

## **An alternative analysis of surface waves data for site characterization**

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The spectral analysis of surface waves (SASW) is an *in situ* non-destructive testing method. It has been developed and used for many years in the fields of geotechnical engineering and site characterization. It is typically used in evaluation of elastic moduli and layer thickness of soils, rocks and pavements. This method consists of wave generation, measurement and processing of dispersive Rayleigh waves. The stiffness profile of soil media or pavement systems are determined by fitting measured dispersion data with an adjustable theoretical model of the material that depends on layer thickness and elastic moduli. The best-fit stiffness

profile is usually formed with optimization techniques. This paper presents an alternative analysis of the Rayleigh waves. This alternative analysis comprises four main steps (1) determine the range of frequencies based on the best coherence value, (2) determine the dominant frequency and wave cycle for wavelength (LR) calculations, (3) calculate the attenuation coefficient for each geophones spacing and plot it versus phase velocity (VR) to produce an exponential equation, and (4) calculate the shear wave velocity from the derived exponential equation. The alternative analysis was tested at three sites i.e. Kamsis H UKM, Bangi, Bandar Sri Putra and Sri Damansara. The analysis has successfully produced an empirical exponential curve for each site. For Bandar Sri Damansara site the exponential equation obtained is  $\pm=0.0084*e^{-0.0014Vs}$ , for Bandar Sri Putra  $\pm=0.0094*e^{-0.0015Vs}$  and for site at KamsisH UKM  $\pm=0.0035*e^{-0.0007Vs}$ . The final profile of Vs versus depth obtained for each site is compared with those of the SASW inversion analysis and Standard Penetration Test data from borehole.