



## II. SCOPE OF SERVICE:

The following services were provided as requested:

1. Meet at the insured's property on February 10, 2009, at 11:00 am to assess the solid hardwood flooring and concrete floor slab.
2. Provide an opinion regarding the cause and origin of the crack in the concrete floor slab that is reportedly heaved.
3. Provide an opinion of the damage to the wood flooring and the heaved and cracked floor slab as being related to a long-term occurrence or a sudden event.
4. Prepare a report summarizing our findings and conclusions.

## III. INSURED'S STATEMENTS:

During our site assessment, Mr. Insured provided the following information:

1. The Insureds have lived in the house since 1971.
2. Approximately 12 years ago, a cold water pipe leaked under the floor slab in the laundry room, directly in front of the laundry washer. The leaking pipe was abandoned and the water pipes were rerouted overhead.
3. Solid hardwood flooring was installed in the family room and dining room approximately 12 years ago when the house was remodeled shortly after the plumbing leak was repaired in the laundry room. Mr. Insured reported that no crack existed in the family room floor slab at the time the solid hardwood flooring was installed approximately 12 years ago.
4. Mr. Insured had a contractor install wood laminate flooring in the kitchen approximately 5 years ago. Mr. Insured reported that he does not remember any cracks in the laundry room porcelain floor tiles at the time he installed the wood laminate flooring approximately 5 years ago.
5. A crack was discovered on the family room floor when the armoire was moved in preparation of remodeling the family room in December of 2008. Mr. Insured reported that the armoire had not been moved since the family room was remodeled after the slab leak was repaired in the laundry room approximately 12 years ago.
6. A plumbing leak was discovered last week when the sprinkler system was turned off during the rain. While the sprinkler system was off, the concrete patio on the

west side of the bathroom remained wet. Water was discovered flowing from the east wall of the bathroom when water drains from the bathtub.

#### IV. SITE OBSERVATIONS:

1. The laundry room is located between the kitchen and the family room. A bearing wall that supports the second floor bedrooms and roof is located between the laundry room and the family room (Figure 1). An east-west trending crack in the family room hardwood flooring is located approximately 13 to 15 inches south of the bearing wall between the laundry room and the family room (photos #2 and #3). The hardwood flooring is separated and peaked, exposing a crack in the concrete floor slab (photo #4). The westerly end of the cracked hardwood flooring aligns with the eastern edge of the armoire (Figure 1). We observed no cracks in the porcelain tiles at the raised entry walkway at the east end of the family room (photo #5).
2. The clothes dryer and utility closet back up to the bearing wall that separates the laundry room and the family room. The insured pointed out that the leak from the cold water pipe, which occurred approximately 12 years ago was identified because the floor slab was damp directly in front of the laundry washer (Figure 1).
3. The family room is located below the loft off the second floor level. An exposed wood beam supports the south end of the loft and provides a separation between the family room and the dining room (Figure 1). The drywall is cracked below the east end of the exposed wood beam that supports the loft (photos #6 and #7).
4. The dining room ceiling is lofted such that the south end of the ceiling is low and the north end of the ceiling is two stories high and extends over the loft off the second floor. The paint is cracked along the joint between the ceiling and the west wall of the family room (photos #8 and #9).
5. The loft off the second floor extends over the dining room and the southern side of the family room (Figure 1). Four bedrooms are located along the north side of the house. The south wall of these four bedrooms is located approximately 5 feet north of the ground floor bearing wall between the laundry and the family room.
6. We observed the condition of the stucco on the west side of the house (photos #10 and #11). A repair patch exists at the base of the wall at the northwest corner of the house (photo #12). Water was observed seeping from the base of the west wall at the sole plate line directly below the bathtub sewer cleanout when we ran water down the bathtub drain (photo #13). With the insured's permission, we removed a small section of the cracked stucco around the bathtub sewer cleanout and observed that water was leaking from the fitting joint of the cleanout, flowing to the sole plate, and onto the walkway and not under the slab floor. Patched stucco cracks exist at the corners of the family room and dining room windows

(photos #14 and #15). A vertical crack exists in the stucco patch below the bottom right (north) corner of the family room window (photo #16).

7. We observed a readily visible crack in the concrete floor slab in the exposed slab edge on the north side of the house (photos #17 and #18). We did not observe any readily visible cracks in the stucco directly above the crack in the exposed slab edge. The crack in the exposed slab edge is located approximately 13 inches north of the north edge of the family room window. This crack in the exposed slab edge aligns with the crack in the family room floor.

## V. DISCUSSION & CONCLUSIONS:

We have reached the following conclusions based on the information we obtained and the readily visible physical evidence that we observed at the site, as presented in the previous sections of this report, combined with our knowledge and experience:

1. The crack in the family room floor slab is located approximately 13 to 15 inches south of the bearing wall between the laundry and the family room, suggesting that the crack is located along the south edge of the wall footing. The west edge of the family room floor slab crack is readily visible in the exposed slab edge on the west side of the house. We observed no crack in the exterior stucco directly above the crack in the exposed slab edge, suggesting that the initial crack in the floor slab occurred before the stucco was installed on the wall or that the crack in the floor slab developed slowly over a long period of time. A ridge exists along the crack in the family room floor slab giving the appearance that the family room floor slab is heaved upwards.
2. We performed a manometer level survey of the dining room floor using a Technidea ZIPLEVEL™ PRO 2000 digital level to document the elevation of the interior dining room floor slab, relative to a benchmark point near the front entry door. The Technidea ZIPLEVEL™ PRO 2000 is an electronic instrument used to measure elevations and as a tool for leveling purposes in the building construction industry. It is calibrated prior to its use at the site; it is accurate to within  $\frac{1}{8}$  of an inch in 10 feet. The instrument has a ZERO key that is pressed and held for two seconds to reset it to zero (0.0) with the unit placed on the floor. The location where this instrument is zeroed becomes the reference point for all future measurements until the unit is recalibrated.

The results of the manometer survey are presented in Figure 1. The numbers shown on the plan are elevations measured in tenths of an inch relative to a zero elevation at the benchmark point near the front door. The manometer survey shows that the family room floor slab is slightly higher at the interior of the room than along the west and east edges of the family room. The elevation of the family room floor slab along the bearing wall, between the laundry room and the family room is approximately equal with the elevation of the family room floor

away from the bearing wall, suggesting that the family room floor slab is not heaved. When a floor slab heaves upward, such as when water interacts with expansive soils, the elevation of the floor area away from bearing walls is typically measurably higher than the floor area adjacent to bearing walls. It is our professional opinion that the family room floor slab is not heaved upward. It is our professional opinion that the localized ridge in the family room floor slab is a result of a vertical offset along the slab crack caused by rotation of the footing below the bearing wall between the laundry room and the family room.

3. The south wall of the second floor bedrooms is located approximately 5 feet south of the bearing wall between the laundry room and the family room. Cracks exist in the dining room east wall at the south edge of the beam that supports the loft off the second floor. The location and pattern of the wall cracks around the east end of the loft beam suggest that the loft beam has been subjected to rotation such as caused by deflection of the floor joists of the second floor bedroom and loft. Due to the span length of the floor joists of the bedroom and loft and the location of the bearing wall between the laundry room and the family room, the most probable cause of deflection of the floor joist of the second floor bedroom and loft is downward movement of the bearing wall between the laundry room and the family room. The insured reported that a plumbing leak occurred below the floor in the laundry room approximately 12 years ago. The location of the crack in the family room floor slab taken together with the history of the water leak below the floor slab in the laundry room suggests that the bearing wall footing between the laundry room and the family room settled and rotated, inducing the crack in the family room floor slab (Figure 2). It is our professional opinion that in all probability, the crack in the family room floor slab and the cracks in the dining room east wall at the loft beam are the result of long-term soil settlement below the bearing wall between the laundry room and the family room. It is our further professional opinion that the soil settlement below the bearing wall between laundry room and the family room is a long-term effect of the water leak that occurred below the floor in the laundry room approximately 12 years ago. Based on the location and extent of the crack in the family room floor, it is our additional professional opinion that the progressive development of the crack in the family room floor slab was hidden from view due to the location of the armoire.
4. Water was observed seeping from the base of the west wall at the sole plate line directly below the bathtub sewer cleanout when we ran water down the bathtub drain. With the insured's permission, we removed a small section of the cracked stucco around the bathtub sewer cleanout and observed that water was leaking from the fitting joint of the cleanout, flowing to the sole plate, and onto the walkway and not under the slab floor. It is our professional opinion that this water leak did not cause or contribute to the cause of the crack in the floor slab of the family room.

5. We reviewed a leak detection report dated 8/1/2008, which states that no pressurized water leaks were found at that time and that the crack damage is due to earth settlement. We reviewed the contractor's assessment report prepared by Big Time Construction, dated July 27, 2008, which states that the family room floor is heaved due to a combination of workmanship, soils, and plumbing leaks. The cracks that we observed in the exterior stucco are concentrated at the corners of windows such as are commonly observed on most houses in Southern California. It is our professional opinion that the crack in the family room floor slab is the result of long-term soil settlement below the bearing wall between the laundry room and the family room due to the water leak that occurred below the floor slab in the laundry room approximately 12 years ago.
6. A synopsis of our professional opinions as they relate to our scope of services is that the crack in the family room floor slab and the cracks in the dining room east wall at the exposed loft beam are the result of long-term soil settlement below the bearing wall between the laundry room and the family room. The soil settlement below the bearing wall between the laundry room and the family room is a long-term effect of the water leak below the laundry room floor approximately 12 years ago. The localized ridge in the family room floor slab is a result of a vertical offset along the slab crack caused by rotation of the footing below the bearing wall between the laundry room and the family room. The progressive development of the crack in the family room floor slab was hidden from view due to the location of the armoire.

## VI. CLOSING:

We have completed the observations for this project with the degree of skill and care ordinarily exercised by Engineers practicing in this and in similar localities, and to reflect the conditions, as they existed at the time of our site assessment, relating to our scope of services. No other warranty, expressed or implied is given regarding the conclusions or professional opinions given in this report.

The scope of this report is limited to the matters expressly covered herein. This report is prepared for the sole benefit of The Insurance Company and may not be relied upon by any other person or entity without the written authorization from Bausley & Associates, Inc.

In preparing this report, we may have relied on information derived from secondary sources and personal interviews. Except as set forth in this report, we have made no independent investigation as to the accuracy of the information derived from secondary sources and personal interviews, and have assumed that such information is accurate and complete. Studies that are more extensive may be performed to reduce any inherent uncertainties of information derived from secondary sources and personal interviews.

All recommendations, findings, and conclusions stated in this report are based upon facts and circumstances, as they existed at the time of our site assessment. A change in any fact or circumstance upon which this report is based may necessitate re-evaluation and/or modification of the recommendations, findings, and conclusions presented herein.

Should you require any further assistance, information or clarification, please contact our office. We appreciate the opportunity to provide this service.

Respectfully submitted:

Engineer Name, S.E.  
Consultant

EN/amb

Enclosures: Photographs #1 through #18  
Figure 1 – Schematic Site Plan

Sample Report