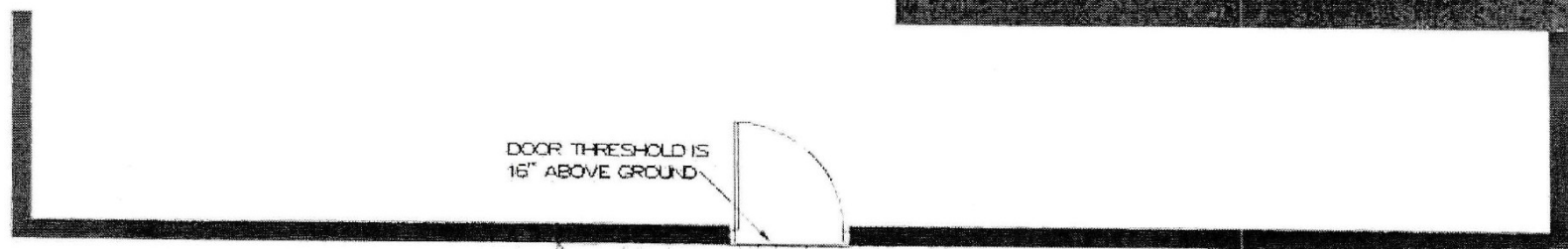


Site Survey

- After needs assessment is complete and it is determined that a ramp is appropriate, a site survey should be completed to determine the best layout and the length of the ramp
- Considerations
 - Will ramp be built off of an existing porch or will a porch/stoop/landing need to be built as part of the project to provide a flat surface outside the door as a starting point?
 - What is the height of the door threshold? The ramp will need to be built at a slope of 1" drop for every 12" of run (ADA & code compliance). Ex. If the threshold is 20", the ramp will need to have a 20" drop and therefore be 20' long not inclusive of any level turns or landings.
 - What is the slope of the yard? Is it possible to make the ramp shorter by terminating the ramp in a place where the ground is higher than at the door? Be careful about "basing a slope," and ending up with a much longer ramp.



Sample Ramp Layout



WITH A 16" DROP AND NO FLAT SURFACE OUTSIDE THE HOME, THE EXISTING STEPS WERE REPLACED WITH AN 8'X8' PORCH WITH A RAIL ALL THE WAY AROUND

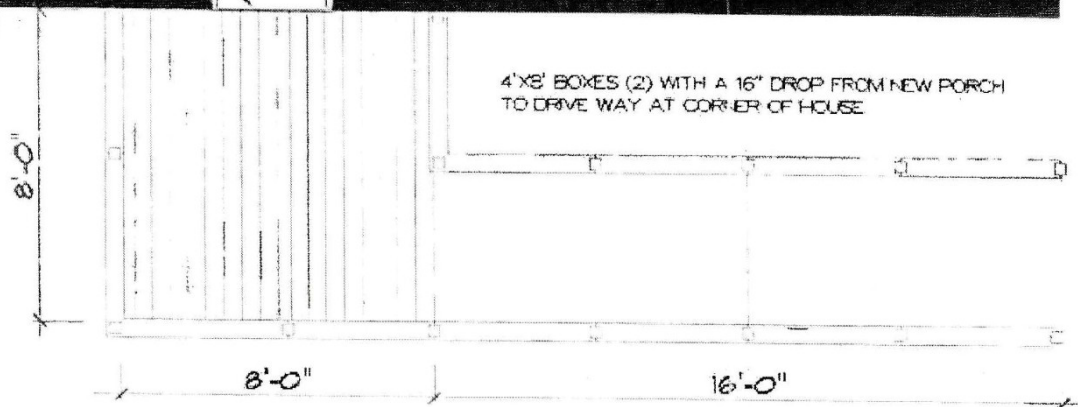
THIS IS BUILT FROM 2 4'X8' BOXES BOLTED TOGETHER

ON A LARGER, FLAT SURFACE, DECK BOARDS ARE GENERALLY USED INSTEAD OF 4'X8' SHEETS OF TREATED PLYWOOD AS THEY WILL WEAR BETTER OVER TIME

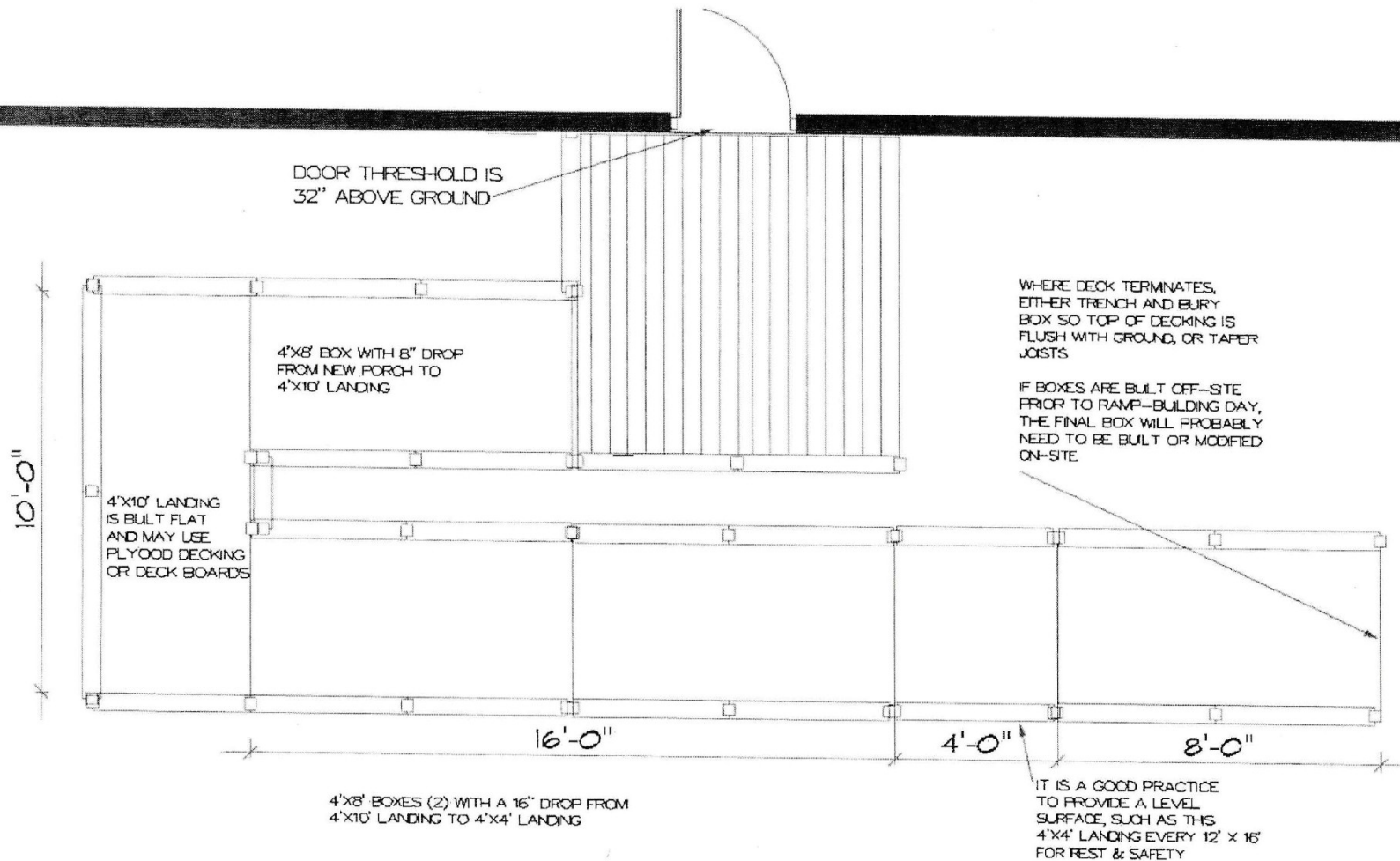
THIS IS 5/4" X 6" PRESSURE-TREATED PINE DECKING WHICH COMES IN 10', 12' AND 16' LENGTHS (CHECK LOCAL AVAILABILITY OF DIFFERENT LENGTHS)

DECKING IS LAID WITH NO GAPS AND IS SCREWED DOWN

WITH WEATHERING, DECKING WILL SHRINK AND GAPS WILL FORM BETWEEN DECK BOARDS SO WATER WILL DRAIN THROUGH THE DECK



Sample Layout With Turn



Other Site Considerations

- Trees, and more specifically, tree roots, can make digging post holes very difficult. Consider this in laying out the ramp.
- Watch for water, electrical and gas lines. If in doubt, call before you dig. The Texas One Call number for excavators is 811.
- If you are uncomfortable attaching to an existing structure, considering making the ramp freestanding instead of supported by the existing structure.
- Try to avoid putting a rail post directly in front of a window
- If there is an existing porch, do you need to build a small wedge ramp for a wheelchair to negotiate the threshold?
- Do you have access to water for mixing concrete?
- Do you have access to electrical outlets and is there enough capacity to handle multiple tools?
- Will all rail posts be able to go into a footing in the ground, or will you need any galvanized post bases/wedge anchors?

Tools Needed for Ramps

The Crew:

If you have all the tools you need, and a good plan in place, you can keep as many as 8-10 people working at a time on different aspects of the ramp-build. A small ramp project may only need 3-6 people.

Tools:

- Post-hole diggers (2)
- Spade (at least 1) and sharpshooter (1)
- If you have access to an auger, this can save time, but you'll still need the post hole diggers and shovels to clean up holes
- Hoe (for mixing concrete)
- Wheelbarrow
- Circular saw
- Reciprocating saw (cutting off rail posts)
- Pencils
- Speed square
- Tape measures
- Hammers
- Level
- Chalk line
- Line level

• Tools (continued):

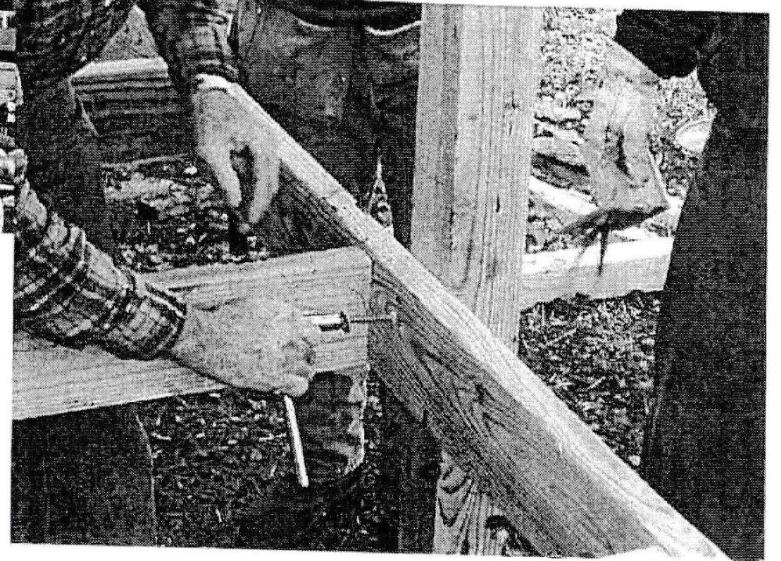
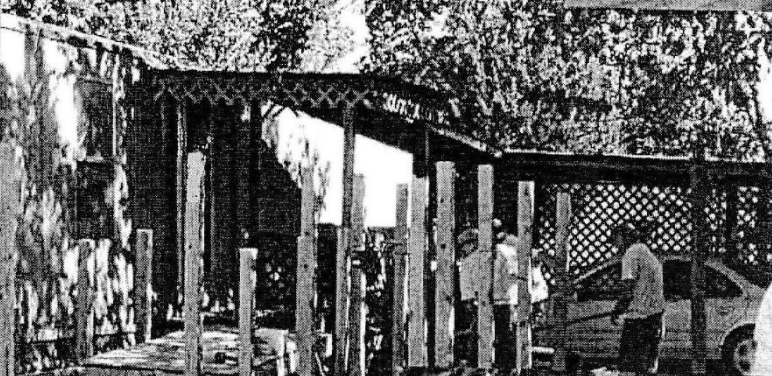
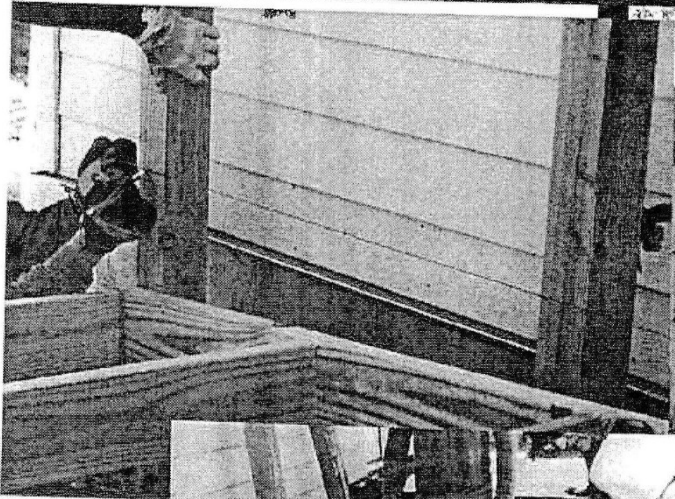
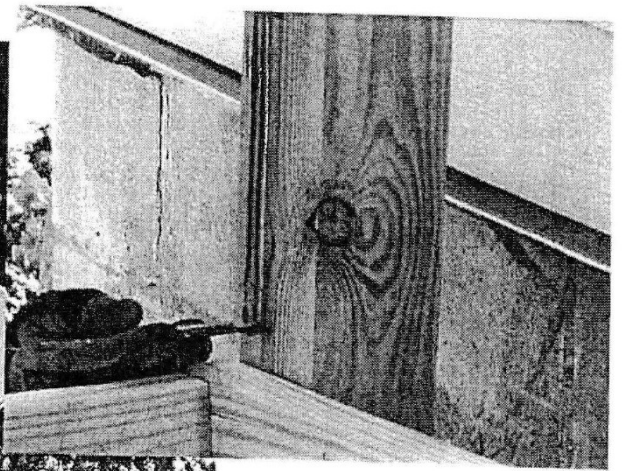
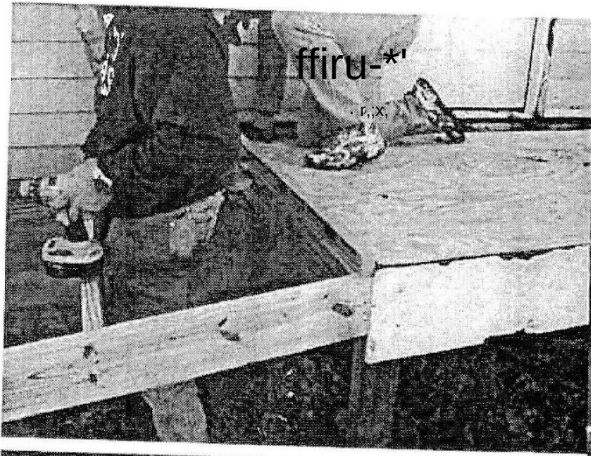
- Post levels that can be strapped onto posts (4 or more)
 - Drills (great to have a hammer drill but at least have two or more drills for deck screws; for pre-drilling pilot holes for lag screws; and for drilling holes for carriage bolts)
 - Drill bits:
 - Wood bit to drill pilot for lag screws
 - Screw bits for deck screws (screws that have a phillips head but can be screwed in with a square bit work great)
 - Spade bit for carriage bolts
 - Ratchet set for putting in lag screws & carriage bolts
-
- Don't forget plenty of water to stay hydrated and plan for lunch if working through the lunch hour. Think about bringing a lunch for your client.

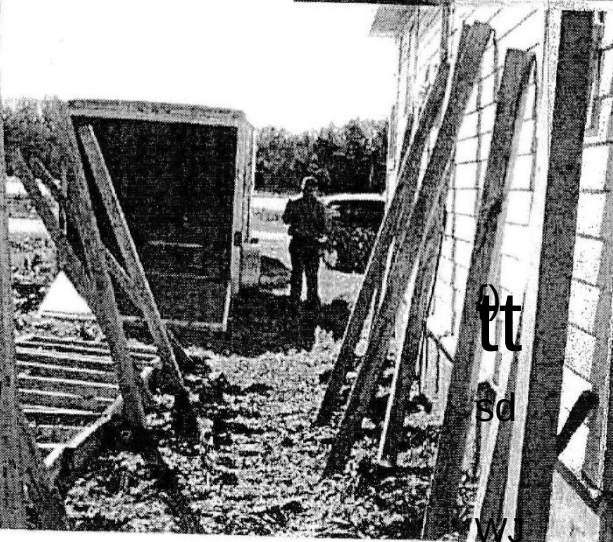
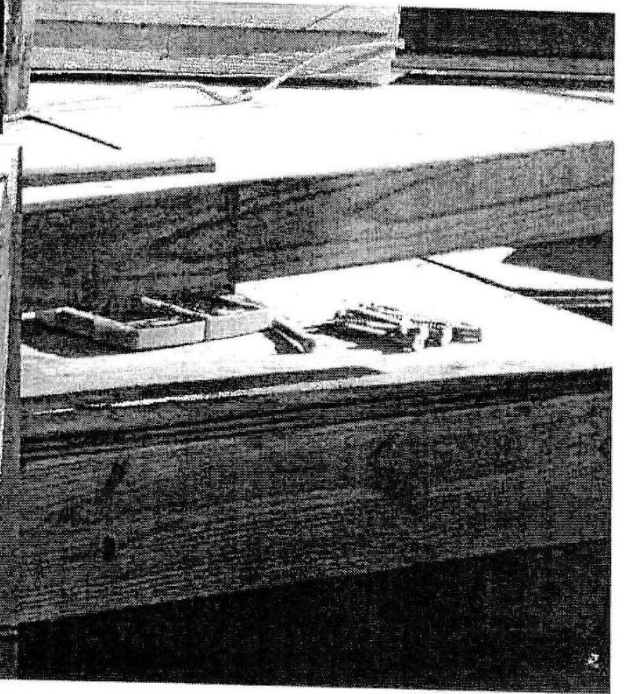
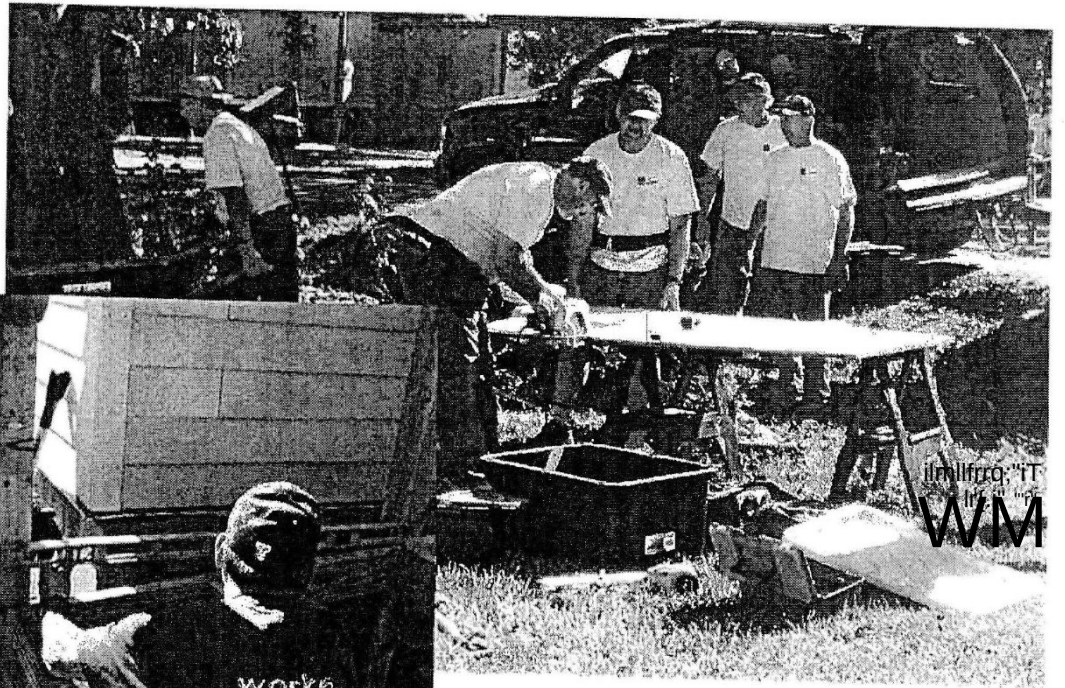
Hardware

- 3" galvanized deck screws for all connections involving framing lumber (2x4s & 2x6s)
 - Buy these in large quantities as you will use tons of them on each ramp.
- 2" galvanized deck screws for screwing down $\frac{3}{4}$ " plywood decking to boxes and for screwing down $\frac{5}{4}$ " rail cap to top rail and top of rail posts
- $\frac{3}{8}$ " x 4" galvanized lag screws for box to post connection
- $\frac{3}{8}$ " x 4" galvanized carriage bolts for box to box connection
- $\frac{3}{8}$ " galvanized washers for use with lag screws and carriage bolts
- $\frac{3}{8}$ " nuts for use with carriage bolts
- Roofing nails – used for tacking down rolled roofing material to decking for non-slip surface

Common Materials

- 2"x6"x8' treated pine
 - Each standard 8' box will need 4.5 pieces
 - (2) 8' pieces and (5) 45" pieces
 - For a 10' box, use 10' boards for the sides and add one 45" joist
- 4"x4"x8' treated pine posts
 - Look at the layout of the ramp and plan for one post and one bag of concrete for every 4' of ramp on each side of the ramp, including flat surfaces like landings and porches. Plan for two posts on corners.
 - If the starting point of the deck is higher than 42", 10' posts must be used for the porch/top landing and the first few rail posts.
- 2"x4"x8' treated pine rails
 - For every box, you will need a top and bottom rail on each side, requiring a total of (4) 2x4x8 pieces for each box.
 - Sometimes it will be possible to use longer pieces for longer straight runs of 12' or 16' and can be efficient if delivery of the materials is not an issue. An 8' piece can always be used in these circumstances too.
- 5/4" x 6" x 10' treated pine decking
 - Use this as the rail cap for the hand rails. You will need as many linear feet of decking as you have linear feet of railing.
 - It comes in different lengths, but often 10' is the shortest (check with your lumber yard about availability), so try to maximize efficiency.
- Quick-crete
 - This comes in 80 lb. bags and you will need one bag for every post.
 - Mix one or two bags at a time in a wheelbarrow and fill holes after box has been attached and posts are level
- 3/4" x 4' x 8' Treated Plywood
 - One sheet for each 8' box
- Rolled roofing
 - Generally, this comes 3' wide in 100 sq ft rolls so 33 linear feet per roll. You will need this for the entire length of the ramp
 - Use the material that does not have the white strip on one side for better aesthetics



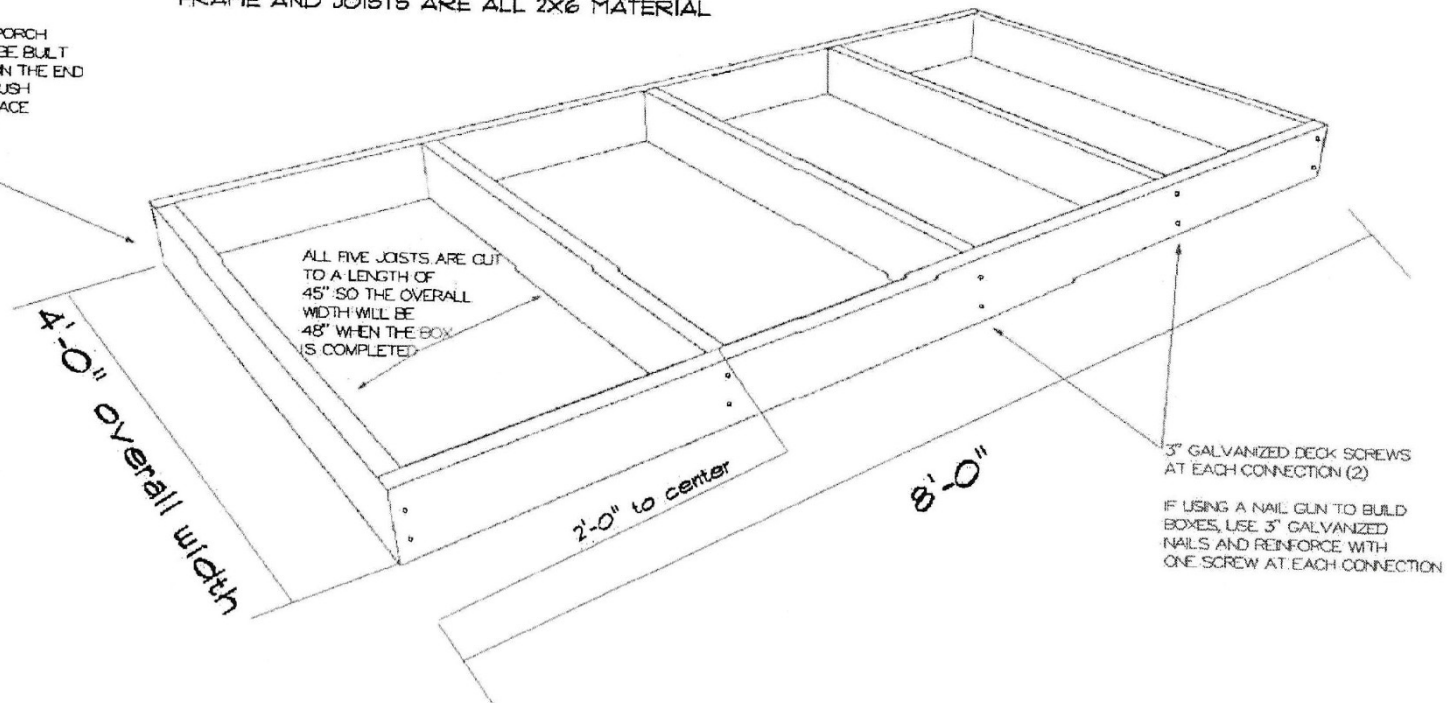


Building A Box

EACH RAMP IS BUILT FROM A SERIES OF 4'X8' (OR OTHER 4'X SIZES AS NEEDED) BUILT FROM PRESSURE-TREATED PINE AND COVERED WITH A 4'X8' SHEET OF 3/4" TREATED PLYWOOD

FRAME AND JOISTS ARE ALL 2X6 MATERIAL

WHEN ATTACHING TO A PORCH OR LANDING, BOX MUST BE BUILT WITH A TAPERED JOIST ON THE END SO END JOIST CAN BE FLUSH WITH THE VERTICAL SURFACE THAT IT IS ATTACHED TO (SEE DETAIL)

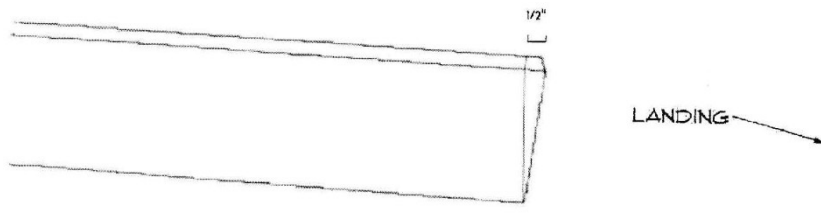


ALL FIVE JOISTS ARE CUT TO A LENGTH OF 45" SO THE OVERALL WIDTH WILL BE 48" WHEN THE BOX IS COMPLETED

3" GALVANIZED DECK SCREWS AT EACH CONNECTION (2)

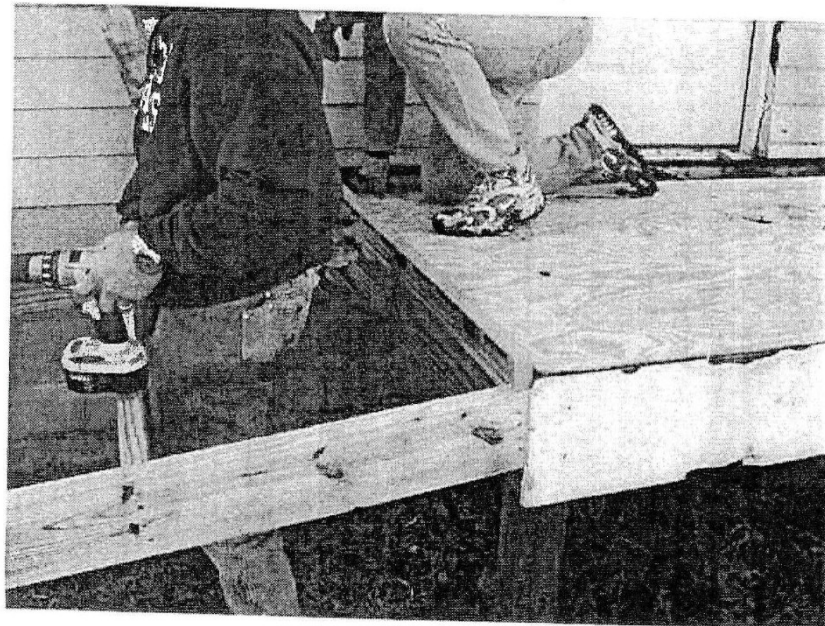
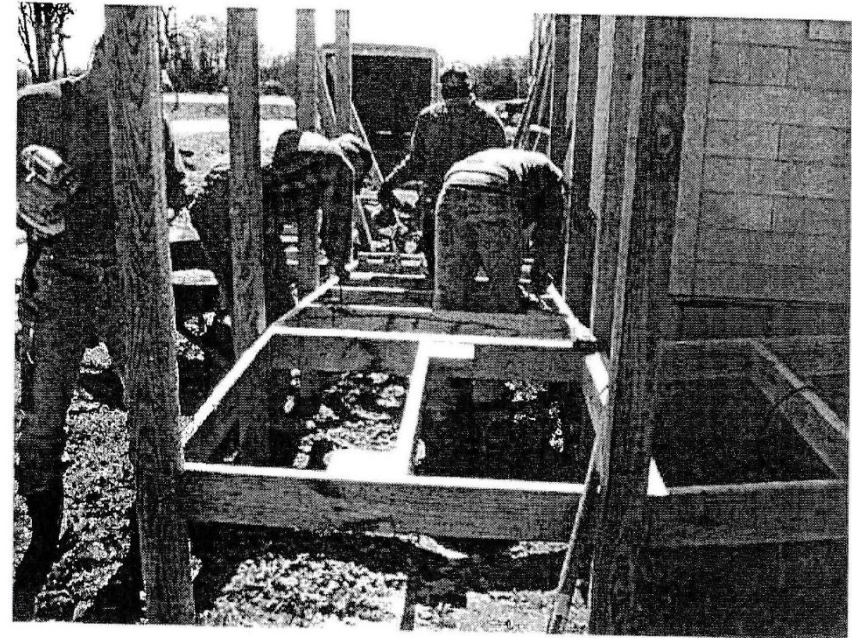
IF USING A NAIL GUN TO BUILD BOXES, USE 3" GALVANIZED NAILS AND REINFORCE WITH ONE SCREW AT EACH CONNECTION

1/2" TAPER (5 DEGREES)
FROM TOP WHEN ATTACHING
TO LANDING AT BOTTOM
OF SLOPE



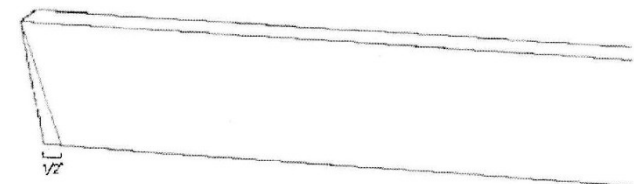
LANDING

ATTACHED END JOIST
AT THE ANGLE OF THE
CUT



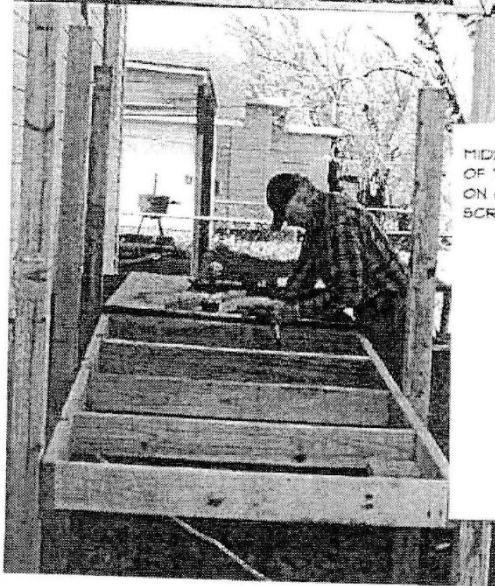
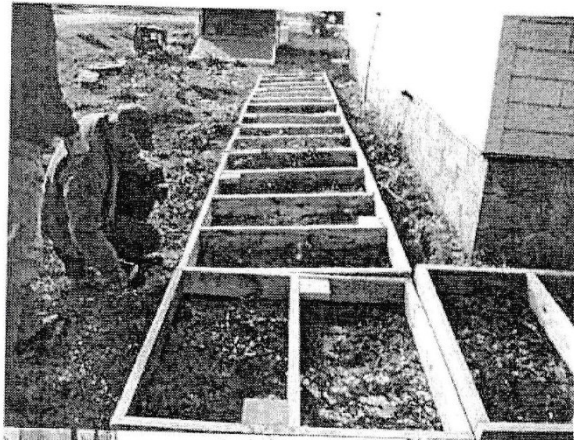
ATTACHED END JOIST
AT THE ANGLE OF THE
CUT

PORCH OR
LANDING

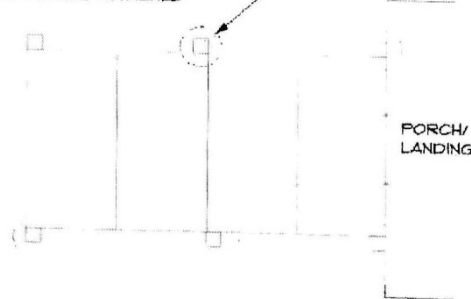


1/2" TAPER (5 DEGREES)
FROM BOTTOM WHEN ATTACHING
TO PORCH OR LANDING AT TOP
OF SLOPE

Layout Boxes On-site, Mark Hole Locations & Start Digging



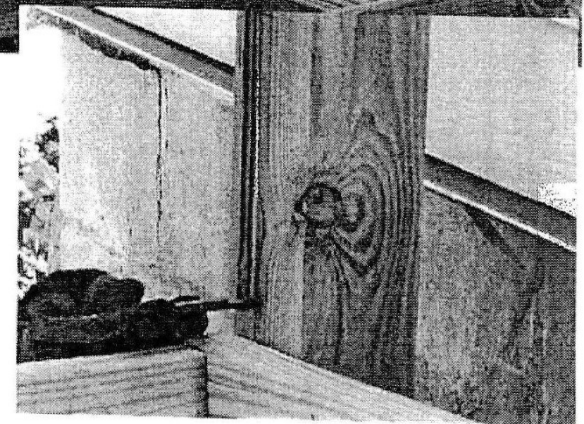
MIDDLE POST CAN SIT ON EITHER SIDE OF THE MIDDLE JOIST BUT NEEDS TO BE ON ONE SIDE OR THE OTHER SO LAG SCREW CAN BE ATTACHED



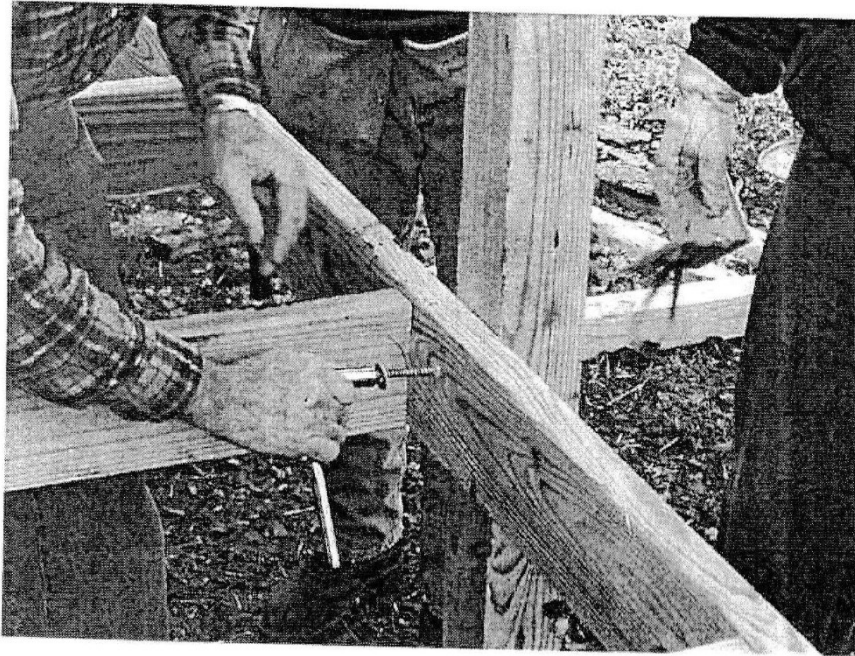
- It's never a good idea to get too far ahead on digging holes, as they will shift some due to the slope of the ramp and other factors. Dig holes for one box at a time.
- Posts are going to be every 4'-5'
- The inside edge of each post sits flush and level with the outside edge of each box
- Post holes are 18" deep and about 12" diameter (plan for approximately one bag of concrete per hole)
- Part of the hole should be dug under the ramp so that when the post is sitting in the middle of the hole, the inside of the post will be flush with the outside edge of the box.

Attach First Box to Porch and Posts

- Put a 4"x4"x8' post in each of the 6 holes surrounding the first box and strap a post level to each post (do not put concrete in the hole at this time)
- 3-4 people should hold up box as one team member attaches the box to the porch with deck screws. Top of box should be $\frac{3}{4}$ " below porch surface to allow for plywood decking. Make sure box is level side-to-side (or make it even with existing porch)
- At opposite end of box from porch, make sure posts are level. Run a chalk-line from the top of the box where it is attached to the porch, to the far edge of the post 8' away. Put the line-level on the chalk-line and when it is level, snap a line on the post. Measure down 8" from the chalk mark and draw a pencil mark. Make sure the top of the box is at the pencil mark. Attach the box to the level post with a deck screw. Repeat this process on the other side of the box.

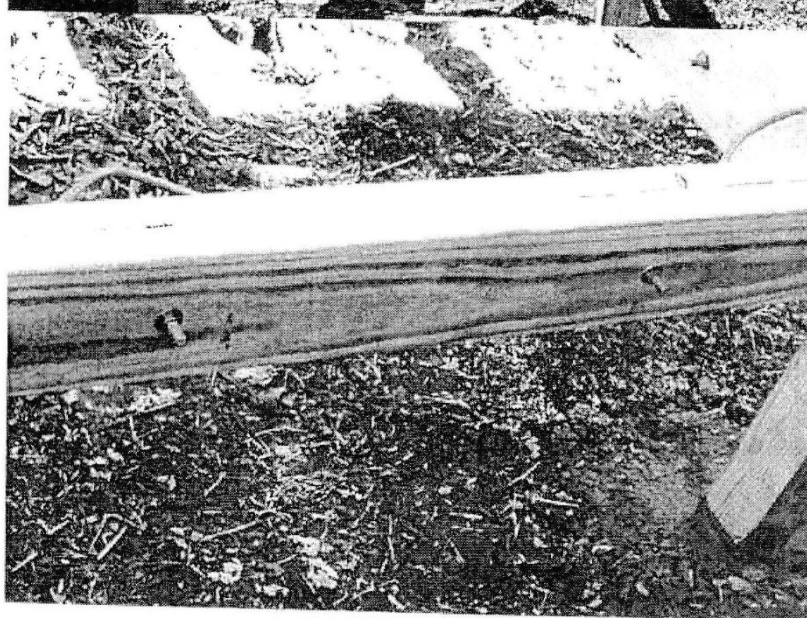
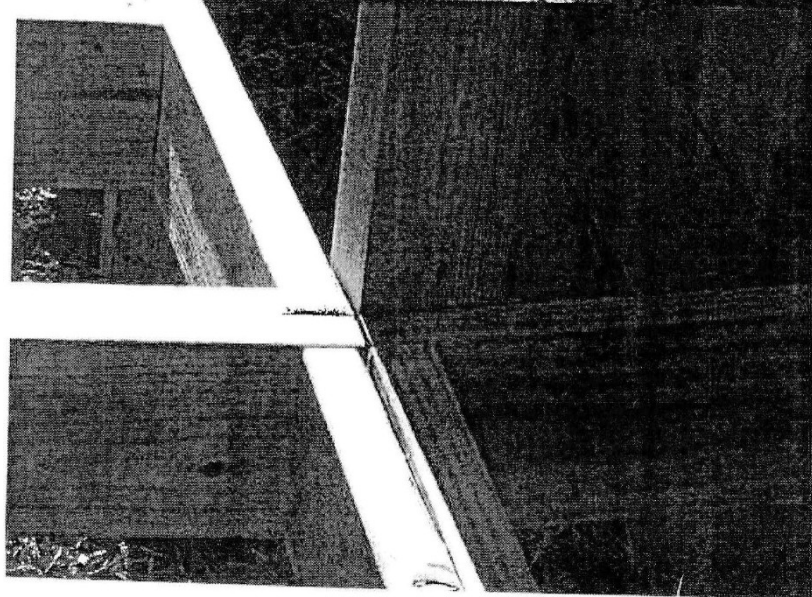
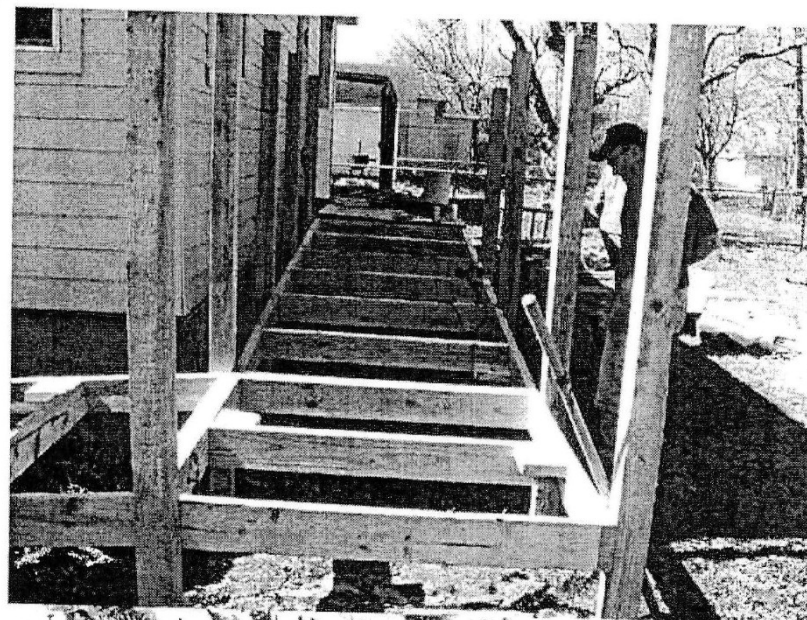
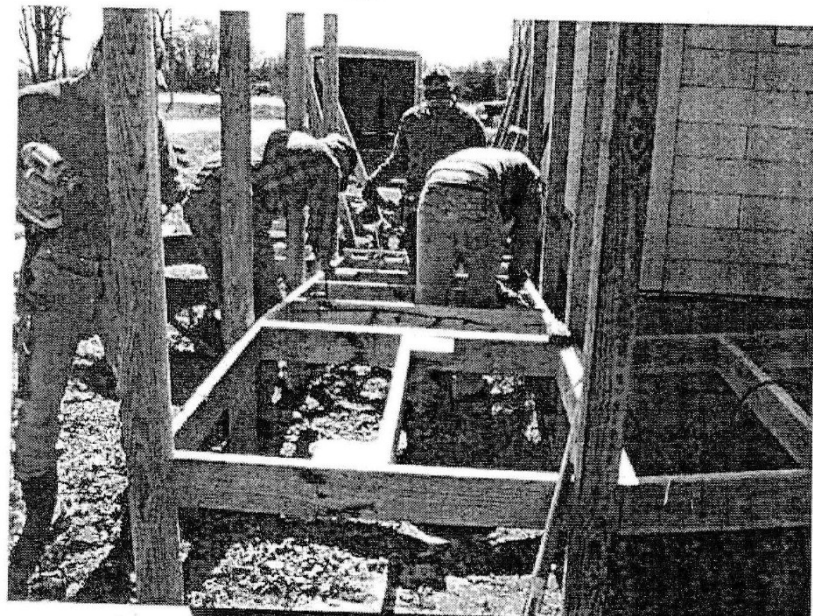


Lag Screw Box Into Posts



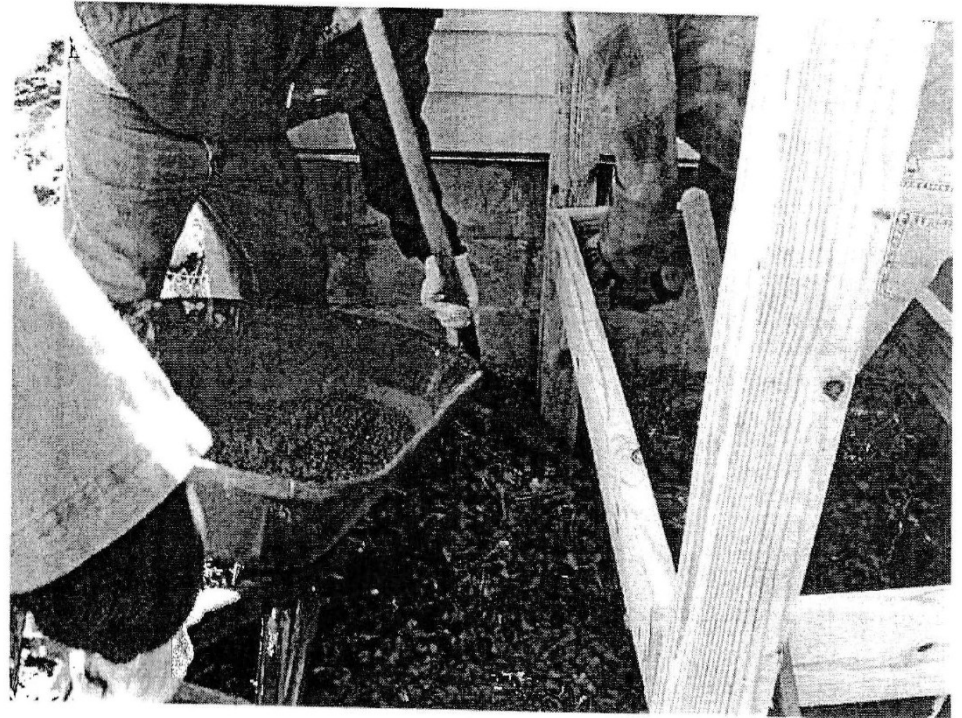
- Pre-drill for 3/8" lag screw and washer from inside of box to post
- Keep checking for level of posts and box
- Also check for square of box by measuring diagonals
- A square box will be vital when plywood decking is installed

Dig Holes and Attach Next Box



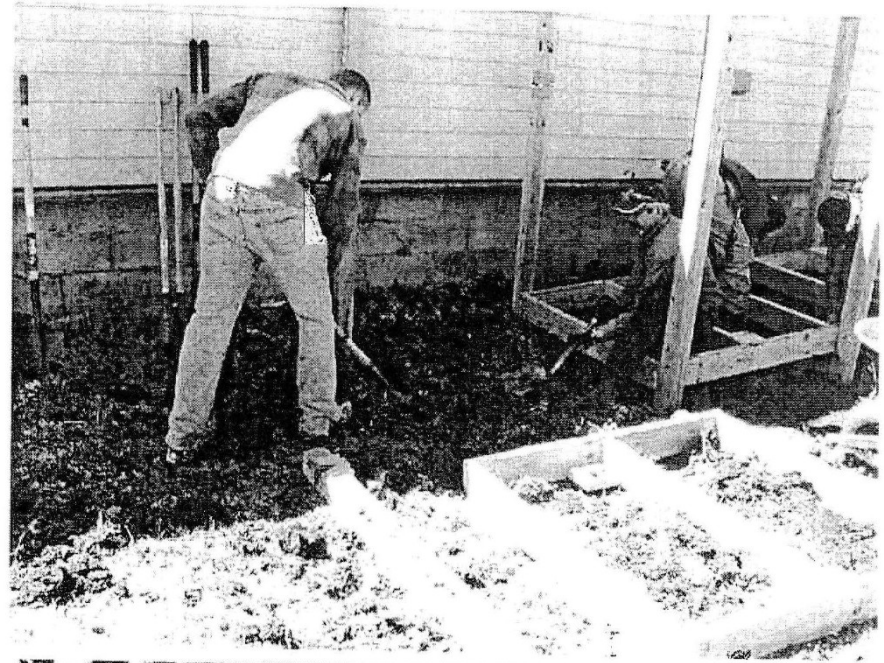
Concrete In Holes

- As team members are working on the next phases of box building, attaching boxes, digging holes, etc., a couple of folks can begin mixing quick-crete and filling holes from the first box.
- They can continue to work behind the rest of the team as the ramp gets extended

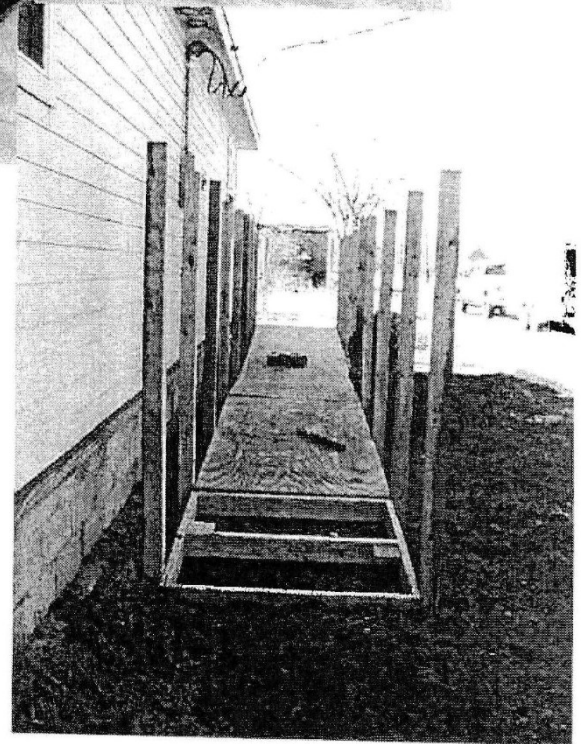
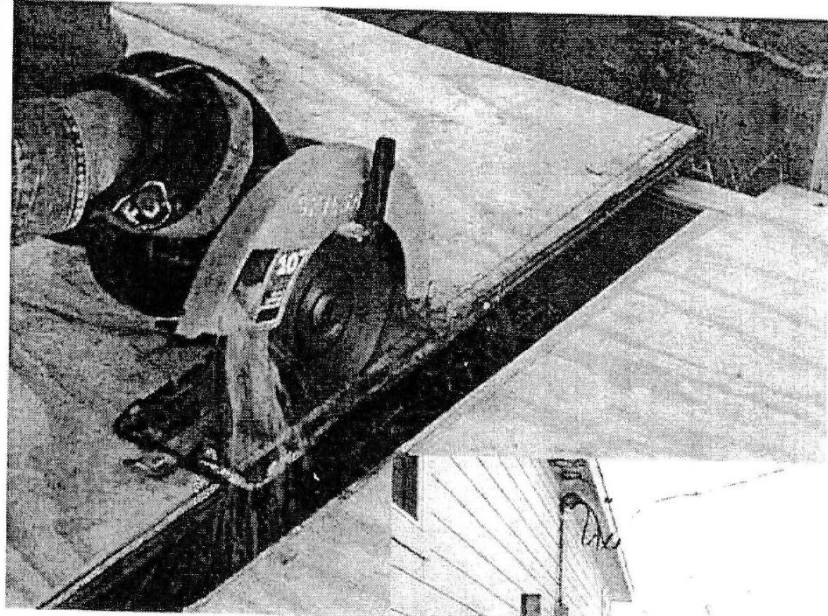


Final Box

- Determine length needed for final box (this may end up slightly different than planned due to elevation changes on the site)
- Determine best solution for termination of ramp so top of ramp is level with ground
- Two options are 1) digging trenches to bury box frame or 2) taper the sides of box and change size of joists to provide support to end of box
- This requires some on-site problem-solving and engineering. There's no exact answer as each ramp ends a little differently. Generally, the trench solution is most common when terminating the ramp in soil and the tapered joist solution is most common on concrete or other solid surfaces



Install Plywood Decking



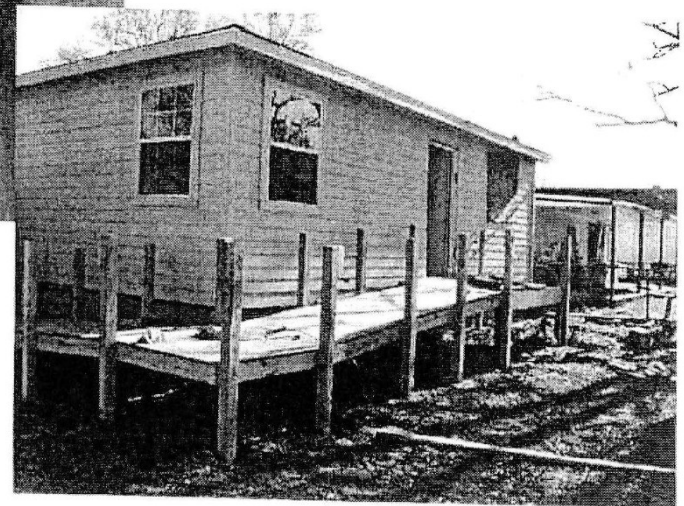
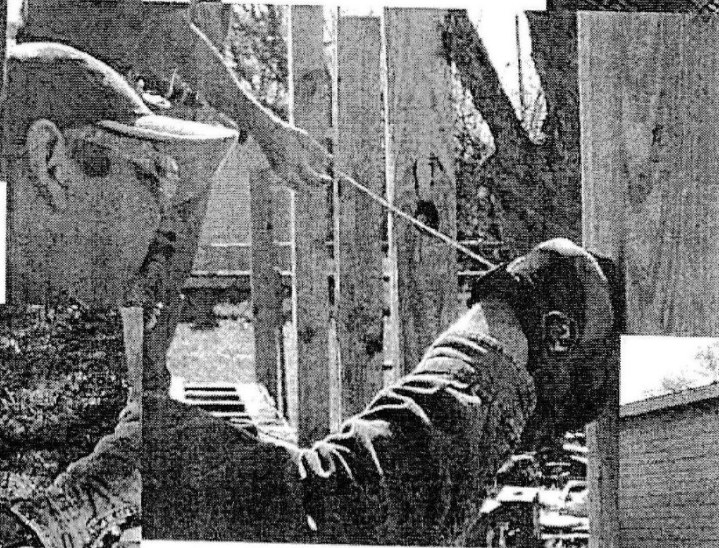
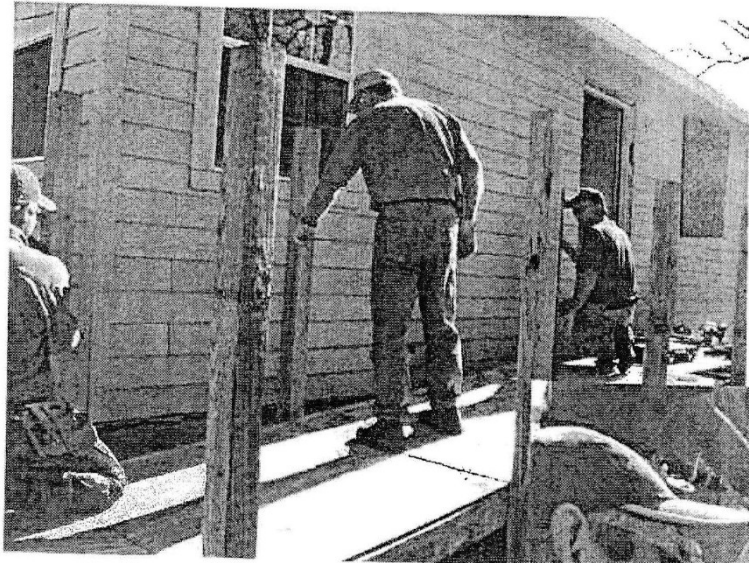
- Before dropping plywood on frame, make sure all carriage bolts and lag screws are installed
- Screw down decking with 2" galvanized deck screws
- If boxes are not square, use hammer for persuasion, then trim decking if necessary (use blocking instead of hammering edges of plywood directly to keep from damaging plywood)
- Continue to drop plywood the entire length of ramp

Cut Beveled Edge For Plywood on Last Box



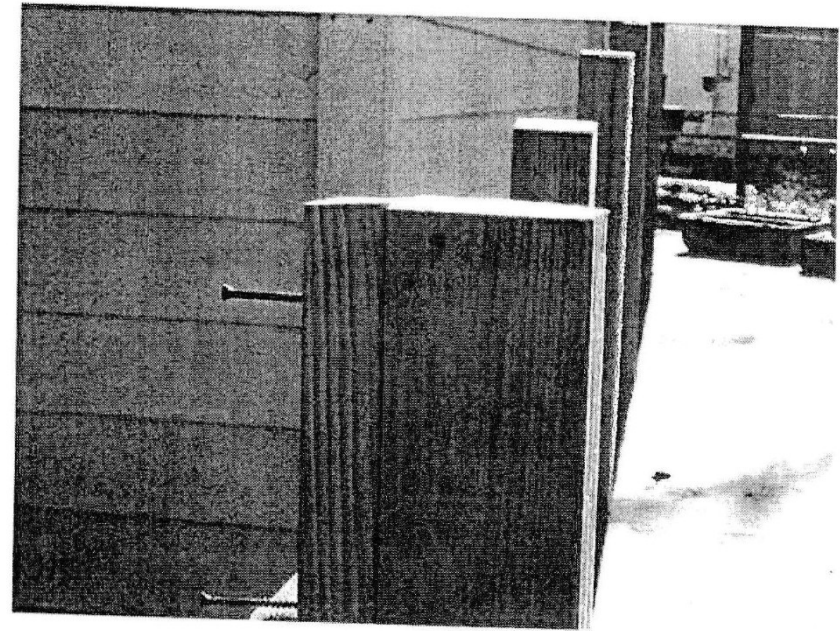
Set circular saw to cut plywood at 45-57 degree angle smoothest transition at end of ramp

Measure and Cut Rail Posts

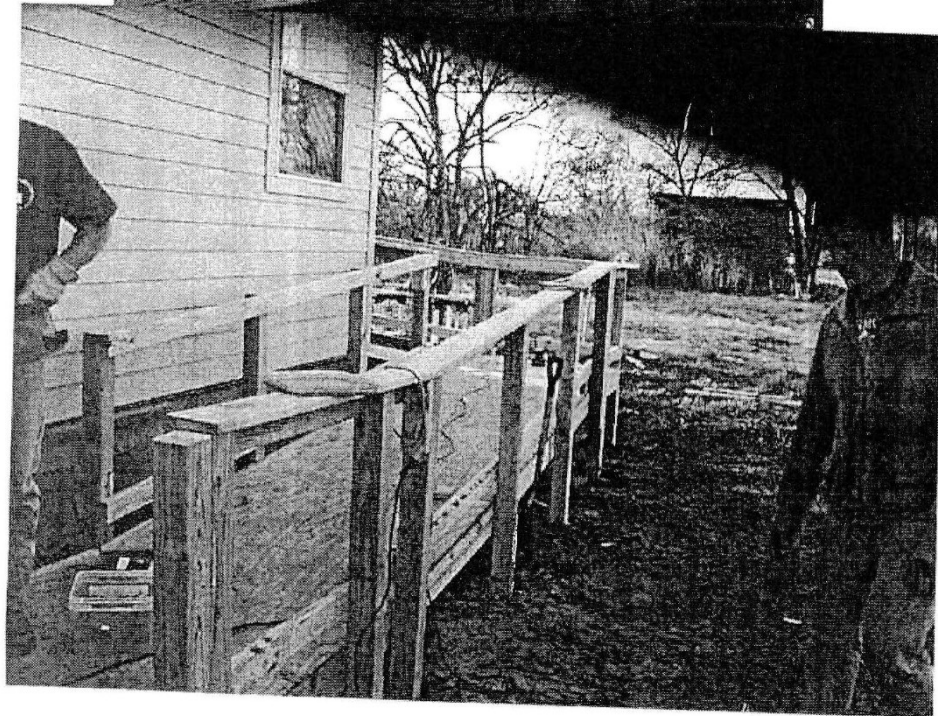
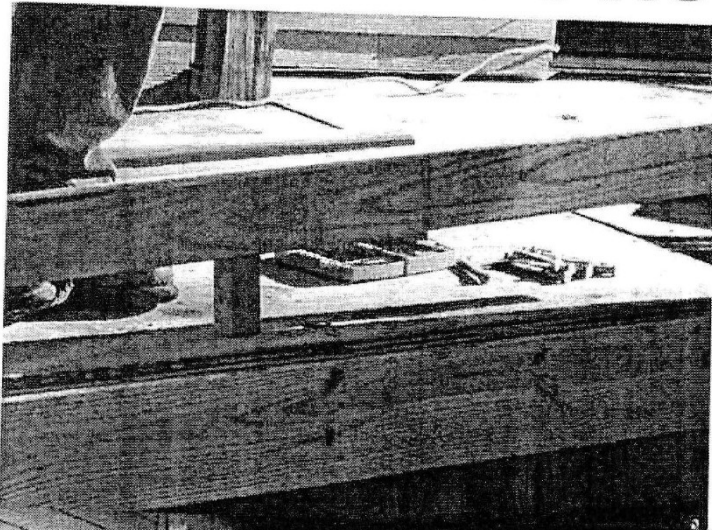


Measure and Cut Rail Posts

- Top of rail cap will be 36" so rail posts need to be cut off at 35" above decking
- Measure up 35" from decking and mark line on rail posts
- Stretch chalk-line on inside edge of rail posts at 35" point and pop line
- It will help in cutting posts to mark each post with a pencil line all the way around
- Cut rail posts on the marked line. Preferred method is to use a circular saw for one or two cuts and finish with the reciprocating saw
- Use 2x4 blocking to support rails and railcap on corners as needed



Add Bottom & Top Rails



- Rails are 2x4's set vertically on inside of rail posts that follow the slope of the decking
- Put 2x4 blocks under bottom rail to provide "sweep space" under rail and screw into rail posts with 3" galvanized screws
- Attached top rail with top of 2x4 level with top of rail posts
- Butt 2x4s end to end in the middle of 4x4 posts so both 2x4s can be screwed into same post
- When butting up an angled 2x4 to a level 2x4, cut taper on angled 2x4 so ends can butt together cleanly

Add Middle Rail

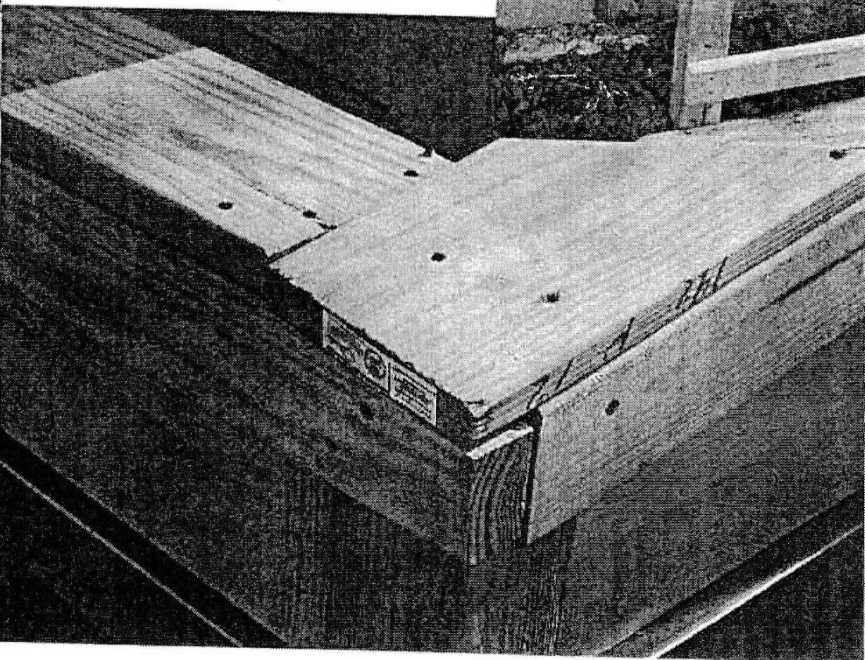
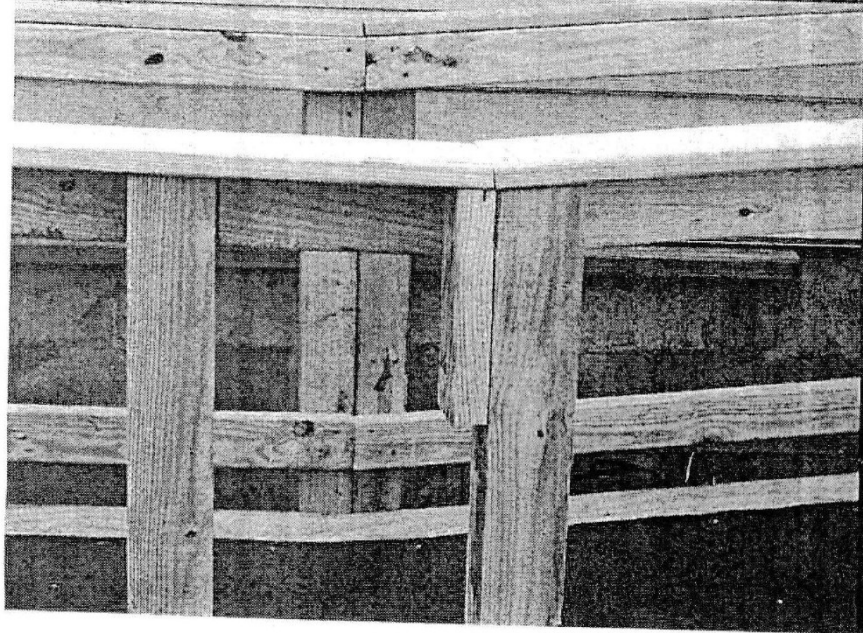


- Middle rail is a 2x4 set vertically mid level between the top and bottom rails
- Screw into rail posts with 3" galvanized screws.
- Butt 2x4s end to end in the middle of the 4x4 posts so both 2x4s can be screwed into same post
- When butting up an angled 2x4, cut taper on angled 2x4 so ends can butt together cleanly

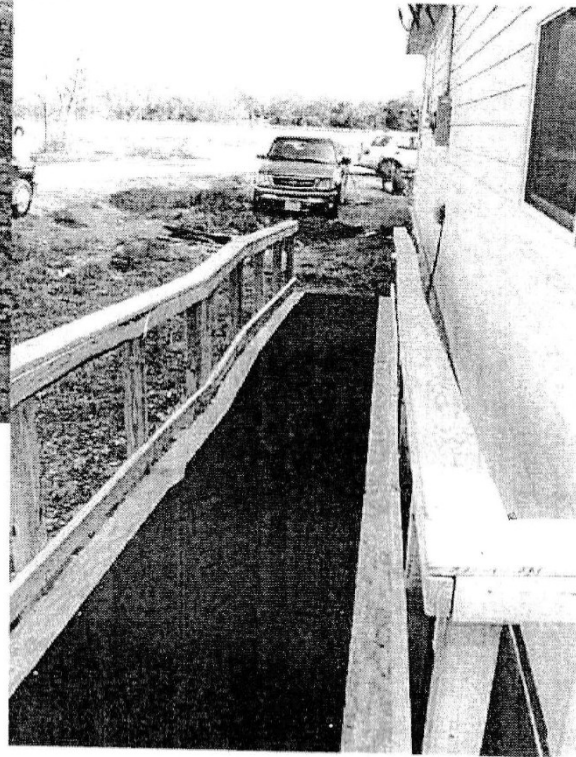
Install Rail Cap



- Attach 5/4" deck board as rail cap with 2" galvanized screws in 2x4 top rail and top of rail posts
- Rail at end of ramp may have a short cantilever beyond end of rail post



Install Rolled Roofing



- Roll out roofing material in middle of ramp – 6" from each edge
- Tack down with $\frac{3}{4}$ " to 1" roofing nails
- Use at least 6 nails at ends of roof roll
- Use one nail every 12" down each side of roof roll