Develop Validated Methodology for Seismic Analysis and Design of Standard and Pile-Supported Retaining Walls

To develop improved procedures for seismic design of earth-retaining structures supported on both spread footing and pile foundations.

WHAT IS THE NEED?
Existing Caltrans design procedures for retaining walls are force-based. Preliminary studies using LRFD-based design procedures suggest this approach may be overly conservative. In addition, the current design method does not provide guidelines for pile-supported walls. Therefore, new analysis and design procedures are needed, which should be displacement-based. The analysis models/methods should be validated with existing experimental (laboratory, field, and centrifuge) data sets, and verified against detailed three-dimensional finite element models. They also should be readily applicable to Caltrans practice.

WHAT ARE WE DOING?
UCLA will study and develop this new displacement-based approach in designing retaining walls and provide the guidelines to design retaining walls that meet the performance-based requirements in high seismic areas.

WHAT IS OUR GOAL?
To develop improved procedures for seismic design of earth-retaining structures supported on both spread footing and pile foundations. These new procedures should be based on an accurate description of the peak stress distributions (the resultant force and its point-of-application) over the height of the retaining wall during a seismic event.

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WHAT IS THE BENEFIT?
This research will support the strategic objectives of the Division of engineering Services to: ensure reliability and structural integrity and balance performance, cost and time to optimize total value.

WHAT IS THE PROGRESS TO DATE?
Begin work as described in the scope.