

APRIL 19, 2003 - Structural Analysis Approach to Residential Foundation Performance Evaluation

Speaker: [R. Michael Gray, P.E.](#), Consultant, Member, Kingwood TX, Tel. 281-358-1121.

Mr. Gray is a Texas Real Estate Commission Professional Level Licensed Real Estate Inspector and Licensed Professional Engineer in Texas. He has a bachelor's degree in engineering from UT Austin and specializes in the structural and mechanical inspection and evaluation of single-family homes for buyers.

PRESENTATION SUMMARY

To an audience of about 30, Mr. Gray presented a different way of looking at foundation assessment by comparing calculated damage to observed damage rather than making the usual level distortion (elevation) survey of the slab. He uses a spreadsheet and makes about 150 to 200 measurements per home, recording crack locations and widths. He then uses structural mechanics to see if an L/360 slope was exceeded.

The reason Mr. Gray uses L/360 for an allowable slope is because that limit has been common among the repair contractors. He also makes other assumptions in his spreadsheet such as a stress concentration factor (SCF) of 1.5 around door and window openings, and that the foundation behaves as a uniform beam in center lift. He uses Timoshenko's deep beam theory for the walls, taking into account for shear deflection, which he says can be 25 to 30 percent of the total deflection.

Mr. Gray said he does not normally use the presented method in his real estate inspections due to the cost and that it does not fall within the A, B or C levels set by the state board. He also noted he prefers not to ever say that a foundation has failed.

Finally, Mr. Gray noted that he had never seen a structural crack in a post-tensioned slab. He defined "structural crack" as a faulted crack (has vertical offsets) or one that occurs through the slab at the high bending moment region.

[PAST PRESENTATIONS \(click here\)](#)