**APPLICATION OF HVSR TO LEVEE COMPOSITION AND THICKNESS ASSESSMENTS**

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The Horizontal-to-Vertical-Seismic-Ratio (HVSR) method has proven an efficient tool for determining depth to bedrock and other shallow interfaces using single-station seismic measurements. Although many applications have been undertaken with HVSR, there are other possible uses that have not yet been explored. The U.S. Army Engineer Research and Development Center (ERDC) in cooperation with Boston College is in the second year of a multiyear study to assess possible applications of HVSR for assessment and triage of dams and levees. Analysis of these data requires foreknowledge or estimation of either the velocity of a surface layer or the thickness of that layer, with HVSR peak frequencies being used to estimate the other parameter. That is, thickness may be estimated when velocity is “known”, and velocity may be estimated when thickness is “known”. In 2022, we have acquired data at levee sites in Tennessee and Illinois. For the Kingston Dike and UT Farm sites in Tennessee, we have used velocities determined from MASW measurements to estimate depth to bedrock from HVSR peak frequencies along profiles at a levee and river bank, respectively. Such HVSR measurements would be useful for assessing levee foundations. At Cairo, IL, we acquired HVSR data along profiles and measured peak frequencies associated with a “marker” bedrock interface beneath the levee. The Cairo levee is known to transition between sand-dominated (low velocity) portions and clay-dominated (higher velocity) portions, and the HVSR measurements were acquired across interfaces between these two types of levee composition, as indicated by low-altitude helicopter electromagnetic data acquired in 2011. The HVSR data were acquired to determine whether there is a shift in HVSR peak frequency that correlates with the change from sands to clays. This would suggest a possible use of HVSR for levee triage, to identify sand-dominated levee segments that might be susceptible to failure. An HVSR profile was also acquired across another Cairo site where there has been a historic concentration of sand boils, to determine whether there is any association between HVSR peaks and the sand boils.