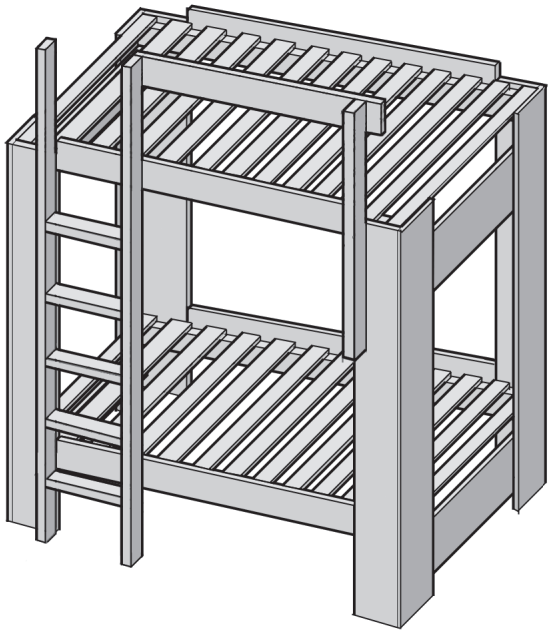
Build a Bunk Bed

Designed by
Jonathan Ochshorn



Instruction Manual

(FITS TWIN SIZE MATTRESSES)

Contents

A. Tools needed

1. Compound miter saw (for cross-cutting boards)

2. Drill and bits (including countersink)

3. Screw gun with assorted phillips head bits (really useful, instead of screw driver)

4. Adjustable wrench (to tighten carriage bolts)

5. Sand paper (course and fine)

6. Tape measure and pencil

7. “Speed square” or right-angle tool (not required, but really useful)

8. Paint brush

B. List of materials

Lumber

1. 1x10 x 6 ft	8 pieces	Cut into 8 5’-4 3/4”-long corner posts, L-1 through L-8
2. 1x10 x 8 ft	2 piece	Cut into 4 3’-3”-long braces
3. 1x4 x 10 ft	8 pieces	Cut into 24 3’-2 7/8”-long slats, SL-1 through SL-24
4. 1x6 x 10 ft	2 piece	Cut into 4 4’-8 1/4” pieces for the four beams, B-1 through B-4
5. 1x6 x 6 ft	1 piece	Cut into 1 4’-0” piece for the guard rail
6. 2x4 x 8 ft	4 pieces	Cut into 4 6’-3”-long pieces for the four beams, B-1 through B-4
7. 2x3 x 8 ft	3 pieces	Cut into 2 6’-6” ladder rails; 5 12” ladder rungs; and 1 2’-4” post to support the guard rail.

Optional lumber*

Closet rod and shelves:

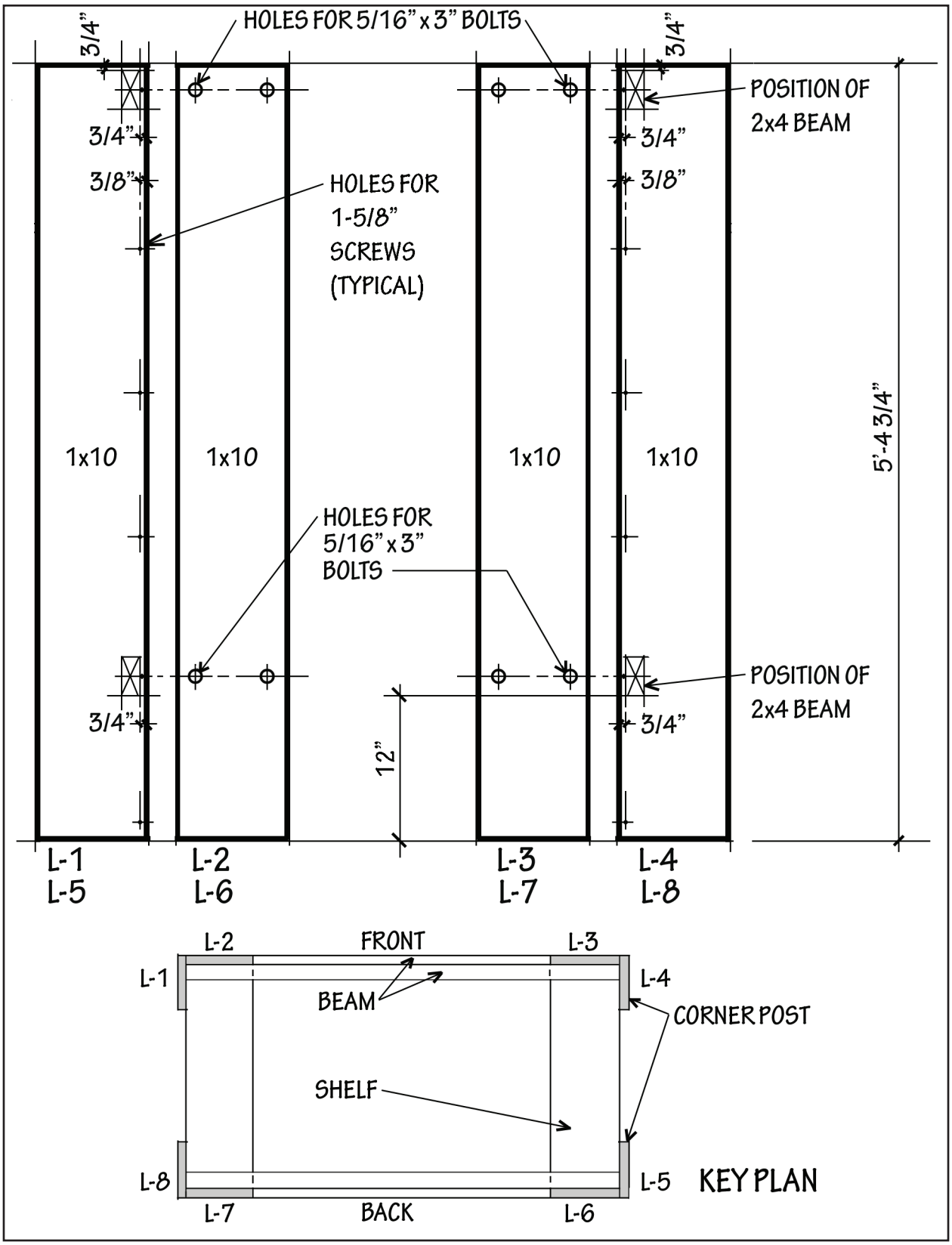
8. 1x12 x 8 ft	1 piece	Cut into 2 3'-3" pieces for the two shelves, and 2 8-1/2" pieces for the two sides
9. closet rod	1 piece	Cut into one 3'-5" piece
10. closet brackets	2 pieces	Purchase at hardware store (also need bracket screws)

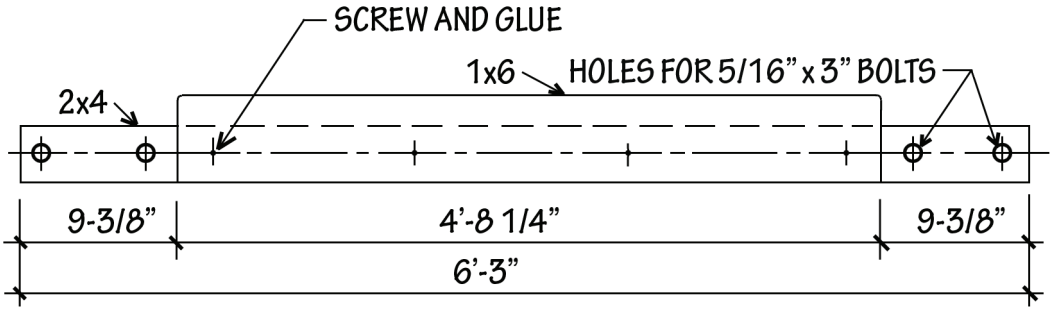
Hardware

11. 1-5/8" screws	1 box	Course-thread drywall screws work well
12. 2-1/2" screws	1 box	Deck screws work well (for ladder rungs, etc.)
13. 3/8" x 5-1/2" carriage bolts	3	Also need 3 nuts and washers (for ladder and guard rail post)
14. 5/16" x 3" carriage bolts	16	Also need 16 nuts and washers (to attach beams to corner posts)
15. 1/4" x 2" carriage bolts	16	Also need 16 nuts and washers (to attach 1x10 braces to corner posts)
16. wood glue		
17. Paint, polyurethane, or polycrylic	1 gallon	I like the Minwax Polycrylic (water-based)

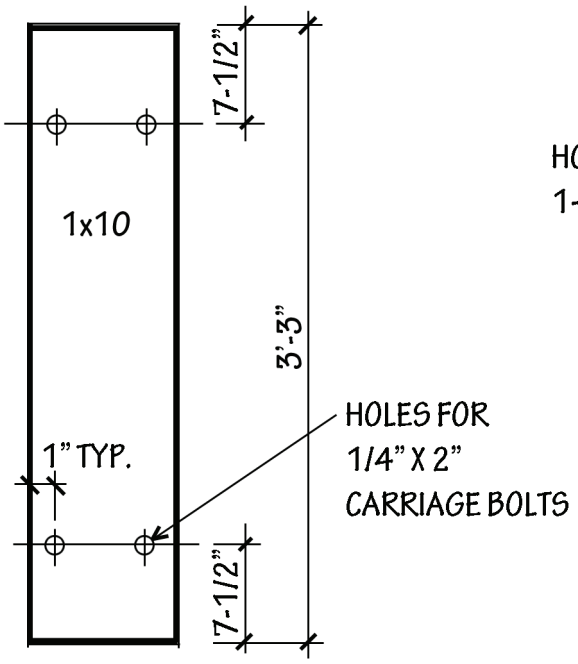
Unsolicited advice: Buy the gallon container -- you won't need that much, but it's good to have around the house.

C. Cuting and preparing the lumber

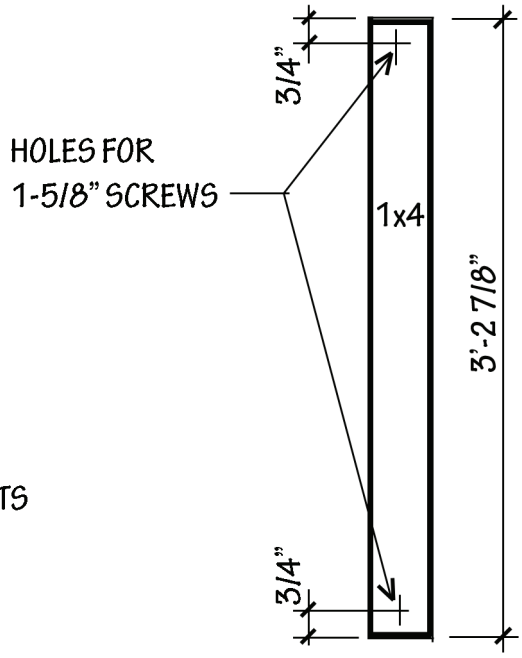




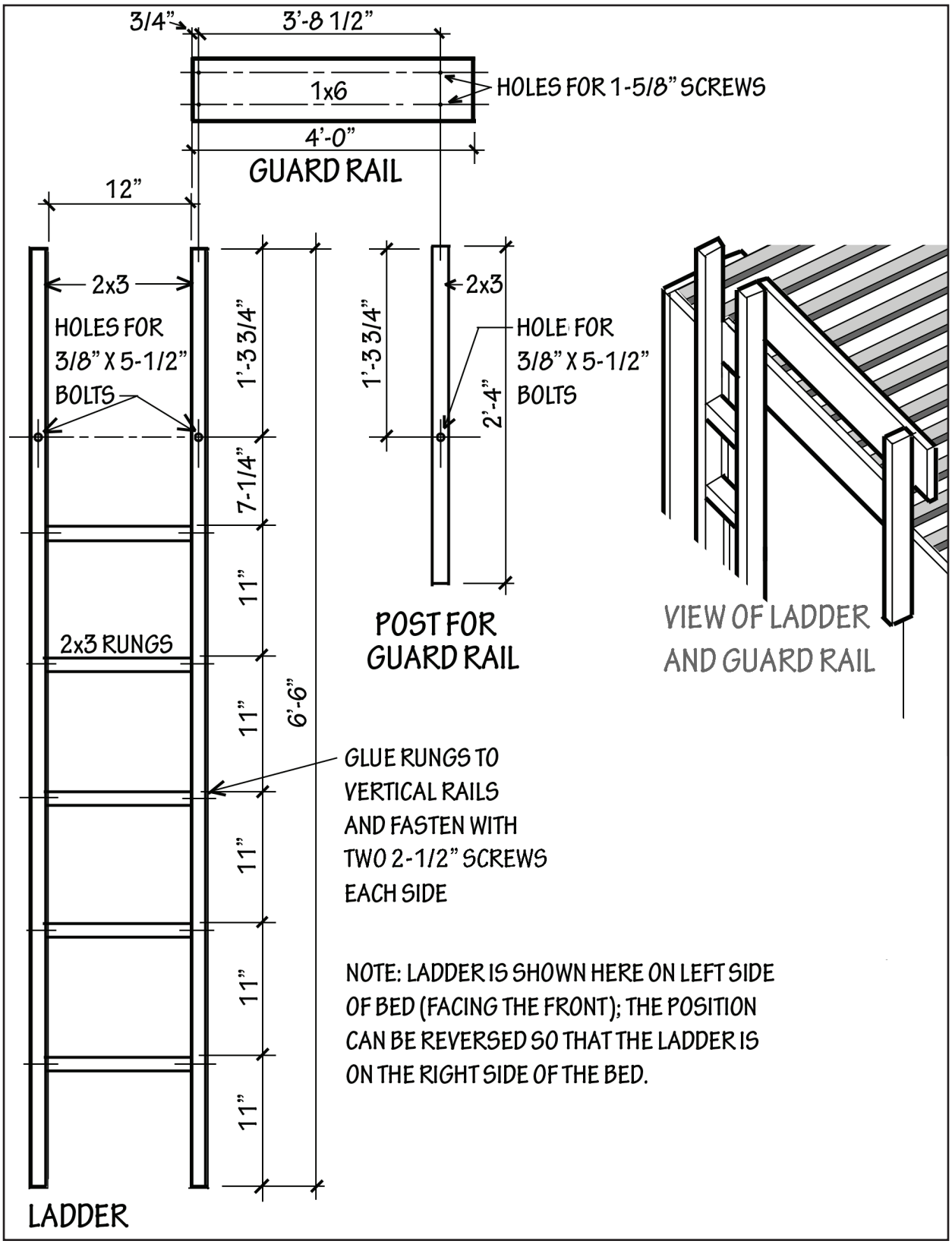
B-1 THROUGH B-4: FRONT AND BACK BEAMS



BRACES (BR-1 THROUGH BR-4)



SLATS: SL-1 THROUGH SL-24


3/4"
3'-8 1/2"
1x6
HOLES FOR 1-5/8" SCREWS
4'-0"
GUARD RAIL
12"
2x3
HOLES FOR
3/8" X 5-1/2"
BOLTS
1'-3 3/4"
7-1/4"
11"
2x3 RUNGS
11"
6'-6"
11"
11"
11"
LADDER
GLUE RUNGS TO
VERTICAL RAILS
AND FASTEN WITH
TWO 2-1/2" SCREWS
EACH SIDE
2x3
1'-3 3/4"
HOLE FOR
3/8" X 5-1/2"
BOLTS
2'-4"
POST FOR
GUARD RAIL
VIEW OF LADDER
AND GUARD RAIL
NOTE: LADDER IS SHOWN HERE ON LEFT SIDE
OF BED (FACING THE FRONT); THE POSITION
CAN BE REVERSED SO THAT THE LADDER IS
ON THE RIGHT SIDE OF THE BED.

D. Step-by-step instructions

1. Cut the lumber, mark the position of shelves and holes, drill and countersink the holes according to the diagrams in Part C. There may be additional holes to drill later -- don't worry, we'll get to that. A note on drilling holes: use a bit just larger than the screw shaft so that the hole offers no resistance to the screw. This allows the screw to pull the "side member" (with the hole) into the "main member" (the piece you're screwing into). Drill into the side of the board that will come into contact with the main member, and countersink the opposite side -- this ensures that the screw will enter the main member at its centerline, and that the head of the screw will end up flush with the face of the side member.

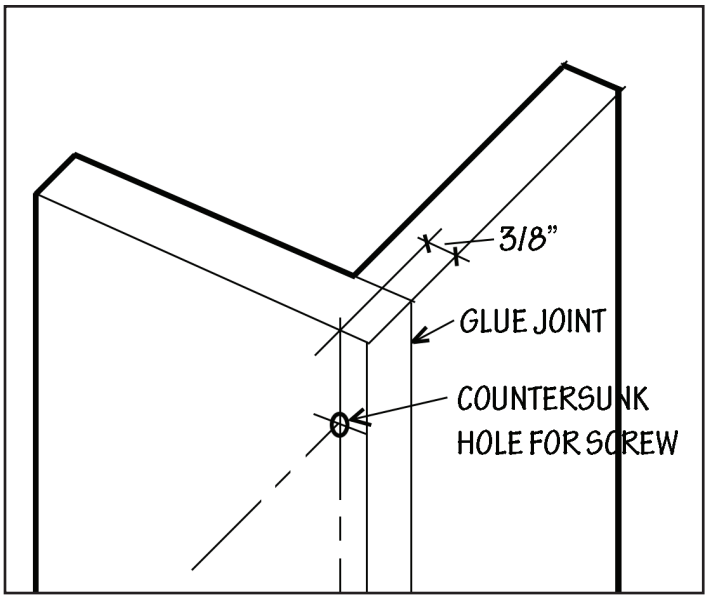


Figure 1. Glue and screw corner posts

2. Glue and screw together the four corner posts (L-1 through L-8) using the 1x10 boards as shown on page 4 and in Figure 1. Use 1-5/8" course-thread wood screws. Note that L-1 and L-2 form one post, as do L-3 and L-4; L-5 and L-6; and L-7 and L-8. The diagram at the bottom of page 4 shows where the four posts are positioned.

3. Using the 1/4" x 2" carriage bolts, fasten the four 1x10 braces (BR-1 through BR-4) to the corner posts, as shown in Figure 2. Two braces are fasstened to L-1 and L-8; the other two are fastened to L-4 and L-5 (see diagram at the bottom of page 4 for labelling of corner post members).

4. Bolt the front and back beams (see page 5 and Figure 3) to the corner posts. The diagram at the bottom of page 4 shows their location. Use two 5/16" x 3" carriage bolts at each end of each beam. Before drilling the bolt holes, make sure that the corner posts and beams are perpendicular to each other. The diagonal distances from A to B and from C to D (shown in Figure 3) must be equal. Drill 3/8" bolt holes through the beams and corner posts in the locations shown in Figure 3. This hole size is slightly larger than the carriage bolt shaft diameter of 5/16". Insert the carriage bolts, place a washer on the side with the nut, and then tighten the nuts. The 1x6 part of the beams should align with the surface of the corner posts (see Figure 4).

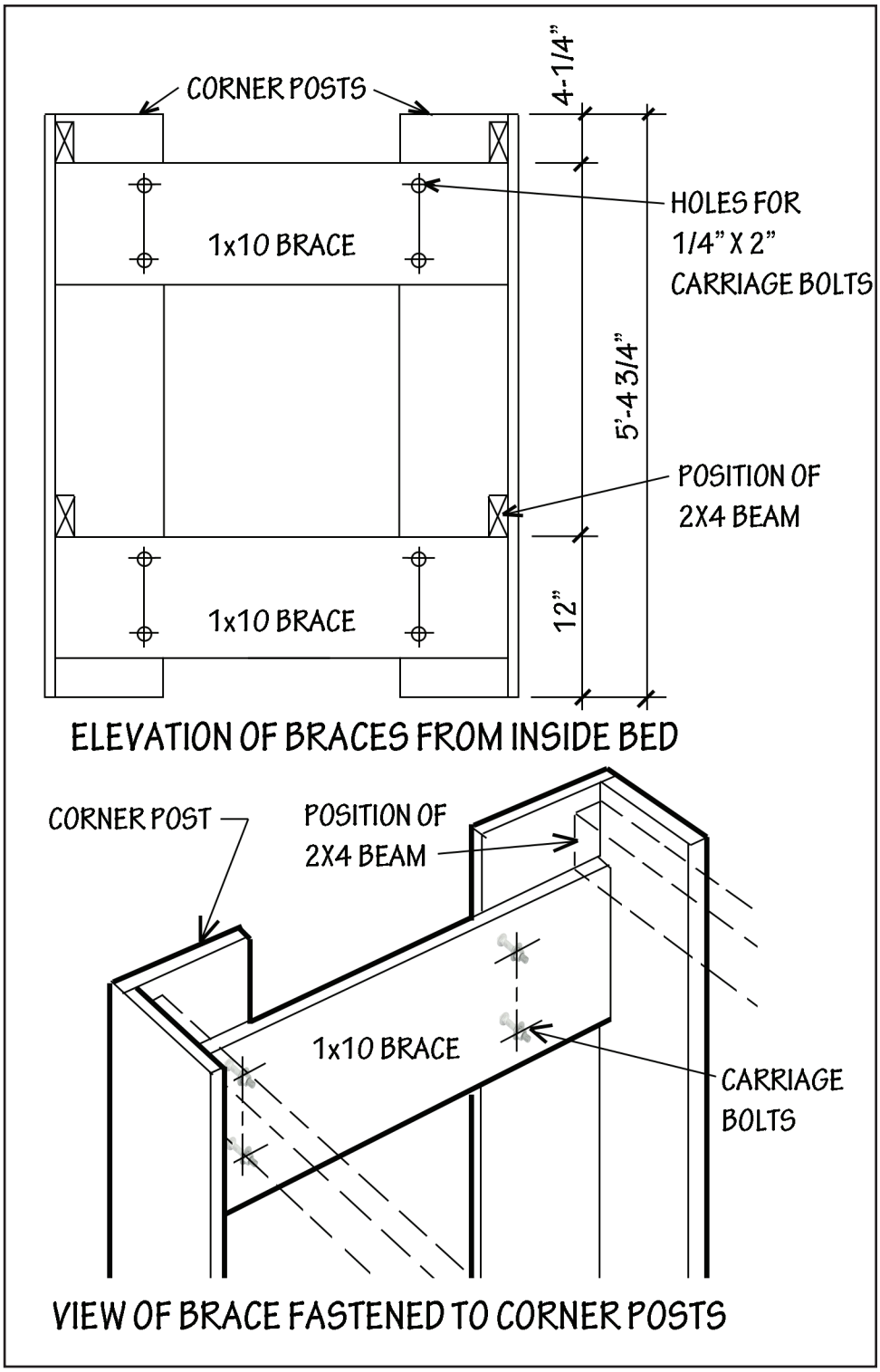


Figure 2. Bolted connection of braces to corner post

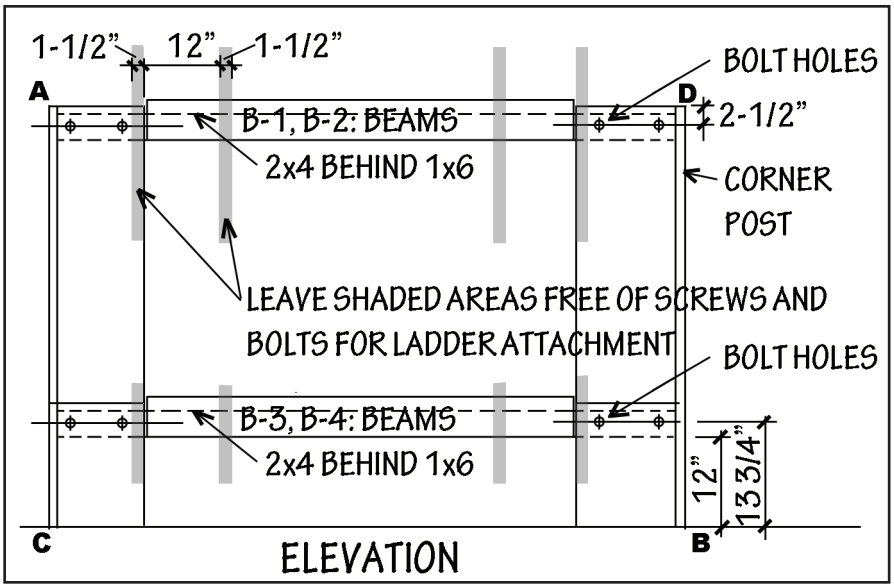


Figure 3. Bolted beams

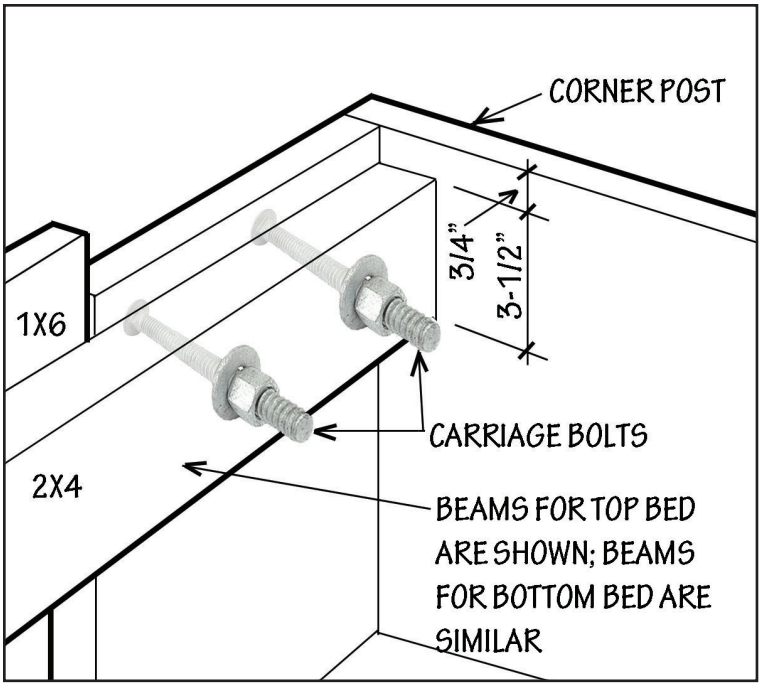


Figure 4. Bolted connection of beam to corner post

5. As shown in Figure 5, 12 slats for each bed (SL-1 through SL-12, and SL-13 through SL-24) can be screwed into the top beams (B-1 and B-2) and the bottom beams (B-3 and B-4), using 1-5/8" screws. For each bed, the first and last slats are placed up against the corner posts, with the ten interior slats evenly spaced, i.e., 3 in. apart.

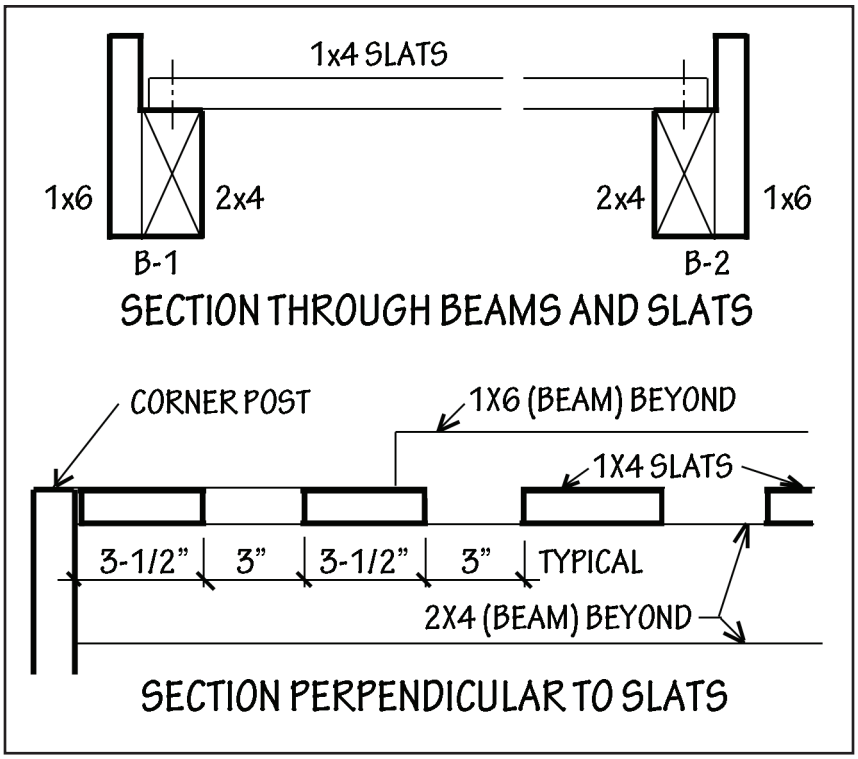


Figure 5. Installation of slats.

6. Now it's time to attach the ladder and guard rail. Fabricate the ladder by gluing and screwing the five rungs into the two vertical rails, as shown in the diagram on page 6. Both the ladder rails and the 2x3 post for the guard rail have a single 7/16" hole (1/16 in. bigger than the 3/8 in. bolt diameter) drilled through the long, 2-1/2", dimension of the 2x3. But the bolt holes in the top beam that line up with the ladder holes can be bigger than 7/16", since they only need to keep the ladder from pulling out laterally: the downward loads on the ladder should be resolved in the floor below, not by being suspended from the beams, so the carriage bolts should *not* bear on the holes in the beams. Just make sure that the bigger holes in the beams are smaller than the diameter of the washers! On the other hand, the single 2x3 post for the guard rail gets the same size hole (7/16") in the beam as in the post, since it does not reach the floor -- its carriage bolt needs to engage both holes in the same way. Note that the ladder and post can be placed on either side of the bed, i.e, the ladder can be attached to corner post member L-2 with the post attached to L-3, or the ladder rail can be attached to L-3 with the post attached to L-2.

Additional 2-1/2" screws should be used to secure one of the vertical rails to the corner post it rests against (the other vertical rail has no other support except for the floor below and the beam above). Drill holes at the edge of corner post L-2 or L-3 (Figure 6) for these screws. Make them approximately 11 in. apart, just above or below the position of the ladder rungs, and screw from inside the corner post into the ladder rail. Same thing for the 2x3 post supporting the guard rail: one 2-1/2" screw into the bottom of the post. The 4'-0"-long 1x6 guard rail is then screwed into the top of the "inside" ladder rail, at one end, and into the 2x3 post at the other end. It's position relative to the 2x3 supports is shown in the diagram on page 6 and in Figure 6.

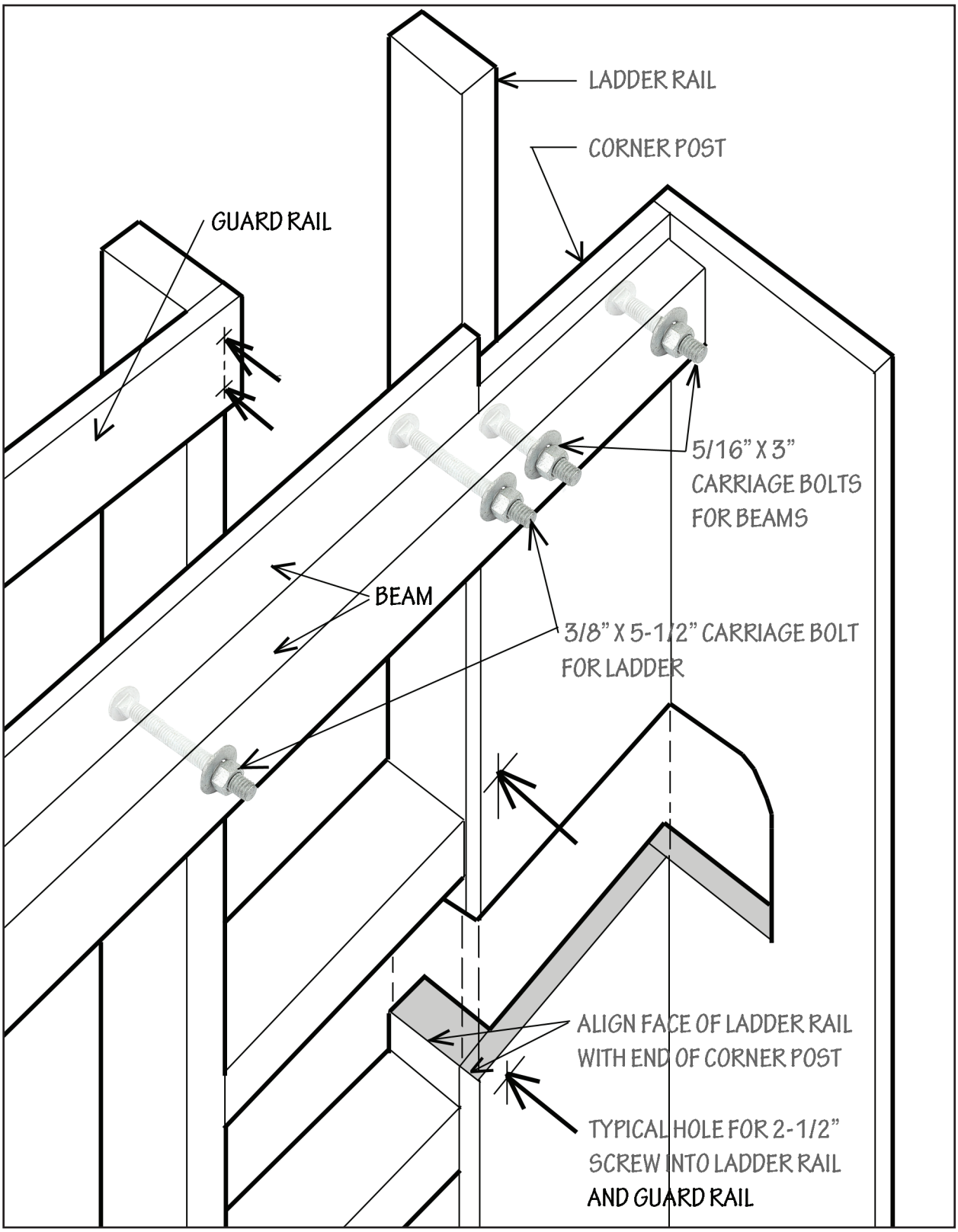


Figure 6. Installation of ladder using 3/8" x 5-1/2" carriage bolts and 2-1/2" screws. Slats, shelves, or braces are not shown. Cutaway at ladder and corner post shows alignment of edge of ladder rail and corner post.

7. There's only one more (optional) item to build and install: a closet rod and shelving unit that can be attached with standard closet rod brackets to the corner posts, as shown in Figure 7. Fasten the brackets to the top of the corner posts with a packet of the "premium" bracket screws (don't use the smaller screws that are sold for this purpose).

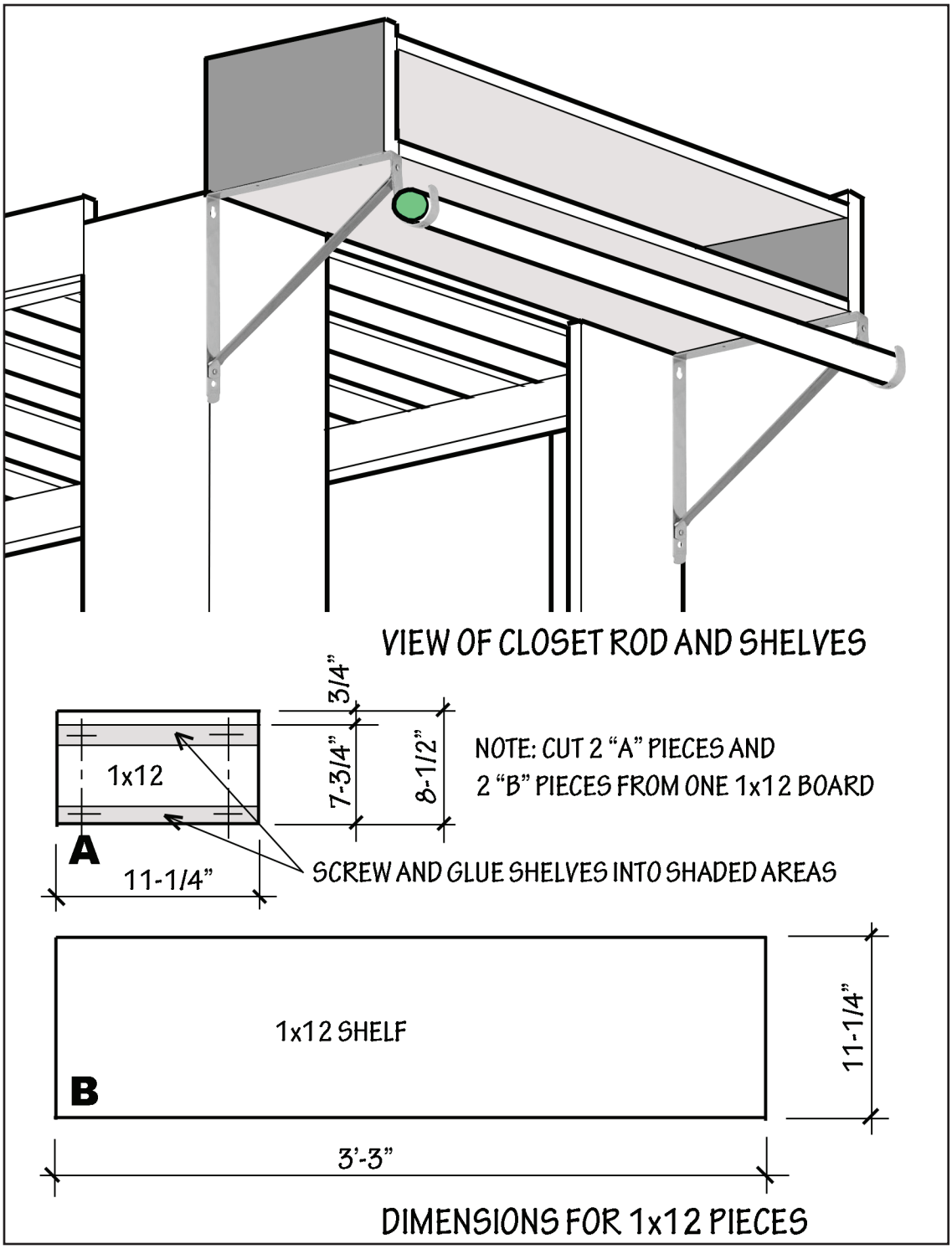


Figure 7. Optional closet rod brackets can support shelves and a closet rod.

E. Cost

Well, prices seem to fluctuate, but you can get an idea of the cost of this bunk bed by examining these unit costs, based on my purchases from Home Depot in August 2012.

Lumber

1. 1x10 x 6 ft	8 pieces	8 @ 9.72 = 77.76
2. 1x10 x 8 ft	2 pieces	2 @ 12.60 = 25.20
3. 1x4 x 10 ft	8 pieces	8 @ 7.22 = 57.76
5. 1x6 x 10 ft	2 piece	2 @ 10.25 = 20.50
6. 1x6 x 6 ft	1 piece	1 @ 6.12 = 6.12
7. 2x4 x 8 ft	4 pieces	4 @ 2.87 = 11.48
8. 2x3 x 8 ft	3 pieces	3 @ 1.86 = 5.58
Sub-total		**$204.40**

Optional lumber

Closet rod and shelves:

13. 1x12 x 8 ft	1 piece	1 @ 16.78 = 16.78
14. closet rod	1 piece	1 @ 4.10 = 4.10
15. closet brackets	2 pieces	2 @ 3.97 = 7.94 (plus premium bracket screws @ 2.48) = 9.97
Sub-total		**$30.85**

Hardware

16. 1-5/8” screws	1 box	[1 lb. @ 6.47 not counted: you’ll have a lot left]
17. 2-1/2” screws	1 box	[5 lb. @ 29.98 not counted: you’ll have a lot left]
18. 3/8” x 5-1/2” carriage bolts	3	3 @ (1.00 + .12 + .25) = 4.11 (includes nuts and washers)
19. 5/16” x 3” carriage bolts	16	16 @ (.32 + .11 + .24) = 10.72 (includes nuts and washers)

(continued)

(continued from previous page)

20. 1/4" x 2" carriage bolts	16	16 @ (.17 + .06 + .11) = 5.44 (includes nuts and washers
21. wood glue	1 container	[not counted: you should have some already]
22. Paint, polyurethane, or polycrylic	1 container	I use the Minwax Polycrylic (water-based); buy the gallon container -- you won't need that much, but it's good to have around the house [not counted: you'll have quite a bit left over for future projects]
Sub-total		**$20.27**
TOtAL COST		**$255.52 + tax**

F. Video and more...

You might want to watch our construction video: we started the project thinking we were building a loft bed, but midway through construction, plans changed and we needed to build a bunk bed. Links to the video, along with other information, can be found at this site:

www.**jonochshorn**.com

From the *jonochshorn.com* homepage, you'll need to follow appropriate links to find the video. Hint: try "Furniture" from the "Art & Design" menu.

Disclaimer: The design and fabrication advice contained in this manual is based on years of experience building such furniture with ordinary No.2 pine. When shopping at lumber yards, you need to personally select the best (straightest) pieces available from among the cheapest grades being sold. Make sure you understand how to use the tools required to build these beds. I've tried to avoid any errors in this document, but I can't be responsible for any such mistakes, or for any of the risks you take by actually building a bed based on these instructions.

This page is intentionally blank.

www.**jonochshorn**.com