RECO NEWS
VOLUME 4: ISSUE 3
The Reinforced Earth Company

Custom Ashlar Stone finish developed for (GTAA) Toronto Lester B. Pearson International Airport expansion

Owner: Greater Toronto Airports Authority
Prime Consultant: Airports Architects Canada (AAC)
Structures Consultant: Greater Toronto Airports Groundside Association (G T A G A)
Landscape Consultant: Terraplan
Retaining Wall System Supplier: Reinforced Earth Company Ltd.
Precaster: Hy-Grade Precast Concrete

The Greater Toronto Airports Authority (GTAA) is currently redeveloping Toronto Lester B. Pearson International Airport to increase capacity. The cornerstone of the overall redevelopment is $3.2 B$ CDN for Phases I and II of a new terminal building and associated roadways. The redevelopment program has a 10-year, multi-phase schedule. Access roads to and from the airport had to be up-graded and/or re-configured to support the new terminal building. Due to space limitations, the road improvements required a significant number of retaining structures.

...continued on page 2

What's inside

Custom Ashlar Stone finish

continued from page 1...

Several different design concepts were adopted to meet the retaining structure requirements. Architectural enhancements, that are compatible with the terminal building, were incorporated into the retaining walls.

Reinforced Earth Company Ltd. participated in developing an architectural finish specifically for this aspect of the airport's redevelopment. The architectural finish (modified **Ashlar Stone**) was developed over a 4-month period in 1999/2000, with input from the prime, structural and landscape consultants. Between 2000 and 2003, RECO supplied 3150 m^2 of mechanically stabilized earth (MSE) wall solutions with the modified **Ashlar Stone** finish at 15 locations throughout Toronto Pearson and the approach roads.

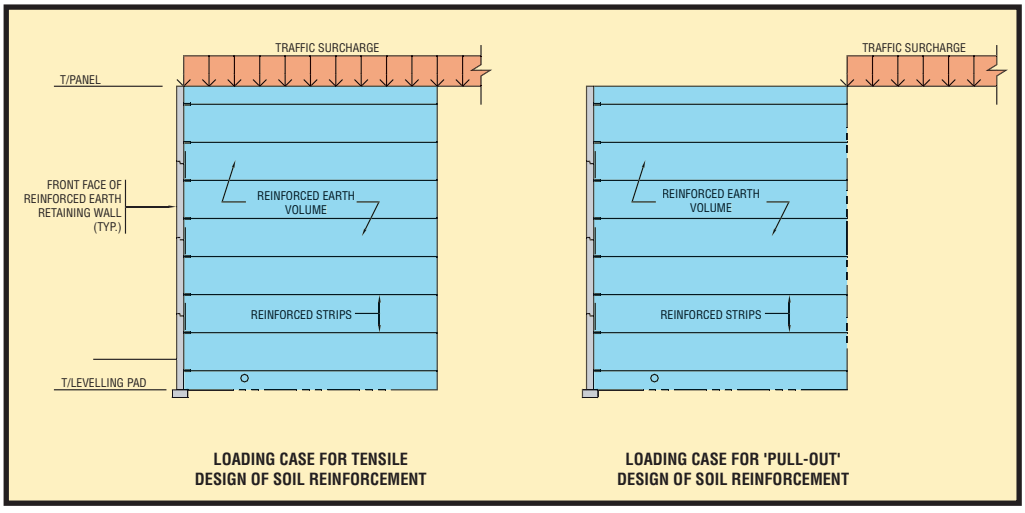
Over 30 lane-km of new roads were built as part of the access road improvements. Due to the positive response after the initial use of the modified **Ashlar Stone** finish, this enhancement was employed on the majority of the over 10 000 m^2 of retaining walls built as part of the Toronto Pearson redevelopment.

Traffic Surcharge in MSE wall design

The subject of evaluating pullout resistance in the design of mechanically stabilized earth (MSE) walls has recently been the source of confusion for some state DOT review agencies. Specifically, The Reinforced Earth Company advocates an industry practice that has been used for over 30 years, whereby traffic surcharge is neglected in pullout calculations. This practice is consistent with positions taken by The Federal Highway Administration, Transportation Review Board and AASHTO. Some review agencies however, have mistakenly interpreted guidance documents such that greater traffic loading is considered, resulting in an increased number of reinforcements at the top level of MSE walls.

Some of the misinterpretation by DOT review agencies has occurred due to missing wording in the guidance documents that would otherwise clarify the meaning of where to place traffic surcharge for pullout calculations. The guidance document causing the most confusion is a manual distributed by the National Highway Institute under the title "Mechanically Stabilized Earth Walls and Reinforced Slopes", dated March 2001. The added cost applied to MSE walls for the additional number of reinforcements does little to increase the reliability of the structures. In fact, tens of thousands of Reinforced Earth and other MSE walls have been designed neglecting live loads in pullout calculations with no problems or failures attributable to the design method.

A more detailed discussion on this subject may be found in a letter prepared by the Association for Metallically Stabilized Earth, which is available upon request.



LOADING CASE FOR TENSILE DESIGN OF SOIL REINFORCEMENT

LOADING CASE FOR 'PULL-OUT' DESIGN OF SOIL REINFORCEMENT

OHIO DOT Incorporates Wright Brother's Flyer into MSE structure

Each of the images, approximately 1 meter high and 3.6 meters long, are placed at varying heights along the MSE structures to give motorists the illusion of flight as they drive by.

When completed, the reconstruction of the I-70/75 interchange near Dayton will provide much needed relief to Ohio's business community and motoring public, reducing lost time and money resulting from constant traffic congestion and daily accidents. The new interchange, created by Ohio Department of Transportation's design consultants CH2M Hill of Dayton, incorporates 50 years of highway design to replace the 1950 cloverleaf intersection. The new interchange eliminates the weaving movement pattern of the old design and should reduce accident rates which are currently twice the state's average.

Phase one and two of the I-70/75 projects represents $60 million of the project's $145 million projected costs. Kokosing Construction Company Incorporated is serving as the general contractor for ODOT's District 7. The project features the use of 11,400 square meters of mechanically stabilized earth (MSE) structures that incorporate architectural design elements unique to Ohio's current transportation system.

Where Great Ideas Take Flight

ODOT, working with community members and local stakeholders developed the theme *"Where Great Ideas Take Flight"* to represent the historical nature of air flight in the Dayton area. The Wright's Brothers from Dayton, designed The Wright Flyer that became the first powered, heavier-than-air machine to achieve controlled, sustained flight with a pilot aboard. This theme incorporates the use of 16 images of the Wright Brother's famous 1903 Flyer. According to Mr. Vince Martini, Project Engineer for the Kokosing Construction Company, The Reinforced Earth Company was selected for the design and material supply of the MSE structures based on prior experience with complex architectural finishes, competitive pricing and a proven record in dealing with projects of this size.

DGI-Menard:
The Ground Improvement Specialists

The Reinforced Earth Company's sister company, DGI-Menard Inc. offers proven expertise in soil improvement techniques. DGI-Menard offers economical ground improvement for construction projects such as commercial warehouses, road and railways, ports and airport platforms and heavy industrial storage areas.

In Burlington, VT owner Lowe's Home Centers recently awarded a project to DGI-Menard. The large site was underlain with 15m of soft clay which was improved with our alternate design and technologies. The original project design called for either wick drains and surcharge, with a time factor that would take the building construction into 2005, or an alternate design using Vibro Concrete Columns (VCC) as direct support of the embankment fills and building loads.

Reverse auger displaces the soil laterally, with virtually no spoil

Once the project was awarded, DGI-Menard evaluated the site soil conditions and proposed a third alternate method, Controlled Modulus Columns (CMC). CMC's are formed using a specially designed auger, powered by equipment with large torque capacity and high static downward thrust, which displaces the soil laterally with virtually no spoil or vibration. During the auger extraction process, a column is developed by pressure-grouting to achieve a predetermined stiffness ratio with the surrounding soil. The result is a composite soil/cement column. CMC proved faster to install and less costly than the VCC technique. CMC proved very effective on this site since a more reliable end bearing on the underlying dense glacial till could be optimized. Three large drill rigs installed 4100 CMC columns to average depths of about 15m.

In New Jersey, a new bridge on Route 1/9 over the Rahway River required a large quantity of 600mm diameter stone columns to support a new embankment. DGI-Menard recommended an alternate of wick drains for consolidation of an organic soil layer, which lies under a loose fill that was then densified with light Dynamic Compaction. This solution was accepted by the NJ-DOT and saved over $250,000 that was shared among the project participants.

Visit **www.dgi-menard.com** for information on services, applications, completed projects, and our wide range of ground improvement techniques. Contact DGI-Menard for your next project and put our experience to work improving your foundations with our technical soil improvement methods.

United States
The Reinforced Earth Company

8614 Westwood Center Drive
Suite 1100
Vienna, Virginia
22182-2233
Tel.: 1-800-446-5700
Fax.: 703-821-1815

www.reinforcedearth.com

- Atlanta (770) 242-9415
- Boston (978) 664-2830
- Chicago (630) 898-3334
- Dallas/Ft. Worth (817) 283-5503
- Lake Forest, CA (949) 587-3060
- Orlando (407) 240-3257
- Seattle (425) 391-0111
- Vienna, VA (703) 821-1175

Canada
Reinforced Earth Company Ltd.

1550 Enterprise Road
Suite 229
Mississauga, Ontario
L4W 4P4
Tel.: 1-800-263-7097
Fax.: 905-564-2609

www.reinforcedearth.ca

- Edmonton AB (780) 453-8983
- Montreal PQ (450) 466-6566
- Toronto ON (905) 564-0896
- Truro NS (902) 897-0982
- Vancouver BC (604) 714-0766