Objective: Measure parameters of soil behind wall-abutment system via lab testing

Full-Scale Field Test
• Backfill-abutment wall specimen with granular backfill
• Performed a full-scale cyclic lateral load test
• Six hydraulic actuators each capable of applying 500 kips of force
• Interested in the force-displacement relationship, initial stiffness, and ultimate passive resistance of the specimen

Can be used in CALTRANS seismic design criteria to build more efficient bridges

Test Methods
• Sieve Analysis Test
  To determine the grain-size distribution and classify the backfill
• Dry Tipping & Modified Japanese Method
  To obtain the maximum and minimum void ratio of the soil
• Compaction Test--Modified Proctor Test
  Construct compaction curves to evaluate max dry density and optimum water content
• Triaxial Test
  Evaluate soil strength parameters such as shear strength, cohesion, and friction angle

Results and Conclusions

• Sieve Analysis Results
  – Gradation curves of six different bulk samples (show on right)
  – Indicates soil is well-graded sand with silt
  – Averaged fines content is about 3.4%

• Compaction Test Results
  – Compaction curves revealed an optimum water content of about 9%
  – An average max dry density of 122 pcf

• Triaxial Test Results
  – Triaxial tests provided the stress-strain relation of soil samples (shown on right)
  – Each test used three samples with the first confined at 68.95 kPa, the second at 137.9 kPa, and the third at 275.8 kPa
  – Cohesion of 25 kPa and friction angle of 33°

• Cone Penetration Testing
  – In situ test that continuously detects fine changes in the stratigraphy
  – Tip resistance vs. depth