**ANALYZING H/V SPECTRAL RATIOS TO IDENTIFY POSSIBLE LOW-VELOCITY ZONES WITHIN AN EARTH EMBANKMENT DAM**

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The purpose of using geophysical methods to assess the stability of earth embankment levees and dams is to identify locations of weaknesses that may result in future failures of such structures. Exploring these methods is desirable because many of these methods are efficient, noninvasive, and inexpensive. The method that we investigate in detail is the application of horizontal-to-vertical spectral ratios of ambient seismic noise, commonly referred to as H/V spectral ratios or HVSR. Typically, the most important and sought-after information from an HVSR is the fundamental frequency (f0), but less studied is how to interpret the shape of the spectral curve. The features of spectral curves vary greatly. For example, some curves exhibit sharp peaks while others have broad, flatter peaks, and some curves have deep troughs after their fundamental frequencies while others remain flat. In this study, repeated ambient seismic noise measurements were made at stations along the top of the earth embankment dam of the Chestnut Hill, MA reservoir in order to compare the produced HVSRs at each station. Overall, the shapes of the spectral curves were quite consistent, and they all exhibited a notable deep trough feature at frequencies just higher than their fundamental frequencies. After performing multi-channel analysis of surface waves (MASW) and inversions on shot traces along the reservoir embankment, possible layer models were produced for the embankment with estimated layer thicknesses, wave velocities, and densities. These layer models were edited to include low-velocity zones and then used for forward HVSR calculations within the *HV-Inv* computer program, developed jointly by the University of Almería, Spain and the National Autonomous University of Mexico, Mexico. The program produced HVSR curves with similar shapes to those observed from seismic noise measurements at the reservoir. Most notably, distinct, deep troughs existed at frequencies just higher than the fundamental frequencies of the produced HVSRs when low-velocity zones were included in the layer models. The results of this HVSR modeling suggest that there is a correlation between HVSR troughs and low-velocity zones. This correlation suggests that observing a deep trough feature in an HVSR could indicate the existence of a low-velocity zone within an earth embankment structure.