EVALUATING CRACKS IN BUILDINGS

by

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Cracks are an indigenous, undesirable feature in many buildings. Some cracks are a result of wear and tear, while others are related to construction or design defects. Expansion and contraction of soils, consolidation of soil, vibration, wind, snow loading, overloading and impact are some causes of cracks in buildings. Insurance coverage for repair of cracks may be extended or denied depending on determination of the cause of the crack.

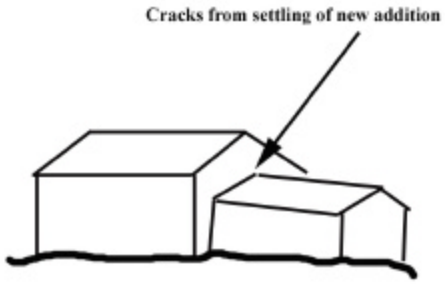

Figure 1

Figure 1 is a classic example of how cracks form between sections of a building. A new addition has experienced settling as a result of soil consolidation at the new foundation. This tends to stress the interface between the two buildings, causing cracking at the interface. Because of the discontinuity at the interface between the old and new addition, soil movement from expansion and contraction can also cause cracks.

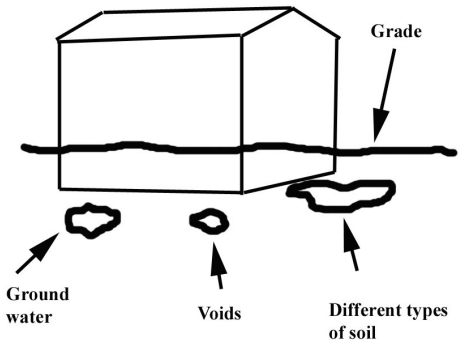

Figure 2

Figure 2 shows crack formation from other soil related influences. Ground water can cause soil erosion and reduction of soil compressive strength, reducing load bearing capacity of the foundation, stressing and cracking building materials. Soil voids from improper or insufficient compaction of the sub soil have a similar effect. Different soil types have characteristically different bearing strengths and can cause foundation movement related cracks.

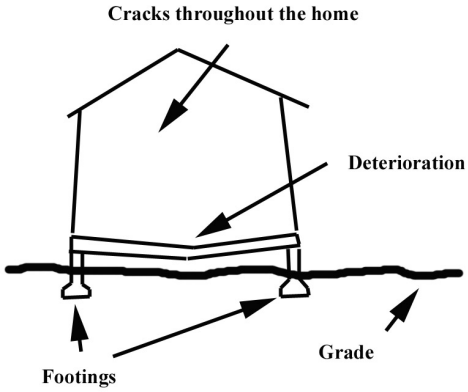

Figure 3

Figure 3 illustrates failure of a structural member, which can occur for a variety of reasons such as a defect or deterioration. This stresses other building components, promoting crack formation.

Figure 4 is a rotten set of floor joists that have deflected sufficiently to crack wallboard in the room above. This is an example of the failure mode shown in Figure 3 - deterioration of the support structure.

Figure 4

Figure 5

Figure 5 is an example of a partial collapse of a foundation, which is common among older stone foundations. Mortar has deteriorated and stones have fallen into the basement area. The loss of structural foundation support has caused cracking of drywall in the building interior. This is a form of deterioration.

Figure 6

Figure 6 is a view of a typical garage floor slab X pattern crack, a symptom of up and down soil movement over time. Chunks of dust and concrete debris have become embedded in the cracks, suggesting that they have formed over time. This is a form of settling.

In Figure 7, flaking and fracturing of brick and mortar joints has caused structural instability and further cracking in the brickwork that is not deteriorated. This type of cracking is typically long term related and a form of deterioration.

Figure 7

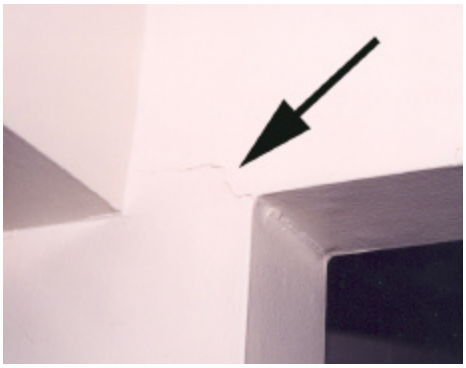

Figure 8

Figure 8 is a crack in wallboard at a corner feature. The crack tip is very thin with increased thickness at the initiation point, the corner. Dust and paint in the crack at the initiation point suggest this crack was developing over time. This is a result of settling.

Figure 9

Figure 9 shows a long crack in new wallboard with a width of about an inch at the corner of the door frame - a relatively large crack displacement. This crack was formed instantaneously as a result of a natural gas leakage fueled explosion in the building.

Figure 10

Figure 10 shows cracking of wallboard in an upstairs bedroom in the center of the home as a result of truss uplift (Claims Magazine, February 2001). Because of larger amounts of insulation in attics in recent years, the lower cord of trusses tends to dry out and shrink, causing an uplift of the truss in the middle. This can generate unsightly cracks in wallboard unless the installer had taken care to allow more flexure of the wallboard in areas of large deflection. This is a result of improper construction.

Figure 11

In Figure 11, severe cracking was occurring in roof rafters of a residential home. The framing lacked any collar ties, which tended to over stress the frame connection. Collar ties are boards that connect opposite rafters at about two thirds the height from the floor to the ridge board. This is considered a construction defect.

Figure 12 shows a horizontal crack in a block wall about halfway up the wall. This is an indicator of soil and/or water pressure causing inward deflection of the wall and impending failure. In this case, water drainage toward the foundation had caused an excessive hydraulic load. Lack of maintenance of gutter drainage and grade near the wall has increased hydraulic loading against the wall over time. These cracks are a result of hydraulic and soil pressure.

Figure 12

Claims involving cracks in buildings often require a technical analysis to determine the cause of the crack. The history of the building such as age, when the last roof replacement was made, when an addition was constructed or remodeling performed, weigh into the technical analysis. Additional information in the form of old photographs of the building, unusual events at the time of the loss date, and repair receipts are helpful. Once the cause of the crack has been determined, coverage decisions based on a determination such as settling (typically denied), deterioration (typically denied), explosion (typically extended) and vehicle impact (typically extended) can be made.

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