TO : KURDISTAN ENGINEERING UNION

A REPORT ABOUT CONCRETE CRACKS

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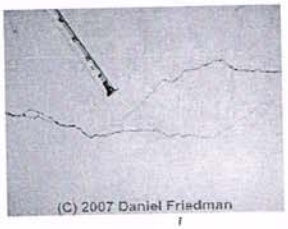
How to Identify, Evaluate & Repair *Shrinkage* Cracks in Poured Concrete:



- **What is concrete shrinkage cracking, how and where does it occur?**
- **Are concrete floor cracks a structural problem?**
- **How to recognize and evaluate shrinkage cracks in poured concrete slabs or floors**
- **Do shrinkage cracks in poured concrete always need repair**

This document explains how to recognize shrinkage, evaluate, and repair cracks in poured concrete walls or floors, and discusses a few (minor) possible problems from shrinkage cracking such as water or radon leaks.

This forms part of our longer concrete cracking article which describes the types of cracks that occur in poured concrete slabs or floors and explains the risks associated with each, thus assisting in deciding what types of repair may be needed. This website describes how to recognize and diagnose various types of foundation failure or damage, such as foundation cracks, masonry foundation crack patterns, and moving, leaning, bulging, or bowing building foundation walls.

Types of foundation cracks, crack patterns, differences in the meaning of cracks in different foundation materials, site conditions, building history, and other evidence of building movement and damage are described to assist in recognizing foundation defects and to help the inspector separate cosmetic or low-risk conditions from those likely to be important and potentially costly to repair

Shrinkage Cracks in Poured Concrete Slabs

Shrinkage cracks in poured concrete are easily recognizable and can be distinguished from other types of cracks that occur later in the life of a foundation wall or floor slab.

The photograph of cracks above were taken of shrinkage cracks in a concrete slab floor in a home built in 2006. The cracks in this case ranged in width (measured across the crack) from "hairline" (less than 1/16") to about 3/32" in the basement floor slab of this particular home. They may appear larger.

What is unique about shrinkage cracks in concrete is that they usually appear to be discontinuous, as shown in this photo. The crack will meander along in the concrete, taper to a stop, and then continue beginning in a parallel line to the first crack, meandering again through the concrete.

This is characteristic of concrete (or mud) shrinking while giving up its moisture.

You can see the shrinkage of even a perfect concrete floor slab with no visible cracks in the field of its surface if the floor was poured inside of an existing foundation. Look for the gap between the edges of the slab and the foundation wall? Look also for the stains or concrete debris on the wall at the slab level? These confirm that at the time the slab was poured it was touching the wall.

What is the significance of *differences* in concrete height on opposite sides of a crack?

Why are some "shrinkage cracks" at different heights on either side of the crack?

The floor on one side of this 3/16" wide crack was about 3/32" higher than on the other. This may be due to settlement of the broken slab section on poorly-compacted fill in the building's basement.

Multiple forces and movements may be present as a poured concrete foundation cures, such as a combination of shrinkage and settlement, or shrinkage and outside pressures on a wall from backfill. (It's best to let any masonry wall cure before backfilling, though that's most critical with masonry block walls where early backfill before the first floor has been framed in place has been known to lead to a total collapse of the foundation.)

In a poured concrete wall or floor if the surface of the concrete on opposite sides of a crack are also at different elevations, that is if the concrete on one side of a crack is higher than the other, additional forces have been at work and the crack is not a simple shrinkage crack

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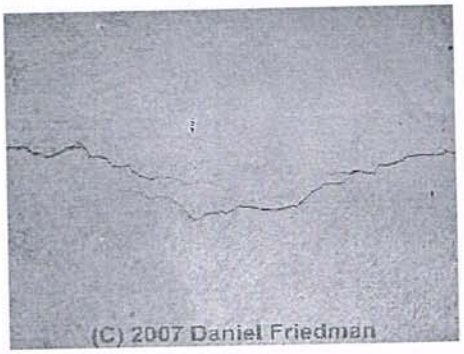
Repair Methods for Foundation Cracks
Repair Methods for Foundation Shrinkage Cracks



Before repairing a foundation crack it is important to diagnose the cause of the crack and its effects on the building structure.

The significance of any foundation crack depends on the crack's cause, size, shape, pattern, location, foundation materials, extent of cracking, impact of the crack on the building, and possibly other factors as well. If there is an underlying ongoing problem causing foundation movement or damage, that problem needs to be corrected too

Suggestions for Repairing Concrete Foundation Shrinkage Cracks

Repairs to foundation cracks which are not traced to building movement, structural problems, site problems, or other conditions which require site or structural repairs may be attempted for cracked foundations and other cracked concrete structural elements using a variety of products and materials such as masonry repair epoxy or sealant products.

These products, some of which include even structural repair epoxies, might be used to seal against water leakage as well, and may be used for repairing certain cracks in concrete foundations following evaluation and advice from a foundation professional. An evaluation of the presence, absence, or condition of reinforcing steel in cracked concrete foundations should be a part of such an inspection.

Shrinkage cracks, which are not normally a structural defect in a building, may nonetheless need to be sealed against water entry. Common repair methods include chipping out the crack and applying a masonry patching compound to the surface, use of epoxies, or other sealants.

Water entry leaks at foundation cracks: Polyurethane foam sealant is used for foundation crack repairs to stop water entry. (Also find and correct outside water sources). See our article on Using Polyurethane Foam for Foundation Repairs for details on using this product to seal foundation cracks against leakage.

For various methods and products used to seal cracks in concrete floors or walls, see How to Seal Cracks in Concrete a description of various products and methods used to seal or repair cracks in poured concrete walls, foundations, floors, & slabs

Once any concrete cracks it is possible for water to leak into the building through the crack. There are several ways to repair a basement crack leak. An easy, quick, and effective measure to stop basement or crawl space water entry through a foundation crack is to perform an injection of polyurethane foam into the basement crack. [Also be sure to find and fix the sources of water outside