

“A Proposed Design Method for Wood Piles used in Residential Construction”

by

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Scant research on the topic of wood pile foundations for residential construction as well as numerous requests by engineers on the Texas Coast for assistance in design gave impetus to this research. In this paper, we present a design procedure that recognizes the variations in the soil p-y curves—sandy soil is assumed—as a function of depth below ground. Many engineers assume that there is fixity of the pile at ground level, but this assumption is relaxed by including a calculation of shear and moment below ground in an analytically-based, but tabulated format.

Structural analyses included nonlinear soil response, but linear elastic response of the wood piles. The outcome of the study is a recommended design procedure for the pile based on predicted structural responses that acknowledge more appropriate boundary conditions at the ground level of the piles. The designer is called upon to provide the shear force, bending moment, and axial force at ground level from which the maximum shear force and bending moment below ground may be calculated; these quantities will depend on the above ground length vs. the below ground length of the pile, the soil characteristics, and the material properties of the wood pile. The accepted design three-term interaction equation is assumed, but the axial capacity determination includes a calculation of the overall effective buckling length of the entire pile—above and below ground—and flexural capacity includes the effects of the nonlinear p-y curves of the soil at various depths below ground level. The designer will be spared the need for a sophisticated structural analysis.