

Public Abstract

First Name:Ryan

Middle Name:Phillip

Last Name:Goetz

Adviser's First Name:Brent

Adviser's Last Name:Rosenblad

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:STUDY OF THE HORIZONTAL-TO-VERTICAL SPECTRAL RATIO (HVSR)
METHOD FOR CHARACTERIZATION OF DEEP SOILS IN THE MISSISSIPPI
EMBAYMENT

Soil deposits can significantly influence the amplitude and frequency content of surface ground motions during earthquakes. Estimating the fundamental frequency (f_0) of a site is often needed for improved planning and design for future earthquakes. A cost-effective method of obtaining an estimate of f_0 is the Horizontal-to-Vertical Spectral Ratio (HVSR) method, which utilizes ambient energy recorded in the horizontal and vertical directions from a single, three-component sensor. In addition to estimating the fundamental frequency, soil deposit characteristics (average shear wave velocity, $V_{S,AVG}$) values have also been estimated using the HVSR method and a simple approximate relationship relating $V_{S,AVG}$ to f_0 and the depth to bedrock. This procedure was performed by Bodin et al. (2001) to develop a relationship between $V_{S,AVG}$ and soil depths in the Mississippi embayment. However, this relationship predicts average velocity values that are about 25% higher than values predicted by another relationship developed using a different method (Chen et al. 1996). In addition, Bodin et al. (2001) identified a second frequency peak of unknown origin in their HVSR plots. It was demonstrated that use of the approximate method to estimate $V_{S,AVG}$ systematically over predicted the true $V_{S,AVG}$ values. Also, it was shown that the second frequency peak observed can be attributed to either body wave resonance of the entire soil deposit or a shallow contrast in V_S within the soil deposit. Based on the findings of this study it is recommended that the V_S relationship for the sediments of the Mississippi Embayment developed by Chen et al. (1996) should be preferred to the Bodin et al. (2001) relationship.