

Common Causes of Foundation Problems

Soil Composition and Moisture Content

Your house is a heavy structure. If the earth below the foundation is of different densities (stone in one area and soil in another, for example), the foundation can crack and settle unevenly. If you've noticed the floors creaking, windows and doors sticking, or you see water in your basement, it's possible that you've had movement in the foundation. Heavy backfill such as clay can create a great deal of pressure on foundation walls, with its weight pushing on the sides of walls and causing them to buckle inward. When this happens, cracks may form near the frost line before advancing to the bottom walls inside of the basement. Once you see the cracks, they've already broken through the entire wall. And foundation wall leaks may occur.

Temperature Changes

Freezing and thawing cycles destroy roads, sidewalks, and parking lots, and these same forces are at work underground and are attacking your basement. If you take a rigid structure such as a foundation and subject it to the continuous flexing and contracting of the earth, damage is inevitable. Temperature changes can cause the soil and water around your foundation walls to expand and contract throughout the year, causing flexing against the wall and resulting in cracking.

Water

Bad news about water around your foundation: When the foundation of your home was dug out and the foundation was placed, dirt was poured back to fill the space between the basement wall and the virgin, untouched soil. This backfilled soil is looser than the soil around it. Because it's loose, the area immediately around your home is more porous than the surrounding area and collects much more water. Additional water will collect around your foundation if it's located near bedrock. This bedrock naturally drains water to springs and other water sources but can be blocked by the presence of your home, causing it to collect around your foundation. As the backfilled soil settles around your home, it can create a dip in the area where water will pool and collect. If the soil is not regraded so the water runs downhill away from your house, the pooling water will drain into the soil around your home. Be sure that the earth is sloped away from your house and that clay is kept away from the foundation. Gutters, downspouts and grading that do not properly direct water away from your home are literally pouring water onto your backfilled soil when it rains, where it seeps down to your foundation. Water can hurt your basement in three ways: when it's there, when it's not, and when it's both.

When water seeps into the ground around the foundation and builds up, it's called hydrostatic pressure.

The higher the water table up against the foundation, the more weight and pressure it causes. This water expands and contracts drastically (and sometimes freezes) as the temperature changes, which continually adds and takes away pressure on your walls. As hydrostatic pressure increases, water will enter your basement any way it can, seeping through porous concrete and block wall foundations, working through cracks, seeping through the wall joint, and entering your basement. The swelling of the earth under your foundation can actually lift up your house! When water dries out around your foundation, the house may settle down again. Exterior pressure against your wall decreases dramatically as the soil shrinks, causing expanding and shrinking, which creates lateral pressure on the basement walls that can create horizontal cracks and step cracks which can weaken the walls. In some cases, the soil is both wet in some areas around the foundation and dry in others. When this happens, pressure on your basement walls from the outside is unevenly distributed, forcing strain on some walls or sections of walls more than others and causing cracks.

Other Foundation Damages

Tree roots can greatly damage foundation walls. As they grow in size, they can swell against the foundation of a house, pushing against the walls. They can also work their way into cracks and gaps in the walls and move underneath the foundation, pushing upwards on the house and causing the house to settle poorly as the earth dries. Tree roots on one side of the house will dry the earth on that side unevenly. A tree that is 12 inches in diameter and 30 feet tall can absorb about 150 gallons of water per day during midsummer. This means that there is water on one side adding pressure to the foundations and not on the other. When the ground is wet, water tends to travel along the paths of tree roots as well as passages created by digging animals, underground water pipes, and electrical lines. If these roots and tunnels lead to the foundation walls, water is being guided along directly to your basement walls.

One final factor that may damage your foundation walls is the vibrations in the earth from nearby traffic. If your house is located directly alongside a major roadway (especially one where large trucks travel frequently), the continual vibrations traveling through the earth from the road over many years will weaken your basement foundation walls and damage your home.