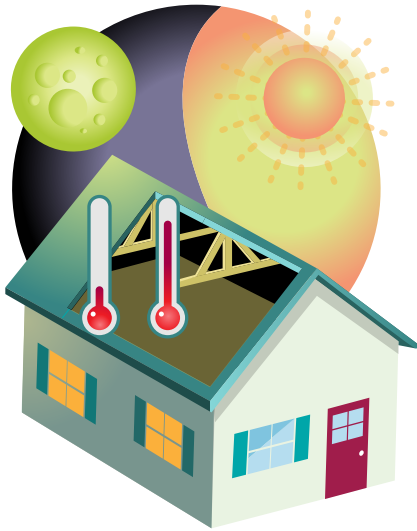


Builder Education Series

by Walt Keaveny, Risk Manager, MS, PE, PG



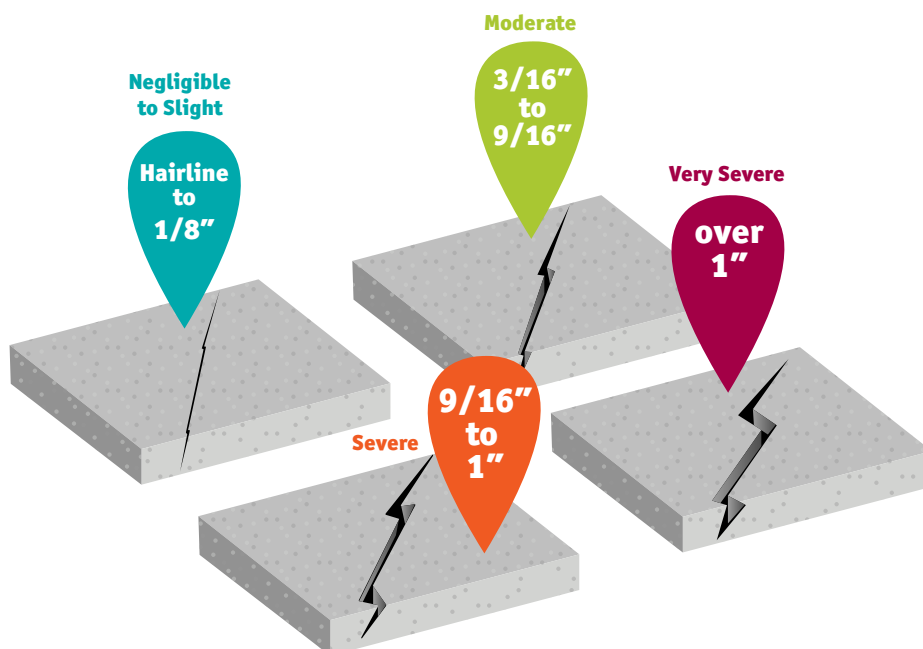
Misconceptions about *the common crack*

Are you concerned about cracks in your house or building? Cracks can be unsightly, but are they an indication of serious structural distress or possibly an unsafe condition? Cracks appear in brittle materials such as concrete, sheet rock, tile, wood, stone, brick and stucco. Structural distress does cause cracks, but the vast majority of cracks are not structural in nature.

Cracks are most commonly caused by expansion and contraction of building materials due to changes in moisture content and temperature. These types of cracks do not represent a structural concern. Concrete, mortar, grout and stucco can shrink and

crack for months after construction as they slowly dry and lose moisture. Shrinkage cracks in concrete floor slabs are expected and very common and do not compromise structural integrity. Wood framing, wood floors and trim can also shrink as the woods dries and becomes acclimated to lower inside humidity. Temperature changes cause construction materials to expand and contract daily and seasonally. For example, the temperature difference between the exterior and interior sides of a wall can cause as much as 1/2" of bowing stress daily. The temperature in an attic can fluctuate daily by as much as 100 degrees Fahrenheit. Cracking is expected and that is why builders use construction joints in materials such as concrete, brick, stucco and tile. The joints allow for stress relief in the form of controlled cracking along a pre-determined alignment. Cracks often emanate from doors and windows since these wall openings act as large construction joints to relieve stresses.

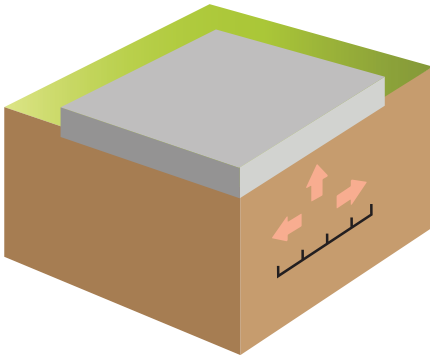
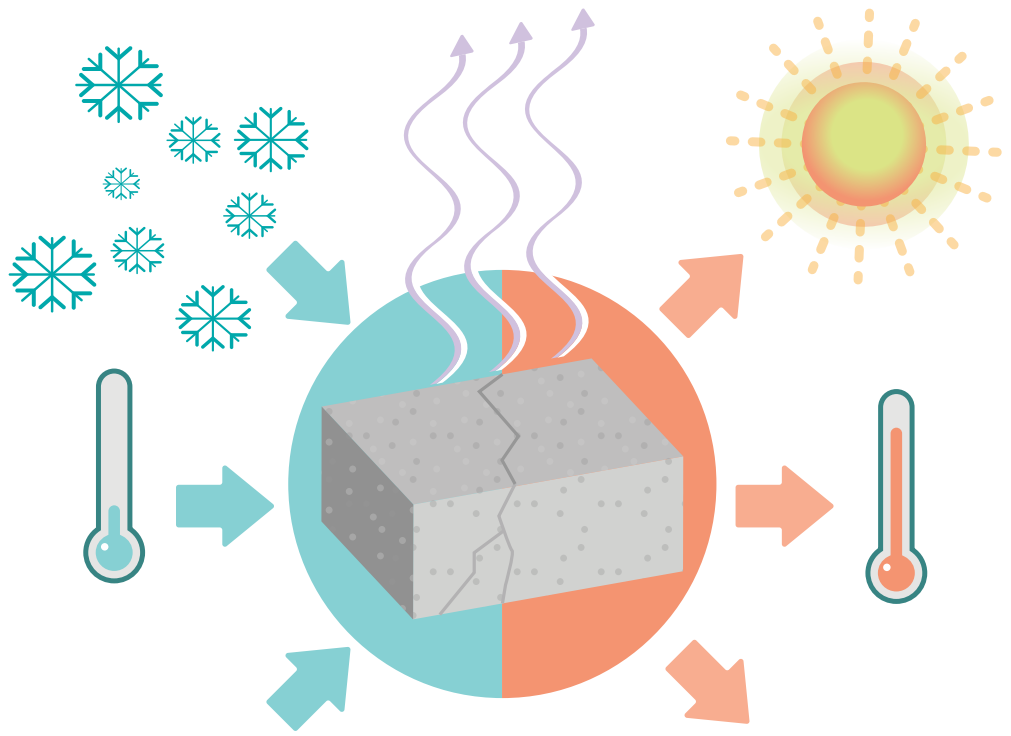
The temperature in an attic can fluctuate daily, by as much as 100° Fahrenheit.



It is important to note that all foundations on soil move to some degree. Soils that support the foundation may consolidate and settle due to the weight of the house, they may shrink and swell due to soil moisture fluctuations or they may heave due to frost activity. Most foundations are designed for up to 1" of soil movement; however, in highly expansive soil areas, slab foundations can be designed for up to about 4" of soil movement. When the foundation moves, the entire structure moves with it causing some

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degree of racking, distortion and cracking. The foundation should be designed to maintain structural integrity as it moves, but some cracking is inevitable. In new homes and buildings, it takes time for soils to adjust to the new foundation and landscape irrigation, and that is why builders prefer to wait until near the end of the typical one-year workmanship warranty period to make any repairs. Cosmetic repair of common cracks is considered routine long-term home maintenance.

The vast majority of cracks are cosmetic, but how can you tell if a crack does represent a structural concern? As a general engineer's guideline, cracks that are hairline up to 1/8" in width are considered negligible to slight, 3/16" – 9/16" are moderate, 9/16" – 1" are severe and over 1" are very severe (Forensic Geotechnical and Foundation Engineering, R. W. Day, 2011). Cracks alone are not necessarily indicative of a structural concern. Cracks are more likely to be a structural concern if accompanied by other indications of structural distress, such as inoperable doors and windows or excessively sloping floors and

surfaces. Cracks with significant vertical displacement across the face of the crack may indicate a structural concern. Cracks in basement walls, especially horizontal cracks, accompanied by bowing or leaning of the wall, are cause for concern.

If in doubt about the seriousness of cracks, retain the services of a qualified professional structural engineer, licensed in your state. The engineer will make observations, take photos and gather measurements. A floor elevation survey may be conducted to evaluate structural deflection (bending) and tilt. The measurements and survey may be used as reference points, if needed, to compare to any future measurements and survey. The engineer may recommend remedial measures such as drainage improvements, landscape adjustments, rain gutters, foundation watering or foundation repair. The best time to make any cosmetic repairs is when foundation movement has ceased. If the home is covered by a third-party structural warranty, the warranty company has qualified warranty administration personnel that can answer questions over the phone.