

# Basement Drainage Trench

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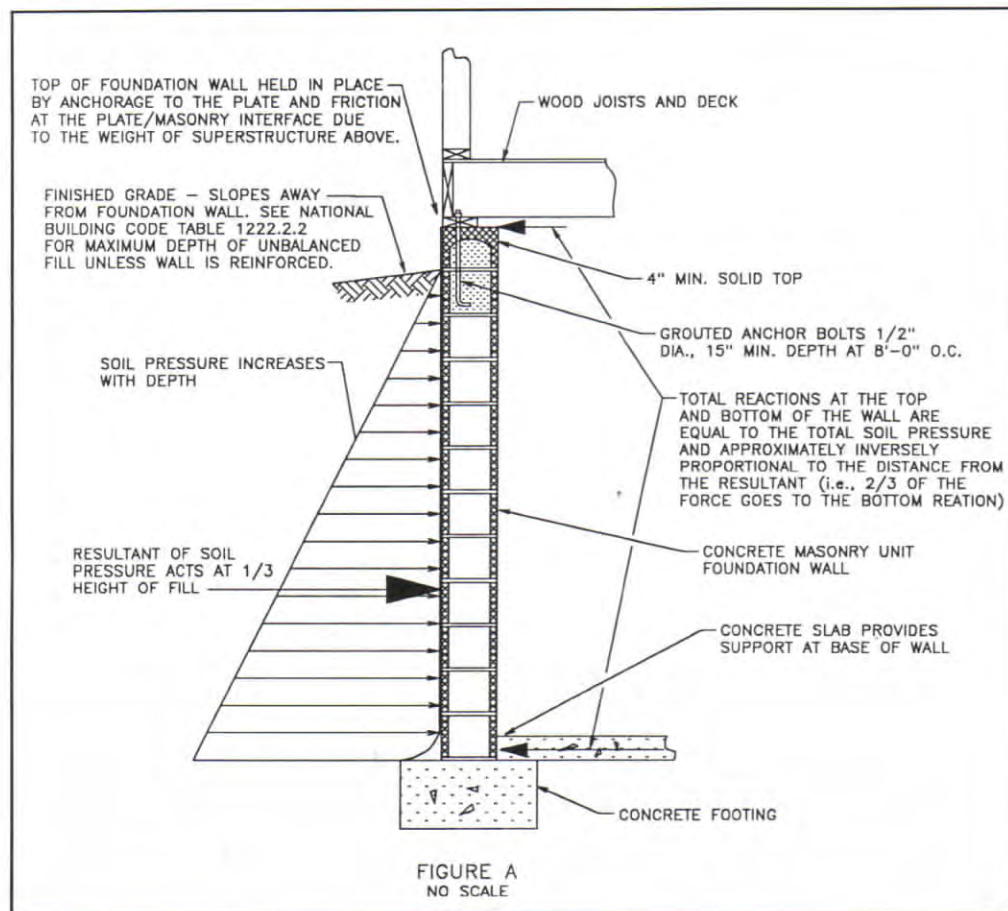
In recent years, it has become the practice of many home builders to construct a "drainage trench" around the inside perimeter of basement foundation walls. This is done in the hope that any water coming through the foundation wall will

drain into the trench and possibly flow through the trench around the basement perimeter to a sump, if one is provided. On the face of it, this sounds like an excellent and creative solution to potential water problems in the basement. Ac-

tually, what is also being created is the potential for future foundation failure.

Basement foundation walls are generally designed as vertical beams supporting a horizontal load that increases with depth (see Figure A). In order for this beam to remain in place, it must have support at both ends. This support is provided: at the top (by the attachment of the plate and joists to the top of the foundation wall); and at the bottom (by the basement slab which abuts the foundation wall). If one looks at the pressure distribution of the loading diagram, it is easy to see that most of the load reaction goes to the bottom of the wall. If the slab does not abut the foundation wall to restrain movement, the only restraint provided to prevent the foundation wall from sliding on the footing is the mortar bond between the concrete footing and the foundation wall.

This bond, even under the best of circumstances, has low strength. Under field conditions, with the possibility of laitance at the top of the concrete footing, as well as mud, dirt and sand which has not been properly cleaned away prior to the installation of the



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first course of masonry, one can hardly expect any bond to exist between the footing and the foundation wall. Consequently, unless special provisions, such as dowels from the footing into the masonry or shear keys, are provided, the foundation wall will, as the soil compacts, develop a mortar shear failure at the base of the wall. The foundation wall will then slide on the footing until it comes into contact with the slab. Since the drainage trench is usually 1 inch to 1½ inches wide or more, it is highly likely that this excessive amount of movement will completely shatter a concrete block masonry foundation wall. Under these conditions, the trench, which was originally installed with good intentions, is the cause of an excessively cracked wall creating the potential for even more disastrous consequences; i.e., complete foundation failure. In order to prevent this sliding of the foundation wall on the footing, if the builder insists on installing the trench at the slab edge, the builder should be required to install a shear key in the footing, or if loads require, to install vertical reinforcing from the footing into the wall cores then grout them solid (see Figures C and D).

The major causes of moisture entering a foundation wall are from:

- Failure to parge and dampproof the exterior properly;
- Failure to compact properly the backfill; and
- Failure to slope properly the grade away from the foundation.

As such, the need for such a trench is highly questionable. Given that the cost of either of the solutions shown in Figures C and D, along with the cost of installing the trench, would far outweigh the additional cost necessary to build a properly dampproofed and backfilled masonry foundation wall, the better solution to the problem would be proper workmanship in dampproofing and backfilling. This being the case, the bottom of the foundation wall can be constructed as normally done and as shown in Figure B.

