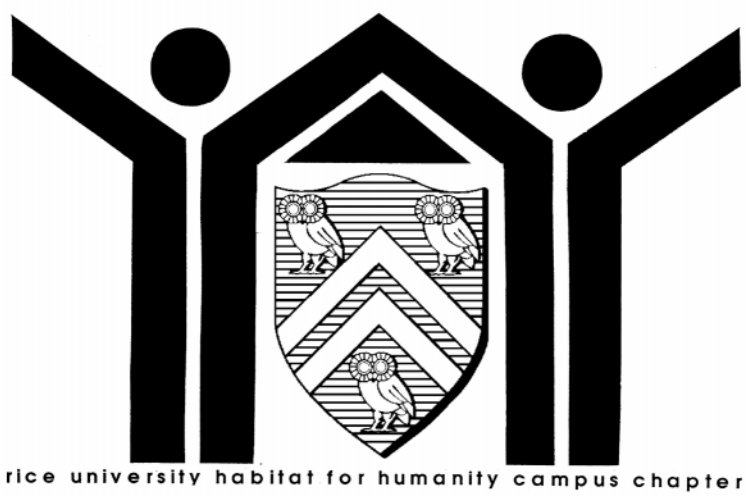
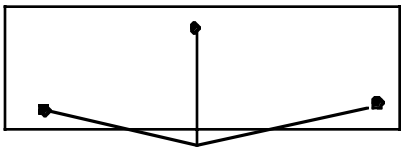


Rice Habitat for Humanity Ask-Me Construction Manual

Hammering - Hammering correctly makes the difference between being tired after fifteen minutes or eight hours. First, hold the hammer correctly - by the end of the handle. When swinging, bring the hammer up, and let gravity do most of the work to bring it down. To start a nail, place it firmly into the wood, and give it one or two good taps to start it in. Don't grip up on the hammer; grip it by the end of the handle and don't bring it back very far. *Why? If you are gripping up on the hammer and swinging hard, you will 1)usually miss the nail because you're forcing the hammer down, and 2)swing more crooked than if you simply let gravity bring the hammer down.*

Nailing - Some quick points on driving a nail. When driving into wood, drive them so that they are well into the wood. It is not necessary to pound it in with such force that it is impossible to pull the nail out with a cat's claw. Also, nail in a diagonal pattern, nailing the first nail in on one side, the next in on the other side, down the length of the board. When hanging siding and blue board, **do not** pound the nails so far in so that the nails pull the siding into the blueboard. This is because when the siding heats up it will expand, and could potentially rip out from around the nail.



Nails placed diagonally

Measuring - First, remember that you will only be able to measure to the width of a pencil lead. Obviously, a sharp pencil will measure more accurately than a dull pencil. Don't be afraid to use a utility knife to sharpen your pencil.

The key to accurate measuring is to make an accurate mark. The way that seems to work best is to make an arrow at the point that you want to measure. Place your pencil at the correct measurement on the tape. Make a short line going about 30° to the right. Then bring your pencil back to the correct point and make another short line going about 30° to the left. You end up with an arrow whose point is the **exact** point that you are measuring to. That way there is no ambiguity about the measurement.

Arrowhead -tip shows exact measurment

Another way to make accurate measurements is to measure from a constant reference point. For example, if you are marking a base plate, measure from the end of the baseplate, **not** the last line that you marked. This way if you make one mistake on a line, it does not add onto every other measurement that you mark.

Ladder Safety - Use common sense. Make sure that the ladder is resting on firm ground. If it is not, make sure that the legs have been thoroughly pressed into the ground so that the ladder will not sink. When you go up or down the ladder, make sure that somebody is holding the bottom steady. Be extremely careful when at the top of the ladder - make sure that you do not step above the step that says "Do not step on or above me!"

Handling People - This is the most difficult part of volunteering with Habitat, and for a successful day must be mastered. The key is to divide people up into small, effective working groups with a leader and to make sure that each leader constantly has a job assigned to his group.

1)Divide up into groups of four or five people. Ideally each group will have an Ask-Me leader.

2)Survey the sight. Identify the jobs that need to be done. For example, if doing siding, it is possible to get a group working on each side of the house. The limiting factor here will be equipment; make sure that each group has enough ladders, tin snips, etc. If it is not possible to give a job out to multiple groups, find another job. For example, if two groups are shingling on the roof and you have one group not assigned to a job, then see if the group can be given another job such as installing insulation, putting on siding, etc.

Wood Basics - A few basic terms about wood used in construction.

1)stud - a 2x4 that has been cut to an exact length for building walls. There is no need to cut these boards when they are used in constructing a wall. At Houston Habitat a **stud** usually is painted red on each end to mark it as such.

2)Plywood - a very strong sheet of flat wood that is used to support the roof and corners of a house. **Plywood** looks much smoother in comparison to OSB board. **Plywood** comes in sheets 4' by 8', and in different thicknesses, usually 5/8" or 1/2".

3)OSB board - similar to plywood. **OSB board** is much weaker than plywood because it is constructed of "strips" of wood which are glued and pressed together. **OSB board** is used to sheath the outside of walls except for corners.

4)Measurements - a 2"x4" board used to actually be 2" deep by 4" wide. However, during World War II the size of boards was cut down 1/2" in each direction to conserve wood. After the war it was never changed. So, the actual width and depth of a "2x4" is actually 1 1/2" x 3 1/2"!

5)Pressure treated - some lumber is **pressure treated**. This lumber has been subjected to high pressure in order to seal it and prevent water or other substances from getting into it. The result is a lumber that is much more resistant to rotting.

Constructing headers, trimmers, tees, and corners
Materials needed : studs, scrap lumber, nails, tape measure, speed square, pencil, hammer

Look at the plan to determine how many of each piece you will need. Obviously for each header, you will need to cut two trimmer studs. At each point where you have a wall running into another wall (a "T" shape), you will construct a tee. And, when you have two walls that intersect at a corner, construct a corner. There may be locations where it becomes necessary to construct a double-sided T - that's OK.

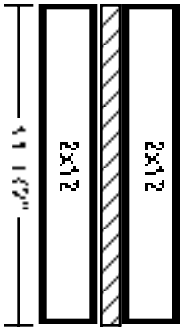
Headers and trimmers - A header is simply two 2x12 boards with a 1/2" piece of plywood nailed between them. The purpose is to provide load-bearing support across a window or door opening,

which creates a break in a wall. To construct a header, it is first necessary to figure out exactly how wide the header must be. The width depends on the specific place that the header is being placed and the opening it must span. In the windows that Houston Habitat currently uses, if the plans call for a 3°5° window, an opening of exactly 3' is required. Thus the header must span 3', plus 1 1/2" on either side for the trimmer studs, for a total width of 39" (36" + 1 1/2" + 1 1/2" = 39").

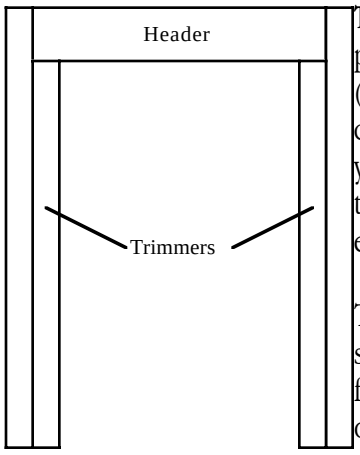
Here is a table describing window and door openings

Opening	Header size	Explanation
2°3° window	27"	24" opening plus trimmer studs on each side
3°5° window	39"	36" opening plus trimmer studs on each side.
3°5° double window	75"	two 36" openings plus trimmers on each side; no space between windows necessary
3⁰ door	41 1/2"	38 1/2" opening plus trimmers on each side
2⁸ door	37 1/2"	34 1/2" opening plus trimmers on each side
2⁰ door	29 1/2"	26 1/2" opening plus trimmers on each side

Next, cut two 2x12 pieces **exactly** the length of the header piece. Then cut a sheet of plywood (not OSB, although it is not the end of the world if you use OSB board) that will fit between the pieces (probably the header width long by 11 1/2" wide). Nail them together as shown to the right.



Cross Section of Header



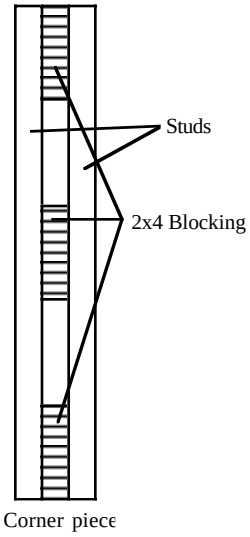
A fully assembled header piece

Trimmer studs - after constructing the header pieces, measure how tall they are on each end (probably about 11 1/2"). Then take a stud and cut off exactly that much from it. Make sure that you make separate measurements for each side of the header piece and that you cut the studs for each side of the header piece.

To finish constructing an entire header piece, nail each of the trimmer studs into a full stud. Be very sure that the bottom of the trimmer stud is flush with the bottom of the full stud. Then place the header piece on top of the completed trimmer studs. Make sure that the top of the header piece is flush with the tops of the full studs; if they are not then cut the top of the trimmer stud down until the header piece is flush. Then drive nails through the side of the full studs into the header pieces.

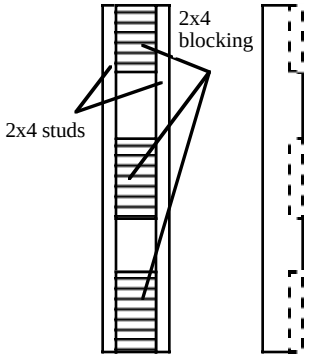
Exceptions - there may be places in the walls that require the header to be nailed directly into the end-stud of a wall , corner, or tee. That's OK - do it.

Lastly, mark in pencil on the header exactly what it is supposed to be, a 2⁸ door, 3°5° window, etc.



Corners - Corners are put at the corner of a wall. They are very easy to construct. Take two studs. Cut three sections of 2x4 wood into lengths of about 18" for blocking. Nail the blocking to the bottom, middle, and top of each stud. Make sure that the bottom and top blocking are flush with the ends of the studs. The placement of the middle blocking is not terribly important; eyeball it and guess it.

Tee's - Tee's are also not very hard to build. Again take two studs, and cut three pieces of 2x4 blocking about 18" long. These are placed as shown below. In order to make a double tee, you simply put blocking on both sides.



Reading Plans - In order to lay out the walls of a house, you must be able to read plans correctly. The following is a quick synopsis of how to read the plans of a house.

walls - Notice that on the floor plans the walls are drawn to scale. Most walls are made of 2x4 base plates (which are 3 1/2" wide); however be very careful around the bathroom because one of those walls is made of 2x6 base plates (5 1/2" wide) to accommodate the plumbing. The dimensioning lines are drawn from the side of a wall to the side of another. *It is **very** important to notice which side of the wall the dimension lines point to.*

windows and doors - windows and doors are measured by centerlines. The dimensioning line on a floorplan will point to a centerline, which is the center of a door or window. Example : a 3°5° window has a centerline pointing to it dimensioned 26" from the inside of the nearest wall. This means that the center of the window opening is 26" from the inside of the nearest wall, and that there are trimmer studs 18" (36"/2 =18") away from the centerline on each side.

Laying out the slab - It is 120% important that this be done absolutely correctly. If any mistakes are made at this point, then the mistakes will build up and it will become progressively harder and harder to build the house correctly.

Materials needed - chalk line, spray enamel, 25' or 30' tape measure, 100' tape measure, pencil, calculator (optional), plans

1)Make sure that the slab is square. Measure the "diagonals" of the slab (from one corner to the opposite corner of the house). If they are the same length or nearly the same length (i.e. 1/4" difference) then the slab is square (remember from geometry, that a square is a rhombus whose diagonals are exactly the same length). If the diagonals have more than 1/4" difference, then contact the construction manager for further assistance.

2)Determine what are the outside through walls of the house. These are the walls that the trusses will rest upon, probably the two longest walls of the house. To simplify the terminology, these walls run the length of the house, and the other outside walls are the width. (With the current Houston Habitat plans, the width of a house is 24'). Measure the actual width of the slab at each end of the house. *Why? It is entirely possible that the slab has not been poured to the exact width and length of the house. Therefore it is necessary to correct for it.*

3)What we now do is correct for any error in the length of the slab. First examine a wall running the length of the house. Example : The slab measures 23' 11" on each end. That means that it is 1" too narrow. In order to split the difference, we will allow the outside walls to overhang 1/2" on either side. Do not forget to measure each end separately. If one end is 23' 11" and the other is 24' exactly, obviously you only make corrections for the short side.

To correct for a short side, determine how much overhang or underhand the walls will have (in the above example they will overhang 1/2" on each side). Remember that a wall is formed by a baseplate which is a pieces of treated 2x4, therefore 3 1/2" wide. In order for the walls to overhang 1/2", the boards will only come in 3" onto the slab. So.... make a mark 3" in from the edge of the slab. Snap a line along the length of the slab between these marks.

4)Correct for the other wall running lengthwise. Since you've already measured the width of the slab, you know how much it needs to be corrected on each side. Simply measure in the correct distance from the edge of the slab on each side of the long edge, and make a mark. Snap a chalkline down the length of the slab between the marks. Spray it down once you've double checked all of the measurements.

5)Next, do the same for the walls that run the width of the slab. Measure the length of the slab, determine what, if any, correction must be made. Make marks on the slab and then snap lines. Then spray the lines with enamel so that they do not wash off.

Now that you know the slab is square and the outside walls are laid down correctly, you can lay out the interior walls.

6)Lay out interior walls. This is really quite simple. Two crews of four people is probably the optimal way to do this. Lay out the walls running the width of the house first. Make sure that your lines are the correct length, and spray them down. Crews can start at opposite ends of the house and head towards the middle to meet.

Important - remember to measure from a constant reference point, say the outside of an exterior wall. Do not make measurements from one interior wall to another; if you do then you run the risk of having mistakes quickly add up. Also, do not spray a line down until you've double checked the measurements and you're sure that you have erased the line so that it is the right length. Finally, keep in mind which side of the wall the dimensioning lines measure to and mark accordingly.

Bathroom wall - the 2x6 wall where the plumbing is placed is the only one that you need to deviate from the plans for. In placing this wall it is much more important that all of the pipes be contained completely in the wall; if it means moving the wall over 1/4" or 1/2" that's fine. Just make sure that the plumbing pipes are able to fit between the lines (5 1/2" apart in the case of a 2x6 wall).

Why did you just spend so much time chalking these walls down on the foundation? Once you have chalked them down, you know that all of the walls line up and don't run into each other. Secondly, you can now follow the markings that you have made on the slab instead of the markings on the plan. This allows you to take into account any errors that occurred when putting up the outside walls. Altogether it results in a much smoother building process.

Cut base plates for walls
Materials needed : tape measure, pencil, speed square, treated lumber, untreated lumber, power saw

The 2x4 lumber available for building base plates will probably come in segments slightly larger than 16'. In order to make putting the walls up easier, it is best to cut the material for the base plates and top plates to an even 16' length. Have a crew of two or three people (one of them trained with using a power saw) do this while others are laying out the slab or cutting base plates.

Laying out base plates for exterior walls
Materials needed : pencil, tape measure, speed square, treated lumber cut into 16' segments
Base plates for all walls are made of pressure treated lumber. Pressure treated lumber is darker than regular lumber. Most base plates are made of 2x4, except for plumbing walls, which are 2x6's. You will very likely need more than one 16' piece of baseplate material. That's OK, just push the ends together.

1)Cut out the foundation bolt holes in the base plates. This involves first locating the bolt holes, and then drilling them. To locate them, put the baseplate into position along the bolt holes. Be **absolutely** sure that the end of the baseplate is where it should be. Take a speed square and draw a line from each side of the bolt onto the baseplate. Then measure the distance from the line you have snapped on the foundation to the center of the bolt, and mark this on the baseplate. You now know where to drill the bolt hole.

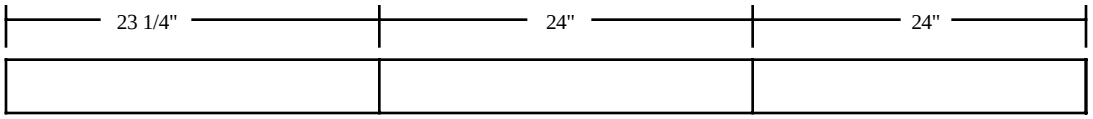
It may be necessary to either chisel or drill out some of the bolt hole if the bolts do not extend up enough so that a nut can be screwed down properly. If possible, find a drill bit that will drill a hole slightly larger than the nut instead of chiseling it out. This will save a lot of time.

Now that the bolt holes have been drilled, place the baseplate down on the bolt holes to make sure that it will fit. If they do not fit, drill them out some more.

2)The primary goal of laying a wall out is to make absolutely sure that there is a stud placed every 2' for plywood and drywall to be nailed into. Therefore, a stud must be placed every 2' on center.

*What does 2' on center mean? 2' on center means that the **center** of a stud will occur every 2' from a point. In wall situations,this means that you will measure from the end of the wall and mark a stud every 2' from there.*

To lay out a wall 2' on center, follow this procedure. 1)Place the end of the tape measure on one end of the wall. This end of the wall marks the center of the first stud. Now go down 23 1/4" down the baseplate and make a mark. Use a speed square to draw a line across the baseplate. This line marks where the edge of a new stud should be placed. Why? Since you're working on 2' centers and started from the edge of the wall, then the *center* of a the next stud will be 2' from the end of the wall. However, that is the center and not the end. Since a stud is 1 1/2" wide, splitting that yields 3/4", and we back up 3/4" from the 2' center (23 1/4") to make a mark where the end of the stud will go.



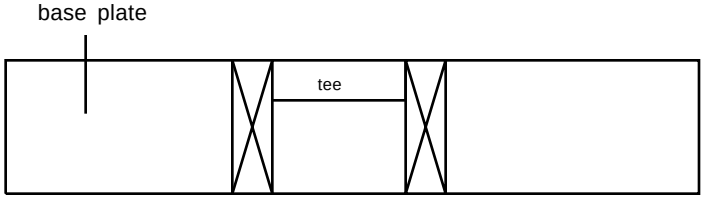
Edge of wall

Drawing not to scale

Continue down the baseplate marking a line 3/4" back from ever 2' mark (at 23 1/4", 47 1/4", 71 1/4", etc.) until you reach the end of the wall. Remember that we backed up from the center to mark our line for a stud. There is not a need to mark the lines for the other side of the stud right now because we have not determined if there will be any tee's, corners, or windows in the wall.

3)Mark tee's in the wall. A tee will be placed everywhere that another wall intersects but does not run through the wall (which will always be the case for an outside wall except on the ends). Since you have already laid out the walls on the slab, it is a simple matter to transfer the markings up onto the baseplate. Using a speed square, draw lines from the markings on the slab up the side of the baseplate. Then extend those lines across the top of the baseplate. Now we have markings on the baseplate which correspond exactly to the markings on the slab for the sides of the intersecting wall.

Mark the tee on the baseplate by making a line between the two already on the baseplate 1 1/2" away from the edge. This shows where the wood fits for the tee piece. Be sure that you put this line on the correct side of the baseplate; otherwise you could put up your wall only to find that your tee is facing the wrong direction. Next, mark a line 1 1/2" to the outside of each of the original



A tee drawn on a base plate

lines. Draw an "X" to denote a full stud.

These X's show where the sides of the tee piece will go. Finally, write the word "tee" on the baseplate just to make sure that we know what is supposed to go there.

Why draw the markings on the side of the baseplate? This helps when we actually nail the tee into place because when the tee covers up the markings on the top of the base plate we still have something on the side to line it up by.

4)Mark the windows and doors. This is the tricky part. First, mark the center line by measuring from the end of the wall to where the center line should be drawn. Draw a line across the top of the base plate at that point, and write "C_L" through it. Next, look at the header width of the window or door that you're putting in. In both directions, measure out from the centerline 1/2 of the width of the header piece and draw a line across the base plate. For example, if putting in a 3°5° window which has a header width of 39", you would measure 19 1/2" in each direction from the centerline and draw a line across the base plate. These lines are mark the joint of the trimmer stud to the full stud of the header piece. It is a good idea to go ahead and extend these lines down the side of the baseplate as well to make it easier to put the header piece into the wall.

Now simply draw lines 1 1/2" away from each side of the line denoting the joining of the trimmer and full stud. Mark the full stud (on the outside) with an "X", and the trimmer with a "T". Now the window or door opening has been properly marked on the baseplate.

Window opening drawn on base plate

5)Mark corners. Corners are very easy. They occur at the ends of each of the through walls of the house, and possibly on the interior walls. The easiest way to do this is to draw lines 1 1/2", 3", and 4 1/2" from the end of wall. Between the end of the wall and first line (1 1/2" in) draw an "X" to denote the full stud. Between the first and second line (1 1/2" and 3") write in "corner". Between the second and third lines (3" and 4 1/2") draw another "X" to denote a full stud. Finally, extend the first and second lines down the side of the base plate; again this makes it easy to line the corner up properly.

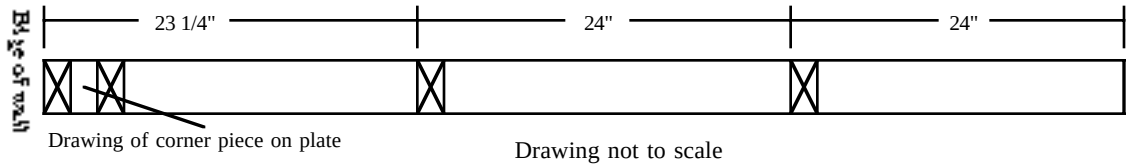
6)Mark the full studs. Remember those lines that were drawn every 2' down the wall? Now it's time to make those into full studs. Make sure you start from the end of the wall that you marked them from; otherwise you will end up marking the studs on the wrong side of the line.

Start at the end of the wall. If there is a corner there, don't worry about it. Otherwise, it is necessary to

mark a stud at the end of the wall. The purpose of placing a stud every 2' on center is so that there will be something behind each place that plywood or sheetrock is hung. The 2' center line started on the end of the wall. Since it doesn't do much good to stuck a stud over the edge of a wall, simply move it over so that it is right on the edge of the wall. This is done by simply drawing a line across the base plate 1 1/2" in from the edge of the wall (the width of a stud) and marking an "X" to denote it as such.

Now move down to the next line that you marked, 23 1/4" away from the edge of the wall. This marks the start of the stud; the center of the stud is 24" away from the edge of the wall. This means that the line showing the opposite side of the stud must be 1 1/2" away from the first line, or 24 3/4" away from the edge of the wall. Draw a line across the baseplate at that point (1 1/2" farther away from the edge of the wall than the first line). It is OK to measure the 1 1/2" from the line already drawn instead of the edge of the wall; errors will not mount up since you are only measuring once. Mark an "X" to denote the full stud.

Continue down the wall, marking down full studs where you previously drew a line. You will undoubtedly run into some situations where you have already placed a tee or header piece there. That's OK. If the tee or full stud or trimmer stud cover the entire area that the 2' stud is supposed to, then there is not need to put another stud there. However, if a tee or the full stud on the side of a header piece does not cover the entire area that the stud should, then simply mark a full stud adjacent to the piece.



Drawing not to scale

When you are marking studs in the middle of the header piece for a window, then do not mark them as full studs by an "X" but use a "C" instead to denote a cripple. That's because in a window or door space, there aren't any full studs - obviously a piece of wood would cause a slightly problem when a door or window is tried to put in the opening. In a window space mark in cripple studs, which will support the window sill.

It is not necessary to mark cripple or full studs in the space of a header piece for a doorway. There are no cripple or full studs in that situation.

Laying out base plates for interior walls

Materials needed : pressure treated lumber, pencil, speed square, tape measure

Laying out the base plate for an interior wall is essentially the same as an exterior walls. The difference is that you will not have to drill bolt holes in the base plate. Also, you will probably place end studs and not corners at the ends of interior walls. Do not forget to use 2x6 material for any walls that require it, such as plumbing walls. Finally, be extremely careful as to how you place your tees in the

interior wall because it is extremely possible to put one in facing the wrong way.

Laying out the top plates
Materials needed : untreated 2x4, 2x6 lumber cut into 16' segments, pencil, speed square
Top plates are made of untreated lumber. The easiest way to lay out top plates is to set them down besides the bottom plates; nailing them to one another is a good way to keep the plates from shifting. Simply use a speed square and transfer the markings from the bottom plate to the top plate. Again, be careful to place the tees facing in the correct positions. Also, it is not necessary to mark cripple studs since there are no cripple studs between the header and the top place. Finally, extend the same markings down the side of the top plates that you extended down the side of the bottom plates.

Assembling a wall
Materials needed : studs, headers, tees, corners, nails, base and top plates already marked up

With the top plate and bottom plate laid out for a wall, it needs to be assembled. Extreme care must be taken to place the pieces exactly as marked on the wall. Remember, you took time and care to mark the plates carefully; if you see a 1/8" space between a stud and a tee, it's supposed to be there and it's OK.

Assemble the wall on the slab. It is possible to have people assembling at both ends and progressing towards the middle; however first place all of your pieces in place. It is recommended that while one person is hammering the bottom of a stud or header in, another person should be hammering in the top. That way the forces oppose each other and the wall does not move as much.

The recommendation is to put two nails into each end of a stud. A nail every foot or so along the top of a header is also acceptable. Remember to use a diagonal nailing pattern (described above).

There is not a need to cut out the base plate in a doorway; it will be cut out later.

When two plates join, some special care needs to be taken:
1)A joint occurring where a tee or stud is placed is acceptable; make sure that each plate is nailed into the stud or tee.
2)If a joint occurs in a door header, that's even better. Simply nail both top plates to the top of the header. The bottom plates can be separate; they will be cut out later.
3)If a joint occurs in a window header, again nail the top plates to the header. If the joint of the bottom plates occurs on a cripple stud, leave it. Otherwise it is necessary to take a short piece of untreated lumber and nail it to each plate to join them together.
4)Finally, if there is no wall piece where two plates join, it is necessary to place a full stud at the joint.

Cut posts for wall bracing
Materials needed : scrap 2x4, power saw
Assign two or three people to cut the posts that we will use for supporting the exterior walls. Find some scrap 2x4 lumber, pieces about 4 or five feet long. Cut points in the bottom of the lumber so that it can

easily be driven into the ground. Point should be roughly about 6" long, but use your own judgement.

Putting up the walls of a house
Materials needed : level, 1x4 or scrap 2x4 lumber for bracing, posts, nails, hammers, moisture barrier

This should not take a great amount of time if you spent were careful assembling the walls and laying out the slab. This job will require the maximum amount of volunteers to complete quickly.

1)Set up three of the exterior walls first. Put a strip of the blue foam moisture barrier down first. Put up the two long exterior walls and one of the shorter ones. Be careful so that you do not allow the joints in a wall to break when carrying it around; use lots of people. Use a lot of people to lift the wall into place. Once the wall is up, use 1x4 or scrap 2x4 wood to brace it about ever 10'. Brace the wall by nailing the bracing to the top of the exterior wall. When bracing this wall up, a level should be used to get the wall approximately vertical. Do not use 2x4 lumber if possible because most of it will be needed later to top plate the house; 1x4 lumber works quite well in bracing the house.

2)Raise interior walls. Once you have three exterior walls up, raise the interior walls from the back to the front. The easiest order of raising is to raise walls coming in from the sides towards the main hallway first, and then to install the long walls running along the hallway. Also, to make maneuvering walls easier, it is a good idea to start with the walls farthest away from the open exterior wall and then move closer towards it. That way you do not put up a wall and then have to maneuver another wall in behind it.

To nail one wall to another, it is not necessary to level that wall. Rather, if you nail it straight into the tee of the tee, then when the exterior wall is plumbed up the interior walls will follow right in line. Make sure that your wall lines up with both the boards at the bottom and the top of the tee that you're nailing into. Three nails per block of the tee is recommended.

3)Finally, raise the last exterior wall up. Remember to put down the moisture barrier. Don't forget to brace the wall.

One word of caution : be sure to use lots of manpower when raising a wall. It would be disastrous for a wall to fall down while being put up. Don't be afraid to ask for more people to help. Also, make sure that enough people continue to hold the wall up while it is being nailed in or braced.

Top plating
Materials needed : 2x4 and 2x6 untreated lumber, hammer, nails, tape measure, ladders, pencil, speed square

Top plating is one of the most fun things to do at Habitat, but one of the more dangerous because of the height. First and foremost, make sure that everybody working on top of a ladder or walking the planks is comfortable.

Top plating is a great job to get everybody working. Ideally, each top plater should be accompanied by another person who will obtain wood of the appropriate lengths. Also, window sills can be put in at the same time, occupying some other people. Probably the sawing crew will become overloaded, so if possible obtain another saw to use while top plating.

1)Get as many different teams as possible top plating. Nails should be driven in about every foot or so, and drive them in on opposite sides. The top plater's helper can feel free to get ahead, measure the lengths needed, and get them cut.

2)The rule on overlapping is this : everywhere that a wall runs into another wall, it's top plate should overlap. Example : an exterior wall has a tee in it, where a closet wall intersects it. The closet wall will have a top plate running on top of it that will continue onto the exterior wall. The exterior wall's top plate will have a break of slightly larger than 3 1/2" in it where the closet wall intersects it.

3)It is not a good idea to have people nailing at each end of a top plate and move towards each other. In order to straighten out a top plate, nails should be driven in on one end, and then work towards the other end, making sure each time a new nail is driven in that the plate is straight.

Window Sills
Material needed : hammer, nails, 2x4 lumber (treated or untreated), tape measure, pencil

Putting in the window sills is very simple, and you can get a number of people working on it at once. First, determine what kind of opening you need. A 3°5° window means that the opening is 3' wide by 5' high. If it is a 2°3° window, then the opening is 3' high.

1)Measure down from the top of the header on each trimmer stud the appropriate amount. If it is a 3°5° window, then you measure down 5' from the top of the header. Make a mark across each trimmer stud; this denotes the top of the windowsill. Make another line across each trimmer stud 1 1/2" beneath the first line; this indicates the bottom of the windowsill. Measure the width at this point and cut a piece of lumber to form the windowsill. Put it into place and nail in from the sides.

2)On each side of the window sill, measure down from the bottom of the windowsill to the base plate. It is possible that the measures may be different, that's OK. Cut cripple studs that length and place underneath the end of the windowsill to support it. It will be necessary to toenail in the cripples into the base plate.

3)Finally, if there are any cripple studs marked on the base plate, measure them and cut them as well.

Stringing the walls
Materials : String, nails, hammer, level, and at least three short pieces of 1x4 blocking.

Stringing the walls up ensures that the exterior and interior walls are all perfectly **plum** - vertical. This is accomplished by bracing the exterior walls up to the interior walls, and using a line of string to make sure the exterior wall is straight for its entire length.

It is best to string the two long exterior walls first, and then to do the short exterior walls.

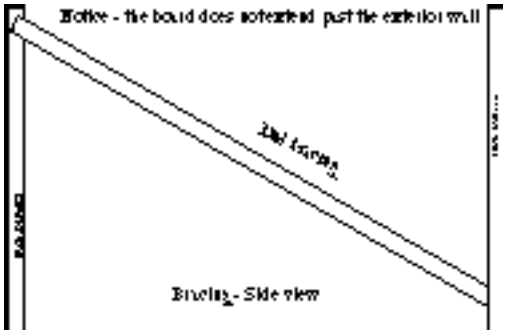
1)Drive a nail partway into the top plate at the end of each exterior walls. Then tie the string to one of the nails. Pull the string as taut as possible, and then tie it to the other nail. Place a piece of the 1x4 blocking between the string and top plate next to the nail at each end.

2)Take your remaining place of 1x4 blocking. At intervals of about 8', we will brace. If that interval is on or close to an interior wall, skip over it because it is extremely difficult to brace right next to an intersecting interior wall.

Shove the piece of blocking between the string and top plate. It's perfect if you can quickly move the blocking into the space between the plate and string and not touch the string. When the block is between them and stopped, ideally the string will just barely be touching the block.

If the block moves the string when you move the block into the space between the string and plate, or if there is a substantial amount of space between the string and block, then the wall must be braced at the point. Even if it is perfect, it's a good idea to brace it just to make sure that everything is steady.

To brace, nail the 1x4 bracing into the top of the exterior wall, into either the side of a stud, tee, header piece, etc. Leave the nail partway out so that it is possible to take the nail out later. Make sure that the end of the 1x4 does not extend outward of the outside of the wall; if it does then it will be impossible to nail plywood onto the exterior later with the bracing in the way.



Put two or three people on the other end of the bracing. They will be nailing it at the base of an interior wall running parallel to the exterior wall. Start a nail into the bracing board so that it is almost ready to poke through the bracing. Pull the bracing forwards or backwards as necessary so that the exterior wall. As soon as the string is OK with the blocking, have the crew immediately nail the bracing into the bottom of the interior wall.

3)Proceed down the entire wall. Then string and do the other exterior walls. It is possible to string two walls at a time.

Sheathing the house
Materials - OSB board, plywood, hammer, nails, Saw-z-All

After the house has been strung up, it is possible to sheath the house and put trusses up. Get crews working all around the house on sheathing; a crew can be working on each wall at once. Crews can be four or five people in size.

1)At the corners of the house, plywood, not OSB board, must be used. Have two people hold the plywood up by the bottom of it. Line the bottom of the plywood up with the bottom of the baseplate. Nail in along the top of the plywood in a few places so that the plywood is able to hang without being supported. Then nail along the sides, top, and bottom of the plywood. Spacing the nails every 18" to 2' is good. It is also OK to nail down the middle of the plywood where the stud at 2' is. To make it easier to find the nail holes, use a chalk line to string along the plywood to indicate where to nail.

2)Place plywood at each corner first. It is important that a full 4'x8' sheet of plywood be at every corner, so do them first.

3)Place a sheet of OSB board tightly up against the plywood. The OSB board should overlap the stud on each side. Line it up again with the bottom of the baseplate. If there is some space now between along the vertical edge between the OSB board and plywood, that's OK as long it is not bigger than 1/8". If there is that much space, then keep a careful eye on whether the OSB board is overlapping more than half of the stud on the opposite side. If enough overlap is not remaining for the next piece of OSB board, then you may have to rip (saw) some of the OSB board off to thin it up. Again nail the OSB board first with a couple of nails at the top, and then drive nails in all around it.

4)Continue down the wall until you run into the plywood at the other corner. The last piece of OSB board may need to be cut to size.

5)Have one or two people go through the house with the Saw-z-All and cut out the window and door openings in the sheathing.

From experience, it seems that the most time consuming aspect actually involves getting the plywood and OSB board initially hung. Have a crew of three people do that for the entire wall, while another two or three people follow behind them and drive remaining nails in.

Putting trusses up
Materials needed : trusses, pencil, tape measure, speed square, 1x4 blocking, level

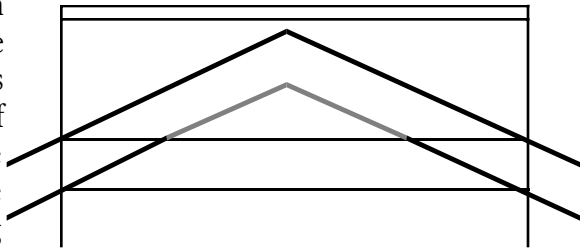
Putting up trusses requires nearly all hands to get the trusses up on the building, but only about six actually on the roof. The first truss (end truss) must be leveled correctly, and the rest then put up. It speeds the operation up to get the end truss up and level it while the rest of the trusses are being hoisted up.

Note and mark where the special trusses for the disappearing stairs must go. If in doubt, ask a construction manager.

1)Mark the truss lines on the top plate. Again, this is done 2' on center, with the center starting at the edge of a wall. The trusses are laid down the longest wall of the house, usually from the back to the front of the house.. If you feel like you are very accurate, use a framing square to mark the trusses. Otherwise, it is suggested that you use a speed square and 100 ft. tape measure to mark the trusses out. Be sure that they are all exactly 2 ft. apart - it will behove you to double check this after you have laid them out.

2)Find Ken or Ralph and have them help you stand the first truss. Meanwhile, get approximately 10 people together to help lift the trusses up onto the top of the house. Station two people on ladders on each interior side of the house, and have one person sit on the middle wall of the house (this person should be very comfortable ridding a wall). Have three people below with 2x4's or something so that they can push the trusses along the roof of the house, one on each side of the truss and one for the middle. Finally, use four or five people to actually pick the trusses up from the pile and lift them onto the roof.

Diagram of trusses sitting on top of a roof. Notice the point of the lower truss is beneath the structure of the top truss.



Have the people on the ground lift the truss on the roof. You can lift the trusses up wherever on the side of the house you want to. The two people on ladders on each side of the house should make sure the trusses are hanging equally off each side of the house - if one is farther out then the other is closer in and could fall off of the wall. Once the truss is on the roof, with the person in the middle helping to get it straight, then the three people below with 2x4's will push the truss along the roof until it is at the end you're starting trusses on. The point should be pointing towards the end of the house. The next truss should come up the same way, except that once it is at the end it's point should be beneath the base of the truss previous to it as diagramed below. Bring the rest of the trusses up onto the roof.

Be careful to note where the trusses for the disappearing stairs must go, and make sure they are put up in the correct order.

3)As soon as the first trusses are up and in position, try and get a crew working to actually put the trusses up vertically.

For maximum speed, you need five people working on it, three people on the lead truss, and two more people on the truss directly behind it.

First, stand the truss up vertically. One person on one side should toe--nail it in on the mark on the top plate, and the other person should then toe-nail it on the other side. Do not toe-nail both sides simultaneously. Then, the person in the middle should toe-nail it into one of the middle walls. It's only necessary to nail into one of the middle walls, if there is one beneath the truss. Then the crew proceeds to the next truss.

The crew working on the following truss will take a long 1x4 board and use it to space the trusses exactly 2 feet apart. Actually, between the trusses there is 20 1/2" because each truss, made of 2x4's, is 3-1/2" wide. Lay the 1x4 across each side of the truss, about 5' from the top point. Mark on the 1x4 exactly where the next truss needs to line up, and then pull or push the truss until it lines up. Then drive one nail through the 1x4 to hold the truss in place. Do not nail in completely - the nail will have to be removed later. When you come to the end of a 1x4, lay another one and overlap about two or three trusses before the end of the previous one.

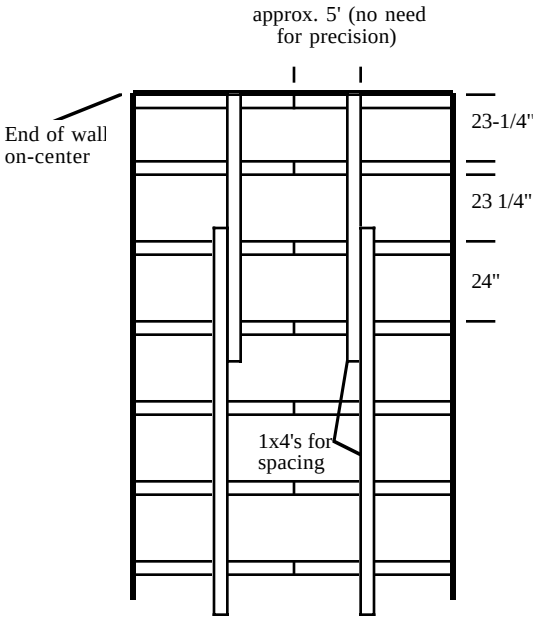
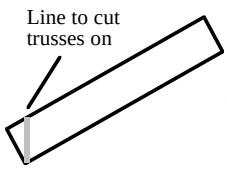
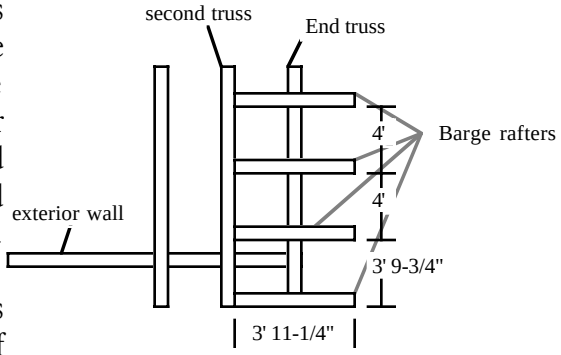


Diagram of trusses up on house

4)Once all of the trusses are up, it is necessary to cut the edges off of the trusses. Most of the roofs are pitched on a 5-12 pitch (it rises 5' in height for every 12' of horizontal run). With a speed square and chalk line, it is possible to easily determine a vertical line for each truss end. On a truss on one end of the house, place the pivot of the speed square on the top side of the truss, and finagle it around to get a reading of 5 on the bottom line (common). Then draw a vertical line. Do the same with the truss on the opposite end of the house. Then snap a chalk line from the top of each line across the ends of all the trusses - now you have an even line across all of the ends of the truss. Use a saw to cut the end of each truss off - be extremely careful when using a saw while standing on a ladder. Do this on the other side of the house.



5)Cut the barge rafters (or lookouts). These are pieces of 2x4's 3' 11-1/4" long that stick out of the sides of the houses to create a 2' overhang on each end of the house. Notice that the end trusses are slightly lower than the other trusses. The barge rafters are placed across the end truss; one end is nailed into the second truss, and the other hangs out. They should be nailed 4' on center from the bottom fascia board. To do this, remember to account for the fascia board (which is 1-1/2" thick). Then, measure up 4' from the bottom of



the end truss. Subtract 1-1/2" for the fascia board, and make a mark. This line at 3' 10-1/2" is the mark for the center of the first barge rafter. Then go down another 3/4" because you're doing the boards on-center. This is the mark for the bottom of the first barge rafter. Now measure up 4', make a mark - this is the bottom of the second barge rafter. Continue till you reach the peak of the roof. Then repeat for the second truss in (this gives you a mark to nail the ends of the barge rafters in).

The barge rafters are put in on their sides - the end should be nailed into the side of the second truss, and then sit on top of the end truss.

6)Fascia board - nail the fascia board onto the ends of the trusses and barge rafters. If the fascia board is cut into exactly 16' segments, it should then fall in the middle of each truss (remember, everythings on 2' centers).

Decking the roof of a house

Materials needed : Plywood clips, 4'x8' plywood, nails, tape measure, saw, at least 4 ladders

This job will require a number of people nailing plywood up on the trusses, as well as a cutting crew down on the ground. It may be helpful to set up ladders along the sides of the house with boards running between them so that the first row will be easier to nail up. Decking a roof can be done at the same time that blueboard, siding, or sheathing is being put on a house.

1)Plywood is laid down lengthwise across the house - it goes across 8' and up the roof 4'. The first row will start out with plywood being laid from one end of the house to the other end. Place a piece of plywood down with the 4' end running the down the fascia on the side of the house, and the 8' end running along the fascia board down the length of the house. Nail it in, using a nail every foot or so. Don't forget that there are trusses running beneath the plywood that you can nail into.

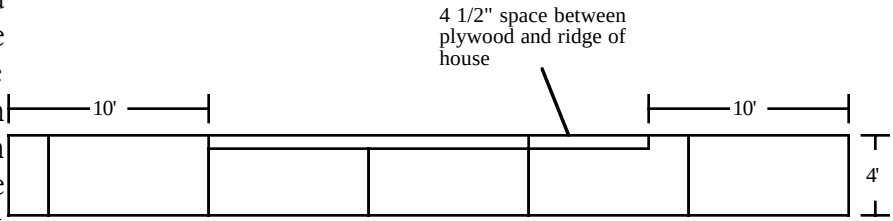
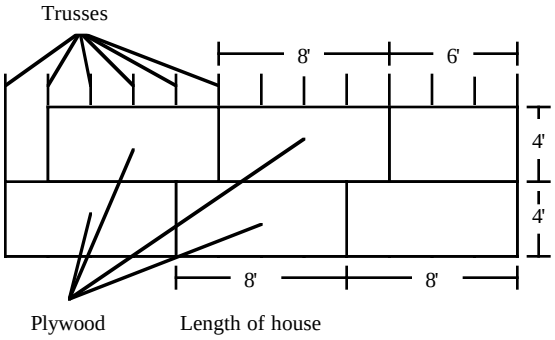


Diagram of top row of plywod on roof



Continue laying plywood down the length of the house. When you begin the second row of plywood, cut 2' off of the length of the plywood so that the plywood rows will be staggered. Place plywood clips between then plywood rows. Rows will be started with plywood at first 8' long, then 6', then 4', then 2', and then returning to 8'.

Why cut 2' off? This allows the plywood to be

staggered across the roof, which is a better structural design. A two-foot length is used because that is the width between trusses (if they were laid out correctly).

2)Top row of plywood - On the top row it is **important** to remember to cut out a space for the roof vent. The roof vent is a hole at the peak of the roof that extends about 4" down from the peak. A hole for the roof vent is NOT cut in the plywood 10' from each end of the vent.

So, to make a roof vent, on the top row of the plywood being laid out, lay plywood for 10' along the peak. Once the 10' mark is reached, measure the distance from the top of the previous row to the peak. Then Cut the plywood so that it is about 4" or 4 1/2" narrower than the distance from the previous row to the peak. Do this for each sheet of plywood you cut until you get within 10' of the other side of the roof, then cut the plywood again the full width (there is no roof vent 10' in from either end of the roof).

Laying down felt paper on the roof of a house
Materials needed : rolls of felt paper, utility knives, drip edge, tin snips, tin caps, staple gun, roofing nails, hammers

Drip edge - the metal strips that go on the edge of a roof .
Tin caps - small round pieces of thin metal which are used to nail felt-paper in place
felt paper - the water resistant barrier put down on a roof before putting the shingles on. Be careful - felt paper tears easily and can get very gooey when it heats up.

1)Install drip edge on lower end of roof. Start at one end, and nail the drip edge onto the lower edge of the roof. You will need more than one length of drip edge to span the length of the roof. When they meet, shove them together and have one piece overlap the other piece by about 1'. Nails can be spaced about every 2'.

2)Roll the first row of felt paper out. There are several different methods to do this - use whatever you feel most comfortable with.

The bottom edge of the felt paper should be rolled so that it is even with the edge of the drip edge. Roll the felt paper out with the line facing up. Start on the end of the roof, and nail it down using one or two tin caps. Then roll it out for about 10' and nail again. **Be very sure that the felt paper is pulled tightly** and that it is aligned correctly. Small bumps in the felt paper are **not** acceptable - the felt paper must be smooth. Take extreme care that the first nail down on the end is done correctly; have someone hold it and roll out the paper 10' or so to make sure that the edges all stay even before nailing it down.

3)The second row starts with its bottom edge running along the top line of the previous piece of felt paper. Again, roll out and nail down about every 10'.

4)When you reach the ridge of the roof, have the felt paper overlap about 6" to 1' on the other side.

Cut out the hole for the ridge vent immediately. Remember, you do not need to cut out more along the 10' on either side of the ridge vent to the edges of the roof.

Methods of laying out felt paper :
a)Staple gun - for the initial rollout, when you are nailing down about every 10', it is OK to use a staple gun to nail those tin caps in. Place a tin cap near the top, middle, and bottom of the felt paper.
b)regular nails - If you prefer, you can use regular nails to nail in the tin caps. To nail in a tin cap, place the tin cap where you wish it to go. Then, drive a roofing nail (1") through the middle of the tin cap.

It is recommended for speed that you have one crew roll out an entire row of felt paper, and that another crew can follow along after the roll is rolled out to tin cap the paper completely. It is recommended that tin caps be placed approximately every 3' to 5', with one in the middle and bottom of the paper. The tin cap driven in the bottom will also serve to nail in the top of the felt paper from the previous row which is overlapped and lying underneath the current row of felt paper. About 6 people can be assigned for the nailing duty, while four or five should be assigned to roll felt paper out.

Again to speed things up, it is permissible to work on both sides of the roof at one time, with the groups meeting each other on the ridge.

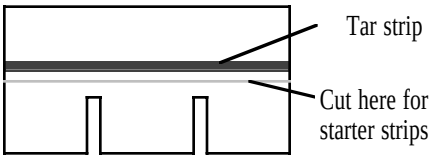
5)The ridge - rows of felt paper should each overlap the ridge. One side will overlap onto the other side of the roof (sitting directly on top of the plywood). **Cut the roof vent** to make your life much easier. Then lay out the other row, with it overlapping on top of the felt paper. In the end, the ridge should be protected by two layers of felt paper. Again cut the roof vent out.

6)Drip edge along the side of the house is installed. Start at the bottom corner; it will be necessary to use tin snips to make the corners fit. Run the drip edge **on top** the felt paper. When you reach the ridge of the roof, simply bend the drip edge to make it fit, and continue running it down the side of the house. Again, space nails approximately every 2'.

Shingling a house

Materials needed : roofing nails, shingles, ridge vent, vent stacks, chalk lines, shank nails for ridge vent, utility knives with shingle blades

Hint - When tearing shingles off of a pack, place the shingles so that the rough grain is facing down. Then lift the shingles off. For some reason, the tar tears more this way.



1)Lay starter strips along the bottom edge of the roof. Starter strips are simply shingles that have had the flaps cut off of them. Since each shingle is 3' long, divide the length of the roof (which is longer than the length of the house on the floor plans) by 3 to determine the number of starter strips you need to cut. **Cut the starter strips below the tar strip**.

Lay the starter strips along the bottom edge of the roof, with the straight edge flush with the edge of the drip edge.. The tar strips should be on the top side of the starter strip (the side closer to the ridge of the house). If necessary, trip the edge of the last starter strip to fit with the edge of the house.

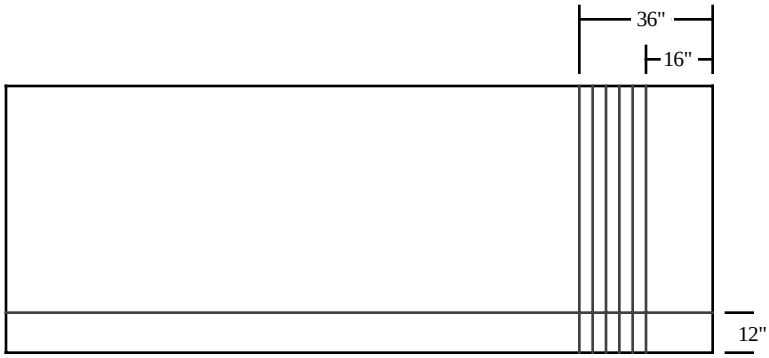


Diagram of chalk lines for starting a roof

2)Measure up from the bottom edge of the house 12" on each side. Snap a chalk line between these measurements across the length of the roof. This line will serve as the line to place the first full row of shingles along. Now, go to one side of the roof. Measure 36" near the top and bottom of the roof. Mark, then measure 32", 28", 24", 20", and 16" at the bottom and top. Then snap chalk lines between these measurements. These lines serve as a marker for where to begin a course (row) of shingles.

Why snap these lines? The 12" line ensures that the first row of shingles is straight along the length of the house. The vertical lines are used to make sure that the shingles

3)Run the first row of shingles. The tops of the shingles should be flush with the 12" line recently snapped. The left edge (or right, depending which side of the house you snapped the lines) of the first shingle should be flush with the 36" line. Trim the right edge so that it fits along the edge of the roof. Continue to lay the shingles next to each other down the entire length of the house. When you reach the end, trip the last shingle to fit. Finally, at your convenience, trim the bottoms of the first row so that they are flush with the drip edge. Usually four roofing nails are placed in each shingle. *Nail through the tar strip* - that way a seal is made when you drive your nail through.

4)Lay the next row. Each row of shingles starts 5" above the next. There are three ways to measure this.
a)Snap chalk lines after laying each a row 5" above it. Not recommended. Very accurate but very time consuming.
b)Use roofing hammers to measure and set the notch in the head to 5". Remember that no two hammers will be able to be set exactly the same. Therefore, to keep the roof even, the same hammer must be used along the entire course of shingles to measure the distance above the previous row. **Do not use different hammers to measure the distance on each side of a shingle**. This will definitely result in a crooked shingle.
c)Cut 1x2 blocking that is 5" high. This is fast and a little more accurate than using a hammer. Recommended if the means to cut enough blocks are available to you.

The left edge of the first shingle of the next row begins 4" to the right of the previous shingle. For example, the left edge of the first shingle in the second course will begin 32" from the edge of the roof (along the 32" chalk line). Each row gets 4" closer until you reach 12" from the edge of the roof. Then, instead of 12" go back to a full 36".

It is a good practice to trim shingles immediately after a row has been put down. This means that you will have less layers to cut through later.

5)Working around flashing and vent caps. This is a little tricky. Take the cap off of the pipe (simply lift it off). Use a 2x4 or something to flatten the metal of the cap out completely - no bumps should be in the metal of the flashing. Set the cap aside.

Next, lay shingles down. It will be necessary to cut the shingles so that the pipe fits through them. Try not to make the hole excessively bigger than the pipe.

The shingles should be laid down until the bottom of the next row is going to be just at the level of the pipe(I.e. the tar strip is just below the level of the pipe, and the next tar strip will be placed above the pipe). Then, put the flashing down, and continue shingling. **Do NOT nail through the flashing** - if you do then you create a direct pathway for water to enter the plywood of the roof and a sure leak will occur. Nail as close to the flashing as you can get.

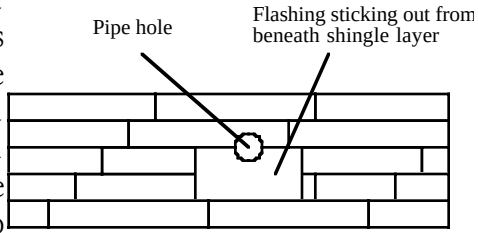


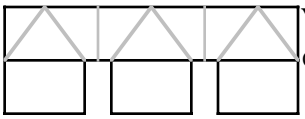
Diagram of how the flashing for a vent should be shingled around

6)The top layer - Continue laying rows of shingles until you are at the very top of the house. Again like the tar paper, overlap one row of shingles onto the other side of the house (it is not necessary to do this where the vent cap is). Along the top near the vent cap, continue shingling until the colored shingle edge (below the tar paper) reaches all the way to the top of the roof next to the vent cap. *Why? You do not want black shingle possibly sticking out beneath the vent cap.* Be careful at this stage; the plywood is usually not well nailed in and nails will bounce very easily. Cut the shingles so that they do not block the roof vent now.

7)Caps. You will need to cut quite a few caps. Detailing three or four people with utility knives is not a bad idea. Roof caps are cut by taking a shingle, cutting it into three pieces, and then cutting triangles from the black side. Diagram at right. It is suggested that you cut one triangular cap as a pattern and use it to cut the rest of your caps so that they are approximately the same size.

Measure 6" down from the peak on one edge of the roof. On the opposite edge measure 6" down. Snap a chalk line down the length of the roof. Now you have an even edge to lay the caps down against.

Lay the first cap down on one end of the roof, lining it up with the chalk line. The colored side should be on the side away from the roof. Nail two nails through the tar. Then using a 5" spacer or shingling hammer, place the next cap down proceeding towards the center of the roof. Continue until you reach the cutout for the ridge vent. Stop there.



How to cut roof caps
Cut along the dotted lines - could it be easier?

You can start on each end of the house and work towards the ridge--vent cutout to speed the process.

8)Laying the ridge vent. The vent will overhang one foot over the hole. Again, snapping a chalk line is helpful - measure the width of the ridge vent, divide by 2, measure down that far from each end of the house (at the actual end and not where the ridge vent ends), and snap a line down the length of the house.

Place the ridge vent in place. Using roof shanking nails, nail it in appropriately. This really isn't too hard. Then, cap the ridge vent just like capping the house. However, you must choose an end to start at.

Interior blocking

Once the roof is on the house, maetirals can be put in the house to assist the drywallers. There are several jobs that need to be done; crews can work on them simultaneously. This work can proceed very quickly even with only a couple of Ask-Me's assigned to oversee a large crew. The jobs are :

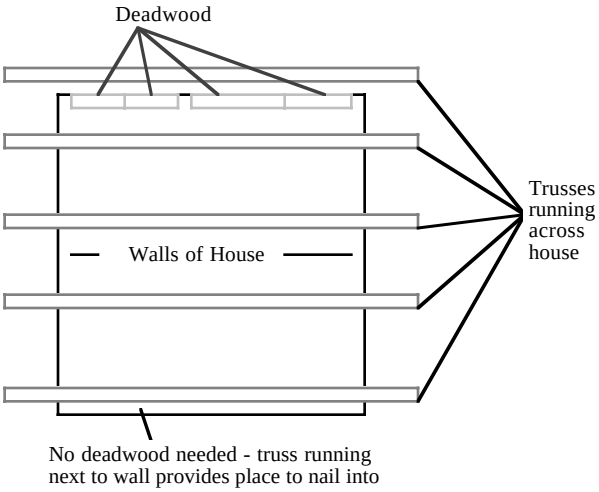
1)Deadwood
2)Blocking on baseplates
3)Blocking for kitchen cabinets, bathroom
4)Blocking for closets
5)Furrdown for cabinets

Deadwood

Materials needed : Hammers, tape measures, 16 penny nails, lumber (2x6,2x4,2x8 scrap)

Deadwood is attached to the top plates to give the drywallers a place to nail into. You do not need walls running across the length of the house - trusses running across provide a place to nail into. However, deadwood is required on walls running the width of the house because it is possible for an entire wall to have nothing along its edge to nail into. Simply nail small scraps of 2x4 onto the top of the second top plate, with about 1/2 hanging off the edge and into the room. If you need deadwood on both sides of the wall, simply use scraps of 2x6 to span across both walls.

Blocking on Baseplates



Materials needed - Hammers, tape measures, 16-penny nails, lumber (2x4 scrap)

Why do you need blocking on the baseplates? Again a very easy task. In between studs, tees, trimmers, etc., there must be a 2x4 laying on top of the baseplate for the drywall to be nailed into. Drywall is nailed from the ceiling to the floor, and it is not guaranteed that the drywall will extend all the way to the floor of the house.

Very simply measure the distance between the studs, and subtract about 1/2 inch off of the measurement. Get a piece of scrap 2x4 cut, and then nail it down between the studs with 16-penny nails. The only important thing is to **make sure the block is flush on both sides**. If it isn't flush with the baseplate, the block will prevent the drywall from easily fitting onto the wall.

To speed up the operation, make several measurements and write them on a scrap piece of wood. Make sure the person running the saw knows that it is not at all important to get these measurements perfect or straight - in this case speed is almost more important (but not more important than safety).

Blocking for Kitchen Cabinets, Bathroom

Materials needed - Hammers, tape measures, 16-penny nails, lumber (scrap 2x4,2x6,2x8,2x12)

This is slightly more tricky. More accurate measurement and straight cutting is necessary. When you cut the blocking, be careful not too cut the blocking too short. The blocking should fit perfectly between the studs - you don't want to force the studs apart with the blocking, but should not be so short as to have significant space between the blocking and the studs.

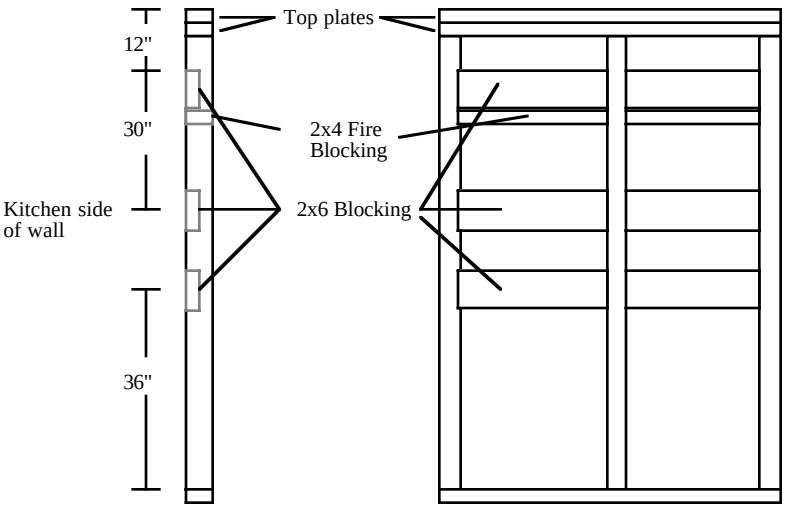
Kitchen cabinet blocking - Blocking is needed in three areas - the top and bottom of the upper cabinets, and at the top of the lower cabinets. Use 2x6 or 2x8 (whichever is more convenient; it doesn't matter). Blocking is placed in all along the wall where you think there might be cabinets (refer to the plans if you aren't sure).

1)The top blocking for the upper cabinets - Make a mark 12" from the top of the wall - this is where the furrdown extends to. The top of your piece of blocking must align with this line. Measure the distance between the studs, and place a 2x6 block at the height.

2)Fire blocking - This strip is placed below the top blocking (see diagram). Cut a 2x4 to the distance between the studs, and toe-nail it into place.

Why do you need fire blocking? The furrdown allows a chimney effect to be created in a wall apparently. It would allow gases and air from a fire to go up the wall behind the furrdown and quickly spread. The fire blocking helps to prevent this.

3)Middle blocking - Look at the plans to determine how tall the upper cabinets are (usually 30"). Measure down from the furrdown that distance, and make a **centerline** mark. This marks the approximate center of where your blocking must be placed. Again measure the distance between the studs, and cut a 2x6 or 2x8 to that distance. Toe nail it into place, with the center of it being placed at where you marked the centerline.



Ktchen cabinet blcoking

4)Bottom blocking - Look at the plans and determine how high the lower cabinets are. Measure up from the concrete floor (not the bottom of the baseplate) the height (usually 36") and make a centerline mark. Cut a 2x6 that will fit between the studs, and place its center at the centerline you have drawn.

Bathroom blocking - most of this is very similar to the kitchen. Look at the plans to determine what backing is needed for the bathroom vanity. Check with the construction manager to see where the blocking for towel racks and toilet paper must be placed.

Blocking for Closets

Materials needed : Hammers, 16-penny nails, scrap lumber (2x12)

Find the center of the back side of the closet. Measure 6' up from the concrete and make a mark on the stud. Measure the distance between studs and cut a 2x12 blocking. Place the **top** of the 2x12 at the 6' mark. If you are not exactly sure where the center of the closet must be, then feel free to place additional 2x12 blocking in the back of the closet.

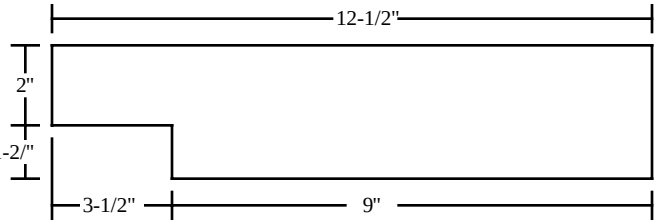
Also, place blocking along the side closet walls. Again measure 6' from the floor, and place 2x12 blocking so that the top of it is at the 6' mark.

Furrdown for cabinets
Materials - Hammers, 16-penny nails, 2x4 lumber, saw

What's a furrdown for? It fills the space between the top of the upper cabinets and the ceiling. Be extremely careful to get it level and plum.

A furrdown extends 12" down from the ceiling and 14" out from the wall. It can be built basically by building a mini-wall for the front and then connectors for the sides. The easiest way to construct it is to build the mini-wall first, cut the connectors, and put it up.

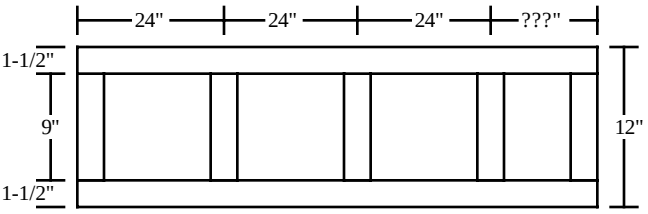
1)Cut the pieces. Consult the plans to see how long the furrdown must be. Cut three lengths of 2x4 wood to that length. Be precise. Next, cut "mini-studs". They are 9" long (12" - 1-1/2" - 1-1/2" = 9"). You will need one for every 2' of length, plus an extra for the end. Finally, cut the connectors as diagramed below. You need the same number of connectors as studs.



How to cut a connector for a furrdown

2)Assemble the mini-wall. Lay it out as you would a real wall. Place a mini-stud on each end. Measure from one end, and place studs 2' on center.chalkline marks.

3)Nail the ends of the connectors into the back wood segment. A connector is placed on one side of each stud.

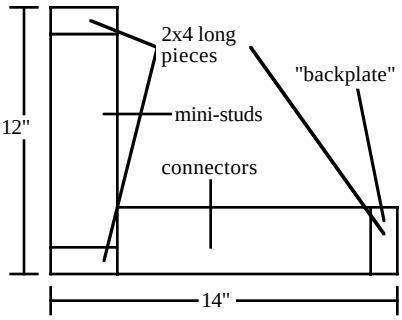


How to build a mini-wall

4)Measure out from the existing wall 14" on each side of where the furrdown will be placed. Snap a chalkline across the trusses to mark the edge of the furrdown. Nail the miniwall up, with the top of the miniwall being inside of the chalk line marks. Only use a few nails and do not nail in all the way; you may have to remove them.

5)Measure 12” down from the top of the top plates on each side of where the furrdown will be placed. Snap a chalk line across the studs in the wall; this line marks the bottom of where the “back plate” will go. Next, place the piece with the connectors nailed into it up their. Nail a few connectors into the mini wall, and use a couple of nails to nail the back plate into the studs of the wall.

6)Use a level and check each “station” (where a connector intersects the mini wall) to see that the entire structure is plum (vertical). Adjust as necessary to make each station plum. Now go back and make sure that the connectors are level (perfectly horizontal). Seek help from the construction manager if you are unsure. Finally, eyeball the entire assembly and make sure it looks straight, plum, and level.



7)Once everything is plum and level, go back and drive more nails in to hold the entire structure into place.

Insulation

Materials needed : Staple guns, insulation, gloves, long sleeve shirts, baby powder

Insulation is very easy but also extremely irritating. Follow these precautions to minimize volunteer discomfort : Open all windows in the house for better ventilation. Make sure all volunteers are using baby powder (this closes the pores in the skin). Powder face for extra protection. Do not wear contact lenses. Use powder even if you are wearing long-sleeves and gloves. If possible, use face masks.

Insulation comes in strips slightly shorter than 8’, which is the height of a wall (how convenient). Simply place the strip between the studs. There is excess paper on the sides. Do not staple this onto the face of the studs - it will hide the studs from the sheetrockers and get ripped more easily. Staple to the side of the stud instead, using staples about every 2’ or so.

If there is an electrical cable or something behind it, use a utility knife to cut a slit in the back of the insulation that the cable can fit it. When placing the insulation, force the cable into the slit.

If the space between studs is less than 2’, cut the insulation to fit.

Do not insulate interior walls - only exterior walls need to be insulated.

Insulation must also be placed between the trusses underneath the attic platforms, where the air conditioner and water heater are. Use a ladder to reach these places.