

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional service. If legal advice or other expert assistance is required, the services of a competent professional person should be sought.

**President:** Roy Lipner

**Publisher and Director of Distance Learning:** Evan M. Butterfield

**Senior Development Editor:** Laurie McGuire

**Content Consultant:** Alan Carson

**Production Coordinator:** Daniel Frey

**Creative Director:** Lucy Jenkins

© 2003

Carson Dunlop & Associates Limited. All rights reserved.

Published by Dearborn™ Real Estate Education

a Division of Dearborn Financial Publishing, Inc.®

a Kaplan Professional Company®

30 South Wacker Drive

Chicago, IL 60606-7481

[www.dearbornRE.com](http://www.dearbornRE.com)

All rights reserved. The text of this publication, or any part thereof, may not be reproduced in any manner whatsoever without written permission in writing from the publisher.

Printed in the United States of America.

03 04 05 10 9 8 7 6 5 4 3 2 1

# CONTENTS

---

## INTRODUCTION 1

- Features of This Book 1
- An Overview of Structure 2

PART ONE

## FOOTINGS AND FOUNDATIONS

---

### CHAPTER 1

#### AN OVERVIEW OF FOOTINGS AND FOUNDATIONS 5

- 1.1 The Function of Footings and Foundations 6
- 1.2 Soils 7
- 1.3 Frost 8
- 1.4 Basements, Crawlspace, Slab-On-Grade Construction 9
- 1.5 Footing and Foundation Types 11
- 1.6 Special Foundations 15
- 1.7 Inspection Tips 17
- Chapter Review Questions 17
- Key Terms 18

### CHAPTER 2

#### CONDITIONS OF FOOTINGS AND FOUNDATIONS 19

- 2.1 Summary of Conditions 20
- 2.2 Shrinkage Cracks 20
- 2.3 Differential Settlement Cracks 21
- 2.4 Footing Issues 31
- 2.5 Lowered Basements 31
- 2.6 Other Crack Causes and Locations 33
- 2.7 Cracks due to Heaving 36
- 2.8 Cracks due to Horizontal Forces (Lateral Thrust) 44
- 2.9 Bowed, Bulging, and Leaning Foundation Walls 57
- 2.10 Mortar Deterioration 57
- 2.11 Spalling Foundation Material 58
- 2.12 Rot, Insect, or Fire Damage 59
- 2.13 Piers Moving or Deteriorating 60
- 2.14 Pilasters or Buttresses Pulling away from Wall 62

<b>2.15</b>	Cold Joints	64
<b>2.16</b>	Honeycombing	64
<b>2.17</b>	Prior Repairs	66
<b>2.18</b>	Foundation Walls That Are Too Short	66
<b>2.19</b>	Foundation Walls That Are Too Thin	67
<b>2.20</b>	Summary	68
	Chapter Review Questions	69
	Key Terms	71

PART TWO

## FLOORS

---

### CHAPTER 3

#### AN OVERVIEW OF FLOORS 74

<b>3.1</b>	Function and Materials	75
<b>3.2</b>	Characteristics	75
	Chapter Review Questions	79
	Key Terms	79

### CHAPTER 4

#### SILLS 80

<b>4.1</b>	Definition and Overview	81
<b>4.2</b>	Conditions	84
	Chapter Review Questions	88
	Key Terms	88

### CHAPTER 5

#### COLUMNS 89

<b>5.1</b>	Function and Materials	90
<b>5.2</b>	Conditions	90
	Chapter Review Questions	98
	Key Terms	98

### CHAPTER 6

#### BEAMS 99

<b>6.1</b>	Function and Materials	100
<b>6.2</b>	Conditions	103
	Chapter Review Questions	113
	Key Terms	115

**CHAPTER 7****JOISTS, SUBFLOORING, AND CONCRETE FLOOR SLABS 116**

- 7.1** Joists 117
- 7.2** Supporting Masonry Walls 118
- 7.3** Fire Cut Joists 119
- 7.4** Joists Laid Crown up 119
- 7.5** Rim Joists 121
- 7.6** Joist Conditions 121
- 7.7** Engineered Wood 135
- 7.8** Subflooring 137
- 7.9** Subfloor Conditions 138
- 7.10** Concrete Floor Slabs 142
- 7.11** Concrete Floor Slab Conditions 143
- 7.12** Summary 146
  - Chapter Review Questions 147
  - Key Terms 148

**PART THREE****WALL SYSTEMS**

---

**CHAPTER 8****SOLID MASONRY WALLS 152**

- 8.1** Materials and Types 153
- 8.2** Holding the Wythes Together 154
- 8.3** Structural Overview 156
- 8.4** Conditions 159
  - Chapter Review Questions 176
  - Key Terms 178

**CHAPTER 9****WOOD-FRAME WALLS 179**

- 9.1** Overview 180
- 9.2** Conditions 191
  - Chapter Review Questions 201
  - Key Terms 203

**CHAPTER 10****MASONRY VENEER WALLS 204**

- 10.1** Overview 205
- 10.2** Vented Rain Screen Principle 207
- 10.3** Identifying Masonry Veneer Walls 209
- 10.4** Conditions 210

Chapter Review Questions 214  
Key Terms 215

**CHAPTER 11**

**ARCHES AND LINTELS 216**

**11.1** Overview 217  
**11.2** Conditions 220  
Chapter Review Questions 224  
Key Terms 225

PART **IV** FOUR

**ROOF FRAMING**

---

**CHAPTER 12**

**INTRODUCTION TO ROOFS 228**

**12.1** Types and Function 229  
**12.2** Insulation and Ventilation 230  
**12.3** Anchorage 230  
**12.4** General Strategy 231  
Chapter Review Questions 233  
Key Terms 234

**CHAPTER 13**

**RAFTERS, ROOF JOISTS, AND CEILING JOISTS 235**

**13.1** Functions and Definitions 236  
**13.2** Installation Basics 237  
**13.3** Ridges 240  
**13.4** Gable Walls 241  
**13.5** Gable Overhangs 243  
**13.6** Dormers 245  
**13.7** Eaves 245  
**13.8** Flat Roofs and Cathedral Roofs 246  
**13.9** Notches and Holes 247  
**13.10** Conditions 247  
Chapter Review Questions 254  
Key Terms 254

**CHAPTER 14**

**COLLAR TIES, KNEE WALLS, AND PURLINS 255**

**14.1** Collar Ties 256  
**14.2** Knee Walls and Purlins 258

Chapter Review Questions 261  
 Key Terms 261

**CHAPTER 15**

**TRUSSES, WOOD I JOISTS, AND ROOF SHEATHING 262**

**15.1** Trusses 263  
**15.2** Wood I Joists 272  
**15.3** Roof Sheathing 273  
 Chapter Review Questions 278  
 Key Terms 278

**CHAPTER 16**

**SEISMIC AND WIND RESISTANCE 279**

**16.1** Introduction 280  
**16.2** Earthquakes 280  
**16.3** Hurricanes 282  
 Chapter Review Questions 284  
 Key Terms 284

**APPENDIX A**

**INSPECTION TOOLS 285**

**APPENDIX B**

**INSPECTION CHECKLIST 286**

**APPENDIX C**

**INSPECTION PROCEDURES 289**

**APPENDIX D**

**ANSWERS TO CHAPTER REVIEW QUESTIONS 292**

**INDEX 309**

