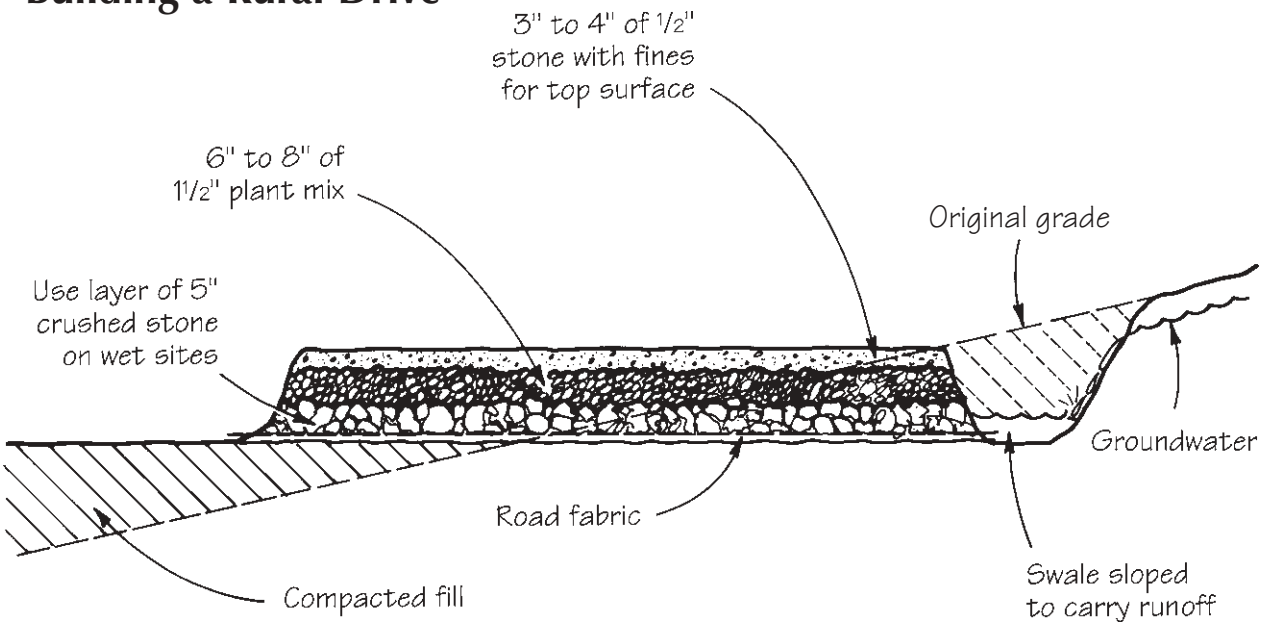
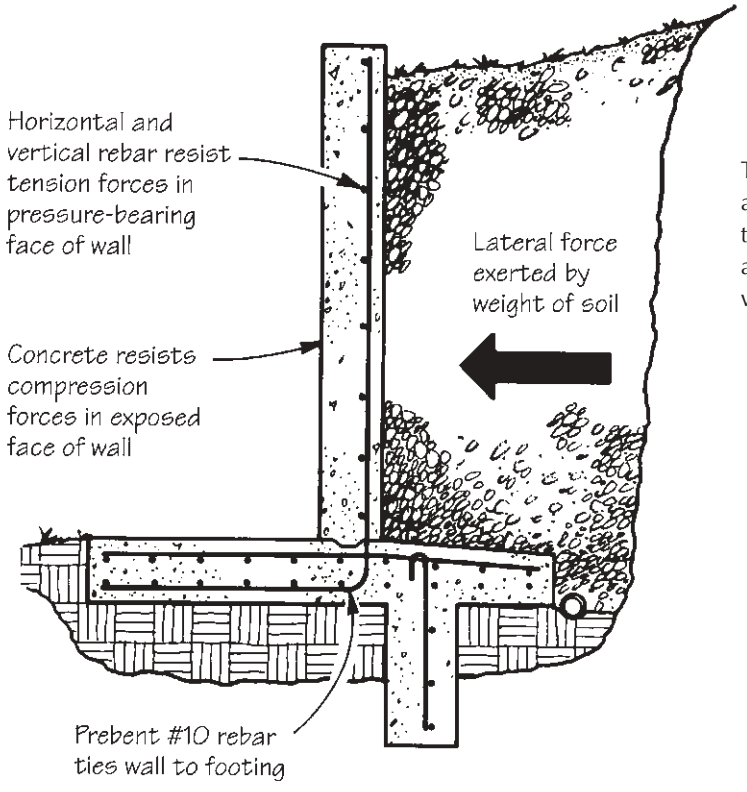
Building a Rural Drive



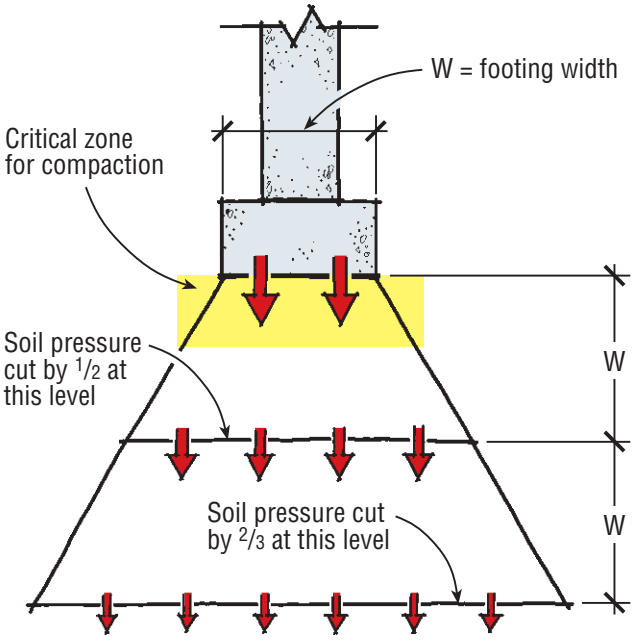
To get the longest life from a stone drive, the author starts by providing proper pitch and drainage. Then, before placing any stone, he lays down Mirafi 500X road fabric, which strengthens the road and prevents the stone from being pushed into the ground. ("Laying the Groundwork: Tips From an Excavator," 3/92)

Concrete Retaining-Wall Basics



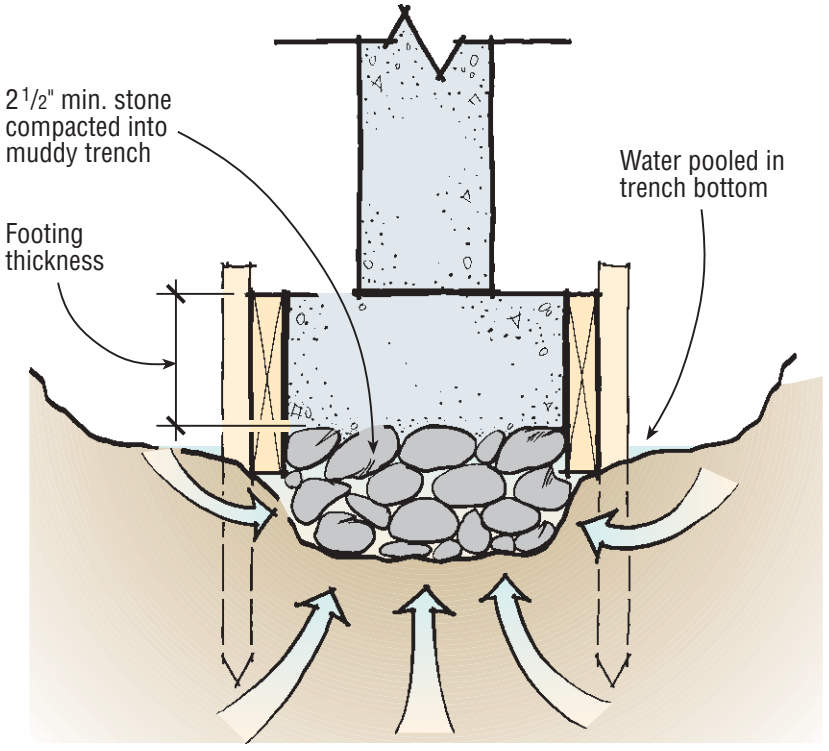
The compressive strength of concrete and the tensile strength of steel work together to resist lateral soil pressures in a typical poured-concrete retaining wall. ("Rebar Tips," 7/94)

Diminishing Soil Pressure



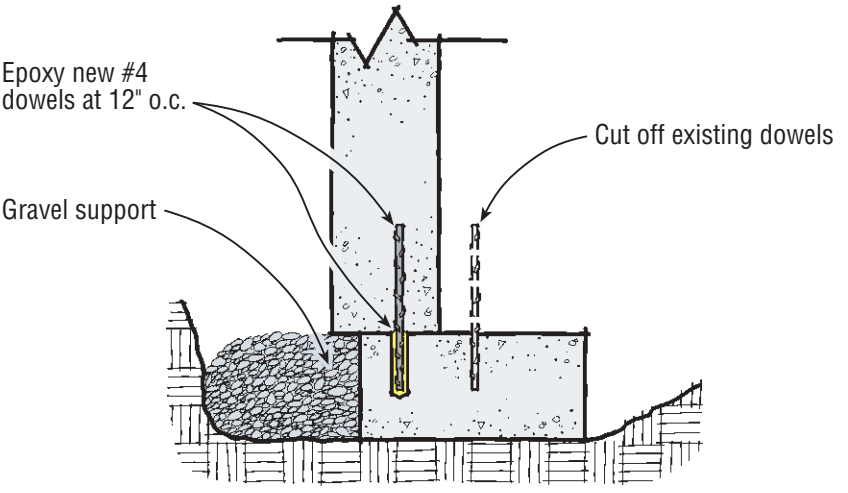
As the load under a footing spreads out, pressure on the soil diminishes. Soil directly under the footing takes the greatest load, and therefore should be thoroughly compacted. ("Footing Fundamentals," 10/00)

When the Footing Trench Is Wet

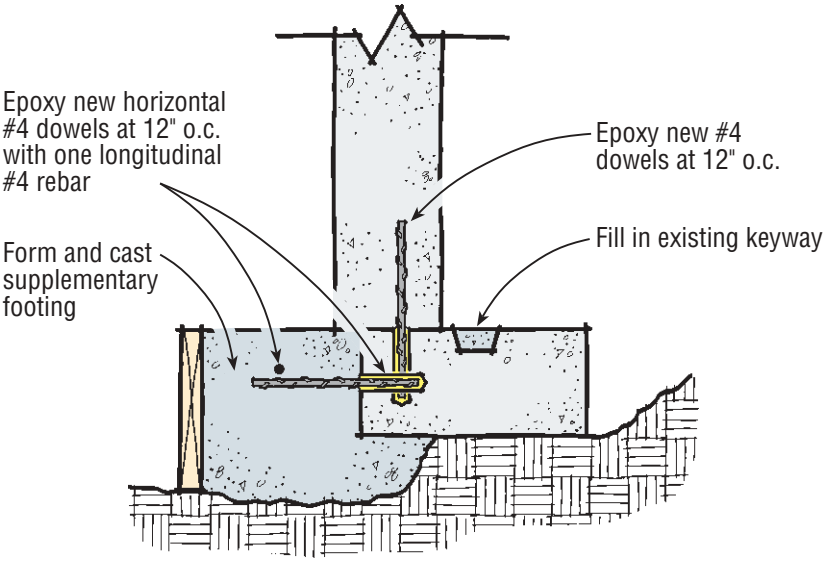


When water is pooled in the trench, the author recommends placing large cobbles in the form bottom and compacting them down into the mud. Muck and water may fill the spaces between stones, but contact between the stones will provide bearing. Be sure to use a stiff concrete mix when you cast the footings. ("Footing Fundamentals," 10/00)

Repairing Off-Center Footings



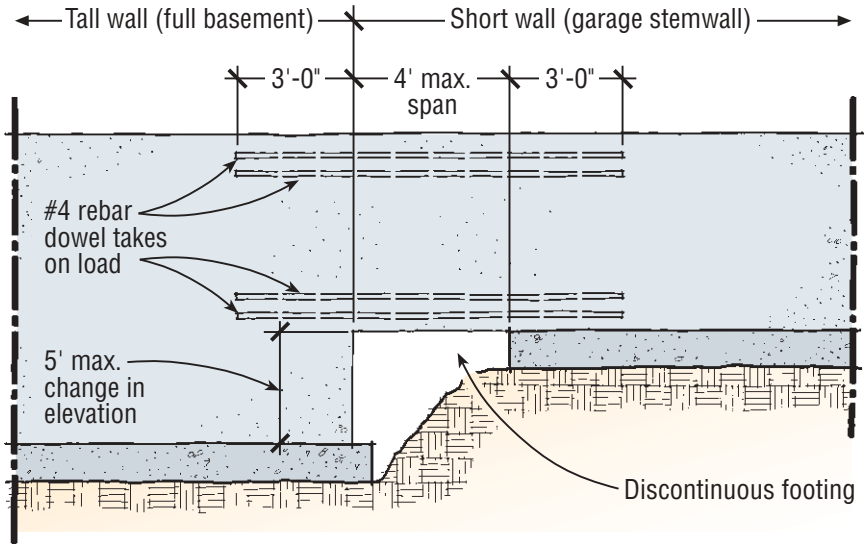
In Good Soil (4,000 psf or greater)



In Average or Below-Average Soil

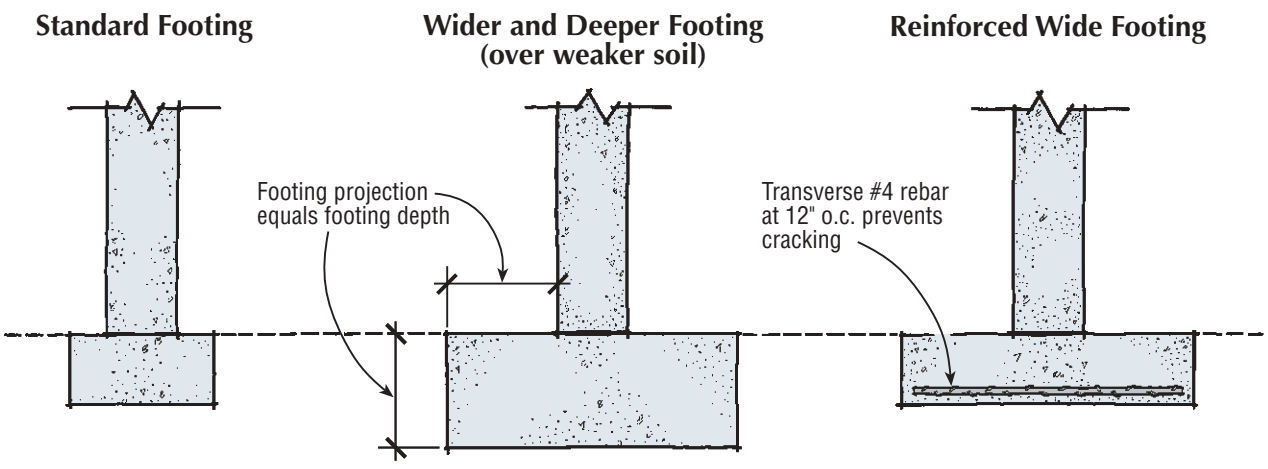
In strong soils, a mistake in footing layout can be corrected by placing gravel to support the wall (top). In weaker soils, the author recommends casting an augmented footing alongside the existing footing (above), connected by dowels epoxied into the side of the existing footing. Be sure to fill any notches in the footing, and cut off any existing steel dowels that will miss the wall. ("Footing Fundamentals," 10/00)

Jump Footings



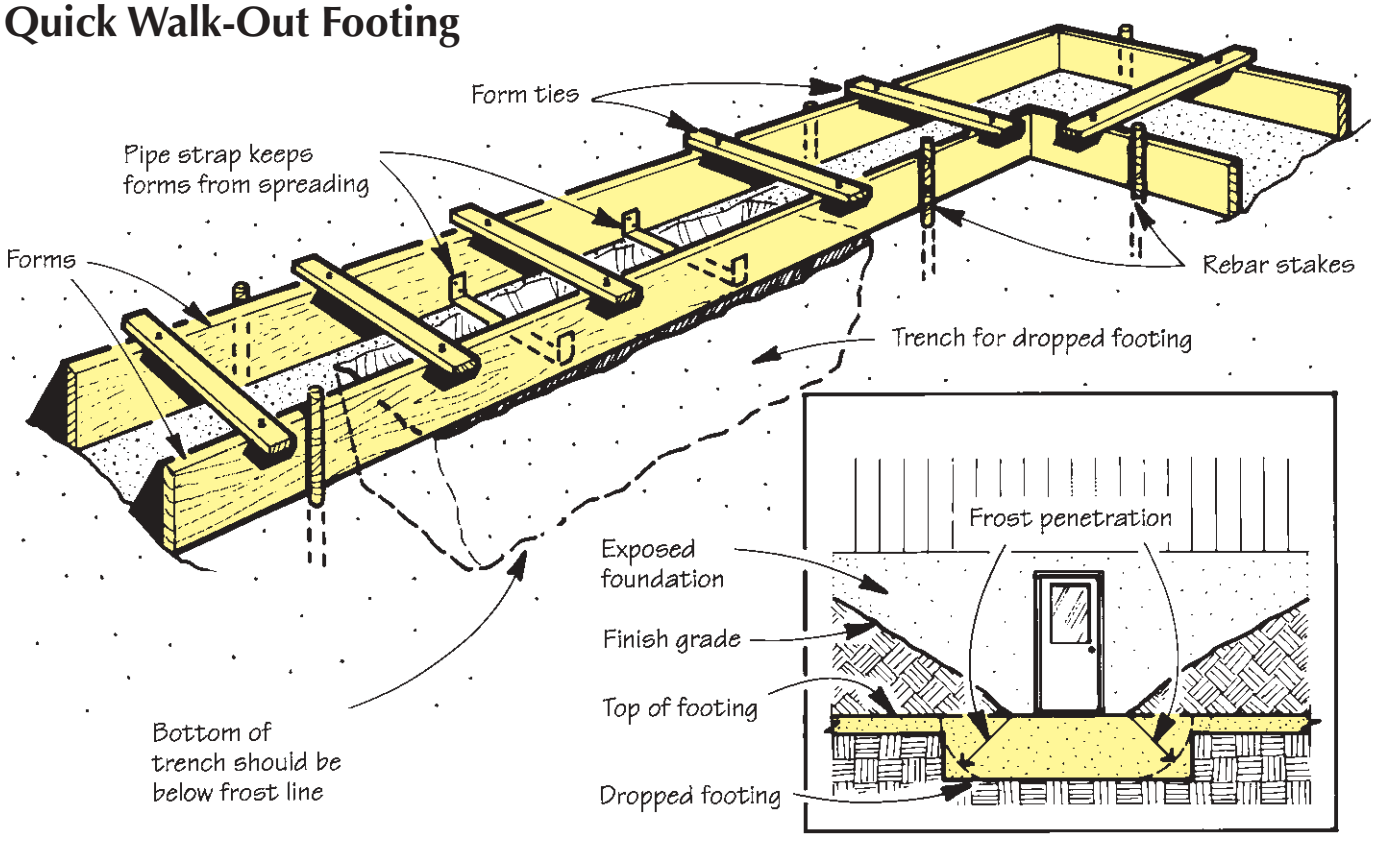
Discontinuous footings work fine for concrete walls, which can be reinforced to take the loads. A typical situation where a garage stemwall abuts a main basement wall can be handled by reinforcing the short section of wall that spans the opening with two #4 bars at the top and bottom, extending 3 feet into each adjoining section of wall above the footing. This solution is limited to a 4-foot maximum span and a 5-foot maximum change in elevation. If the walls are at right angles, the rebar has to be bent accordingly. ("Footing Fundamentals," 10/00)

Wider Footings for Better Bearing



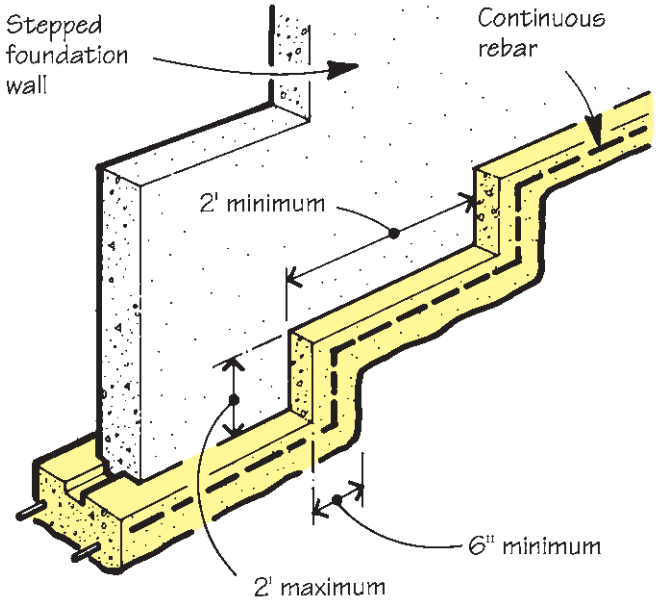
When a footing must be widened to boost bearing ability, it should also be reinforced or deepened. An unreinforced footing that is too wide may crack close to the wall, overloading the soil beneath. Without reinforcement, codes say the thickness of the footing should be at least as great as the distance it projects next to the wall. As an alternative, the author recommends transverse (crosswise) #4 bar at 12 inches o.c. ("Footing Fundamentals," 10/00)

Quick Walk-Out Footing



To avoid frost heaves, footings for walk-out entrances must drop below the frost line. To save time, the author prefers to form walk-out footings as a solid trench wall. ("Fast Forming for Stepped Footings," 3/94)

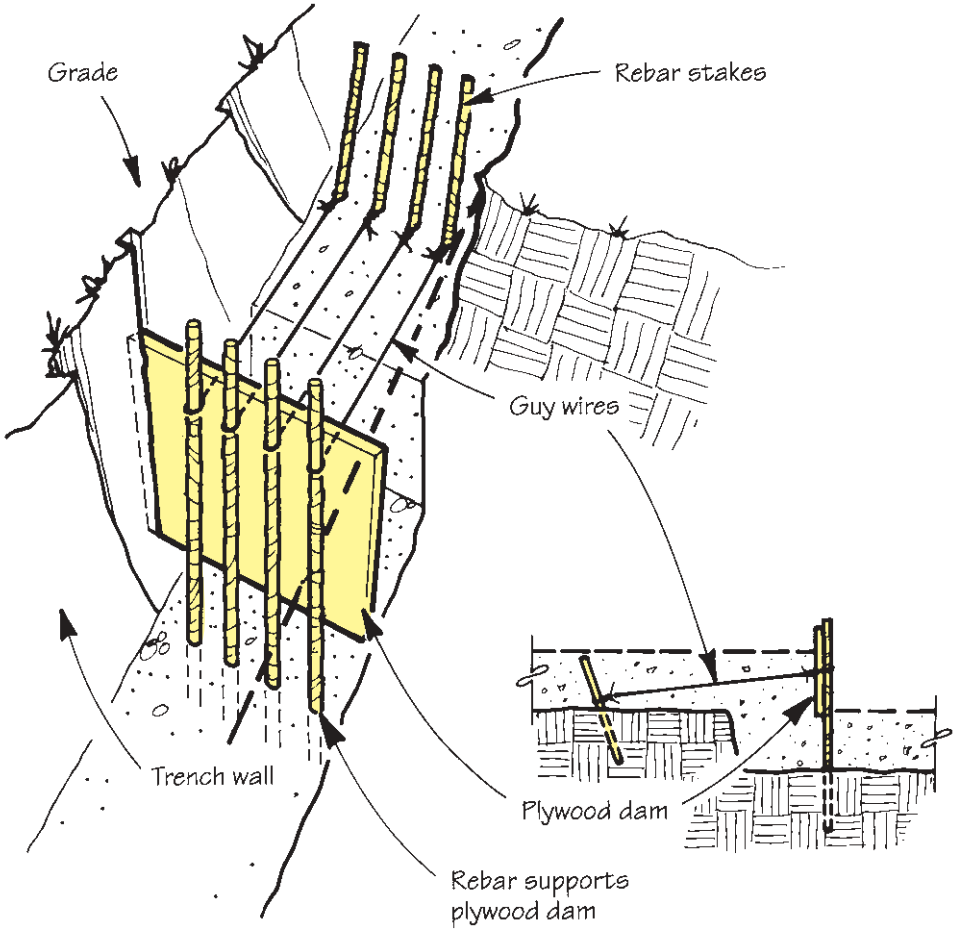
Stepped-Footing Specs



The rise of a stepped footing should not exceed 2 feet. There should be at least 2 horizontal feet between steps. ("Fast Forming for Stepped Footings," 3/94)

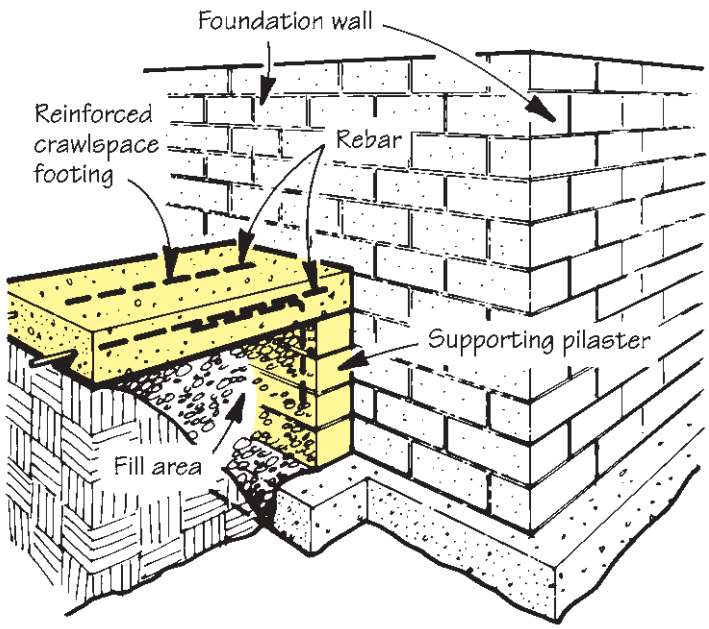
Quick Stepped-Footing Form

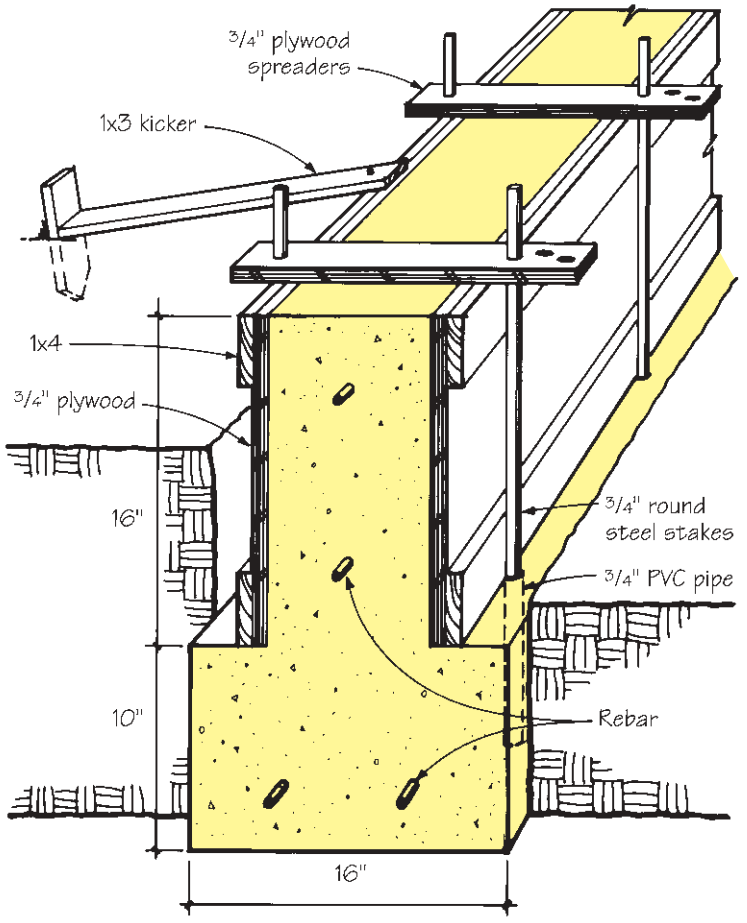
When pouring stepped footings, the author uses the trench walls and a plywood dam at each step to form the concrete. This technique requires careful excavation to avoid wasting concrete, but is much faster than building conventional stepped forms from two-by stock. ("Fast Forming for Stepped Footings," 3/94)



Supporting a Garage Footing

Where a garage or crawlspace footing meets a full-basement wall, the author increases the basement footing width and builds a block pilaster to support the edge of the concrete. Otherwise, the portion above the excavated trench is likely to settle. ("Fast Forming for Stepped Footings," 3/94)

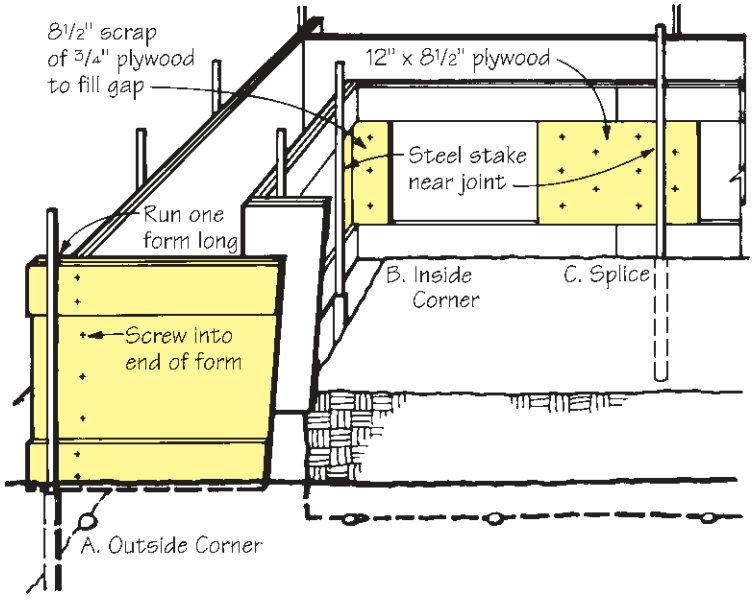




Pouring a Stem Wall

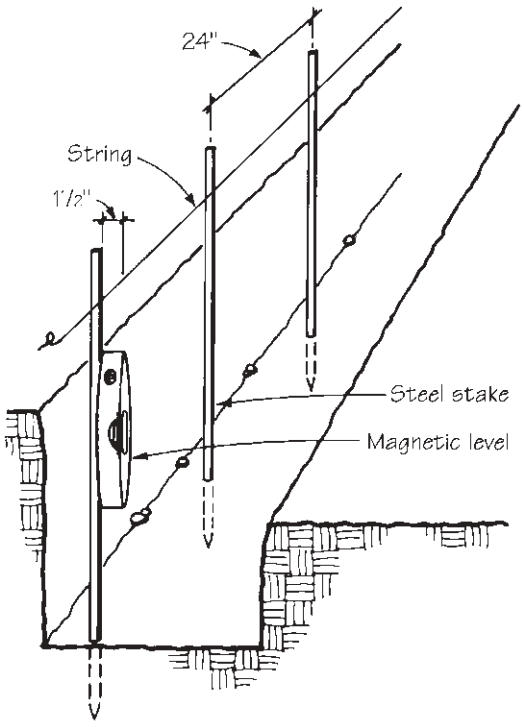
To speed up the forming process for short stem walls, the author uses steel stakes to support plywood form boards. The resulting monolithic foundation is accurate and sturdy. ("One-Step Stem Wall Foundations," 3/92)

Forming Outside Corners

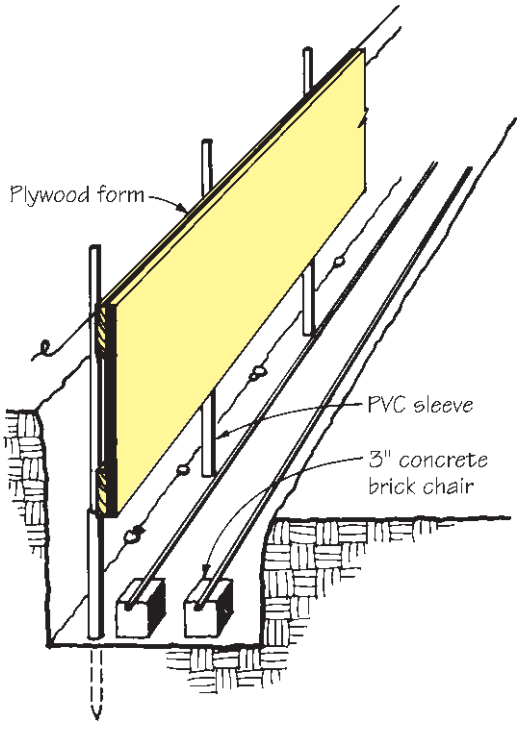


To form an outside corner, the author runs one board long and screws into the end of the other (A). At inside corners, he fills the gap with scrap plywood (B). To join two form boards, the author splices the connection with plywood, making sure a stake is placed within 3 inches of the joint (C). ("One-Step Stem Wall Foundations," 3/92)

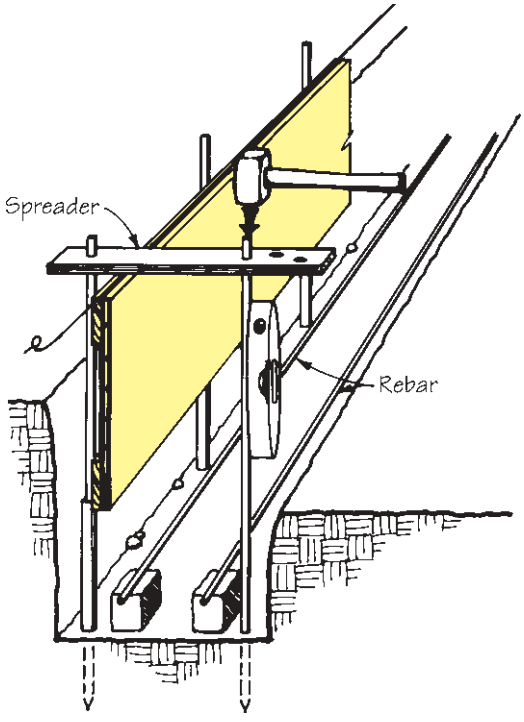
Hanging Stem Wall Forms



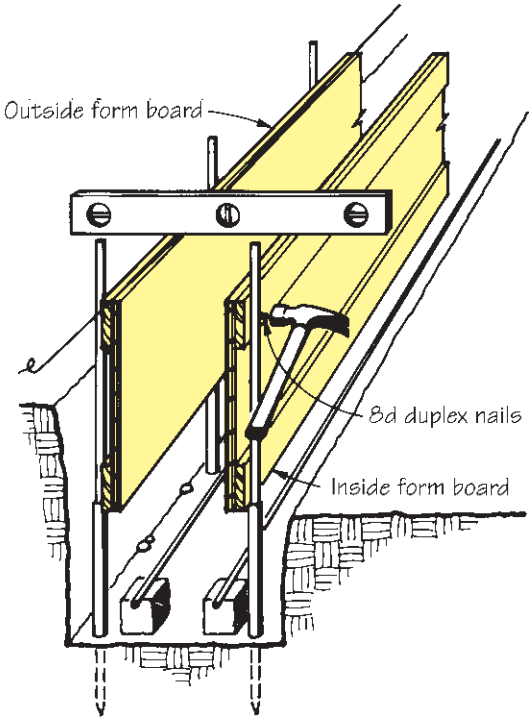
Step 1. Using a magnetic torpedo level to check for plumb, drive the stakes 1 1/2 inches outside the string lines.



Step 2. Slip the PVC sleeves over the stakes and nail the outside form board to the stake an inch below the string line. Install the footing rebar before hanging inside form boards.

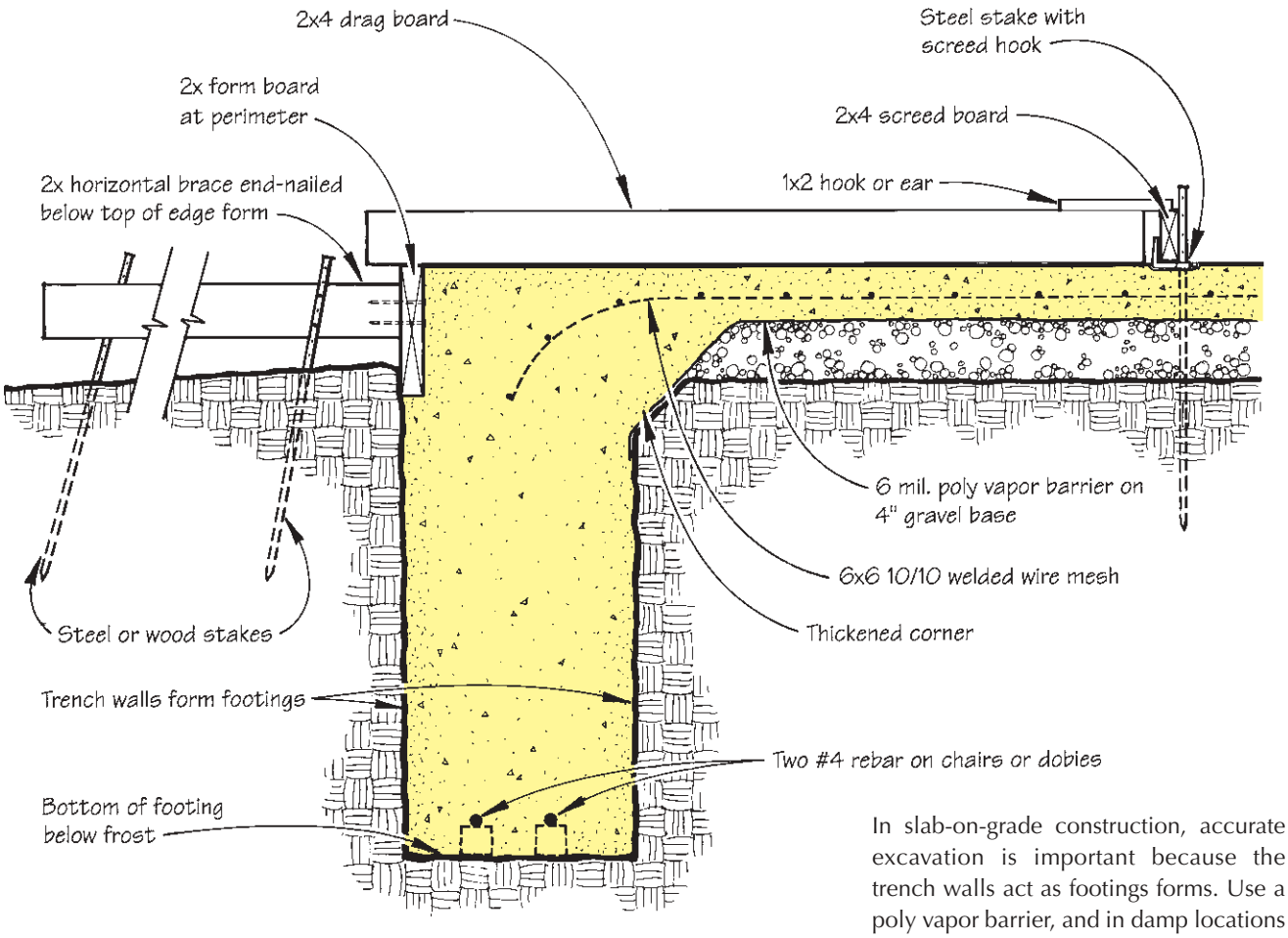


Step 3. Using the spreader to gauge the thickness of the stem wall, drive the inside stakes, again checking for plumb with a magnetic level.



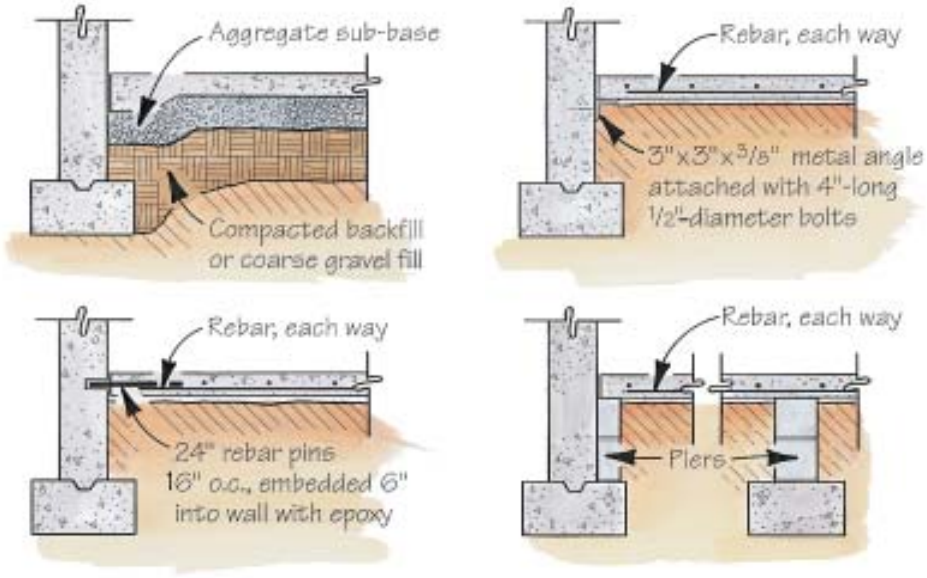
Step 4. Slip the PVC sleeves over the inside stakes. Then level across from the outside form board to install the inside form boards. ("One-Step Stem Wall Foundations," 3/92)

Forming a Monolithic Slab Foundation



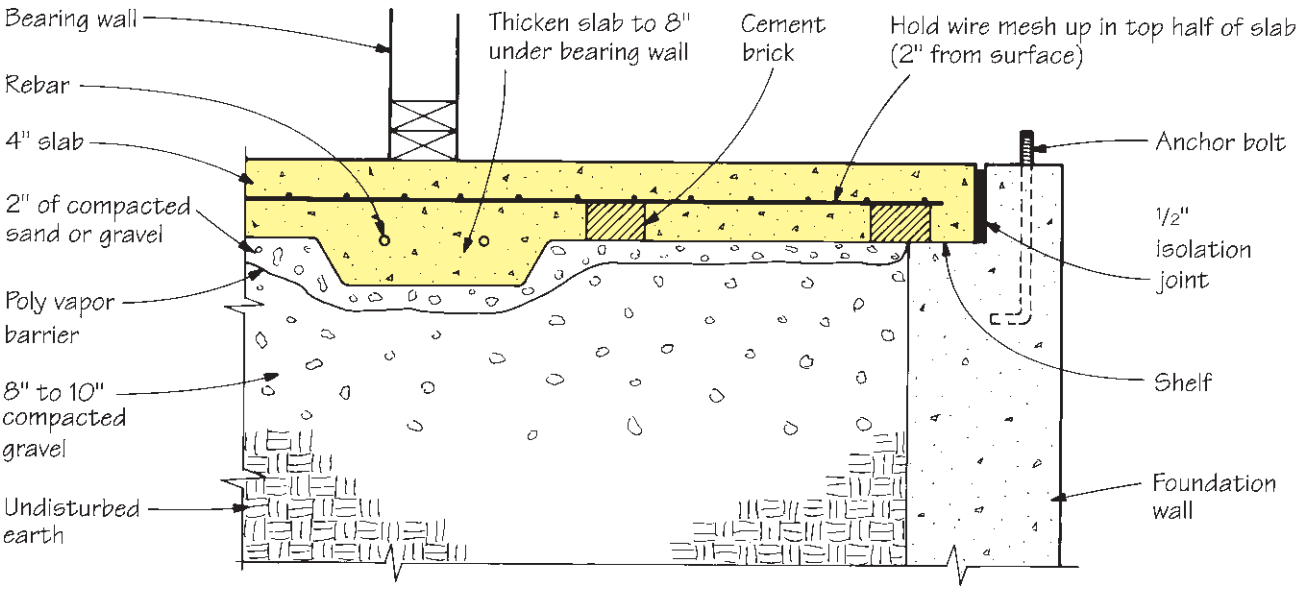
In slab-on-grade construction, accurate excavation is important because the trench walls act as footings forms. Use a poly vapor barrier, and in damp locations add a 4-inch compacted gravel base. ("Slab-on-Grade Foundations," 4/95)

Supporting Garage Slabs



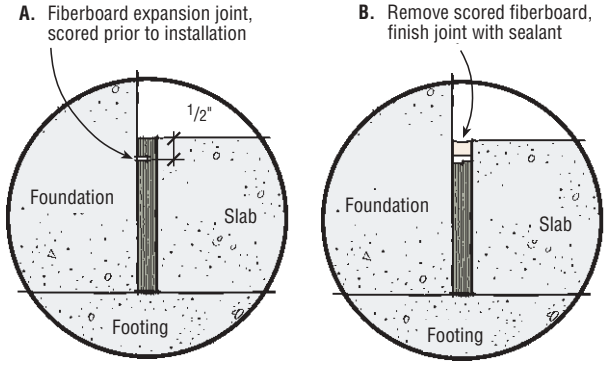
(*On the House*, 12/97)

Successful Slab Details



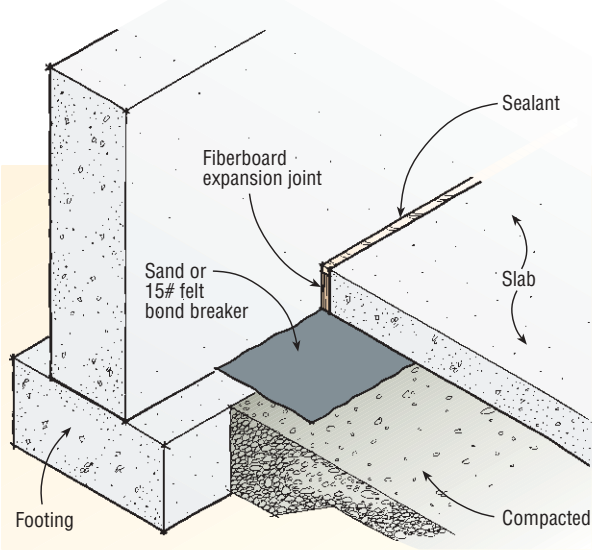
Thicken a slab to 8 inches under a bearing wall, and lay two #4 (1/2-inch) reinforcing bars lengthwise for additional support. Under a fireplace, thicken the slab to 12 inches and use #5 (5/8-inch) reinforcing bars 12 inches on-center each way. A shelf in the foundation will not hold up a slab-on-grade and is not a substitute for good compaction of the subgrade. Wire mesh does not provide support, either. Its sole purpose is to keep cracks from opening, which works only if it is placed 2 inches from the top of the slab. ("Pouring Successful Slabs," 7/92)

Finished Expansion Joint



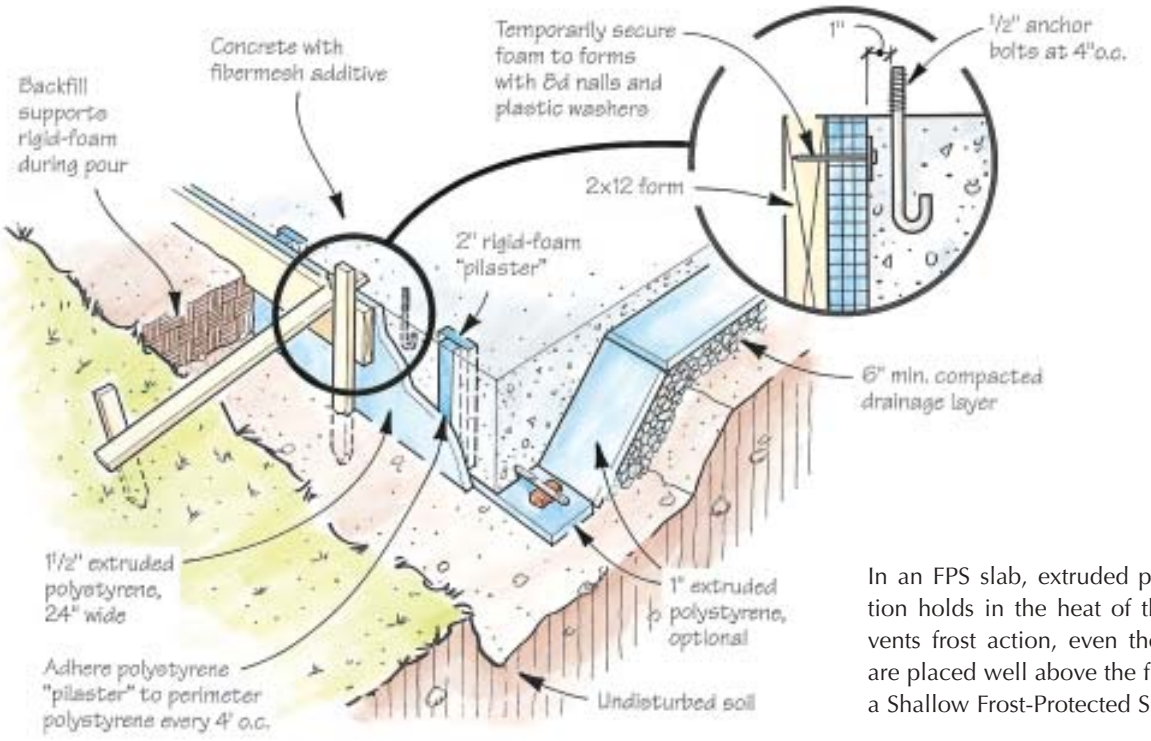
Fiberboard expansion joint material permits the slab to move independently of the wall. For a finished appearance at the slab edge, score the fiberboard on a table saw so the top 1/2 inch can be easily snapped off after the pour. Then finish the joint with sealant (above). ("Tips for Crack-Free Concrete Slabs," 3/01)

Isolating a Slab From a Footing



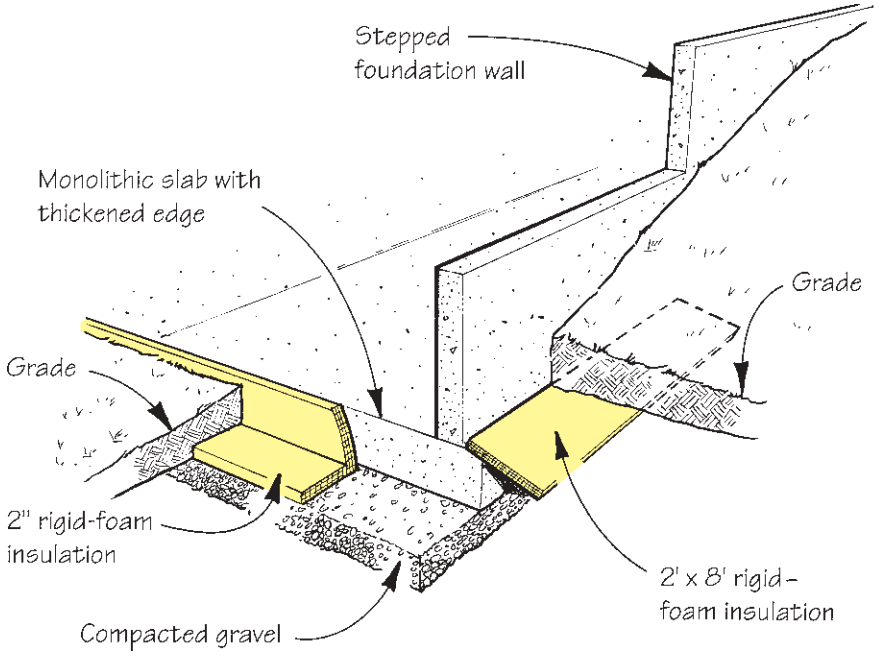
Breaking the bond between the footing and the slab with felt paper or sand will help prevent cracking as the slab moves. ("Tips for Crack-Free Concrete Slabs," 3/01)

FROST-PROTECTED SLABS



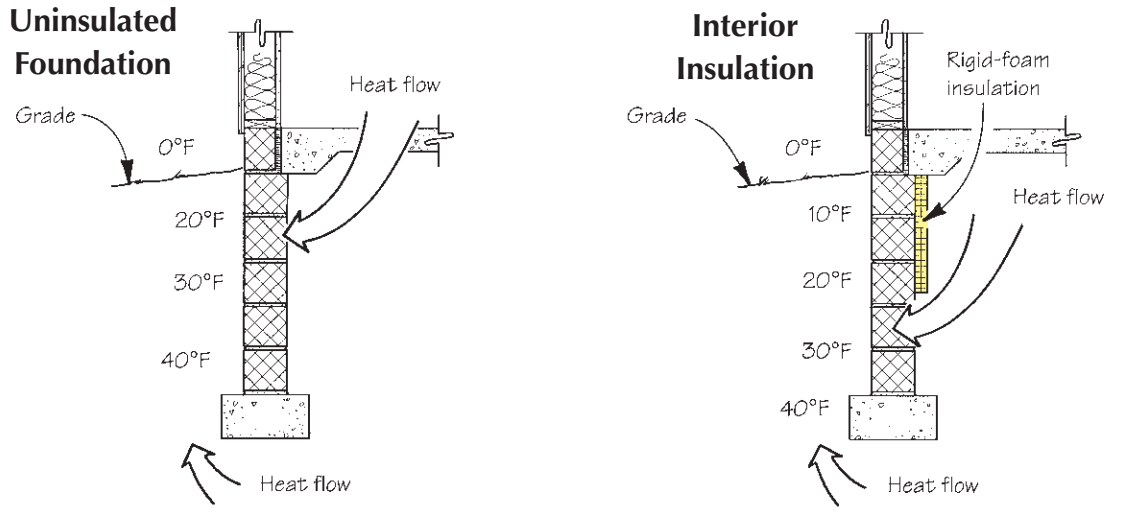
In an FPS slab, extruded polystyrene insulation holds in the heat of the earth and prevents frost action, even though the footings are placed well above the frostline. ("Pouring a Shallow Frost-Protected Slab," 8/97)

Protecting a Walk-Out Foundation With Insulation



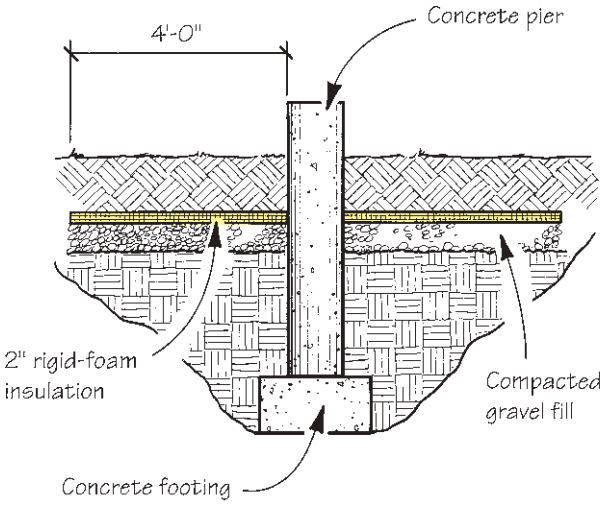
The author protects walk-out basement foundations with foam to avoid having to step down the excavation. A 2x8-foot length of foam board protects the footing of the main wall at the corner where the backfill is shallow. ("Frost-Protected Shallow Foundations," 9/96)

Heat Flow in Insulated Foundations



In an uninsulated foundation (top left), the footing is warmed by the earth's heat, as well as by heat from inside the building. The deep soil above the footing provides the insulation and heat-storage capacity to keep the soil near the footing from freezing. With interior insulation (top right), the footings still have to be below the frostline. But in a frost-protected foundation (bottom left), foam insulation rather than soil depth keeps the soil at the footing from freezing. For unheated slabs-on-grade (bottom right), the foam is placed under the entire slab to retain ground heat. The insulation must extend horizontally 4 feet beyond the footing. ("Frost-Protected Shallow Foundations," 9/96)

Frost Protection for Concrete Piers



To prevent frost heaving of pier foundations, the author places 2-inch foam horizontally around the piers about a foot below grade. ("Frost-Protected Shallow Foundations," 9/96)