

390 -Wall Plumb, Straighten and Double Plate

Materials Needed:

1. Nails gun(s) loaded with 16D sinkers
2. String line
3. Plate level
4. Circular saw
5. Step ladders
6. About 10 10-12 ft 2x4s for braces, equal number of about 4 ft 2x4s
7. Enough long 2x6 and 2x4 for double top plating

Most Common Mistakes:

1. Putting many nails in wall intersections at corners prior to the walls being properly plumbed. Only put 1 or 2 in to steady the wall and leave their heads standing proud.
2. Putting on double top plates before the walls are plumbed. The nails at the wall intersections will need to be pulled to allow the walls to be plumbed. Some double-plates may be long or short and need to be recut.
3. Walls segments that collectively form one long wall may individually appear properly plumb, but when you run a string, you find that they are not. This is especially true for walls that are broken by a bump-out.

Construction:

When 2nd floor or roof load is put on top of the current walls, this new load can drive the walls substantially off plumb. This crookedness can make the structure less sound, can drive the building dimensions substantially off plan and can cause many fit and finish problems.

Exterior wall corners and intersections of interior and exterior walls will help considerably to plumb and stiffen all the walls. But, there are spans that will not be stiff enough and will require more bracing.

1. Before this step

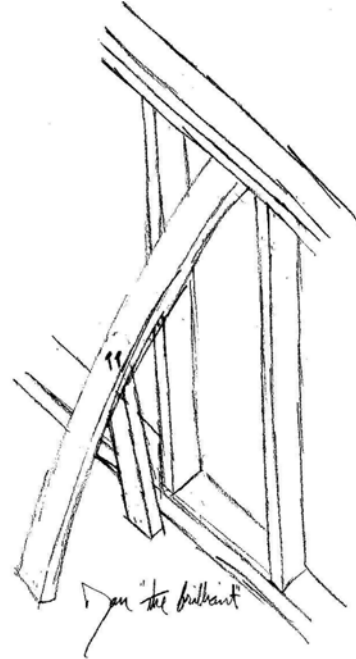
Before this step is started, the walls where framed, sheeted, nailed in position to the deck and rough plumbed. Rough-plumbed means that when the teams stood the walls, they made a reasonable effort to plumb the walls. Particularly, this means getting both sides of corners plumb. Corners should be secured by only a few nails. Since we do not do wall receivers, the intersections of some interior and exterior walls may be very floppy and only secured by a nail or two into the top plate.

2. If one of the walls is a common wall with another unit that is already standing, then one of the walls may be plumbed by carefully adjusting the “melt-away” clips connecting to the firewall. This step may have been done prior to this step or may need to be done now. Attach the melt-away clip to the H channel in the firewall. For each stud, use the plate level to plumb it and then attach the meltaway clip to the stud to hold this plumb.

3. Brace all exterior walls

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- a) To plumb the exterior walls, do the following for both directions at each corner and in the middle of long walls;
1. Start near corners. Remove any nails currently in the corner.
 2. Start with the wall leaning out *slightly*
 3. Nail a 10-12 ft 2x4 flat side to the underside of one of the stud bays. Use 4 16d gun nails. Toe nail the other end to the deck, using 4 16d nails
 4. Toenail a 3-4 ft kicker 2x4 to the deck about mid-point of the above 2x4. This 2x4 should now run from the floor to the underside of the above 2x4.
 5. While someone carefully watches the bubble on the plate level, someone else pushes the kicker to bend the 10 ft upward. This effectively shortens the 2x4 and pulls the wall in. When the level person calls out, a 3rd person nails the kicker to the long 2x4 by 2-3 nails. This spot on the wall is now plumb.
 6. If the wall will not reasonably pull into plumb, determine what else is holding the wall rigid.
 7. Typically, a spring brace is needed in both directions at all exterior corners and in the middle of a long wall that has few interior wall intersections.
 8. After you are satisfied with plumb, put 4-8 nails in each corner.



2. Plumb the interior walls and double plate all walls.

- a) Use the “rectangle method” to plumb interior walls
1. Starting with the places where interior walls intersect exterior walls, measure the distance at the bottom of the wall. That is the same distance that should exist at the top of the wall. Pencil mark that at the top of the exterior wall.
 2. Double top plates lap over the intersections of the 1st top plates. The 2nd top plate laps over the intersection existing in the 1st top plate.
 3. Cut 2nd top plates to the right length to lap as described above. Nail in place, lapping the intersection of exterior and interior as marked in step 1.
 4. The 2nd top plate should be nailed to the wall only at the stud locations. This is so the plumber or electrician’s drill does not end up in one of our nails.
- b) After the interior to exterior intersections are double plated as described above, complete the double plating of the remainder of the exterior walls. Breaks in the double top plate should be at least 2 ft from any wall intersections.
- c) Continuing to move inward on the building, double plate the remainder of the interior walls

3. String the exterior walls

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- a) Nail a short scrap of 2x4 near each corner of each exterior wall. The scrap extends above the double plates by about 6 inches.
- b) Run a string line from corner to corner, pulled tight around the above 2x4 scraps. The string should run around the outside edge of these scraps and be a few inches about the double top plate.
- c) Use a longer piece of 2x4 as a guide, check the walls for straightness. The 2x4 guide should just barely fit between the string and the wall in all places. If there is more than 1/8th inch variance, the wall is not straight. Correct the plumb errors or look for other problems.
- d) After you are satisfied the string shows the walls are straight, take down the string and the blocks.

4. Final dimensional check

- a) As a final step, measure all dimensions from exterior wall to exterior wall and verify them against the architectural drawings. Measure the 2 major diagonals of the building. If dimensions or diagonals do not match (plus/minus 1/2 inch max), something substantial is wrong. Get help!
- b) When these steps are complete, you are ready to set the 2nd subfloor or roof trusses, as appropriate.

Safety

44 Struck By Nail gun

Safety Glasses Required

All guns must be in single shot mode. No bump fire guns

Air hose must be disconnected during any servicing, unjamming, etc

Never shoot toward yourself or anyone else.
Never have your free hand or the hand of another within 1 ft of the shooting tip

47 Tools - Hand and Power Circular Saw - wood propped between 2 supports, cut in the middle, blade is pinched, kickback causes injury

When using a circular saw, short end of the cut is left to fall away. Do not make a cut inbetween 2 supported ends. If someone is holding the drop-away end, he/she must lightly support it, letting it sag as the cut is made

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| 48 | Tools - Hand and Power | Circular Saw - arms, legs etc too close to cut | Common practice among carpenters is to support the cut with their foot. This is not accepted practice at Habitat. Cut to be done on saw horses or otherwise supported away from body |
| 51 | Tools - Hand and Power | Detective or dull power tool | Red tag defective or dull tools. Do not put back such tools back in the POD exposing some other worker to the same risk. |
| 18 | Electrocution | Bad cord on power tool | Do routine audits (every 2 months?) and red tag. Teach the red tag culture. Tag a tool with a bad cord. |
| 19 | Electrocution | Cut cord on power tool while using tool | Train workers to drape the power cord away from the area of the cut. |
| 46 | Struck By | Power tools sawdust or other objects shot toward eyes | Safety Glasses required with any power tools |