

REPORT
results
of
**WORLD BLOCK
LANDSCAPE BLOCK
DIRECT SLIDING
CAPACITY TESTING**
over
**3/4 INCH WELL GRADED
CRUSHED STONE**
&
LEVEL CONCRETE PAD

submitted to
WORLD BLOCK
CONFIDENTIAL

INTRODUCTION

This report gives the results of a direct sliding testing program carried out to evaluate the base sliding resistance of World Block Landscape Block segmental concrete units on a ¾ inch crushed stone foundation pad. The test program was initiated in response to an email authorization to proceed from Mr. Rod Johnson of World Block received 25 September 2007.

The tests were carried out at the laboratories of Bathurst, Clarabut Geotechnical Testing, Inc. in Kingston, Ontario, under the supervision of Mr. Peter Clarabut.

MATERIALS

World Block Landscape Blocks are solid concrete units weighing approximately 2400 pounds per unit. The nominal dimensions of the block are 24 inches wide (toe to heel) by 24 inches high by 48 inches long. Construction alignment and wall batter is achieved by means of two concrete shear keys cast into the top surface of the units. The installation arrangement is illustrated in Figures 1 -3. A photograph of the World Block Landscape Block units is shown in Figure 2. The block used in this series of tests were supplied by World Block and were re-ceived at our laboratory on 28 September 2007 and designated as BIC 07-036.

APPARATUS AND GENERAL TEST PROCEDURE

The test procedure employed to conduct direct sliding tests was modeled on the SRWU-2 method of test as reported in the NCMA Segmental

Retaining Wall Design Manual (1993) and ASTM D 6916. A brief description of the apparatus and test methodology is presented here. The apparatus used to perform the tests is illustrated in Figures 1 -3. The test apparatus allows horizontal loads of up to 35,000 lbf to be applied to the block. A single block was placed on a granular pad comprised of ¾ inch crushed stone. Figure 4 illustrates the particle size dis-tribution of the base foundation soil used in this test series. The horizontal force was applied at a constant rate of displacement using a computer-controlled hydraulic actuator. A manually controlled hydraulic actuator was used to apply a constant vertical load during each test. The load and displacements measured by the actuator and displacement transducers were re-corded continuously during the test by a microcomputer/ data acquisition system. Each test was continued beyond the peak sliding resistance of the system.

The only variable in this series of tests was the magnitude of surcharge (i.e. the magnitude of normal load applied to the unit). The normal loads used in the test program are given in Table 1.

TEST RESULTS

Results of direct sliding tests are summarized in Table 1. Sliding resistance capacities are plotted against normal load in Figure 5. The regressed line in Figure 5 has been used to estimate the foundation sliding capacity at peak resistance. The displacement criterion was calcu lated to be 0.48 inch based on 2% of the block height, however peak sliding capacity was achieved before 0.48 inches of displacement in all tests. The minimum peak sliding

resistance capacity recorded from the test series was 585 lb/ft.

CONCLUDING REMARKS

The test results presented here are applicable to conventional and geosynthetic reinforced soil segmental retaining wall designs that employ World

Block Landscape Block units. Sliding resistance may be less than the values reported here when the unit is placed on a different foundation material.



P. Clarabut



R. J. Bathurst, Ph.D., P. Eng.

TABLE 1:

Test Program:
 Design Pro Landscape Block unit base sliding over 3/4 inch well graded crushed stone testing

Test number	approximate wall height (feet)	approximate number of blocks	normal load (lb/ft)	sliding resistance at 0.24 inch displacement (lb/ft)	peak sliding resistance (lb/ft)
1	11.4	5.7	3437	1654	1654
2	14.1	7.1	4258	1727	1727
3	17.1	8.6	5158	2098	2098
4	8.6	4.3	2576	1238	1238
5	8.7	4.3	2610	1283	1283
6	8.6	4.3	2582	1148	1148
7	5.7	2.9	1716	990	990
8	3.0	1.5	906	585	585

REFERENCES

ASTM D6916-03. Standard Test Method for Determining Shear Strength between Segmental Concrete Units (Modular Concrete Blocks), American Society for Testing and Materials, West Conshohocken, PA 19428-2958 USA.

Simac, M.R., Bathurst, R.J., Berg, R.R. and Lothspeich 1993. NCMA Segmental Retaining Wall Design Manual (First Edition, 1993), National Concrete Masonry Association, 2302 Horse Pen Road, Herndon, VA 22071-3406, 250 p.

FIGURE 1:

Photograph of the block and foundation pad in the test frame apparatus



FIGURE 2:

Photograph of the back of the World Block Landscape Block prior to testing



FIGURE 3:

Photograph of the World Block Landscape Block on the foundation pad prior to testing



FIGURE 4: Particle size distribution for 100% crushed granular stone (3/4 inch well graded) used in World Block Landscape Block base sliding tests

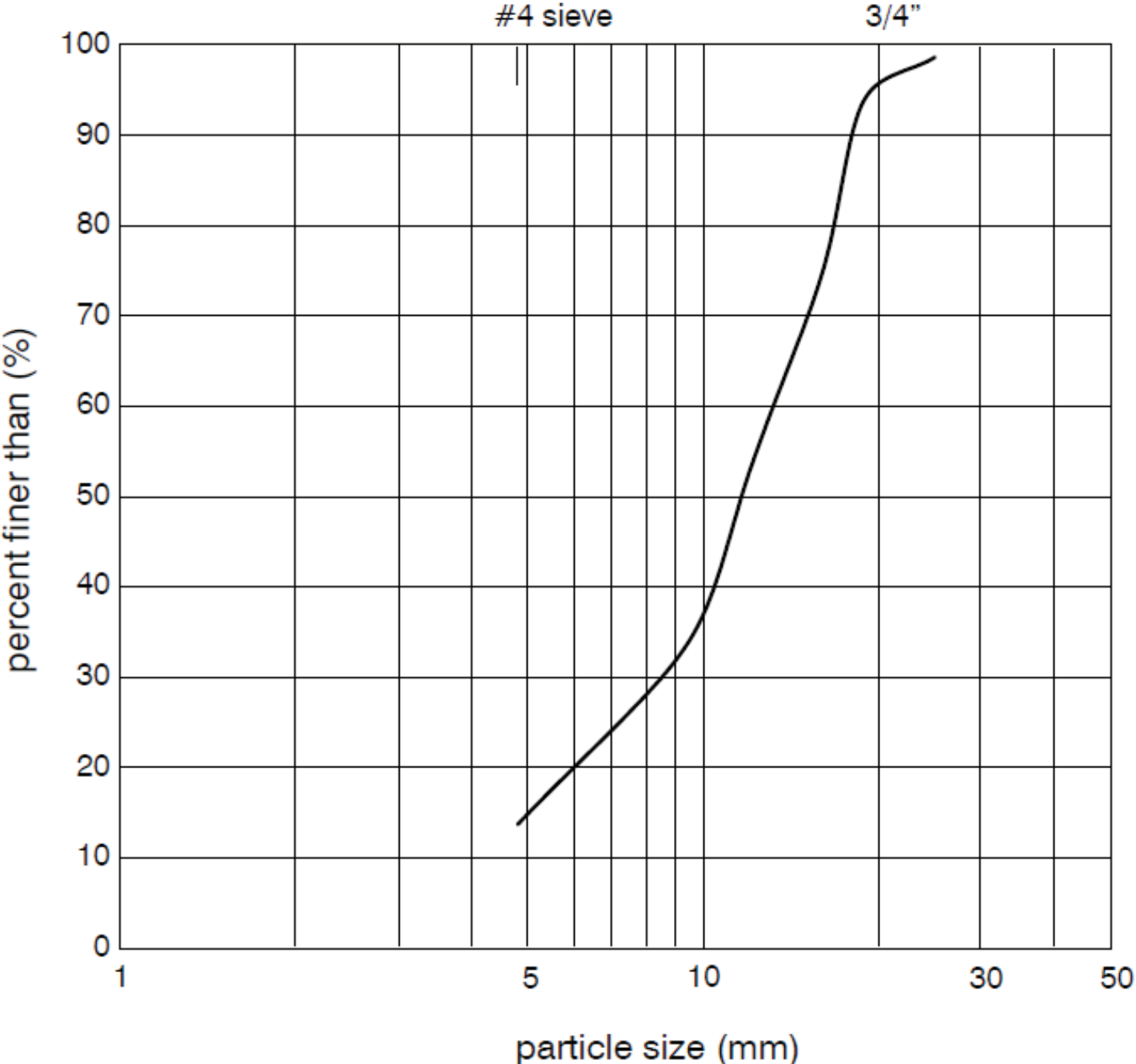
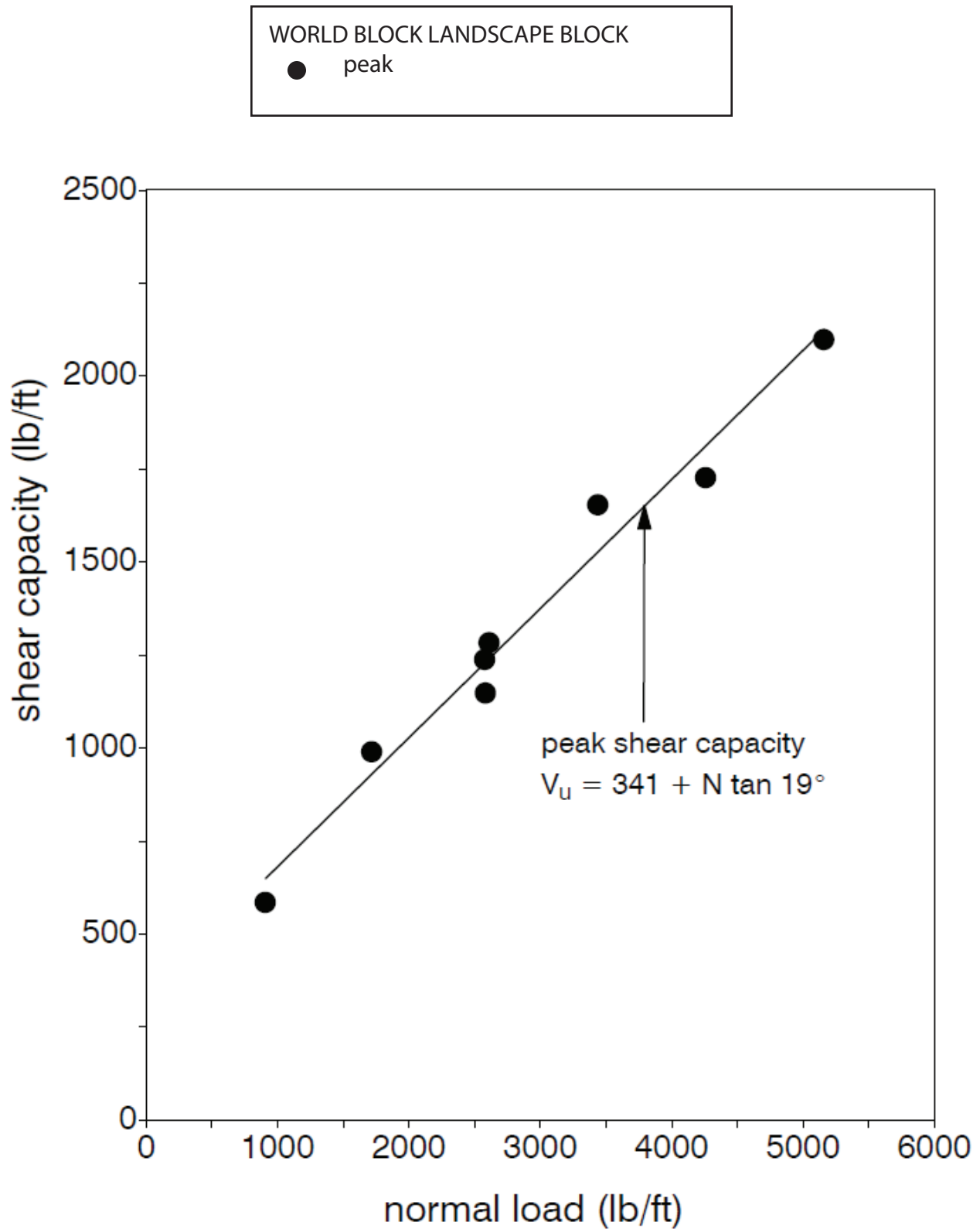


FIGURE 5:
Sliding resistance versus normal load for World Block Landscape Block tests



INTRODUCTION

This report gives the results of a direct sliding testing program carried out to evaluate the base sliding resistance of World Block Landscape Block segmental concrete units on a level concrete foundation pad. The test program was initiated in response to an email authorization to proceed from Mr. Rod Johnson of Design Pro received 25 September 2007.

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CONCLUDING REMARKS

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TABLE 1:

Test Program:

World Block Landscape Block unit base sliding over level concrete pad testing

Test number	approximate wall height (feet)	approximate number of blocks	normal load (lb/ft)	sliding resistance at 0.24 inch displacement (lb/ft)	peak sliding resistance (lb/ft)
1	2.9	1.5	883	782	782
2	5.8	2.9	1755	1609	1609
3	8.6	4.3	2593	2160	2160
4	8.6	4.3	2588	2295	2295
5	8.5	4.3	2571	2244	2244
6	11.5	5.7	3454	2897	2897
7	14.1	7.0	4236	3561	3561
8	17.0	8.5	5108	4247	4247

REFERENCES

ASTM D6916-03. Standard Test Method for Determining Shear Strength between Segmental Concrete Units (Modular Concrete Blocks), American Society for Testing and Materials, West Conshohocken, PA 19428-2958 USA.

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FIGURE 5:
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