular aspects. Their format and content does also influence the billed descriptions of the

measured items. Bill formats and bill preparation processes have not been included as it is felt that they have been covered sufficiently in *Building Quantities Explained*. However, it was felt desirable to outline the documents and procedures encompassed in co-ordinated project information, and the use of computers in bill production. Some revision notes based on examiners' reports have been included at the end of the text in chapter 10, as these identify major weaknesses and will assist students with their revision work.

Nottingham
Spring 1989

IVOR H. SEELEY

ACKNOWLEDGEMENTS

The author expresses his thanks to the Standing Joint Committee for the Standard Method of Measurement of Building Works for kind permission to quote from *SMM7: Standard Method of Measurement of Building Works: Seventh Edition* and the *SMM7 Code of Procedure for Measurement of Building Works*. Considerable help and advice was received from Christopher Willis FRICS FCI Arb and Norman Wheatley FRICS, Chairman and Honorary Secretary respectively of the Standing Joint Committee. I am also grateful to the Society of Chief Quantity Surveyors in Local Government for permission to quote extensively from its report on *The Presentation and Format of Standard Preliminaries*, and to the former Greater London Council and to the Architectural Press for permission to quote from *Preambles to Bills of Quantities*. Adrian Smith kindly gave permission to quote and incorporate a figure from *Computers and Quantity Surveyors*, in the same series.

Considerable assistance has been obtained from a variety of persons and organisations, many of whom are listed below, which the author acknowledges with gratitude. The Royal Institution of Chartered Surveyors, former Institute of Quantity Surveyors, Polytechnic of Wales (Department of Estate Management and Quantity Surveying), Polytechnic of the South Bank (Department of Building Economics), Trent Polytechnic (Department of Surveying) and University of Hong Kong (School of Architecture) kindly agreed to the use of past examination paper drawings which have been incorporated to advantage, generally with a number of adaptations to increase their usefulness to the student. Subject to various modifications, some of the examples follow concepts adopted by the author when preparing study material for the Ellis School of Surveying and Building in Worcester in years past. This wide ranging search for suitable material for examples has enabled the author to provide a good coverage of the more commonly used works sections in *SMM7*, without repetition of similar items, and of an appropriate standard and format.

Keith Stafford FRICS helped with the preparation of the original draft material for chapters 8 and 9. Jack Preite provided various drawings of alteration work from which drawing 15 was prepared and E. G. Phillips, Son and Partners, Consulting Engineers, Nottingham assisted with the supply of a drawing and specification that provided the basis for the mechanical services example. Nigel Neville FRICS, while serving as Regional Quantity Surveyor to the East Anglian Regional Health Authority, kindly supplied some excellent documents produced in his office and illustrating current practice.

Ronald Sears MCIOB once again prepared the hand-written dimensions and explanatory notes. He spares neither time nor effort in producing artwork of outstanding quality which adds immeasurably to the value of the book. Malcolm Stewart of Macmillan Education Ltd resolved all the book production problems in a most satisfactory and helpful way. I am grateful to the Earl of Stockton and Peter Murby of the publishers for their general encouragement, and to my wife for her continual tolerance and understanding.

Publisher's note: Pages 31, 43, 51, 79, 95, 101 and 127 are intentionally blank to improve presentation of the drawings and dimensions sheets.