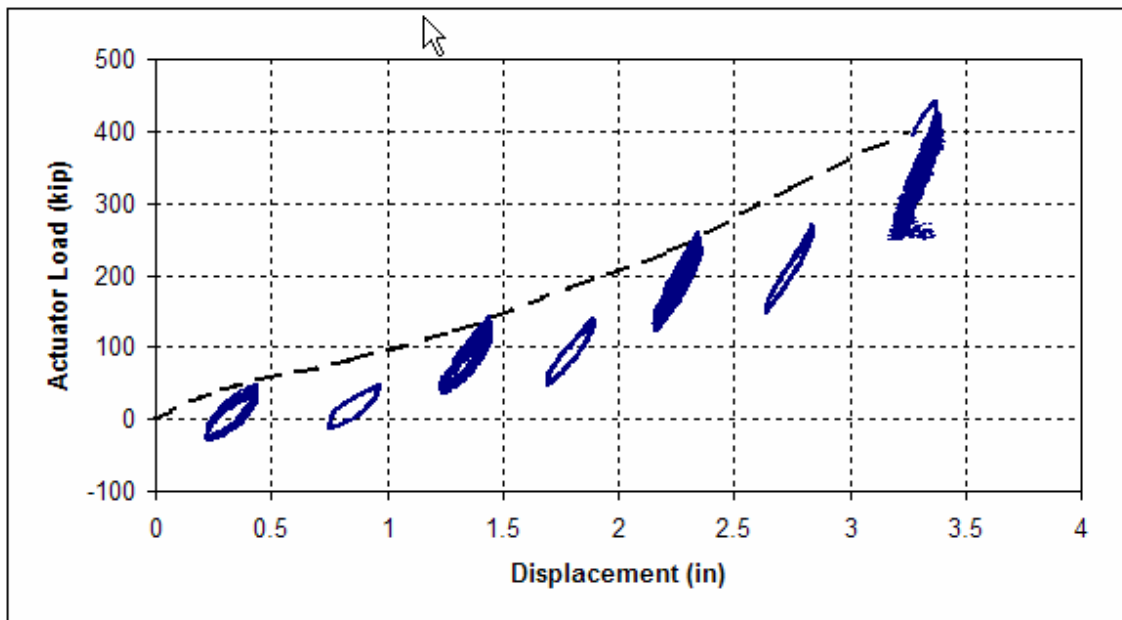


## Dynamic Passive Pressure on Abutments and Pile Caps

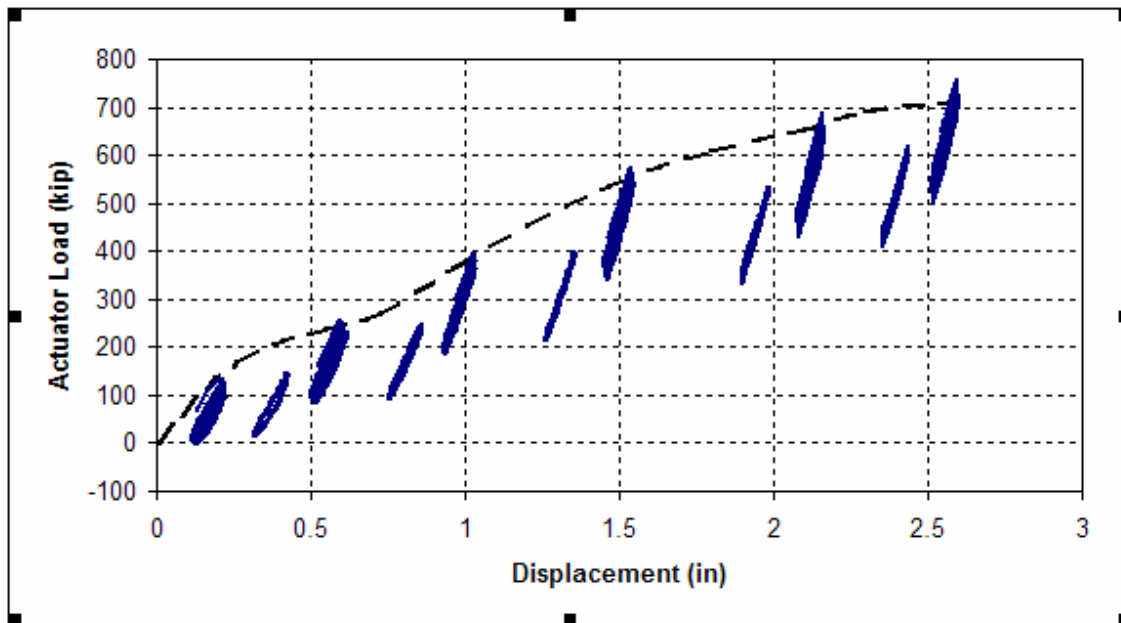
PI's Profs. Rollins and Gerber

### Quarterly Report Nov 2007 - Feb 2008

During this quarter work has primarily focused on a developing an automated procedure for processing the dynamic test results associated with work tasks 5 and 6. This procedure is in place, and data is now being processed. Fig.1 illustrates typical results, this particular case being the load-displacement loops produced by cycling of the load actuators during the baseline case for the pile cap (i.e., without any backfill in place). The static backbone curve is shown as a dashed line and loops associated with the eccentric-mass shaker have been omitted for clarity. It can be seen that the ordinates of the loops are alternately higher and lower. The higher loops are associated with the case where actuators cycled first followed by cycling with the shaker. The lower loops are associated with the case where the actuators shaker cycled first followed by the actuator. As a result, the soil resistance degraded immediately following use of the shaker. Results for the pile cap with dense sand backfill are shown in Fig. 2 for comparison.



**Fig 2 Actuator load-displacement loops for pile cap without backfill**

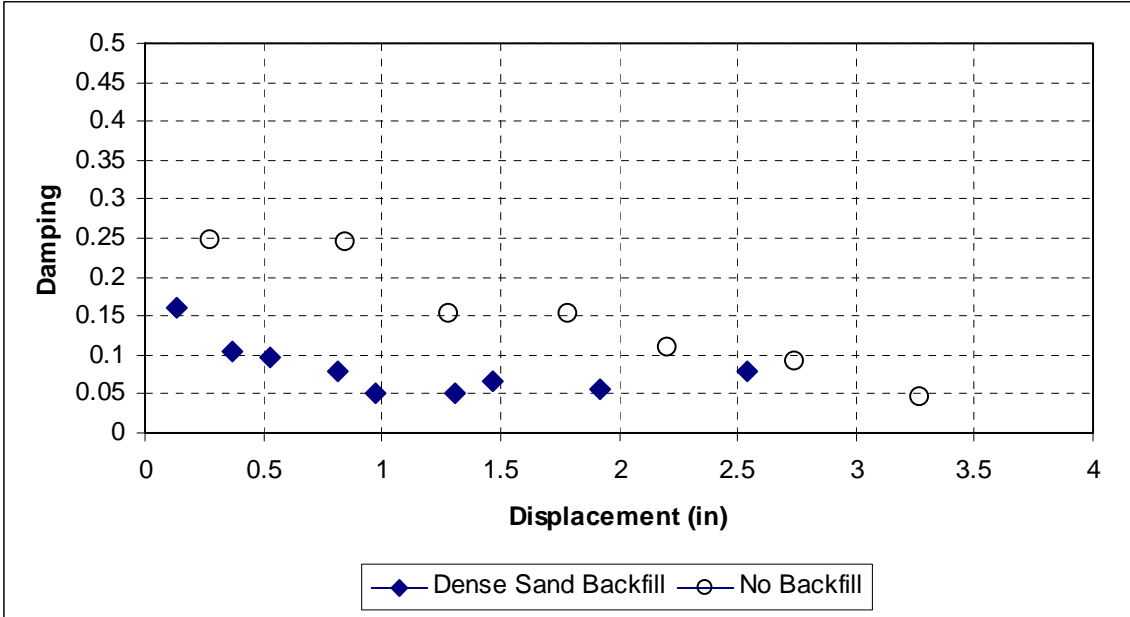


**Fig. 2 Actuator load-displacement loops for pile cap with dense sand backfill**

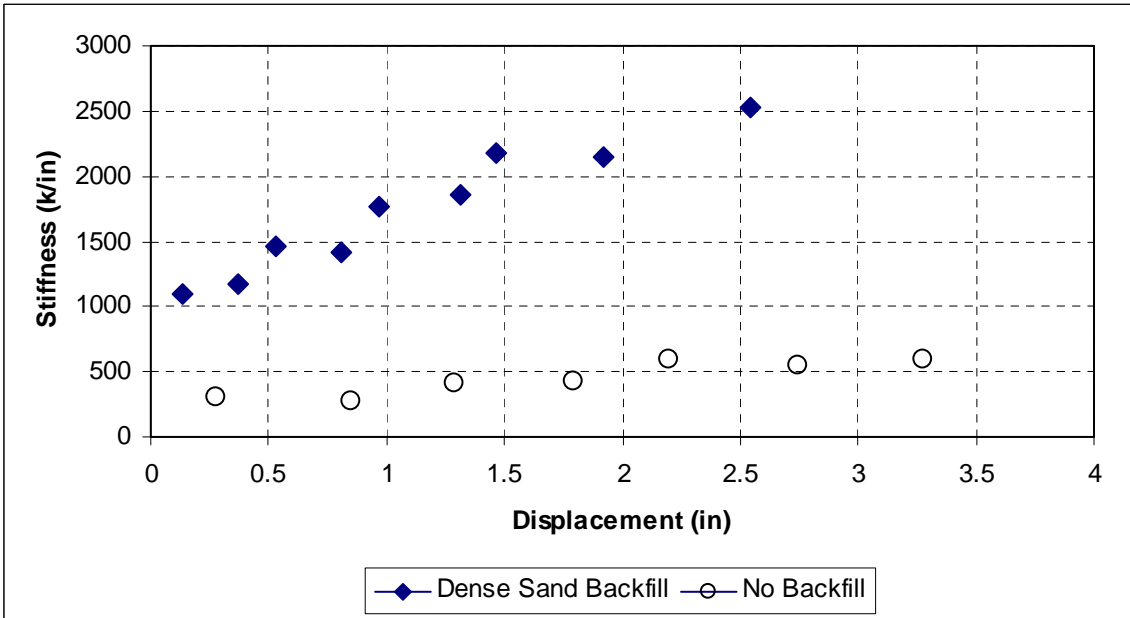
Figs. 3 and 4 present a comparison of the calculated damping and stiffness, respectively for the pile cap with and without the dense sand backfill. As displacement increases, the damping decreases for both backfill conditions, although the decrease is more pronounced in the case of the dense sand backfill. This is consistent with the observed narrowing of the load-displacement loops with increasing displacement in Figs. 1 and 2. Stiffness is observed to increase with increasing displacement for both backfill cases, with a much more pronounced (and expected) increase in the case of the dense sand backfill.

### **Plans for the Next Quarter**

During the next quarter we anticipate that we can complete a draft final report on the static load tests associated with task 5 (pile cap tests with limited gravel backfill zones) and task 6 (pile cap tests with MSE wall). We will also continue analysis of the dynamic response of the tests associated with task 5 and 6 which we hope to complete in the subsequent quarter.



**Fig. 3 Comparison of calculated damping for pile cap with dense sand backfill and no backfill**



**Fig. 3 Comparison of calculated stiffness for pile cap with dense sand backfill and no backfill**

**Budget Considerations**

We estimate that approximate \$165,000 will have been spent at the end of the quarter on work associated with Tasks 1-6. The total budget associated with all the project tasks is

\$265,395. Therefore, approximately 62% of the budget has been spent for these tasks. We estimate that approximately 70% of the work on the project has now been completed. Therefore, the project appears to be on track from a budget standpoint.