



Questions Homeowners Ask

1. Why do I have cracks in my brick veneer?

There are dozens of reasons why cracks develop in brick veneer. These include differential foundation settlement, brick expansion, brick shrinkage, steel lintel expansion, steel lintel sag and reflective cracking, among other things. The main thing to understand about brick veneer is that it is very brittle and cannot withstand much stress without cracking to relieve the stress. Very minor amounts of differential foundation settlement can lead to unsightly cracking in brick veneer whereas minor amounts of settlement will generally not cause cracks in gypsum drywall and masonry/concrete foundation walls. The wood frame superstructure also doesn't care about minor settlements. A very important thing to understand is that brick veneer is not a structural component of the home. In other words it is not load-bearing. It doesn't serve any structural function. It doesn't support the roof or ceiling and it doesn't resist wind load. It is simply a protective weather barrier. Hence, small cracks in brick veneer, whatever their cause, do not represent any type of major concern. However, if you contact a foundation repair contractor (and some engineers, unfortunately), they will usually tell you that all brick veneer cracks are a sign of foundation failure, and so some type of foundation repair is needed. This is simply not true.

2. Why do I have cracks in the brick veneer above my garage door?

Brick veneer is fairly heavy and tall brick walls above double-wide garage doors place heavy loads on the steel lintel that spans across the top of the door and supports the overlying brick. Unfortunately, there are no steel lintels that can be purchased which can span 16 to 18 feet and support more than about three feet of brick. The standard 4-inch by 4-inch by 3/8-inch steel angle used most often in residential construction cannot span 16 - 18 feet and support any brick weight without cracking! For heavy brick veneer loads, the steel lintels need to be bolted to the wood or steel header beams that span above the garage door and which support the weight of the wood frame building structure. These headers need to be sized for the building loads plus the brick load and they must be very stiff (non-deflecting) in order to prevent cracking in brick veneer. If you have a sagging garage door lintel and cracked brick there may be hope for repair. It may be possible to jack the sagging lintel back to level and bolt it to the header beam. This requires a structural analysis of the existing header and the repair should only be performed by an experienced contractor.

3. Why do I have cracks in my foundation walls?

There are generally three types of cracks in masonry and concrete foundation walls: vertical cracks, diagonal (or stair-step) cracks and horizontal cracks. Vertical cracks and stair-step cracks near the centers of long walls are usually shrinkage cracks which do not reflect any type of major problem. Stair-step and diagonal cracks can also indicate differential foundation settlement and may be of some structural concern. Horizontal cracks typically form in tall, below-grade, crawl space and basement foundation walls which have excessive lateral earth (soil backfill) pressure exerted on them. The cracks are caused by tensile stresses from the wall bending or bulging inward between the lower foundation and upper floor structure. These types of cracks generally indicate a serious structural problem and need to be evaluated by a professional engineer. Typical repairs for serious settlement cracks may involve foundation underpinning. Typical repairs for bulging basement walls may involve reinforcing the wall with either carbon fiber straps or steel rebar, or installing helical tie-back anchors.

4. Why do I have cracks in my concrete floor slab?

There are basically two types of concrete slab cracks: shrinkage cracks and settlement cracks. Most of the time, slab cracks are shrinkage cracks which typically cause no problems unless they lead to cracking in adhered interior finishes. Even if the later occurs, this is not a serious structural problem and fairly simple repairs are available. For more information about slab cracks and how to repair damaged floor coverings, please click on the attached PowerPoint presentation.

5. Why do I have cracks in my drywall?

There are a multitude of reasons why interior drywall develops cracks. These include: wood framing shrinkage, floor/ceiling sag, foundation settlement and thermal/moisture-related expansion/contraction. During the early phases of house construction, the wood frame skeleton is exposed to direct rainfall and then later on, the wood framing is exposed to outdoor humidity. Once a home is finished and occupied, the central heating and cooling systems are employed and the wood frame structure begins to dry to a low level. During this drying, the wood framing shrinks dimensionally and this can cause drywall cracking around windows/doors and at seams or panel joints. These types of cracks can usually be repaired during the first year after construction and never come back. Whenever heavy walls are located near the centers of long joist/beam spans, the floor can develop sag and this can lead to wracking of interior doorways. This wracking distortion can lead to shearing stresses in the drywall which in turn can lead to cracking. Floor sag can also lead to ceiling cracking. Interior foundation pier settlement can also lead to floor sag and drywall cracking around interior doors. Similarly, perimeter foundation settlement can lead to drywall cracking around windows and doors. These types of cracks generally require some type of structural repair in order to make effective and successful crack repair. Perhaps the most mis-diagnosed drywall cracks are caused by seasonal humidity and temperature changes. These types of cracks typically form at points of natural stress concentration such as at abrupt changes in geometry or around reentrant corners. Repairs for these types of cracks typically require the use of control joints in the drywall.

6. Why do I have cracks in my ceiling?

Moisture damage from above the ceiling, either from the floor above or from damage to a roof, can cause significant ceiling damage. Cracks may appear along with crumbling, discoloration or peeling paint. Also, if your ceiling has drywall tape affixed to it, the tape may separate from the ceiling and hang down in strips. The combination of moisture and temperature fluctuations can also cause ceiling cracks. Building materials expand with warm air and moisture and contract with dry air and cold temperatures. This fluctuation between expanding and contracting can cause stress fractures in your ceiling. The use of inferior quality drywall tape can also lead to ceiling cracking, as well as applying the joint compound in too thick of a layer. The type of drywall installed in a ceiling and the way it was installed can have a significant impact on how the ceiling holds up over time. Because your cracked ceiling has another floor or an attic above it, it's possible that weight and force from the floor above might cause ceiling cracks. Bathrooms on a floor above need specific floor/ceiling support to carry the weight of the fixtures. Even improperly installed insulation above the ceiling can contribute to sagging and cracking in a ceiling. If it's not possible to remove or redistribute weight on the floor above the ceiling, you will need to reinforce and strengthen the ceiling to enable it to hold the weight efficiently. An inferior foundation can cause significant structural issues and damage to a home, including ceiling cracking. Sometimes the house foundation is set without effective drainage or the ground may even move to disrupt the foundation. Substandard construction of the foundation is another common issue that results in ceiling cracking. Ceiling cracking that occur due to a poor foundation will often occur near load bearing walls, indicating the reduced capability of the load bearing walls to support the home. If you notice foundation issues, it may be possible to repair the structural damage with underpinning. It is important to understand that not all ceiling and drywall cracking within a home can be attributed to foundation failure. As you can see in this list provided, foundation failure is lower on the list of reasons for cracks in ceilings.

7. Why do I have floor sag?

Probably the most common cause of floor sag in residential construction is lack of support (main beams and foundation piers) beneath heavy or load-bearing room partition walls. This often occurs at central hallway areas where the hallway walls support second floor loads (in two story homes) or roof bracing and ceiling loads (in single story homes). Unless there are main beams and foundation piers placed under these walls, the weight of the walls can cause sag in the supporting floor joists. Sometimes a main beam is placed under one side of the hallway and sometimes the main beam is placed at the center off the hallway. Both can lead to floor sag as shown in Figure 1. A relatively simple repair would entail constructing a new beam and series of foundation piers/posts under the unsupported wall(s) and jacking the sagging floor back to level. Unfortunately, there are often several obstacles that can make this simple task complicated, including interferences of duct work, piping and electrical wiring. Other causes of floor sag include long-spanning floor joists or main beams and settlement of interior foundation piers. The former can be corrected by adding additional mid-span support. The later can be corrected by either shimming the settled piers or removing/replacing them.

8. Why do I have ceiling sag?

The primary cause of ceiling sag is structural over-load. This can be due to long ceiling joist or main beam spans, the application of heavy loads on ceiling joists from overlying room partition walls (in two story homes) or roof bracing. Unfortunately, there is no simple repair for these types of problems and repairs usually require removal of drywall and the addition of new structural supports.

9. Why do I have roof sag?

In stick-framed roofs, sag is usually caused by lack of mid-span rafter bracing or sag/settlement of the underlying supports for the mid-span rafter bracing. Repairs for this type of problem entail the construction of mid-span supports or correction of the sag/settlement problems in the rafter bracing supports. Sag in roof trusses (light-gage-metal-plate-connected wood trusses) is usually related to improper design/fabrication/bracing or by structural damage to some of the truss components. Tall, long-spanning roof trusses usually have long interior web members which have large compressive forces. If these long compression members are not laterally braced, they will often buckle or bow out of plane and the entire truss will sag. If any truss members are cut or broken during or after installation, the entire truss becomes compromised and sag will occur. Trusses are basically a series of uni-axial "pin-connected" members which are either in compression or tension. If one member of the truss is compromised, the entire truss becomes compromised. It is not unusual for sub-trades (plumbers, HVAC technicians and electricians) to cut truss members after installation in order to install ducts or drains or wiring. Repairs require a structural analysis of the truss and the design of new replacement members and the use of nailed/screwed- plywood gusset plate connections.

10. Why do my walls lean out?

This typically only occurs in rooms with tall, cathedral ceilings. The problem is actually caused by the failure to utilize a strong/rigid ridge beam to support the ceiling rafters. If no ridge beam is used, the ridge will sag and the walls will lean out. This can be a very serious structural problem and is unfortunately very difficult to repair.