

# Framing Basement Stairs

## TASK 19

**Purpose:** Frame stairs from the ground level floor to the basement. Porch stairs and other stairs would use similar methods.

**Tools:** Framing hammer, carpenter's square with stops, tape measure, circular saw, hand saw, Sawzall or saber saw, Hilti-gun and nails, drill & bits, pencil

**Safety Issues:**

- When cutting with a circular saw, work on a stable platform like saw horses. Don't use a saw where the work might move and allow the saw to cut you or someone else.
- An open stairwell is a real hazard until it is protected by walls. Cover the opening with strong lumber and plywood so someone won't fall in. Keep it covered, except when building or using the stairs, until a wall protects it.
- Stairs should be installed as soon as possible after the decking is in place.

**Materials:** 2x12 stringers and stair treads  
OSB for backs of stairs (not used on exterior stairs, which are left open.)  
16d nails & 6d nails  
Construction Adhesive  
3" general-purpose screws

**Inspection:** Make certain opening is properly located and all members are secure.

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### Sequence and Methods:

- 0 **Note: this is best done by someone with experience.**
- 1 Determine the slope of the stair by measuring the distance from 1<sup>st</sup> floor to the basement floor (Example: 106"). We use a 2x12 making an 11 1/4" tread and a 6"-7 1/2" rise and adjust the rise and run to fit.
- 2 Divide the floor-to-floor height by 7" (preferred height) to get an approximate # of rises. Round down to the smaller number to reduce the number of treads and therefore the length of the stair. Then subtract 1 because the 1<sup>st</sup> floor serves as the top tread, so there is one less tread than riser. (Example:  $106''/7'' = 15.2$  rises, use 15 rises of  $106/15 = 7.07$  or 7 1/16")
- 3 Since the current floor plans indicate going about half way down to a Landing and then turning 90 degrees to proceed the rest of the way, the Landing must be built first. Decide how many treads are above the landing and how many treads below. (e.g, with 15 rises there may be 5 treads below and 8 above—the landing counts as one tread.) If the landing is the 6<sup>th</sup> tread, then the top of the landing should be 6 rises (c. 6x7" or c.42") above the basement floor. On the side toward the basement the landing should be as wide as the opening. On the side toward the 1st floor, however, it should extend at least 6: into the opening (see dotted line in diagram) to provide a base for the stringers going on up. After the landing is in place, proceed to build the stairs above and below it.
- 4 Assuming a 10 1/4" tread (a 2x12 is 11 1/4" but we'll have a 1" nosing overhanging the riser face...see sketch) and 7 1/16" riser, use a framing square and set the inside of the short leg measuring 7 1/16" at the edge of the stringer and the inside of the other leg reading 10 1/4", also at the edge of the stringer (see sketch). Trace the inside of the square for the cutout of the stair. Repeat, starting at the bottom stair cutout until you reach the required number of treads. An inexpensive set of stops can be attached to the square and then it can quickly be moved along for successive steps.
- 5 For greater uniformity, calculate the hypotenuse of the right triangles whose legs are the rise and tread lengths: e.g. with legs of 7 1/16" and 10 1/4" the hypotenuse is 12.52" or 12 1/2". Mark one edge of the stringer at these lengths and then fit the framing square between these marks as listed above. Note: the bottom rise will be 3" less than the others because of the 1 1/2" tread board and the treated 2x is to be placed between the stringers and the concrete floor.

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- 6 Once you have cut one stringer and tested to see it fits as expected, it can serve as a pattern for the other two.
- 7 To assemble the stairs, begin by cutting out the sub-floor over the stairwell. (It is safest to leave this hole covered until you are ready to build the stairs and re-cover it until it has wall to protect it.) If the basement partitions were installed before the decking was laid down, the opening for the stairs should have been already lined with rim-joists and not decked over. In this case, it should have had a temporary cover placed over the opening already for safety.
- 8 Nail a  $\frac{3}{4}$ " thick spacer about 4" wide on the outside face of the two outside stringers flush with the bottom edge of the stringers. This will allow the sheetrock to go between the stringer and the studs and save cutting notches in the sheetrock.
- 9 Nail the bottoms of the stringers to a 2x treated plank at the proper spacing. Nail the tops with a temporary 2x4 to simplify raising them in place. Make them about  $\frac{1}{2}$ " narrower at the top than the opening so you have room to move.
- 10 Make marks for the top tread line which will be  $1\frac{1}{2}$ " plus one riser below the subfloor. (Example  $7\frac{1}{16}" + 1\frac{1}{2}" = 8\frac{9}{16}"$ ). This allows for a normal rise on the final step after the tread has been installed.
- 11 With the top of the stairs at the proper height and the proper distance from the opening, nail one outside stringer to the studs. Remove the temporary tying board and nail the other outside stringer to the studs. Then nail a 2x10 across the top end of the stairs.
- 12 Install the fire-stop blocking between the studs against the outside of the spacer mentioned in Step 7, keeping below the stair notches so drywall can be slid in past the steps.
- 13 Install the risers and treads from the bottom up. Start by putting  $\frac{1}{2}$ " OSB on the front of the riser. Glue it and nail with 3-6d nails on each side. Round one corner of a 2x12 with a  $\frac{3}{8}$ " round over router bit for the stair nosing. Cut it in the correct lengths for stair treads. (Make sure you leave about  $\frac{3}{4}$ " on each side so the drywall can go in the space by the stairs.) Glue and screw with 3-3" screws the lowest tread to the stringers with 2-16d nails on each side of each screw.

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- 14 Cut a 2x to the proper width to serve as the stair nose at the top. After installation, the nose-to-nose dimension of all steps should be the same.

Sketches of notched stringer, fire blocking, & top stair nosing to follow.

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