Final Project Summary — PEER Lifelines Program

Project Title—**ID Number**	*Application of SASW to US SMA Sites*—**2C01**		
Start/End Dates	6/1/01 – 5/31/03	Budget/ Funding Source	$125,000 / Caltrans
Project Leader (boldface) and Other Team Members	**Stokoe (UT at Austin)**		

1. Project goals and objectives

Apply the Spectral-Analysis-of-Surface-Waves (**SASW**) Method to determine the shear wave velocity profiles of selected strong-motion recording (SMR) sites in Imperial Valley and Los Angeles, CA and use the results to determine classification of these sites in terms of the shear wave velocity in the top 30 m ($V_{s,30}$) and the upper portion of the V_s profiles to evaluate of their liquefaction potential.

2. Benefits of the results of this project to develop technologies and protocols to mitigate the vulnerability of electric systems and other lifelines to damage directly and indirectly caused by earthquakes. Also, benefits to develop assessment techniques to evaluate damage to electric systems caused by earthquakes and to assess fiscal impacts due to the loss of electric service to the community.

The SASW method can be used in siting facilities for electric systems, because $V_{s,30}$ obtained from the SASW method is used by engineers in estimating the earthquake site response and the upper portion of the V_s profiles can be used in liquefaction evaluations.

3. Brief description of the accomplishments of the project

In total, 30 shear wave velocity profiles in the Imperial Valley area and 19 shear wave velocity profiles in the Los Angeles area were determined. The site classification for each site was determined and was used in ground motion studies.

4. Describe any instances where you are aware that your results have been used in industry

The shear wave velocity profile reduced from the SASW method can be applied to determine earthquake site response/classification, liquefaction evaluations, landfill/soil compaction control, and pavement quality evaluation.

5. Methodology employed

Spectral-Analysis-of-Surface-Waves (**SASW**) Method is a non-intrusive seismic method of profiling geotechnical sites.

6. Other related work conducted within and/or outside PEER

Outside PEER: SASW testing in the Seattle, Washington area, at several landfills in the San Francisco area, and at the Yucca Mountain, Nevada, test site.

7. Recommendations for the future work: what do you think should be done next?

Perform SASW testing with a source which can generate more energy to explore deeper soil profiles at some sites which already have deeper V_s data obtained from other intrusive methods to demonstrate the accuracy of the SASW method for future deeper profiling.

8. Author(s), Title, and Date for the final report for this project

Authors: K.H. Stokoe, II and Yin-Cheng Lin
Title: Application of SASW to US SMA Sites

Date: August 31, 2004

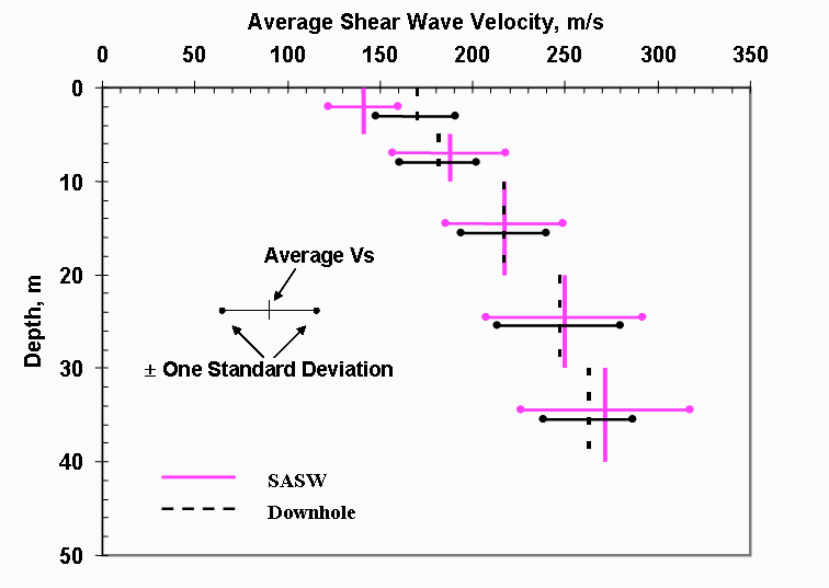

Figure 1. Comparison of Average V_s Values from SASW and Downhole Seismic Tests at 19 Common SMR Sites in Imperial Valley, California

Table 1. Comparison of $V_{s,30}$ Values and Site Classifications from 19 Common Sites where SASW and Downhole Seismic Tests were Performed; Imperial Valley, CA.

No.	Site Name	$V_{S,30}$, m/s ($V_{S,100}$, ft/s)		Classification	
		Downhole	SASW	Downhole	SASW
1	Bond's Corner	223(743)	236(780)	D	D
2	Brawley Airport	209(696)	188(620)	D	D
3	Calexico Fire Station	231(769)	197(650)	D	D
4	Calipatria Fire Station	203(676)	224(740)	D	D
5	El Centro Array # 2	189(629)	179(590)	D	E
6	El Centro Array # 3	164(546)	173(570)	E	E
7	El Centro Array # 4	207(690)	215(710)	D	D
8	El Centro Array # 5	208(692)	194(640)	D	D
9	El Centro Array # 6	202(672)	200(660)	D	D
10	El Centro Array # 7	212(706)	194(640)	D	D
11	El Centro Array # 8	208(692)	203(670)	D	D
12	El Centro Array # 9	213(710)	206(680)	D	D
13	El Centro Array # 10	204(680)	203(670)	D	D
14	El Centro Array # 11	198(660)	203(670)	D	D
15	El Centro Array # 12	209(696)	197(650)	D	D
16	El Centro Array # 13	251(835)	270(890)	D	D
17	El Centro Differential Array	220(666)	191(630)	D	D
18	Holtville Post Office	201(670)	209(690)	D	D
19	Westmorland Fire Station	195(650)	203(670)	D	D