

## **WOOD FOUNDATIONS Troubleshooting**

### **A. At the Bottom of the Foundation Wall**

1. Water or moisture on the top of Bottom Wall Plate and/or high humidity in the basement  
Causes:
  - a. No Sump.
  - b. No or too little gravel under the floor or under the footing plate or floor.
  - c. There is something damming the water under the floor or under the footing plate.
  - d. The Vapor Barrier has been extended under the footing plate.
  - e. The Vapor Barrier has not been cut off at the bottom of the footing plate, but is instead extended into the gravel.
  - f. The Vapor Barrier has been left off the Wall or omitted under the floor.
  - g. The bottom of the sump has not been perforated or open to the gravel.
  - h. The sump is not drained to a positive drain (by gravity or pump).
  - i. The sump is not surrounded with at least 4 inches of gravel.
2. Foundation wall sinks out of level at any point along the foundation wall.  
Causes:
  - a. The axial load is too heavy for the size of the footing plate.
  - b. There is not enough gravel depth or width under the footing plate.
  - c. There is too much gravel depth under the footing plate (gravel shear).
  - d. The footing plate is too wide giving rise too induced tension.
  - e. Plywood stiffener is too thin.
  - f. Plywood stiffener face grain is not perpendicular to footing plate grain.
  - g. Plywood or concrete concentrated load pad is missing or too small for the point load.
  - h. The load pad is not thick enough for the concentrated load.
  - i. If a plywood pad, the adjacent pieces are not perpendicular to each other.
  - j. If a plywood pad, the adjacent pieces are not glued together.
  - k. The footing plate is plywood, the adjacent pieces are not perpendicular, are not enough layers thick, are too wide, or are not glued together.
3. The foundation wall is bowed, out of plumb, or deflecting inward.  
Causes:
  - a. There is not enough bearing against the floor by the bottom edge of the studs.
  - b. The grade for the species used for studs is too low.
  - c. The spacing of the studs is too great.
  - d. Insufficient number and/or size and diameter of nails used to nail bottom top plate to studs.
  - e. The grade for the species used for top plates are too low.
  - f. Nail spacing is too far apart and/or size and diameter of nails used to nail the two top plates together.
  - g. Nail spacing is too far apart and/or size and diameter of nails used to nail band joists to top plates.
  - h. Floor joists not adequately attached to the band and the top plates (this may be done with pwf framing straps, joist angles, or joist hangers---The number of nails, size, and diameter is significant for each type of framing anchor).
  - i. Shear wall(s) may be needed.
  - j. The length of the shear wall(s) may be too short.
  - k. The nail spacing at the plywood panel edges of the shear wall(s) may be too far apart at the plywood panel edges, and/or the nails are the incorrect length or diameter.
  - l. Horizontal blocking may be left out at a horizontal plywood joint in the shear wall.
  - m. Holes were drilled in the tension half of the stud or near the point of maximum moment.

- n. At end walls where the floor joists run parallel to the foundation wall, blocking between the 1<sup>st</sup>, 2<sup>nd</sup>, etc. interior joist space(s) may have been left out or removed for ducts, pipes, wires, etc. The block spacing is significant.
  - o. In all blocked joist spaces the minimum joist spaces must be at least as wide as the blocks are high.
  - p. The sub-floor above the foundation may not have been nailed to the 1<sup>st</sup>, 2<sup>nd</sup>, etc. interior joists at the correct nail spacing; or the correct number of nails were not used to nail the sub-floor to the blocks; or the nails are not the correct length or diameter.
  - q. The sub-floor is not a rated sheathing.
  - r. When a stairwell or other opening is in the floor-ceiling diaphragm, adjacent to and less than 4 feet from a foundation wall with a backfill, the top plates of the wall become a horizontal beam. Depending on conditions, the beam is constructed by adding plates to the top and thru-bolting all the plates together. The lateral load on the beam is blocked into the floor/ceiling diaphragm through headers to the inside of the opening. If this is not done correctly the top of the foundation wall will deflect into the opening. The grade, species, and size of the top plates are significant in determining the number of pieces to use for the beam. The size of the bolts are important in order to determine the spacing of the bolts. All bolts used in wood foundations should always be hex-head machine bolts with washers. (Never use carriage bolts).
4. The wood basement wood floor is up-lifting or sliding or sinking.
- Causes:
- a. Uplifting: The lateral soil loads at the bottom of opposite foundation walls are forcing the wood floor to rise near the center. A short kneewall under the floor joists and connected to the floor joists will correct this. Also, bearing walls, shear walls, partitions, or posts on top of the floor will do the same thing.
  - b. Sliding: This can occur when a high backfill is opposite a walkout wall. Sliding can occur if there is no frost wall or anchor wall under the walkout wall; or if the wood floor is not adequately connected to the top of the frost wall. Nailing patterns become significant at the bottom of the walkout wall where it connects to the frost wall.
  - c. Sinking: This occurs when the spacing between the sleepers is too wide for the width of the floor joists or floor joist spacing, or if the sleepers themselves are too narrow in width to adequately transfer the floor load to the gravel and ultimately to the bearing soil; or if there are no sleepers and the floor joists rest directly on the gravel under the floor.

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