

Spectral Analysis of Surface Waves - G » ACI 228.2R

Spectral Analysis of Surface Waves Geophysical (SASW-G) investigations are typically applied to assess material properties of soil and rock.



Optional SASW-S Bar and Extension Arm for: SASW-S+ G4 or G8 Models

The Spectral Analysis of Surface Waves (SASW-G) system is designed to measure the in-place shear wave velocity profile of soil and rock without requiring a borehole. In general, the method uses the dispersive characteristics of surface waves to determine the variation of the shear wave velocity (stiffness) of layered systems with depth. Once the shear wave velocity profiles are determined, shear and Young's moduli of the materials can be estimated through the use of elastic wave theory equations. The shear wave velocity profiles (shear wave velocity versus depth) are determined from the experimental dispersion curves (surface wave velocity versus wavelength) obtained from SASW-G measurements through a process called forward modeling or through an inversion process. The SASW-G method has been applied to soil sites with measurement depths exceeding 150 feet. It should be noted that the method requires an accessible area on the surface with a length equal to or greater than the measurement depth required. The method can be applied on both bare ground as well as paved surfaces. Add the SASW-S bar for structural and pavement applications.

Features:

- System design allows for fast and accurate field measurements
- System is compact, durable, and easily transported, allowing for multiple tests per day
- Real-time waveform display while testing
- SASW measurements are accurate to within 5% for the determination of the thickness and stiffness of the top layer in a pavement system
- Correlation between SASW and Crosshole Seismic (CS) tests on soil sites showed that the values from both tests typically compare within a 10% difference
- Acquisition and modeling software are compatible and easy to use, yielding fast and accurate results

» Applicable On:
Asphalt
Concrete
Masonry
Rock
Soil
Wood
» Test For:
Layer Thickness
Shear Wave Velocity Profiles
Soil Moduli



Model	Advantages
SASW-G4 Model	Four channel SASW-G system with a pair of 1 Hz geophones and a pair of 4.5 Hz geophones. Most cost effective system.
SASW-G8 Model	Eight channel SASW-G system with four 1 Hz geophones and four 4.5 Hz geophones. Allows for more rapid testing than the SASW-G4 Base Model.
SASW-S+G8 Model	Most complete SASW system which includes structural and geophysical options.

Freedom Data PC or NDE 360 Required, Sold Separately

SASW-G8 Models: Freedom Data PC Platform Only

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Method

The SASW-G method requires an accessible surface for receiver attachments. The extent of the accessible surface limits the investigation depth. As a rule of thumb, in order to investigate material properties to a depth D , the line of receivers on the surface must extend to a distance equal to $1.5D$, preferably $2D$. Once the receivers are mounted to the surface, acoustic energy is generated by an impactor and measured on the receivers.

Data Collection

The user-friendly SASW software is written and tested at Olson Instruments' corporate office in Colorado. We do not outsource any tech support questions and, should you require software support, we welcome your questions and comments. It should be noted SASW-G data is usually displayed and analyzed in a program called WINSASW, available from the University of Texas at Austin.

Available Models

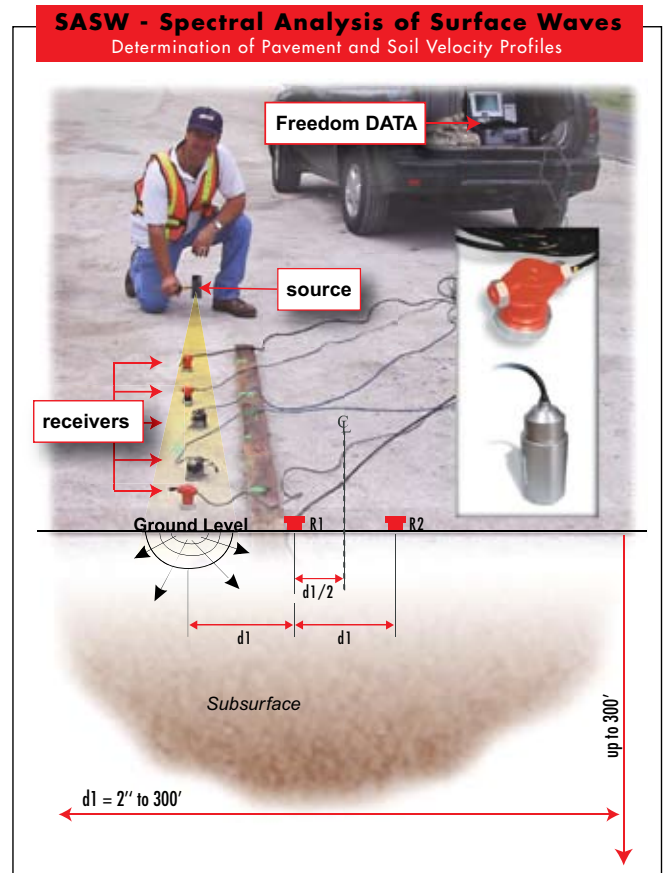
The Spectral Analysis of Surface Waves – Geophysical system (SASW-G) is available in three different models:

1. Spectral Analysis of Surface Waves – G4 (SASW-G4)
2. Spectral Analysis of Surface Waves – G8 (SASW-G8)
3. Spectral Analysis of Surface Waves – S+G8 (SASW-S+G8)

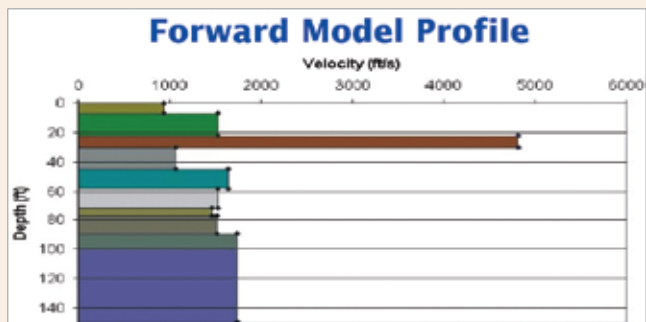
The **SASW-G4 Model** is the base model for Spectral Analysis of Surface Wave testing, and can be run from the Freedom Data PC or NDE 360 platforms. This system includes a pair of 1 Hz geophones, a pair of 4.5 Hz geophones, a four channel module, and associated connection cables.

The **SASW-G8 Model** can be run from the Freedom Data PC only. The system includes four 1 Hz geophones, four 4.5 Hz geophones, an eight channel module, and associated connection cables. This system allows for faster testing than the SASW-G4 model.

The **SASW-S + G4/G8 Models** can be run from the Freedom Data PC only. The system includes all parts listed for the SASW-G8 system and SASW-S system (see the **SASW-S Section, page 30**). This is the most complete SASW system available.



Data Example » 1



Example SASW-S shear wave velocity profile data for seismic building design