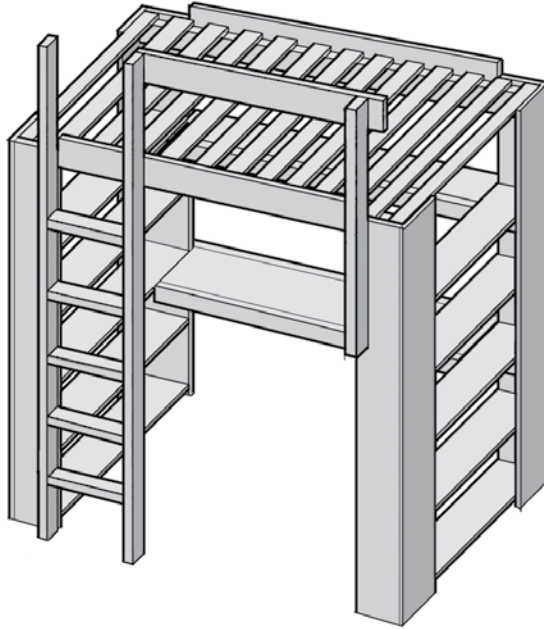


Build a Loft Bed

Designed by
Jonathan Ochshorn



Instruction Manual

(FITS TWIN SIZE MATTRESS)

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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
9. Jig saw or hand saw (for cutting notches into optional desk support).

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 10 ft	3 pieces	Cut into 9 3'-3"-long shelves, S-1 through S-11
3. 1x10 x 8 ft	1 piece	Cut into 1 3'-3"-long shelf, S-12, and one 4'-8 1/4"-long piece for a back shelf (optional)
4. 1x4 x 10 ft	4 pieces	Cut into 12 3'-2 7/8"-long slats, SL-1 through SL-12
5. 1x6 x 10 ft	1 piece	Cut into 2 4'-8 1/4" pieces for the two beams, B-1 and B-2
6. 1x6 x 6 ft	1 piece	Cut into 1 4'-0" piece for the guard rail
7. 2x4 x 8 ft	2 pieces	Cut into 2 6'-3"-long pieces for the two beams, B-1 and B-2
8. 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*

Desk:

9. 2x3 x 8 ft	3 pieces	Cut into 3 pieces: 6'-3"; 5'-4 1/2"; and 4'-8 1/4" long
10. 1x12 x 6 ft	1 piece	Cut into 1 4'-8 1/4"-long piece

Back shelf:

11. 2x3 x 8 ft	2 pieces	Cut into 2 6'-3"-long pieces (one of which needs further cutting (notching) to fit under shelves)
12. 1x10	(use extra 1x10 board from item #3 above, cut into one 4'-8 1/4"-long piece)	

Closet rod and shelves:

13. 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
14. closet rod	1 piece	Cut into one 3'-5" piece
15. closet brackets	2 pieces	Purchase at hardware store (also need bracket screws)

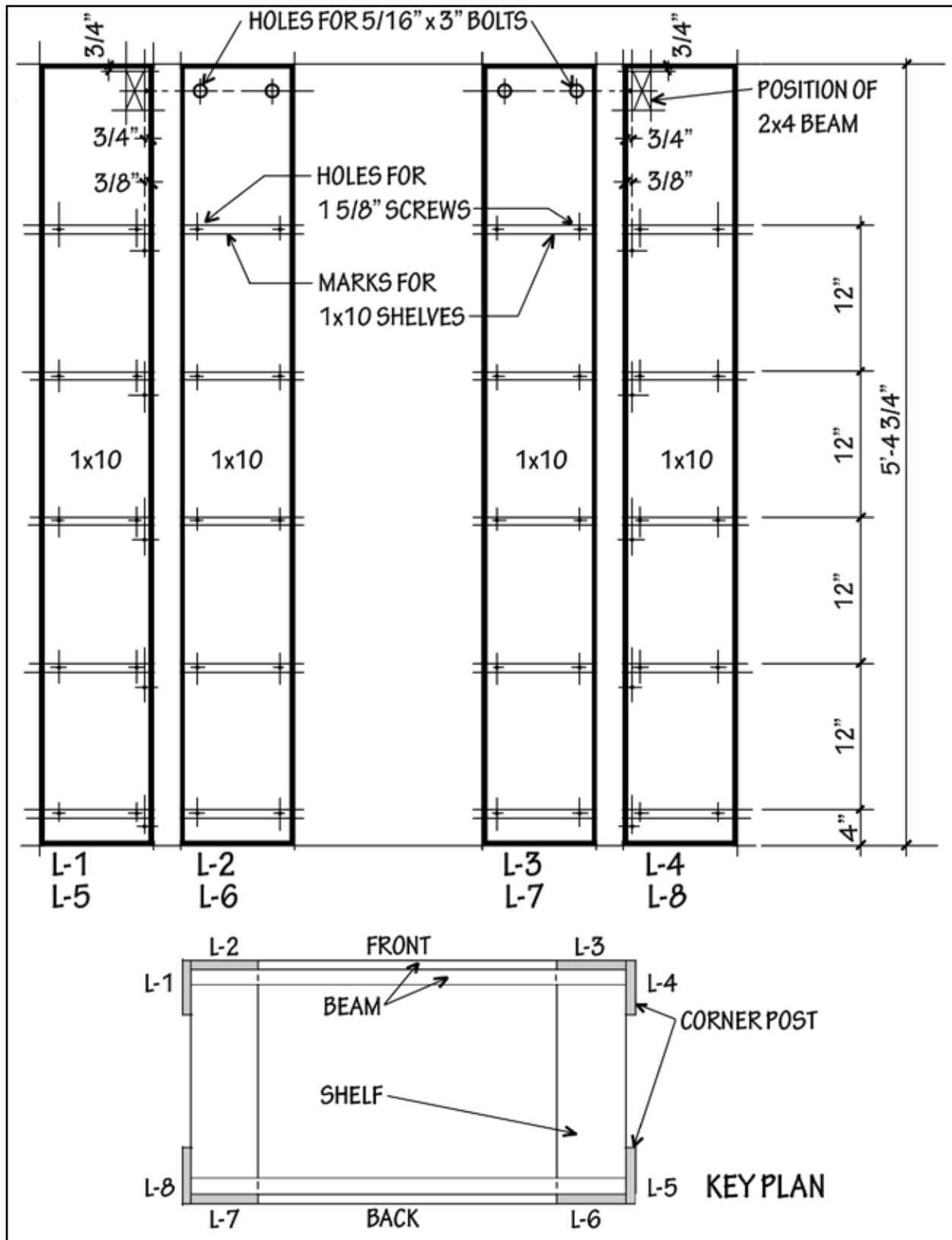
* Either the back shelf or the desk should be used with the loft bed, in order to brace the corner posts. Of course, both items can be used in which case you'll have both a desk and a long shelf above it.

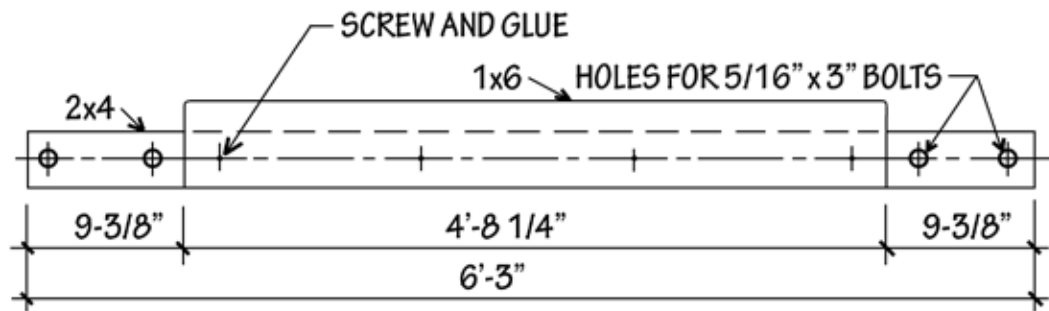
Hardware

16. 1-5/8" screws	1 box	Course-thread drywall screws work well
17. 2-1/2" screws	1 box	Deck screws work well (for ladder rungs, etc.)
18. 3/8" x 5-1/2" carriage bolts	3	Also need 3 nuts and washers (for ladder and guard rail post)
19. 5/16" x 3" carriage bolts	8	Also need 8 nuts and washers (to attach beams to corner posts)
20. wood glue		
21. Paint, polyurethane, or polycrylic	1 gallon	I like the Minwax Polycrylic (water-based)

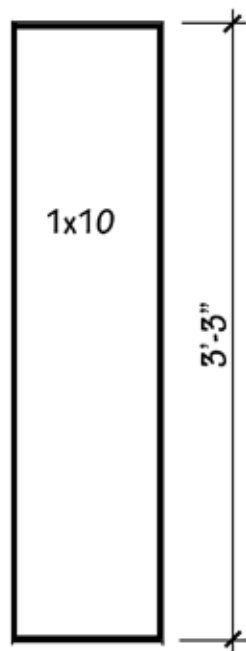
Unsolicited advice: Buy the gallon container -- you won't need that much, but it's good to have around the house.

C. Cutting and preparing the lumber

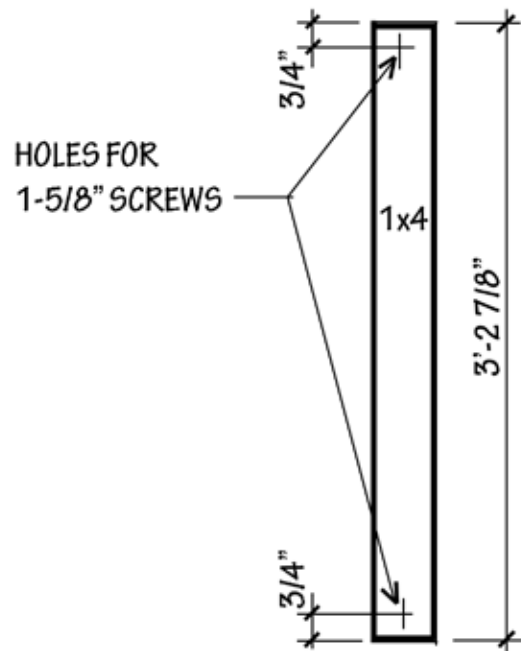




B-1 and B-2: FRONT AND BACK BEAMS



SHELVES: S-1 THROUGH S-10



SLATS: SL-1 THROUGH SL-12

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.

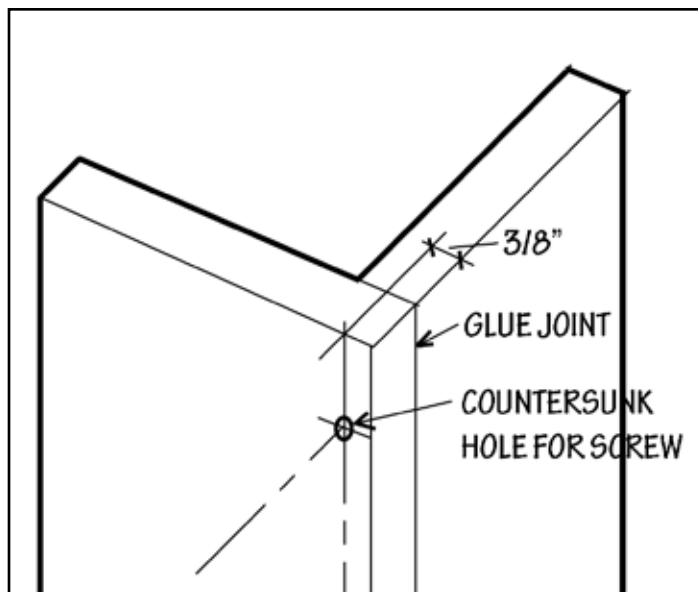


Figure 1. Glue and screw corner posts

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 1-5/8" course-thread wood screws, fasten the 10 shelves to the pairs of corner posts. Refer to the diagram at the bottom of page 4. If you're willing to move around two fairly substantial shelving units, consisting each of five shelves and two corner posts, then it is possible to *glue* and screw the

shelves in place. However, if you want to be able to disassemble the bed into relatively small pieces, then just screw the shelves in place without using glue.

4. Bolt the front and back beams (see page 5 and Figure 2) to the corner posts. The diagram at the bottom of page 4

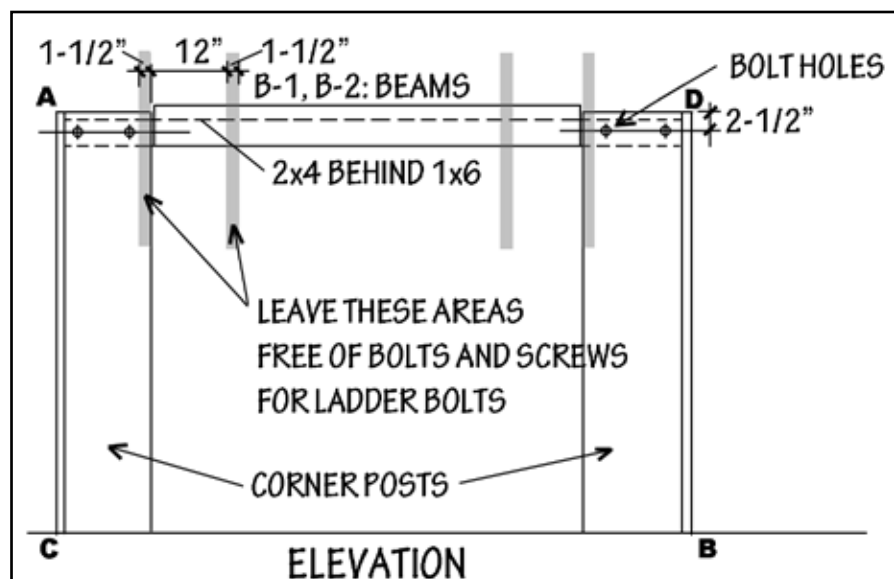


Figure 2. Bolted beams

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

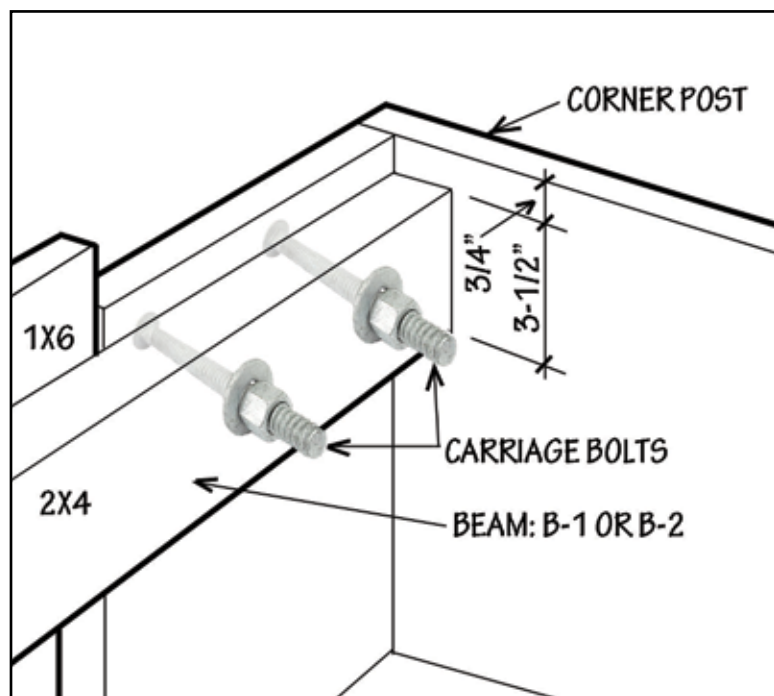


Figure 3. Bolted connection of beam to corner post

corner posts. Step 6 describes the desk fabrication and installation; and step 7 describes the back shelf fabrication and installation.

6. DESK. The desk consists of three 2x3s and a 1x12 glued together as shown in Figure 4. Two of the three 2x3s extend symmetrically beyond the 1x12 board (i.e., the 2x3s labelled A and B); the third 2x3 (labelled C) is the same length as the 1x12. First screw 2x3 (A) flush with the corner posts as shown. The top of the desk aligns with the top of the third shelf from the bottom, i.e., it is 2'-4" above the floor (see diagram on page 4). So the top of 2x3 (A) should be pressed up against the bottom of that shelf. Fasten this 2x3 to the corner posts with two 2-1/2" screws on each side.

Next, move the rest of the desk, already screwed and glued together as shown in Figure 4, into position, resting on 2x3 (A) and pressed up against the outside surface of the back corner posts. Screw 2x3 (B) to the corner posts with 2-1/2" screws, paying attention to the direction of the arrows in Figure 4. Finally, screw the 1x12 desk surface into 2x3 (A) with 1-5/8" screws. It is also a good idea to screw through the side shelves into 2x3 (A) on the same line as the screws through the 1x12 desk into 2x3 (A). These additional screws are not shown in Figure 4.

diagonal distances from A to B and from C to D (shown in Figure 2) must be equal. Drill 3/8" bolt holes through the beams and corner posts in the locations shown in Figure 2. 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 3).

5. After the two beams are bolted in place, the desk and/or the back shelf can be fabricated and installed. At least one of these items should be fastened to the bed to provide additional bracing to the

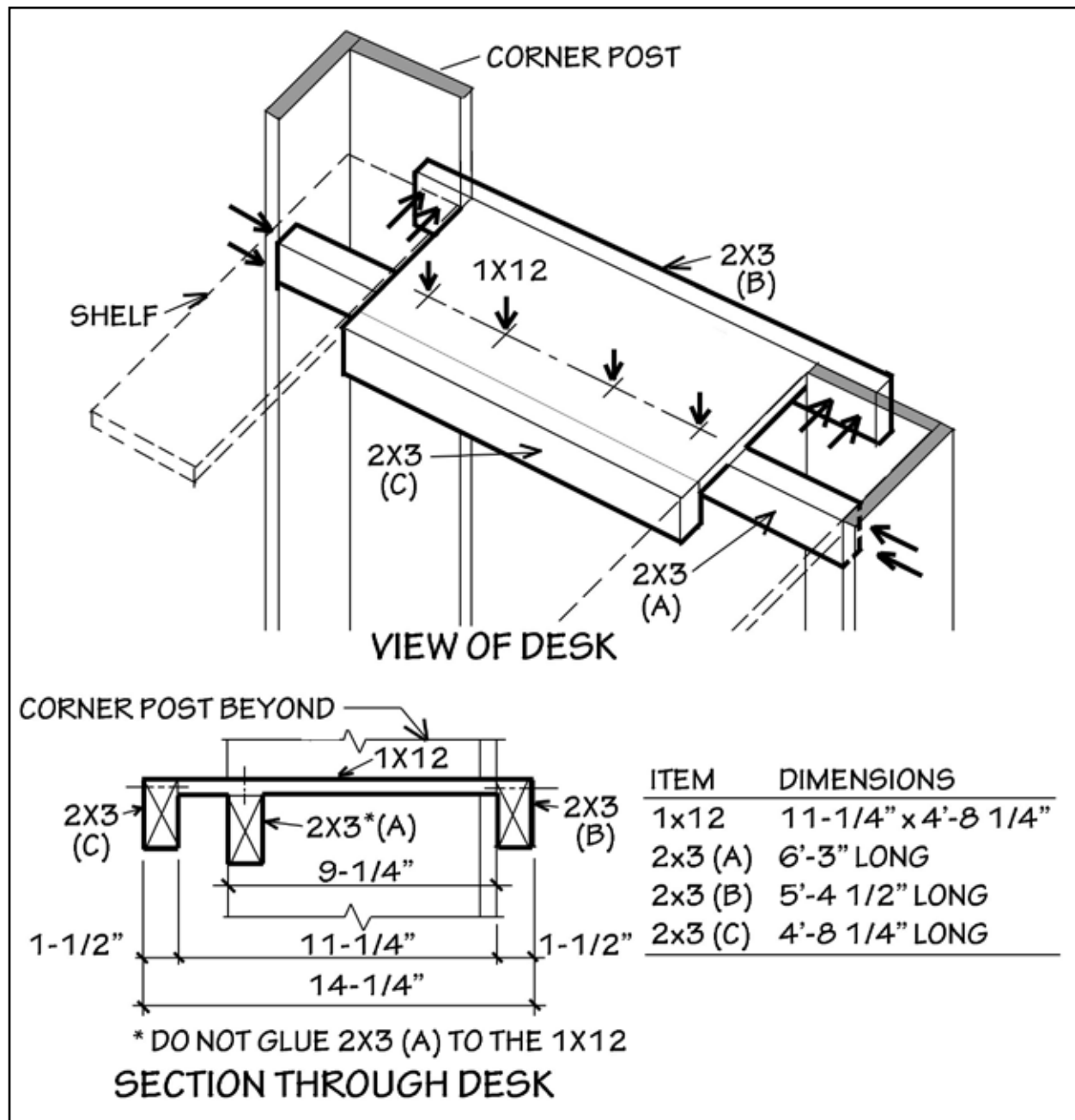


Figure 4. Fabrication and installation of desk

7. BACK SHELF. The construction and installation of the back shelf is shown in Figure 5. This shelf consists of a 1x10 board and two 2x3s screwed and glued to the 1x10 before it is attached to the corner posts of the bed. The front 2x3 is notched as shown in Figure 5 so that the two shelves on either side can be flush with the top surface of the back shelf. Once the 2x3s are glued and screwd into the 1x10, the shelf unit is placed so that the 2x3s that extend beyond the 1x10

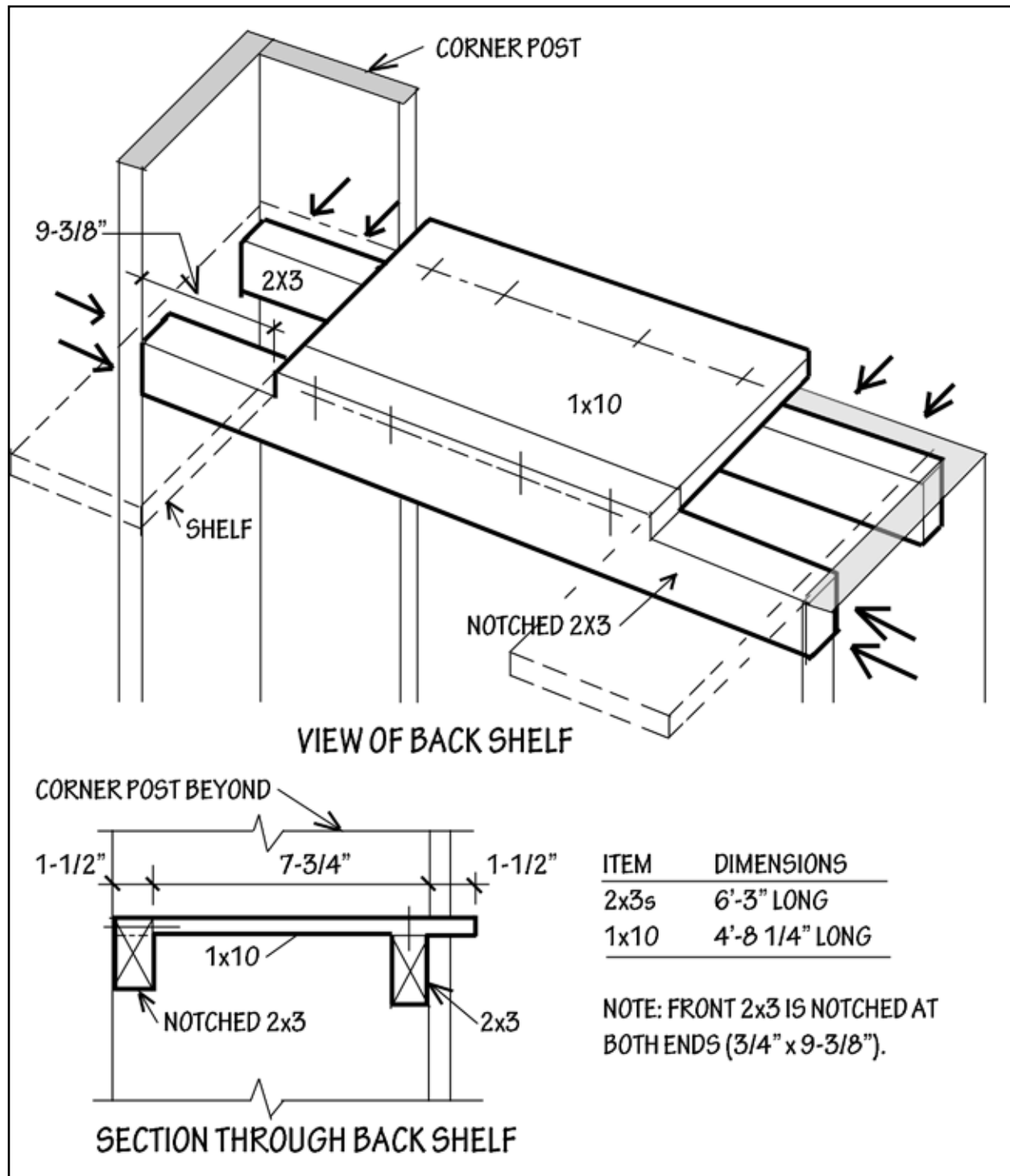


Figure 5. Fabrication and installation of back shelf

are pushed up against the underside of the two highest side shelves with the back 2x3 pushed up against the inside surface of the corner posts. The ends of the 2x3s are then screwed into

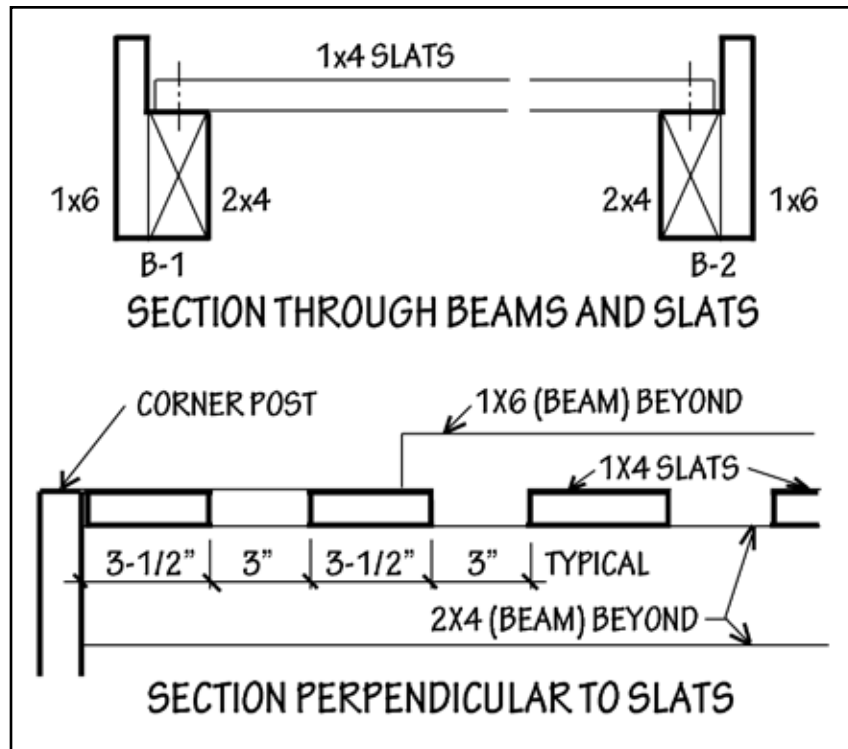


Figure 6. Installation of slats.

ing 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 beam B-1 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 7) 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 7.

the corner posts (from the outside of the posts). It is also a good idea to screw through the side shelves into notched 2x3 at both ends. These additional screws are not shown in Figure 5.

8. At this point, the twelve slats (SL-1 through SL-12) can be screwed into beams B-1 and B-2 (see Figure 6), using 1-5/8" screws. The first and last slats are placed up against the corner posts, with the ten interior slats evenly spaced, i.e., 3 in. apart.

9. Now it's time to attach the ladder and guard rail. Fabricate the ladder by glu-

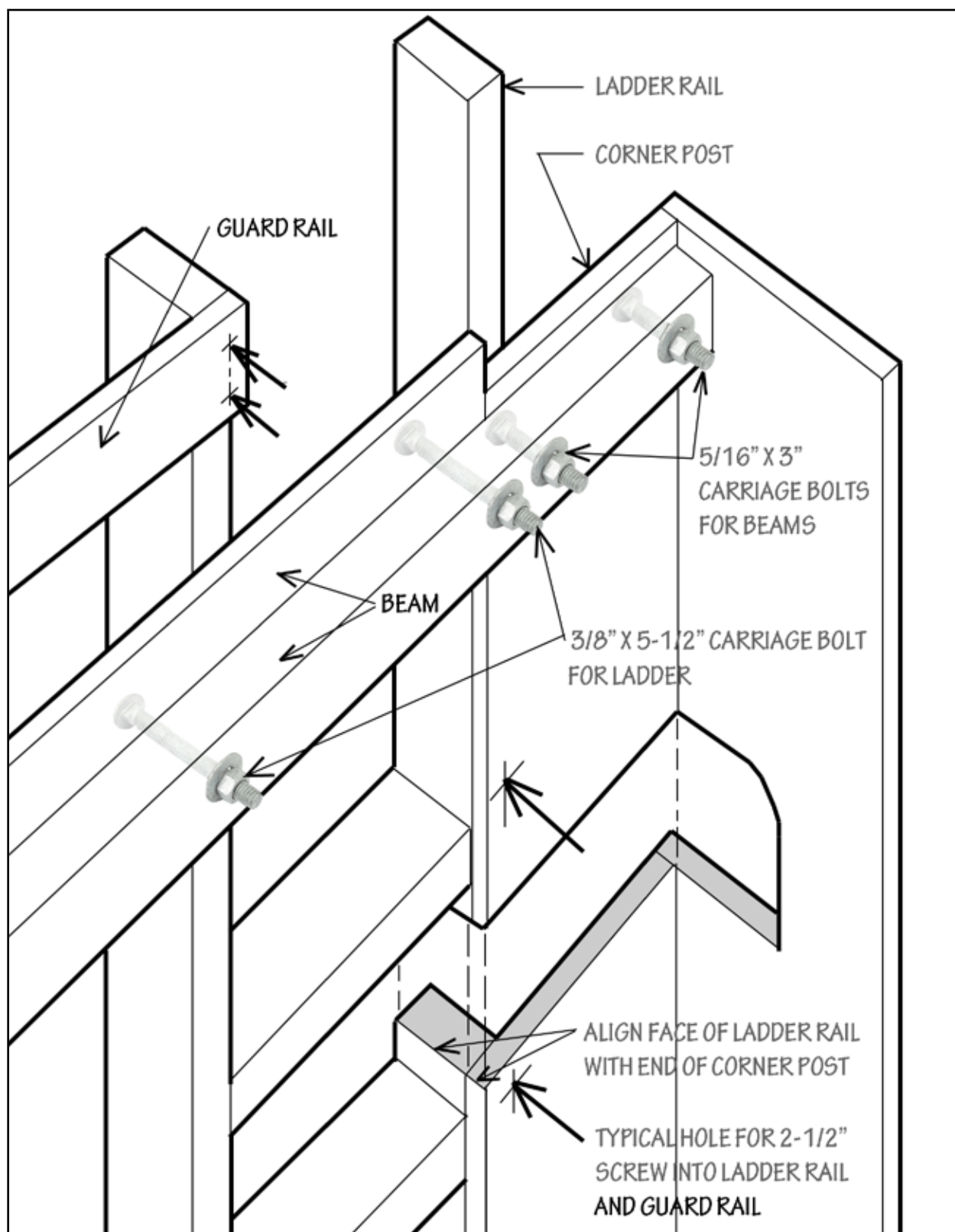


Figure 7. Installation of ladder using 3/8" x 5-1/2" carriage bolts and 2-1/2" screws. Slats, shelves, or braces are not shown. Cutaway at ladder and corner post shows alignment of edge of ladder rail and corner post.

10. 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 8. 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).

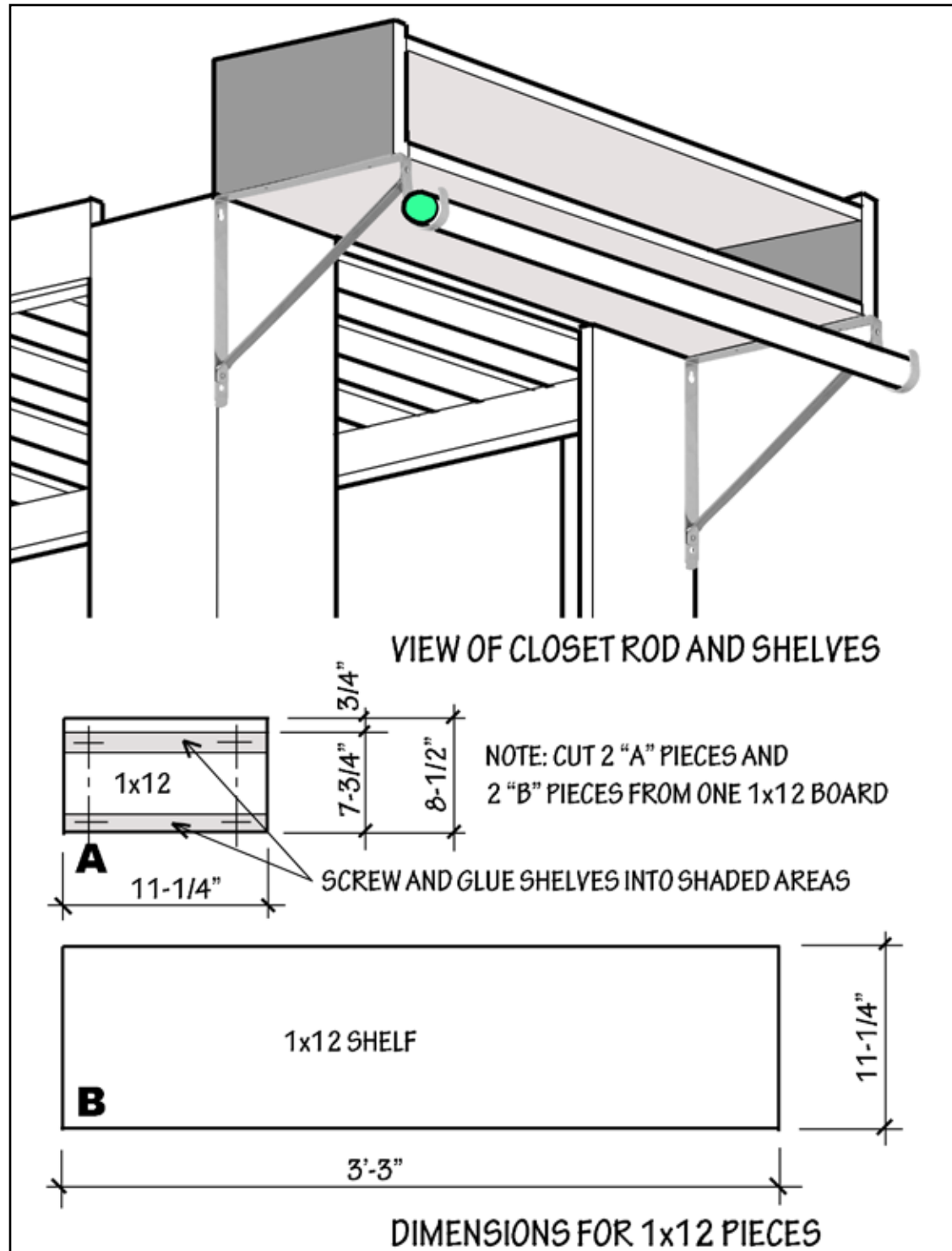


Figure 8. Optional closet rod brackets can support shelves and a closet rod.

E. Cost

Well, prices seem to fluctuate, but you can get an idea of the cost of this loft 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 10 ft	3 pieces	2 @ 16.14 = 32.38
3. 1x10 x 8 ft	1 piece	1 @ 12.60 = 12.60
4. 1x4 x 10 ft	4 pieces	4 @ 7.22 = 28.88
5. 1x6 x 10 ft	1 piece	1 @ 10.25 = 10.25
6. 1x6 x 6 ft	1 piece	1 @ 6.12 = 6.12
7. 2x4 x 8 ft	2 pieces	2 @ 2.87 = 5.74
8. 2x3 x 8 ft	3 pieces	3 @ 1.86 = 5.58
Sub-total		\$179.31

Optional lumber*

Desk:

9. 2x3 x 8 ft	3 pieces	3 @ 1.86 = 5.58
10. 1x12 x 6 ft	1 piece	1 @ 12.59 = 12.59

Back shelf:

11. 2x3 x 8 ft	2 pieces	2 @ 1.86 = 3.72
12. 1x10	(use extra 1x10 board from item #3 above)	

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		\$52.74 (if all options are purchased)

* Either the back shelf or the desk should be used with the loft bed, in order to brace the corner posts. Of course, both items can be used.

(continued)

Cost (continued)

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	8	8 @ (.32 + .11 + .24) = 5.36 (includes nuts and washers)
20. wood glue	1 container	[not counted: you should have some already]
21. 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		\$9.47
TOTAL COST		\$241.52 + 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" under 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.

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