



HOW-TO BOOKLET #3067

BUILDING DRIVEWAYS



TOOL & MATERIAL CHECKLIST

- | | | |
|---|--------------------------------------|---|
| <input type="checkbox"/> Concrete Mixture | <input type="checkbox"/> Form Boards | <input type="checkbox"/> Level |
| <input type="checkbox"/> Chalkline | <input type="checkbox"/> Stakes | <input type="checkbox"/> Line Level |
| <input type="checkbox"/> Saw | <input type="checkbox"/> Hammer | <input type="checkbox"/> Tamper |
| <input type="checkbox"/> Tape Measure | <input type="checkbox"/> Shovel | <input type="checkbox"/> Spade |
| <input type="checkbox"/> Edger | <input type="checkbox"/> Groover | <input type="checkbox"/> Finishing Trowel |
| <input type="checkbox"/> Expansion Strips | <input type="checkbox"/> Bull Float | <input type="checkbox"/> Garden Hose |

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

It is hot and heavy work, but placing a new concrete driveway is within a do-it-yourselfer's skills. The trick is complete organization at the outset so the project will go smoothly without any major hitches. This How-To Booklet presents such a plan: from the first sketch to the last swipe of a finishing broom.

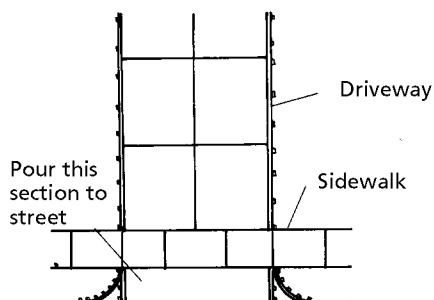
First, because of extra weight requirements, driveway construction is often well-regulated by local building codes. Make sure you understand all code restrictions before you start construction. You also must have the proper building permits. For example, most municipalities have strict rules governing the steepness, thickness and width of a driveway—as well as the means by which it joins the curbing.

The first step, therefore, is to find out any code restrictions and then sketch out your driveway plan. Submit this plan to the building permit officials when you go to get the building permit for the project.

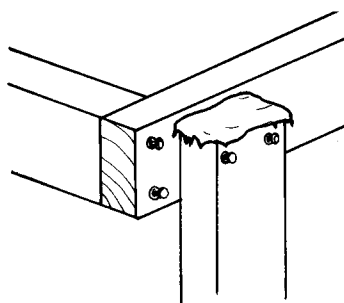
DESIGN CONSIDERATIONS

Most single driveways today are formed with a single slab instead of double-slab ramp drives that has paving only where the car wheels go and grass between. A single slab provides a wider usable surface to serve the wheel base dimensions of more car models. The trend of the times has reinforced the single slab, perhaps partly because a single slab requires less edge forming. Two-car driveways must be a full-slab design.

The Garage and Street. The edge of the driveway should fall about 1 inch below the garage floor to prevent water from running into the garage.



Place driveway and apron in sections. The apron is placed in a main section and then the two side, curved sections are added. Sketch a plan similar to this, with dimensions, for permits.



Form stakes are driven (or cut) slightly below tops of the forms. The stakes also are nailed to the forms with double-headed nails. With stakes like this, screed can run freely on forms.

The driveway should slope downward from the garage to the street. If the garage sits downhill from the street, install a drain where the driveway meets the garage. Where the driveway meets the street, raise the edge of the driveway just a tad above the road to prevent water and debris from flowing from the street into the driveway.

Driveway Size. In most cases, the driveway is cast so it is 2 inches above ground level.

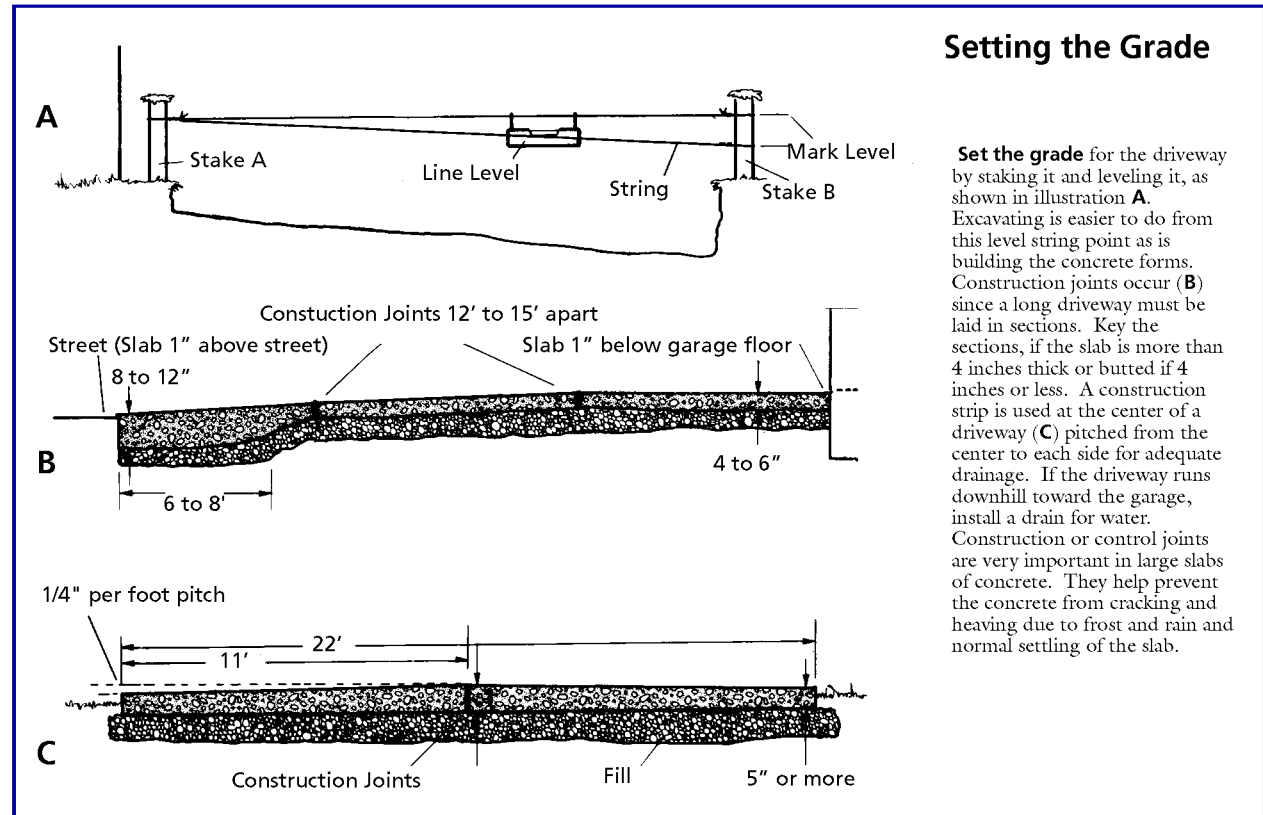
Slabs for passenger cars are 4 or 5 inches thick. However, a slab that will have truck traffic should be 5 or 6 inches thick. Some contractors make the area near the street 8 inches thick to accommodate the extra weight of trucks that might pull partly up onto the driveway for delivery or collection.

A slab for a single-car garage should be between 8 and 10 feet wide. A slab for a double-car garage should be between 15 and 20 feet wide. Widths up to 22 feet are common, and you ought to consider this dimension.

Pitching The Driveway. The driveway should also provide a pitch of from 1/4 to 1/2 inch to the foot. This is considered a minimum in most areas. You can give a sideways pitch to the entire drive, but the best plan is to crown the driveway, providing pitch from the center to both sides.

To create the proper pitch from the center to the edges, the slab is placed in two stages. First, the form for the entire driveway is built. Then a centered stopboard is inserted lengthwise in the form. It runs from the garage to the street, and must be high enough to create the correct pitch.

If your driveway is to be 20 feet wide, the center of the placement must be 5 inches (10-1/2 inch) higher than the outside edges of the slab. The form boards at the garage and street must correspond to this pitch, and the top edge of the centered stopboard must be 5 inches higher than the side form boards. The center joint between the two sections of the slab will be held together with a butted construction joint.



Setting the Grade

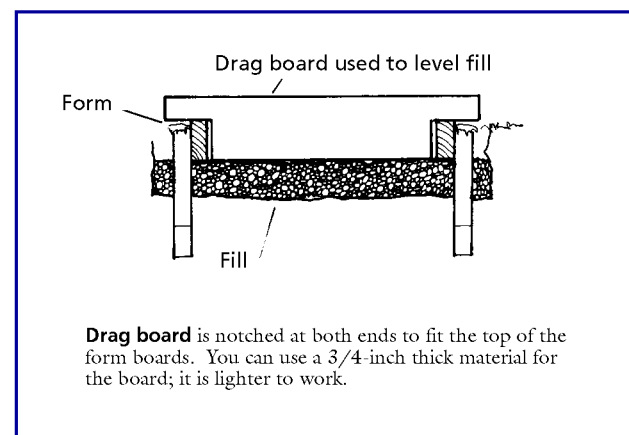
Set the grade for the driveway by staking it and leveling it, as shown in illustration **A**.

Excavating is easier to do from this level string point as is building the concrete forms. Construction joints occur (**B**) since a long driveway must be laid in sections. Key the sections, if the slab is more than 4 inches thick or butted if 4 inches or less. A construction strip is used at the center of a driveway (**C**) pitched from the center to each side for adequate drainage. If the driveway runs downhill toward the garage, install a drain for water.

Construction or control joints are very important in large slabs of concrete. They help prevent the concrete from cracking and heaving due to frost and rain and normal settling of the slab.

Excavating/Base Materials. Lay out the dimensions of the pour and excavate as needed. The depth and width of an excavation depends on the project, its specifications and codes.

A correctly prepared excavation has several characteristics. A uniform subgrade ensures a consistent response to temperature and moisture changes. Level the earth surface so there are no deep holes or protruding objects. Remove all large rocks, roots, and other debris from the area. Tamp the subgrade, either with a hand tamper or a mechanical one. The subgrade should follow the angle or slope of the ground.



Base materials of sand, gravel and rock are placed at the bottom of the excavation to prevent settling and heaving and to aid drainage. They also provide a level surface on which to place the concrete.

The depth of the base is often regulated by codes. Find out how much base you need as you did for concrete, but order twice as much as your figures indicate. This is because the base materials will compress to half their original size when tamped.

Order of Placement. First, place the gravel in at least two layers. Tamp each layer so the top of the final layer is 2 inches below the bottom edge of the concrete pour. Then add sand. Keep adding and tamping until you have a level layer that reaches to the top of the pour. Follow this order. The depth of any given layer may vary according to code. The level is checked with a strikeboard that you make.

BUILDING THE CONCRETE FORMS

At entryways, for better appearance and easier access, use curved forms to provide curved entryways on both sides where the driveway meets the street. Use 1/4-inch plywood cut in widths to match the concrete depth dimension and stake the plywood as it is bent into a gentle curve. Use plenty of stakes to prevent the plywood from bulging when the concrete is placed into the form.

Concrete takes the shape of the mold in which it is placed. In most cases, the mold is made of 2X4, 2X6, or 2X8 lumber supported by 1X2, 1X4, or 2X4 stakes.

To build the form, position two parallel boards in the excavation so that their inside edges form the driveway 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. Run a straightedge across the forms so it bridges them. Then set the level on the straightedge.

Fasten the forms to the stakes with duplex (double) headed nails. If the tops of the stakes are not flush with or slightly below the top edge of the forms, saw them off once 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 ft. along the form boards and nail the stakes to the form boards. Install a stake at any location where two form boards butt. Nail the stake to both boards. If the ends of the boards are angled or uneven, square them with a saw before nailing them into position with double-headed nails.

Oil the form boards with old motor oil applied with a paintbrush. The oil will prevent the forms from sticking to the concrete. The oil also prevents water in the concrete from being absorbed by the forms, thus weakening the concrete mixture.

Once the forms are in place, including the centered stopboard, double-check all measurements. Then order any necessary reinforcing mesh, cut it to fit inside the forms, if needed, and elevate it with stones or brickbats about half the distance from the grade to the top of the form boards.

NOW, THE CONCRETE

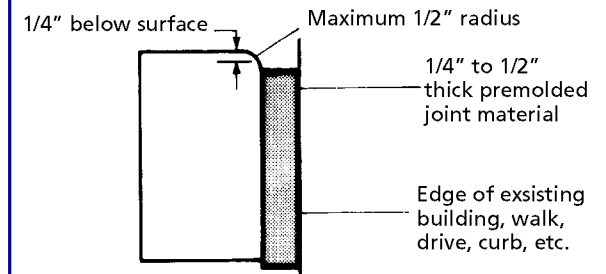
When you're satisfied that the forms are ready, order the concrete for the job. It is strongly recommended that you use a ready-mix service; the time and work you will save in not mixing the concrete yourself is worth the added expense. The ready-mix company will need to know the dimensions of the driveway between the form boards: the length, the width, and the depth (overall average). The concrete folks will fill your order accordingly. Tell them your plans.

If the driveway will be crowned, you will place one section of concrete at a time. Tell this to the ready-mix company. Schedule a date for the pour with the company and be ready when the

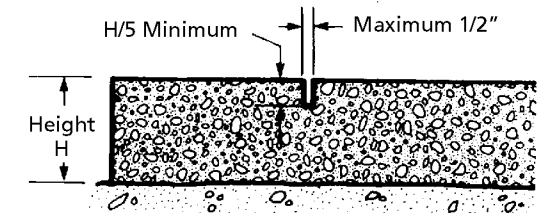
truck drives up. It is suggested that you enlist the aid of a couple of friends to help you with the placement. Once dumped out of the concrete truck, you'll have to work fast to level the concrete with shovels and then screed (level) the top with a straightedge. It's hot, heavy, and fast work.

Start the pour at the garage and work toward the street. If you lay the length of the driveway in sections, install a stopboard at about 10 feet. It will then correspond to the placement of control joints. Place the concrete in this first section only.

Details of an Isolation Joint



Where concrete section butts against another concrete section or solid object, install an isolation joint to absorb pressure created when the concrete expands during warm and hot weather.



A control joint is cut to 1/4th of the depth of the slab, as illustrated here. Cut the joints in a large slab—such as a driveway—with a circular saw fitted with a masonry type blade. Snap a guideline.

Tamp and spade as needed, giving special care to edges and tie bars. Screed the concrete off (work a straightedge zig-zag fashion across the top of the form boards) and place it into the adjacent, unpoured section. If you don't screed, some places will have a lot of extra concrete, which must be moved. Other spots won't have enough.

Let the slab set up. Cut any control joints as needed, insert any expansion strips, and give the driveway a lightly broomed finish after you float and finish-trowel the surface fairly smooth.

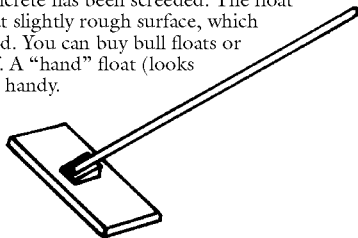
The Final Pour. Once the first half of the slab is finished, remove the stopboard. This is not easy. It is hard to slip the tie bars back through the holes in the stopboard. Repeat the entire process for the remainder of the driveway, in 10-ft. sections as needed to complete the driveway.

Curing. The concrete should be covered with burlap and the burlap kept wet for a week or so with a sprinkler head on a garden hose. You can skip the burlap, but keep the surface of the concrete wet.

If it starts raining as you finish the trowel and brooming job, cover the concrete either with burlap or newspapers so the raindrops don't damage the surface of the concrete.

Let the project set a couple of weeks, then strip off the forms and backfill any dirt needed to cover the surface of the concrete.

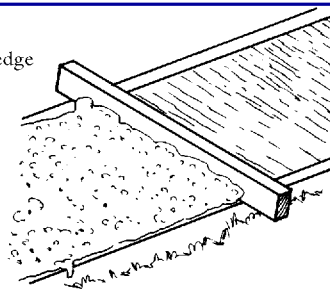
Bull Float is a little more than a handle with a board attached to it. The float is pushed and pulled along the concrete surface after the concrete has been screeded. The float produces a level, but slightly rough surface, which can then be troweled. You can buy bull floats or make them yourself. A "hand" float (looks like a trowel) also is handy.



Procedures check. To sum up the steps involved in placing a concrete driveway, use this quick checklist:

1. Find out the codes in your community.
2. Sketch the project, putting in dimensions.
3. Get the necessary building permits.
4. Excavate and prepare the base.
5. Build the forms (4 & 5 can be done together).
6. Double check all measurements.
7. Order the concrete.
8. Finish the concrete.
9. Protect the concrete until it has hardened.
10. Backfill and landscape.

A **screed** is really a straightedge 2X4 used to level concrete between the forms (foreshortened here for illustrative purposes). You will need a helper to handle one end of the screed.



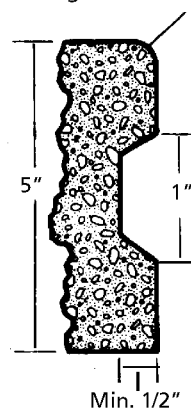
LUMBER SIZES FOR CONCRETE FORMS

Nominal Size	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

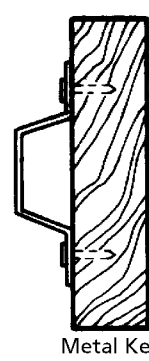
CUBIC FEET OF CONCRETE SLABS

Area, sq. ft. (length x width)	Thickness, inch		
	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

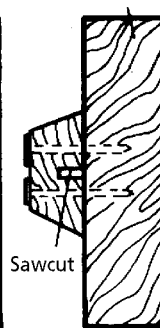
Edge before removing bulkhead



Bulkhead of 2" lumber



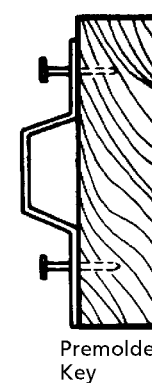
Metal Key



Sawcut

Wood key

Edge (or saw) to match control joints

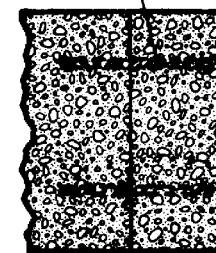


Premolded Key



Break bond with oil, paint or curing compound

Reinforcing rod



A **construction joint** is needed when you are placing sections of a driveway at different times. A key must be created in one section or use reinforcing rods installed so that the later placing of concrete will join the first sections and shift at the same rate. These keys are simply nailed to the stopboard.