

SUBSURFACE EXPLORATION USING THE 2D MULTI-CHANNEL ANALYSIS OF SURFACE WAVES METHOD FOR A PLANNED AIRPORT ON THE CARIBBEAN ISLAND OF BARBUDA

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A planned 7,100-foot-long runway and associated taxiway, apron, and terminal/building area were assessed regarding possible karst for the design of a new airport on the Caribbean island of Barbuda. Based on previous environmental and geotechnical evaluations, and Ground Penetrating Radar (GPR) survey performed by others, supplemental geophysical exploration was recommended to further evaluate these areas. Compacted crushed rock pavement base course had been added to the runway, taxiway, and apron areas so we chose to utilize the two-dimensional (2D) Multi-Channel Analysis of Surface Waves (MASW) method for its ability to be efficiently performed on hard surfaces, to provide additional depth of penetration over the previously performed GPR survey, and to characterize subsurface variability associated with material stiffness/density.

Nineteen (19) 2D MASW profiles were collected at the site; seven (7) about 6,900 feet in length and spaced at about 25 feet across the runway area, three (3) about 500 feet in length and spaced at about 25 feet along the taxiway area, and nine (9) about 600 feet in length and spaced between about 25 to 50 feet within the apron/terminal/building areas. A landstreamer with 4.5 Hz vertical geophones and accelerated weight drop (AWG) was used for the survey. Our final 2D profiles highlighted significant variability in shear wave velocity at the site, while our developed pseudo-3D models for each area provided additional lateral perspective of the seismic data sets. In this talk, we will discuss the logistics of working on such a fun and challenging project, the results obtained from the seismic survey, and their correlation with new geotechnical boring information and the previous explorations.