Project Title	*Agmt./Task No.*	*Item No.*	*Agency Bgt. No.*
SPR-3(072) Strength and Deformation of Mechanically Stabilized Earth (MSE) Walls at Working Loads and Failure	**SPR-3(072)**		
Research Agency	*Start Date*	*Estimated Completion*	*Revised Completion*
Royal Military College of Canada	**12/1/99**	**04/30/04**	**12/31/08**
Principal Investigator(s)	*Technical Contact*		
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Funding Source	*Schedule Status*		
WA, NY, ID, CA, WY, ND, MN, OR, AZ, AK	☐ On schedule ☐ Ahead of schedule ☒ On revised schedule ☐ Behind schedule		
Research Area			
Geotechnical			

Original Estimated Cost	*Revised Cost*	*% Funds Expended*	*% Work Completed*
$360,104	**$690,000**	**70%**	**75%**

Objective

Develop a design procedure for the internal stability of MSE walls, especially those reinforced with fabrics.

Project Progress:

1. Wall 13 - the second full-scale reinforced soil wall of Phase 5 testing at RMC has been constructed, tested and excavated. A full report in the form of a MSc thesis for Walls 12 and 13 has been prepared. A copy of the thesis will be forwarded to Tony Allen by the end of April 2008 in hard copy and electronic versions.

2. A paper is in press with the journal Ground Improvement that investigates the accuracy of the current Coherent Gravity Method for steel reinforced soil walls. This paper clearly identifies the influence of backfill strength and compaction on reinforcement loads in these structures and contains practical recommendations for design engineers. A similar paper is in press with the ASCE Journal of Geotechnical and Geoenvironmental Engineering. The latter paper demonstrates that the current AASHTO Simplified Method is sufficiently accurate for steel strip reinforced soil walls.

3. The new modified K-stiffness Method has been verified against an extended database of case studies and a paper is now in press with the journal Geosynthetics International. Our project database now includes 42 case studies. Many of the new case studies are from unpublished Japanese research reports that have only recently been made available.

4. A sophisticated constitutive soil model (Lade's model) has been implemented in our FLAC numerical code and verified against RMC test walls. A paper is in second-round review with the ASCE Journal of Geotechnical and Geoenvironmental Engineering that demonstrates the influence of soil model on wall performance. This paper will be the keystone reference paper for future journal papers by providing background validation to the use of our FLAC model to carry out parametric analyses to extend our physical database to a wider range of wall types, reinforcement layers and types, different soils etc. Three papers have or will shortly appear in conferences using this new code.

New Period Proposed Activity:

Construction of Wall 14 (Phase 5) is scheduled for this summer.

Three papers that summarize the results of the first 11 walls in the RMC test program with sand backfill will be submitted shortly.

Paper 1: Influence of reinforcement stiffness on wall performance
Paper 2: Influence of facing batter on wall performance
Paper 4: Influence of surcharging on wall performance.

All data for these paper has been plotted up and draft versions of the papers are in review circulation with the authors. These papers include a comparison of predicted versus measured reinforcement loads using the AASHTO and current K-stiffness Methods. The papers demonstrate the much improved accuracy of the K-stiffness Method over the current AASHTO Simplified Method for geosynthetic reinforced soil walls.

Data from RMC walls and our larger database of field walls has been synthesized to isolate the influence of connection loads on wall performance. A draft paper will be produced second quarter.

A numerical database will be completed and the results used to fill in the gaps in the K-stiffness Method.

The use of synthetic data for this purpose will appear at a conference in September.