A Homeowner's Guide to

Foundation Inspection & Repair

by Chattanooga Foundation Repair Experts

Chattanooga
Foundation Repair Experts

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Ensure a Stable Foundation for Your Home & Family

The foundation's job is to be the stable, rigid base that supports your home's structure and transfers the weight load to the underlying soil or rock without excessive settlement or movement. Because a home's foundation is in direct contact with the ground, it also protects the home from moisture and soil contact. They contribute to insulating against the cold, keeping moisture away, and resisting movements made by the earth below it, which is why foundations must rest on firm soil and be protected from excessive dampness.

It's quite likely that you'll encounter a house with foundation issues during your home search.

An estimated 25% of all U.S. homes will suffer "structural distress" like foundation damage during their lifetime.

Regular inspections and knowing what to look for can save you not just the headache of dealing with large structural issues, but also quite a bit of money in the future—as long as you plan ahead!

25%

of all U.S. homes will suffer "structural distress"

The Basics - Types of Foundation

A foundation can be built with many different materials, but is most commonly made with concrete and steel. In order for a foundation to be laid well, a builder needs to make sure to use quality materials, but also needs to lay the proper foundation for the property. Different types of foundations function well for different environments, there are two primary types that are most often seen and most commonly used:

Slab Foundation
Similar to what it sounds like, slab foundations are a large concrete slab that is poured on leveled and compacted dirt. A slab is usually poured all at once and is 4-6” thick. To support the structure, a 24” beam is poured every 10 feet around the perimeter. Once the slab is cured, a building is constructed directly on top of the slab.

Pier and Beam Foundation
There are multiple variations of pier and beam homes, but in general they are great for small- to medium-sized homes. In simplest terms, brick, stone, and concrete piers are pressed into the ground and leveled, then wooden beams are placed top of the piers, 1-2 feet above the ground, in order to create a foundation for the home to be built on. Heavier home structures also feature a concrete footing or grade beam, similar to a slab, that surrounds the perimeter of the home.

Benefits to Slab Foundations

Concrete slab foundations are often used in warmer climates where ground doesn't freeze too often, and are popular because they are less expensive, can be made quickly, and don't require a crawl space.

Common Concerns with Slab Foundations

Because the slab lays directly on the ground, it is often exposed to weather, and can create water damage to the slab. In colder climates, freeze/thaw cycles often affect slab foundations because water seeps into the soil surrounding the slab and then expands when it freezes, then contracts when it thaws—shifting the foundation. With enough movement, the slab can crack or shift into the ground creating stress on any structure that sits on top of it. In addition, the lack of a crawl space with a slab foundation makes access to underground utilities difficult and expensive.

Benefits to Pier and Beam Foundations

One of the obvious benefits of a pier and beam foundation is that it protects again flooding since it is elevated above the ground. Also, since the home sits 1-2 feet above the ground, it creates a crawl space under the home, allowing easy access to utilities such as plumbing. The crawl space can also allow for easier and less costly repairs to foundations when repairs are needed.

Common Concerns with Pier and Beam Foundations

While the crawl space provides flood protection, it also causes one of the main disadvantages of pier and beam foundations—since the area is shaded all day, moisture can easily build up and cause the wooden supports to rot if the area is poorly ventilated. In areas of flooding or plumbing leaks can increase this risk of damaging moisture under the foundation. The crawl space can also cause a risk of bug or pest infestation, though this can be prevented with a lattice across a pier and beam foundation.

Flooring in homes that are built on pier and beam foundations can have less support than a concrete slab, so squeaking can be common, but there are also ways to prevent creaks by positioning shims between joists and floorboards.

Well Laid Home Foundations That Last

Your foundation is vital for keeping your home standing—but what makes a great foundation last?

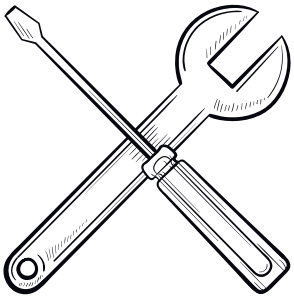
1. No Shortcuts: Builders can't take any shortcuts with time and budget. A strong foundation needs the highest quality materials to be strong and effective. A foundation should be made from poured concrete and steel-reinforced walls.

2. Don't Rush: Curing the concrete is time consuming, but it's necessary. For a foundation to be at full strength, it needs about four weeks of slow curing time.

3. Quality Soil: Anything and everything that foundation lays on can affect the integrity of it. That's why soil is so important. Making sure your foundation is laid on the highest quality soil that is property compacted will be essential to maintaining a solid foundation.

4. Concrete Timing: Concrete needs to be poured in a continuous action, otherwise it could dry at different times and the foundation won't be as strong as it can be.

Top Causes of Foundation Damage & How to Prevent Them

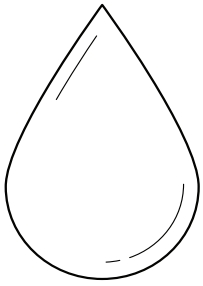


Poor Construction

Not every builder is the same, and some contractors may work with materials that are below-grade. One area to never cut corners when a house is built is with the foundation, but you never know what you will get when purchasing a house that is already built. If you're purchasing an older home, make sure to bring in an inspector. If you are working with a builder, make sure they are using the highest quality materials for your home.

Soil

Some areas of the country have higher rates of foundation trouble, especially where homes are built on clay soil as they often are in Texas. Clay is more malleable and can easily expand and contract, especially under pressure. Aside from clay soil, people may find trouble with foundations if the fill dirt below the foundation wasn't compacted properly, which is why it's important to make sure the builders are following code and compacting up to standard.



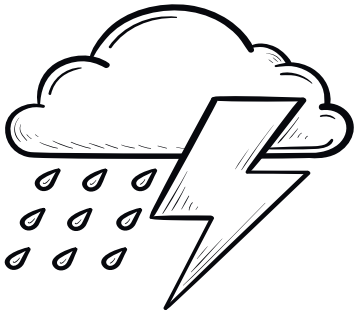
Plumbing Leak

A plumbing leak beneath your home is big trouble for your foundation for a few reasons—they are hard to identify, access, and repair, and they also cause an increase in soil moisture under your home. When leaks aren't detected early, the integrity of your foundation could be in trouble.

Top Causes of Foundation Damage & How to Prevent Them

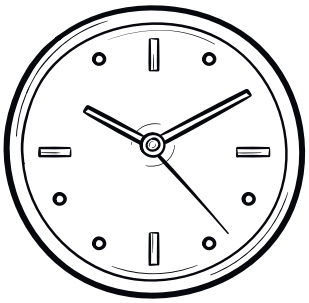
Weather

Drastic weather cycles can have a major impact on foundations. For example, if your areas fluctuate between droughts and floods, the soil moisture expands and contracts which could make the foundation shift. Similarly with areas that have regular freeze/thaw cycles. This can be prevented by using foundation watering systems during droughts and in-ground drains during wet seasons.



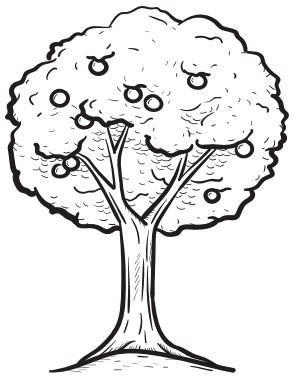
Aging

While using high-quality materials and properly installing foundation can make it last a long time, it's common for foundations to deteriorate after 10-15 years from normal wear and tear. Even in the most strongly built homes, foundation repair will be needed after a few decades. That's why it's necessary to have a foundation inspection regularly, and that you bring in an engineer at the first sign of trouble to perform maintenance before things get really bad.



Tree Roots

If you want to plant trees around your house, make sure to consult with a professional landscaper. Some trees grow very deep and long roots that can affect your foundation. Roots can either grow under the foundation, raising it, or they can suck up the water from the soil leaving the soil dry and causing the foundation to settle unevenly.



8 Signs Your Home's Foundation May Be Failing & What To Look For

The list of potentially expensive home repairs is long, but for most homeowners a home's foundation is at the top of that list. Knowing how to spot foundation issues early is crucial to prevent expensive damage to your home. These are 10 warning signs of foundation issues that you should look out for:

1 Cracks and Fractures

Usually, small, fine cracks in exterior walls or in the steps aren't anything to worry about. It's normal for foundation to sink and develop tiny cracks up to 1/16" soon after construction. What should cause worry are large horizontal cracks, gaps in the foundation, or zig-zag patterned cracks—those may mean there's something wrong with the foundation. Even a ¼" gap can mean that your house may be experiencing more than an acceptable amount of settling. Moderate wall and foundation cracks can mean weakening or damaged foundation. Floor cracks, wall fissures, cracks in the junctions of walls or ceilings, and broken chimneys can also mean big trouble to the structure because these are signs that the foundation has moved and shifted.

2 Rotten Wood

Especially in pier and beam foundations, rotten wood can be a sign that humidity in the basement is too high, your crawl space has experienced a flood, or that you have an infestation of termites. It's better to get someone to take a look sooner rather than later to make sure there aren't major foundational issues with the home.

3 Foundation Upheaval

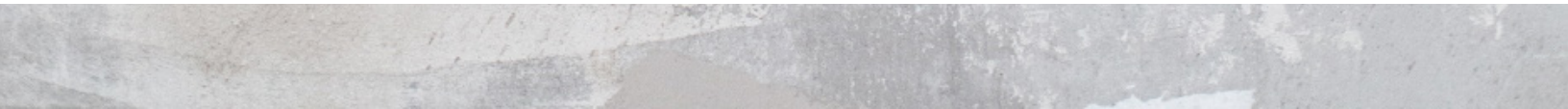
If a slab foundation has moved in an upward direction, this means that your foundation is experiencing the opposite of settling and this can cause extensive damage. Often this issue impacts hallways, doorways, and outside garage walls. This happens to slab foundations when moisture gets under the slab due to rain or plumbing leaks, then the soil expands due to a freeze/thaw cycle. This puts pressure on the foundation, and cracks soon become visible.

4 Uneven or Sagging Floors

Most people don't even realize that their homes have uneven floors until they spill some water or drop something round and it rolls in one direction. The big concern for foundations is if the gradient of the floor is more than one or two inches. Sagging or bouncing floors could mean two things: that the wood is rotting which is a sign of leaking foundation, or that the foundation has shifted and caused pier and beam foundations to sag and squeak. Sagging floors or broken floorboards could be a hazard inside the house, but uneven floorboards likely mean foundation issues that need fixing as well.

5 Gaps Around Windows and Doors

When windows or door frames have gaps and are pulling away from the wall, this is a serious sign that the foundation needs immediate help. Similarly, kitchen cabinets or countertops begin to tilt and pull away from the wall when there are foundation issues. The first sign is separation of caulking, so if you see this happening, it may be worth getting someone to come take a look before things get worse.



6 Tile Cracks

Many things can cause tile cracks, but if you're seeing tiles cracking in the kitchen or bathroom along with other signs of foundation damage, you have serious signs of foundation trouble.

7 Doors Don't Open or Close Properly

Very few homes are at their peak condition after a few years of settling, so it's likely every home will have it's issues, but something to look out for that could mean foundation issues is when doors are out of square or don't open and close properly. When foundations are off, interior and exterior doors may both have issues. Exterior doors can drag at the threshold or hang at the top unevenly. Interior doors are more likely to stick or drag at the top. Double doors like french doors may not meet in the middle or they hang funny. Sticking doors could also be an issue of humidity, so make sure to look for this sign in conjunction with other signs of settling.

8 Damp Basement or Crawl Space

In addition to rotting floorboards being a sign of foundation trouble, heavy moisture in a crawl space can also be a sign that the foundation is developing trouble. Damp spaces are trouble on many fronts—mold and mildew can make your home smell bad and cause health hazards, moisture attracts termites and other rodents, and of course, moisture causes wood to rot and fall apart. There are a few ways to prevent dampness in the crawl space, depending on the climate of where you live. If you live somewhere where it rains and floods often, a foundation drainage system could be beneficial. A polyethylene vapor barrier can also be installed in a crawl space to prevent water from evaporating from the soil and making the crawl space damp.

Does it Need Repair or is My House Just Settling?

How do you know when your home needs residential foundation repair versus natural settling?

Settling is the all-encompassing term used to describe natural changes that take place in and under a foundation over the years. Over time, a new home will gradually sink into the ground, and of course how much will depend on soil composition and climate. There is no exact science on how much a foundation will settle over time, but good builders who know the area and soil can make a good prediction.

Every house sees settlement over the years—a few inches of settlement is usually nothing to worry about.

When you should worry is if your home has ongoing settlement well beyond the first few years and that settlement is causing moisture or compromising the structural integrity of the foundation.

Only a structural engineer or foundation repair contractor in your area can determine if your home needs foundation crack repair, underpinning, and other such work. To know when it's time to call a foundation repair company near you, note some vital information about settling as well as signs of residential foundation damage. Remember, too, that if you're unsure about damage to your home's foundation, call a foundation repair contractor for an inspection just to be sure and so you can get those repairs done quickly.

What to Expect From a Foundation Inspection

If you're seeing any signs of foundation issues, a home foundation inspection by a qualified structural engineer is necessary. Here's what you should expect from an inspection.

Visual Walk Through
The engineer will then inspect inside,outside, and under your home, looking for any kind of damage, cracks, separations, leaning/listing walls or doors, sticking windows and doors, or any other observable evidence of sinking or cracking foundation. Under the home, in the crawl space, the inspector will look for signs of moisture, including wet spots, rotting wood, or even just musty smells.

Floor Evaluation Survey
Your inspector will then gather floor elevation data to determine whether the foundation is out of level. The contractor can even check walls, trim, cabinets, and doorways to see if they are level.

Analysis and Report
If the inspector does find foundation trouble, they will need to determine why it's happening and come up with a solution. They will verbally explain the findings of the inspection, and likely offer a report along with recommendations on how to fix it.

An In-Depth Interview
An inspection typically begins by meeting with the inspector where they will ask you questions about your concerns and what you've observed in your home. At this point, you should inform the inspector of the issues you've noticed along with a timeline of when you began to notice them.

Repair Methods for Foundation Damage

So you've spotted the signs of foundation issues and you know you're in need of repairs—what options do you have? Your repair needs will greatly depend on many factors, including soil type, climate, the type of foundation you have, how extensive the damage is, and more. A consultation with a foundation repair expert will be able to give you in depth details of your foundation issues and give you a personalized recommendation on how to solve it, but here are some of the typical foundation repair methods:

Pier & Beam Foundation Repair Options

1. If water is the primary source of damage, a drainage solution may be recommended.
2. If existing piers are up to industry standards, they may be releveled.
3. If new piers are needed, they will be installed in critical areas to reinforce and stabilize the home.
4. If concrete footing looks compromised, a new one may need to be installed.

Concrete Slab Foundation Repair Options

1. Helical, concrete or steel piers or beams may need to be installed along the home's exterior. These beams help compact the soil and add strength to the foundation.
2. Slabjacking: Foundation jacking may be needed to inject materials like high-density polyurethane foam or grout under the foundation into the soil to boost it up. The foam expands and hardens to correct cracks.
3. The heavier and larger the home, the stronger the foundation repair must be.

What is House Leveling?

House leveling refers to returning or restoring a house to a level and even position, original to when the house was constructed. House leveling, slab jacking, and other foundation repair services allow for structural damage repairs while protecting a home from future damage.

Common signs of needed house leveling include:

- **Stuck cabinets, windows, & interior doors**
- **Sloping or warped floors**
- **Cracks along interior floors, walls, and ceilings**
- **Leaning or cracked chimney stacks**
- **Interior and cabinet doors that swing open or don't close completely**
- **Severely cracked plaster walls or ceilings**

While interior wall and ceiling cracks and other signs of needed house leveling might be the result of water damage and other such causes, it's vital that homeowners schedule house leveling services as soon as needed. Neglecting this service allows that damage to get worse over time while also increasing the risk of interior water leaks and resultant mold growth, electrical systems damage, and a collapsed chimney.

When is House Leveling Needed?

The best way to determine if you need house leveling is to schedule a foundation inspection from a foundation repair contractor. They can note any unevenness and damage to a home's foundation and measure the level of sinking exactly.

A foundation repair contractor can also note the risk factors for your home, given the level of damage to a foundation. However, a homeowner might also note some signs of needed house leveling, so you don't put off this work and are sure to call a foundation repair person as soon as possible:

- Visible cracks in the walls are one of the most obvious signs of needed house leveling. When a home shifts, settles, or tilts, this puts undue stress on sections of interior walls which then tend to crack or split.
- Entryway doors and windows stick or refuse to close also typically mean that your house is sinking or sagging! When a door or window frame tips or tilts, the door or window pane might not go with it so that it then sticks inside the frame. If they all tilt together, the door or window might hang downward and be difficult to close.
- Gaps between walls and ceilings are also a sign of needed foundation repair. As a house shifts and sags, wall studs and other parts of its framework might pull away from roof beams and joists. You might then see cracks or gaps running along the top of the wall where it should meet the ceiling.
- Sloping floors and other unlevel surfaces in the home often typically mean that your house needs leveling. If items on shelves suddenly start to slide or look lopsided, or if you put a ball in the middle of a floor and it starts rolling on its own, you probably need house leveling.
- Swelling basement walls often indicate a sloping side of a house and the need for house leveling.
- Bowing or sagging wood floors in the home might indicate a sunken area that needs jacking up and leveling.

Advanced Foundation Repair Techniques

From a construction prospective, some landscapes present unique challenges. Primarily, the different weather conditions each season brings has a huge impact on soil moisture content. For example, some summers may bring rain while others may be bone dry. Rain causes clay soil to expand creating pressure against a home foundation. When this moisture evaporates, the soil contracts, becomes less supportive, and the foundation can shift. If foundation issues, such as cracks, are present, it is best to consult with a foundation repair specialist.

Advanced foundation repair techniques that not only fill the cracks and level the structure, but also address underlying causal factors.

4 Advanced Techniques for Foundation Repair

1 Helical Pilings

Helical pilings, also referred to as screw piles, are another technique used for advanced foundation repair. They are drilled into the ground much like a metal screw through a block of wood. The benefit of helical pilings is that installation requires less effort, and therefore, are sometimes more cost effective. Helical pilings are generally recommended for slab or pier and beam foundations that are not heavy. Depending on the foundation strength and depth, helical pilings are worth considering, but should also be avoided in some circumstances. Helical pilings can be extremely effective for house and foundation leveling.

2 Mudjacking

In the foundation repair industry, concrete is often referred to as mud. Therefore, mudjacking or slab-jacking is the process of raising and repairing a slab foundation by pressure injecting concrete underneath a foundation. Usually, a lower strength concrete is used to facilitate this advanced foundation repair technique. Some homes with foundation problems are not always compatible with this strategy, but it can be useful when conditions are appropriate. For homes where mudjacking is not a good option, a variety of other advanced foundation repair methods are utilized to effectively repair the foundation.

3 Concrete and Steel Piers

Concrete piers are used as cost-effective foundation supports that are placed under a home. They are especially effective for combating clay soil conditions and can be drilled or poured into the earth around and under a structure. Pressure around 10,000 psi is used to drill the piers around 10-15 feet below the foundation. Piers can also be created by pouring concrete directly into manufactured holes around the foundation. Both poured and drilled piers are often reinforced with rebar and it can take 1-2 weeks before the piers have set fully. Steel piers, which can be drilled much further into the ground, are used in more advanced foundation repair. Clay soil is notorious for expanding and contracting frequently, and therefore, it's sometimes necessary to use a stronger material like steel. Like concrete piers, these are drilled into the earth, but can reach incredible depths of 60 or 70 feet.

4 Soil Injection

Soil injection, or injection stabilization, chemically alters the soil using potassium ions. For advanced foundation repair, this technique is sometimes required due to the expansiveness of the clay soil. Penetrating the clay with a potassium based chemical solution results in a more stable soil zone. Therefore, any future shifting and heaving of the foundations is drastically reduced or non-existent. Soil injection is a cost effective solution to digging up and replacing clay soil during construction. Since it permanently reduces soil swelling, it is an extremely effective advanced foundation repair strategy when other means are ineffective.

5 Reasons To Repair Your Home's Foundation

Before you decide that you can put off foundation repair for another year, you might note these reasons why concrete crack repairs are so vital. This will ensure you call a foundation repair contractor and have those cracks patched and filled or have your home underpinned as needed.

1. Cracks in a structure's foundation allow water to seep in. Don't underestimate the extent of damage caused by water leaks in a foundation, as a structure's wood framework absorbs this moisture and then softens and cracks itself. Excessive dampness and water in a home also increase the risk of mold growth and attracts insects and rodents looking for a water source.

2. Foundation damage affects your home's overall value. You might not think much of the value of your property if you're not considering putting your home on the real estate market, but note that a house's value is considered when you apply for a home equity loan or any other such secured loan.

3. Small cracks in a foundation and other such minor damage only gets worse over time. The weight of a structure, pressure from surrounding soil, and other such factors will cause small cracks to spread and allow larger sections of a structure's foundation to chip and crack. Repairing a foundation now will avoid that damage and keep foundation repair costs contained.

4. Foundation repair helps avoid damage to the structure's interior. As a bad foundation continues to crack, chip, or otherwise suffer damage, a home or commercial building will shift and settle with it, allowing cracks to form along interior walls, ceilings, and floors. Foundation repair helps avoid this damage and the cost of patching or replacing interior building materials.

5. Repairing foundation cracks and other damage helps contain your utility costs, as heating and cooling is often lost through cracks in a foundation as well as resultant gaps around windowsills and door frames. When a structure's foundation is strong and stable, you avoid these resultant gaps and keep your structure's interior dry and comfortable year-round.

Getting Started with Foundation Repair

Foundation isn't a do-it-yourself project, but it also can be expensive, so it's important that you get the most out of what you're paying for. Here are some tips for hiring a reputable company for your foundation repair.

Ask Questions

Educate yourself on the options and make sure that it's the right choice for your needs and your budget.

Think Quality Control and Safety

Look for contractors that are highly knowledgeable in their field and will correct foundation issues safety and securely.

Find a Reputable Contractor

Look for honest, trustworthy, and reliable companies that have experience and train their contractors to provide quality work.

Look for Good Reviews

Every company will say they're great, but if you want honest reviews and feedback, ask family and friends for recommendations, or look to sites like the Better Business Bureau to get good feedback.

Warranties and Guarantees

Pay attention to the terms: a warranty is as good as the company that backs it. Make sure the company has a plan to provide follow-up services if needed.

Foundation Repair Options

Your foundation repair options will depend on the type of foundation holding up your home or commercial structure, the type and extent of damage to the foundation, and if you want to invest in strengthening your foundation against future damage while repairs are made.

- Cracks wider than 1/8” need repairs. If your foundation has cracks larger than 1/8”, it’s also recommended to consult with a structural engineer, to note if your home or business is sinking, shifting, or otherwise in danger of future foundation damage. Silicone or other patching materials are injected into the cracks and allowed to dry.

- A leaking foundation requires more extensive crack repair as well as waterproofing or sealing. A foundation excavator typically digs around the structure’s foundation and fills those larger cracks with fresh cement. Waterproofing membranes are then applied to the structure’s interior.

- A sinking foundation requires raising and then securing with piers or mud jacking. A sinking foundation often signals problems with soft soil or improper drainage. These issues need addressing, which then adds to your foundation repair costs.

- Bowing basement walls are often the result of poor soil conditions and excess moisture around the home. The soil might need treatment with clay or another stabilizer, and bracing or reinforcement added to the structure’s basement walls.

Expected Cost vs.
What You Could Lose

It pays to be proactive about foundation damage:

Basic Fix for Smaller Cracks: as low as $500
Substantial Structural Support: $1,972 - $6,978
Severe Foundational Damage: $10,000+

Stats Courtesy of HomAdvisor

What you should expect to spend depends on the severity of the damage. For smaller cracks that just require an injection of foam or epoxy, you can pay as low as $500. This will keep out water and keep cracks from growing.

More substantial structural support requires attaching steel braces inside of basement walls at $600 - $700 each, plus a large anchor that run across the foundation wall at about $500 each, which will cost more than $5000 total.

Major foundational damage requires slab jacking or hydraulic piers will cost homeowners more than $10,000.

Is Foundation Repair Covered By Insurance?

Since major foundation repair costs are often a bit steep for most homeowners, many wonder if foundation repair is covered by insurance. The short answer is that homeowner's insurance typically does not cover the cost of foundation repairs. In most cases, fixing foundation cracks that are the result of age or shifting and settling is considered standard home maintenance.

However, a homeowner's insurance policy might cover the cost of foundation repairs if the damage was caused by an event covered by your policy. For example, if a plumbing pipe were to burst and flood the basement and cause resultant leaks in the home's foundation, repairs might be reimbursed by your insurance provider.

Also, if you carry a flood insurance policy and your home's foundation is damaged by an outside flood, repair costs might then be reimbursed. To find out if foundation repairs are covered by your insurance policy, ask your insurance agent about your coverage and what is included.

Finding the Right Foundation Repair Service

For foundation repairs it's important to find engineers that have decades of experience in slab foundation repair. Teams that take staff training very seriously and effective communication is a big part of making sure your foundation repairs are made efficiently, safely, and minimally intrusive to your lifestyle. Ignoring the problem can result in more expensive work in the long term—

So get an inspection from a trusted company and get ahead of major damage with foundation maintenance and repair today!

A Word From Our Experts at

Chattanooga Foundation Re-

If we told you that all foundation repair companies provided services up to our standard of quality, we'd be lying. Unfortunately, contractors and strucutral engineers a like often have a bad reputation in our business for cutting corners and taking advantage of unsuspecting homeowners.

At Chattanooga Foundation Repair Experts, our steadfast goal is to break this cycle. We operate with a client centered mindset, taking the time to give every client the best possible experience while keeping them informed.

Furthermore, this is the main reason we put this e-book together for you. Our foundation company wants to spread the word about foundation repair to help homeowners ask direct questions to their contractors and also understand their house a little better. When you hire a foundation repair company, make sure they're honest and recommend what's best for your home.