

EXERCISES IN BUILDING CONSTRUCTION

FOURTH EDITION

Forty-Five Homework and Laboratory
Assignments to Accompany

FUNDAMENTALS OF
BUILDING CONSTRUCTION
MATERIALS AND METHODS
FOURTH EDITION

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and
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10 9 8 7 6 5 4 3 2 1

Getting Started With the Exercises	v
1. Making Buildings	1
1.1 The Project Team	3
1.2 Building Code Restrictions	9
1.3 Observing Construction	11
2. Foundations.....	15
2.1 Waterproofing and Drainage	17
2.2 Soil Types and Bearing Capacities.....	19
2.3 Foundation and Slope Support Systems	21
3. Wood	23
3.1 Working With Wood--Part I	25
3.2 Working With Wood--Part II	27
4. Heavy Timber Frame Construction.....	29
4.1 Heavy Timber Framing	31
5. Wood Light Frame Construction.....	33
5.1 Laying Out Floor Framing	35
5.2 Laying Out Wall Framing.....	37
5.3 Working With Pitched Roofs.....	41
5.4 Designing Roof Framing	43
6. Exterior Finishes For Wood Light Frame Construction.....	45
6.1 Exterior Detailing	47
7. Interior Finishes For Wood Light Frame Construction.....	49
7.1 Proportioning Fireplaces	51
7.2 Proportioning Stairs	53
7.3 Platform Frame Design Project.....	55
8. Brick Masonry	59
8.1 Selecting Bricks and Mortar.....	61
8.2 Brick Bonds.....	63
8.3 Masonry Dimensioning.....	67
8.4 Lintels and Arches.....	69
9. Stone and Concrete Masonry	71
9.1 Selecting Concrete Masonry Units	73
9.2 Stone Masonry	75
10. Masonry Loadbearing Wall Construction	77
10.1 Movement Joints In Masonry Construction.....	79
10.2 Masonry Cavity Wall Detailing.....	81

11. Steel Frame Construction	83
11.1 Steel Structural Shapes	85
11.2 Steel Framing Plans.....	89
11.3 Detailing Steel Connections.....	93
11.4 Steel Frame Design Exercise	95
12. Light Gauge Steel Framing	99
12.1 Light Gauge Steel Framing Details	101
13. Concrete Construction	103
13.1 Detailing Concrete Reinforcing Bars	105
14. Sitecast Concrete Framing Systems.....	107
14.1 Sitecast Concrete Framing Systems	109
14.2 Architectural Concrete	111
15. Precast Concrete Framing Systems	113
15.1 Precast Concrete Framing Systems	115
15.2 Detailing Precast Concrete Framing.....	119
16. Roofing.....	121
16.1 Low-Slope Roof Drainage	123
16.2 Low-Slope Roof Detailing	125
17. Glass and Glazing	127
17.1 Selecting Glass and Glazing.....	128
18. Windows and Doors	129
18.1 Selecting Windows and Doors.....	130
19. Designing Cladding Systems	131
19.1 Rainscreen Cladding and Sealant Joint Design.....	133
20. Cladding With Masonry and Concrete	135
20.1 Masonry Cladding Design	136
21. Cladding With Metal and Glass	137
21.1 Aluminum Extrusions	139
22. Selecting Interior Finishes.....	141
22.1 Selecting Interior Finish Systems	143
23. Interior Walls and Partitions	145
23.1 Detailing Wall Finishes	147
24. Finish Ceilings and Floors	149
24.1 Detailing Floor and Ceiling Finishes	151
Teach Yourself To Build	153

HEAVY TIMBER FRAME CONSTRUCTION

4.1 Heavy Timber Framing

Heavy Timber Framing

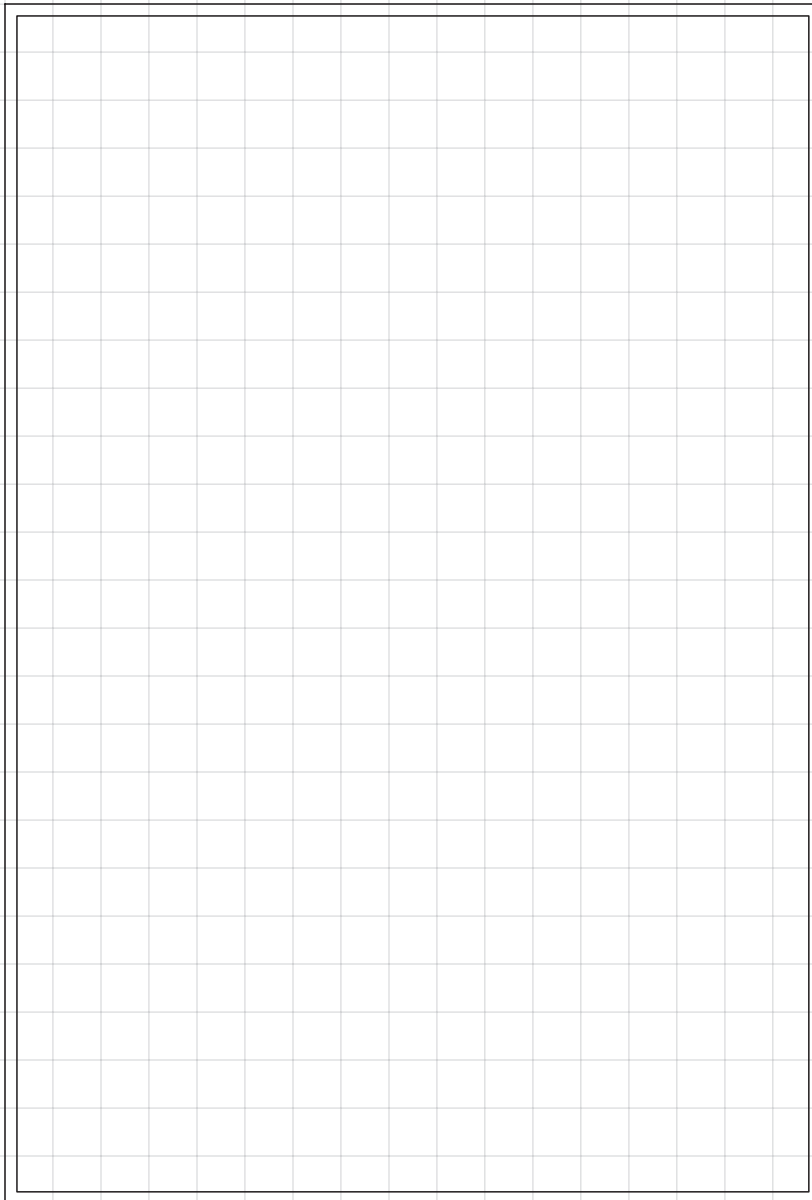
Exercise 4.1 appears simple, but *deserves consideration of several alternative solutions before one is selected*. You have many options: You can use thicker decking and space the beams farther apart, or thinner decking and more beams. Similarly, you can use larger beams and space the girders farther apart, and by using larger girders you can space the columns more widely. Using the structural rules of thumb on page XXX of the text to arrive at approximate member sizes, experiment with different framing plans on scratch paper, then choose one that seems to you to consist of a balanced set of components of reasonable sizes.

Some general guidelines for this building: Remember to abide by the minimum member size restrictions for Heavy Timber construction as given in Figure 4.7 of the text. Use decking that is nominally 2", 3", or 4" deep (38, 64, or 89 mm). Support the decking with laminated wood beams, and the beams with laminated girders. If you divide the building into bays that are not square, span the longer dimension with the girders. Try to keep beam and girder spans in the range of 18' to 25' (5 to 8 m).

You may wish to try using continuous beams joined with metal hinge connectors as shown in Figure 4.15; if so, put the hinge connectors at a distance from the columns of about 20% of the span. For standard sizes of laminated members, refer back to page 82 of the text. Base your connection details on any details in Chapter 4 that seem appropriate.

Heavy Timber Framing 4.1

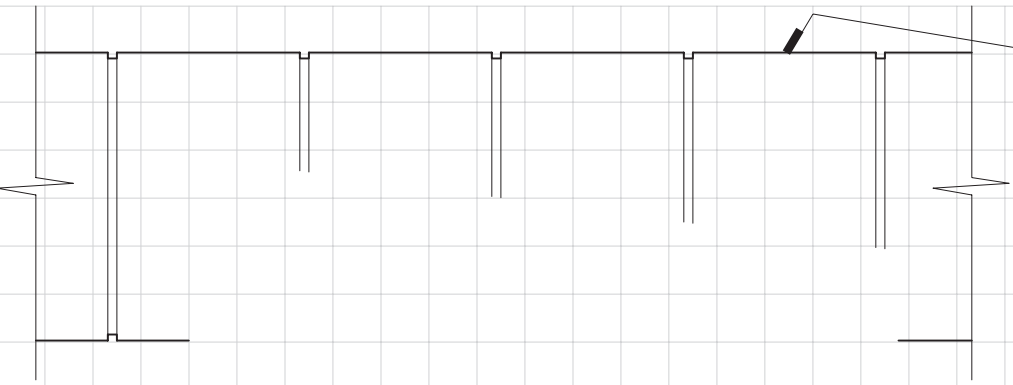
Shown below is the floor plan of a two-story furniture factory in Idaho. The exterior wall is made of 12" thick (300 mm) concrete blocks. Draw a framing plan for the upper floor of this building, using a construction of timber decking supported on laminated wood beams, girders, and columns. Indicate approximate sizes of all members.



Name: _____ Scale: $\frac{1}{16}'' = 1'$ (1:192)
 $1 \text{ square} = 4'$ (1.2 m)

2. To the left, construct a detail of the intersection of a typical beam or girder with the exterior wall. To the right, draw a detail of the intersection of this same member with an interior column. Show the decking and finish flooring in both drawings.

Exterior of wall



Centerline of column



Scale: $1 \frac{1}{2}'' = 1'$ (1:8)
 $1 \text{ square} = 2''$ (50 mm)