



HOW-TO BOOKLET #3063

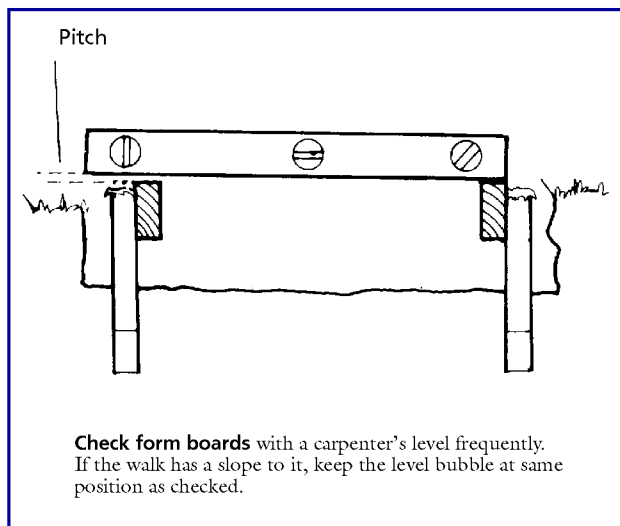
CONCRETE WALKWAYS



TOOL & MATERIAL CHECKLIST

- | | | |
|--|---|---|
| <input type="checkbox"/> Concrete Mixture | <input type="checkbox"/> Base Materials | <input type="checkbox"/> Forming Lumber |
| <input type="checkbox"/> Carpenter's Level | <input type="checkbox"/> Line Level | <input type="checkbox"/> Chalkline |
| <input type="checkbox"/> Shovel | <input type="checkbox"/> Spade | <input type="checkbox"/> Baby Sledge Hammer |
| <input type="checkbox"/> Wooden Float | <input type="checkbox"/> Trowel | <input type="checkbox"/> Groover |
| <input type="checkbox"/> Edger | <input type="checkbox"/> Gloves | <input type="checkbox"/> Garden Hose |
| <input type="checkbox"/> Tape Measure | <input type="checkbox"/> Tamper | <input type="checkbox"/> Tine Rake |

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above.



If you're a newcomer to concrete projects, you'll find that building a concrete walkway is a super introduction to working with this hard material. Concrete walks are well within most do-it-yourselfer's skills and the scale of the job is much less than a project such as a concrete driveway or large patio.

The first step is to design the walk to suit your situation. You can make it as wide or narrow as you need. However, in most cases it should not be narrower than 2 feet. A walk doesn't need to be more than 5 feet wide, unless you have a wheelchair user in the family. Most municipal sidewalks that front a property are 5 feet wide, while sidewalks to front doors are from 3 to 4 feet wide. The sidewalk you plan may be subject to local building codes. Check this with the building department in your community.

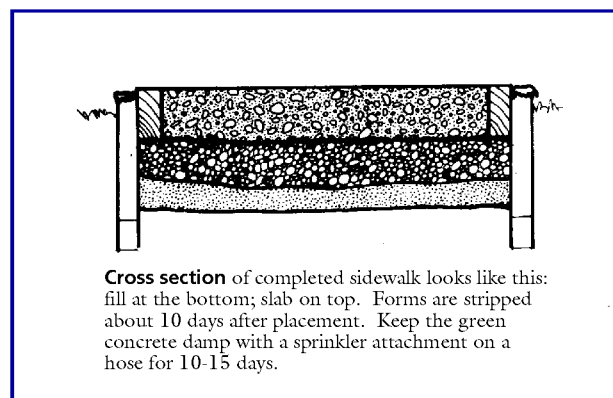
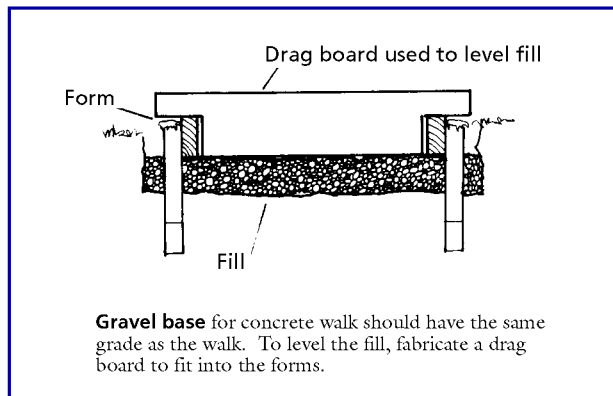
A sidewalk is almost always 3-1/2 inches thick, although it is called a 4-inch-slab. This is because the width of a 2X4 is used for forming the sidewalk and the actual width of a 2X4 is 3-1/2 inches. The thickness, of course, can be about any size that you want.

EXCAVATING PROCEDURES

The depth of the excavation can vary a great deal, depending on the climate in your area, the desired height of the walk above ground level, and the type of soil conditions.

If the soil is extremely hard and dry packed and you live in a temperate climate free of ground heave and erosion, you may not want to excavate at all. In this case, scrape back the grass or roots and debris and then level out the area for the walk.

However, contractors usually excavate to a depth of at least 2 inches, skimming off the sod and some of the top soil. Then, when the 2X4s are set on edge, the top edge of the form—and also the sidewalk—will be about 2 inches above the ground level.



If, on the other hand, the soil is wet or poorly drained, it is best to excavate at least 6 to 8 inches and lay down a base of gravel or crushed stone that comes to within 2 inches of ground level. The form board will again extend 2 inches above ground. For example, if you dug down 6 inches into the ground, you would then need 4 inches of tamped base to bring the form board up to the correct height. If there is a lot of excavating to do, it is recommended that you have a professional grader excavate for you. The price will not be prohibitive; get at least three bids for the job and a definite time schedule for the work to be done.

To mark the walk's location, use stakes and two parallel chalklines. Measure the width carefully. Excavate an area that extends 6 to 9 inches farther (or even more) on each side of the location of the sidewalk so you can have room for the form boards. You can later fill in against the sidewalk edges.

THE BASE AND THE FORMS

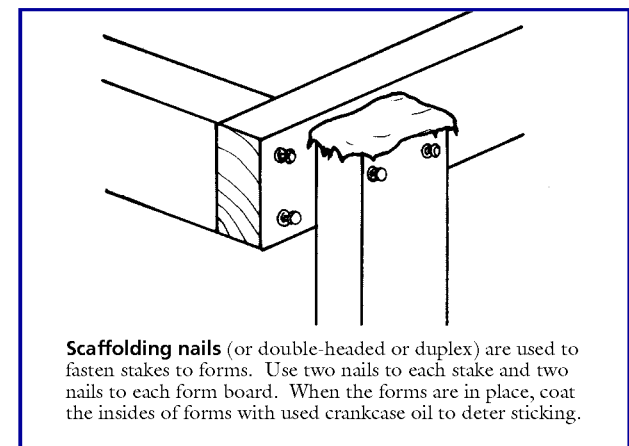
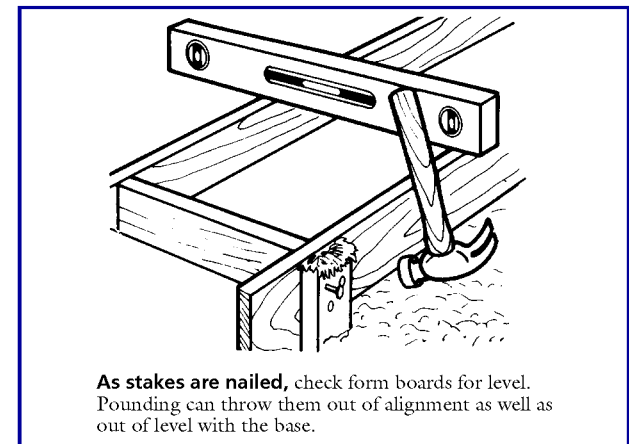
To build the form, position two parallel boards in the excavation so that their inside edges form the sidewalk sides. Drive stakes in place next to the ends of the form boards. Starting at the ground level's highest point, raise the ends of the boards up with their top edges about 2 inches above ground level.

Check for level with a carpenter's level across the tops of the two form boards. Fasten the boards to the stakes with scaffolding (double-headed) nails. If the stakes are not flush with or slightly below the tops of the form, saw them off when the form is completed.

Raise the opposite ends of the boards up to suit, either following the contour of the ground, or raising them to match the desired pitch. Then drive stakes, spaced every 3 feet along the form boards and nail the stakes to the form boards. Use double-headed nails throughout, nailing from the outside of the forms.

Install a stake at any location where two form boards join together. Nail the stake to both form boards. Butt the two boards tightly. If the ends of the boards are angled or uneven, square them off with a saw before nailing them into position.

Oiling The Forms. Oil the form boards by painting on crankcase oil with an old paint brush. With the oil treatment, the boards will not stick to the concrete or absorb water from the pour and weaken the concrete. Nail the end form boards to the side forms and drive stakes against the ends to hold them securely in position.



Tamping. To check the level and depth of the excavation, cut a board equal to the thickness of the base and the slab. Center this on a 2X4 that is at least 12 inches longer than the form and nail the two boards together. This combination is called a dragboard or a strikeboard. Slide the dragboard along the forms. Fill in all low spots; excavate all high spots. Tamp to assure a solid subgrade.

Adding base material. Install a base of crushed stone and gravel and tamp them in place, if your specifications call for base materials. Be sure that the gravel is level by creating another dragboard, this one equal in height to the thickness of a 2 inch layer of sand plus the thickness of the slab.

Now add sand. At first it will sift down to fill the openings between the gravel. Keep adding and tamping until there is a 2 in. layer with a dragboard equal to the thickness of the concrete slab.

Reinforcing Mesh. When set on soil that may heave or shift, the walk will require reinforcing mesh. This also is the case with a subgrade of very wet or sandy soil. The mesh won't stop the

cracking, but it will hold the cracks tightly closed. The mesh is called size 6/6 and 10/10, which means it is made of welded 10-gauge wire having 6 inch square openings.

The mesh is available in rolls and can be cut with fencing pliers or bolt cutters. Take care to flatten the mesh thoroughly so it won't be near the top or bottom surface on the pour. Before placing the mesh, set small stones or half bricks on the base to raise the mesh up about 2 inches below the top of the form—or the approximate center of the concrete slab. Position the mesh on top of the rocks. Do not allow the mesh to come into contact with the form, or you will have a piece of metal sticking out the side of the concrete. This will later rust and discolor.

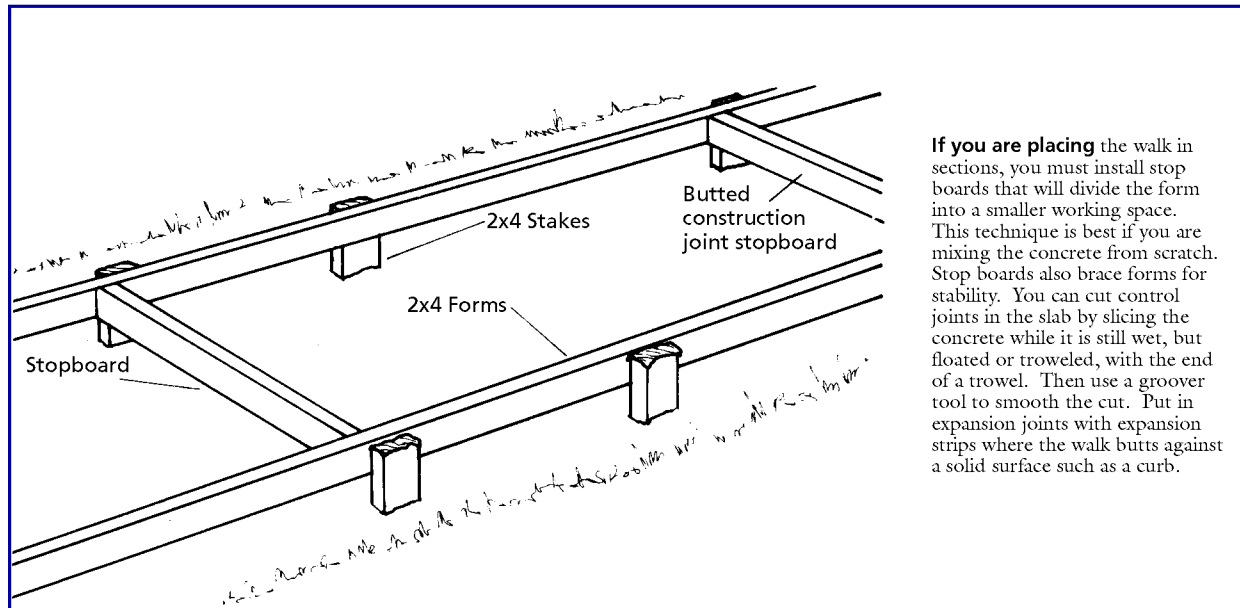
CONCRETE BASICS

There are two ways to go with concrete for the walkway: you can order it from an already-mixed company, or you can mix it yourself. Since a walkway is relatively small, you may opt to mix the concrete yourself, although you should know that the mixing procedure is hot and heavy work.

To order from an already-mixed company, tell the order-taker the length, width, and depth of the project. They will figure the number of cubic yards of concrete you need. Be ready for the concrete truck; the driver will dump it and run and you'll have to be prepared to level the mixture, fill holes, remove high spots, and so on. Have a couple of helpers handy; you don't have too much working time with concrete.

Concrete Formulas. If you decide to mix the concrete yourself, the charts and information on the next page will be helpful.

Air-entrained concrete is needed in areas where concrete must withstand freezing and thawing temperature shifts and de-icing treatments. Air-entrainment is a process of introducing millions of microscopic air bubbles into the concrete. The air bubbles permit enough space for the absorbed water to expand when the water freezes, so the slab doesn't crack or break apart. Air-entrained concrete is also easier to place and finish than is regular concrete, because the tiny air bubbles act as lubricants while the concrete is still plastic.



If you are placing the walk in sections, you must install stop boards that will divide the form into a smaller working space. This technique is best if you are mixing the concrete from scratch. Stop boards also brace forms for stability. You can cut control joints in the slab by slicing the concrete while it is still wet, but floated or troweled, with the end of a trowel. Then use a groover tool to smooth the cut. Put in expansion joints with expansion strips where the walk butts against a solid surface such as a curb.

LUMBER SIZES FOR CONCRETE FORMS

Nominal Sizes	Actual Size
2x2	1-1/2 x 1-1/2
2x4	1-1/2 x 3-1/2
2x6	1-1/2 x 5-1/2
2x8	1-1/2 x 7-1/4
2x10	1-1/2 x 9-1/4
2x12	1-1/2 x 11-1/4

CUBIC FEET OF CONCRETE SLABS

Area, Square Feet (Length x Width)	Thickness, Inches		
	4	5	6
50	17	22	25
100	33	41	50
200	68	84	100
300	100	124	150
400	135	168	200
500	168	208	250

Air-entrained Portland cement is available in home center and building material outlets.

PLACING/FINISHING CONCRETE

Before you start the pour or placement, insert isolation joint material in all locations where the slab meets an existing structure. The strips, sometimes called expansion strips, are readily available.

The top of the joint material should be flush with the top of the slab, or even better, 1/4 inch lower. Never have it above the slab. In some circumstances, that arrangement could be a hazard to foot traffic.

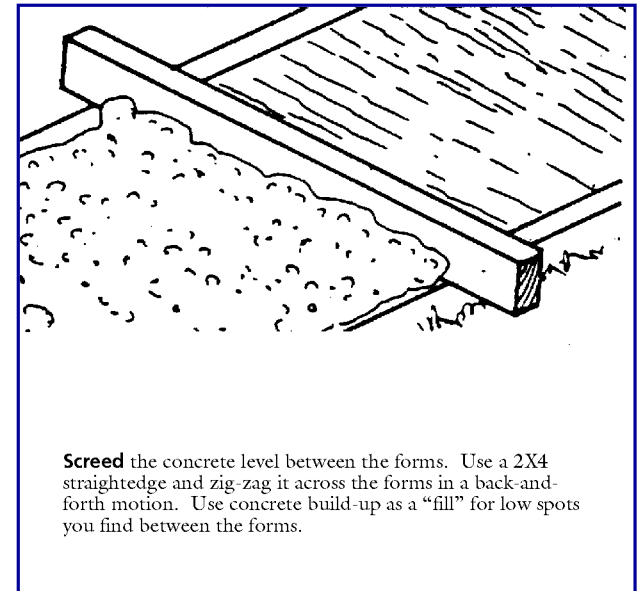
If you don't have permanent interior forms to serve as control joints, cut control joints once the concrete has been floated. The joints should fall every 5 feet in a walk that is over 3 feet wide. In a walk from 2 to 3 feet wide, set control joints every 3 feet.

As the concrete is placed, use a shovel to distribute it as evenly as possible between the forms. Then, with a straightedge 2X4, screed the top of the concrete, removing excess that pushes up before the screed board. This is where a helper comes in handy.

Once the concrete is level between the forms, use a wood float to smooth the surface. When the sheen on the concrete is noticeable, you can finish trowel the surface, although dragging a stiff broom across the surface gives a pleasing non-skid top.

Keep the concrete damp for a week or so. You can use a sprinkler on a garden hose for this. Or, you can cover the concrete with burlap and keep the burlap damp. After 10 days or so, the forms may be stripped from the job and any backfilling with earth completed.

Rain can damage green concrete; the raindrops will pit the surface. Try to avoid rainstorms, but if one comes along, protect the slab with tarps or old newspapers. A pitted surface resulting from a heavy rainstorm can sometimes be troweled over and smoothed—if the concrete hasn't set up too much. However, once set, the material can't be troweled.



Screed the concrete level between the forms. Use a 2X4 straightedge and zig-zag it across the forms in a back-and-forth motion. Use concrete build-up as a "fill" for low spots you find between the forms.

TABLE 1: PROPORTIONS BY WEIGHT TO MAKE 1 CU FT OF CONCRETE

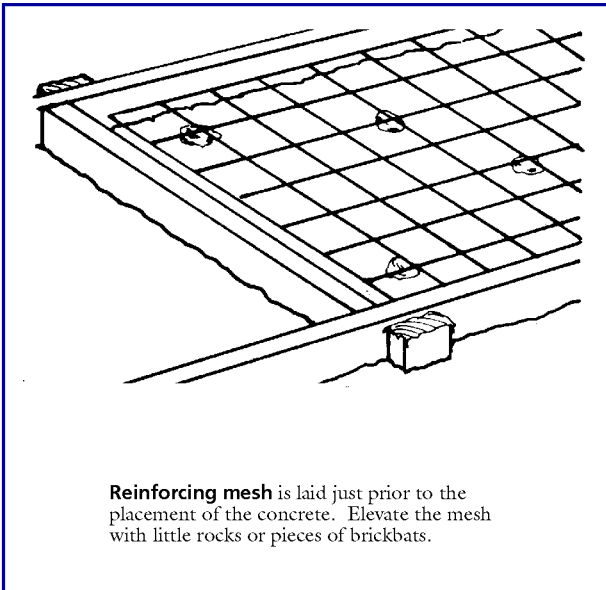
Maximum-size coarse aggregate, inch	Air-entrained concrete				Concrete without air			
	Cement lb.	Sand lb.	Coarse aggregate lb.*	Water lb.	Cement lb.	Sand lb.	Coarse aggregate lb.*	Water lb.
3/8	29	53	46	10	29	59	46	11
1/2	27	46	55	10	27	53	55	11
3/4	25	42	65	10	25	47	65	10
1	24	39	70	9	24	45	70	10
1 1/2	23	38	75	9	23	43	75	0

* If crushed stone is used, decrease coarse aggregate by 3 lb. and increase sand by 3 lb.

TABLE 2: PROPORTIONS BY VOLUME*

Maximum-size coarse aggregate, inch	Air-entrained concrete				Concrete without air			
	Cement	Sand	Coarse aggregate	Water	Cement	Sand	Coarse aggregate	Water
3/8	1	2 1/4	1 1/2	1/2	1	2 1/2	1 1/2	1/2
1/2	1	2 1/4	2	1/2	1	2 1/2	2	1/2
3/4	1	2 1/4	2 1/2	1/2	1	2 1/2	2 1/2	1/2
1	1	2 1/4	2 3/4	1/2	1	2 1/2	2 3/4	1/2
1 1/2	1	2 1/4	3	1/2	1	2 1/2	3	1/2

* The combined volume is approximately 2/3 of the original bulk.



Reinforcing mesh is laid just prior to the placement of the concrete. Elevate the mesh with little rocks or pieces of brickbats.