

SGI TESTING SERVICES

A GEORGIA LIMITED LIABILITY COMPANY

25 October 2013

Mr. Mark Siver
Heritage Block
409 Northbrook Drive
Youngsville, NC 27596

Subject: Final Report
Connection and Block Shear Testing
Heritage Block

Dear Mr. Siver,

SGI Testing Services, LLC (SGI) is pleased to present the attached test results for the above-mentioned testing program. The note section below addresses sample preparation, sample disposal and a disclosure statement.

SGI appreciates the opportunity to provide laboratory testing services to Heritage Block. Should you have any questions regarding the attached document(s), or if you require additional information, please do not hesitate to contact the undersigned.

Sincerely,

Zehong Yuan, Ph.D., P.E.
Laboratory Manager

Attachments

NOTES:

- (1) Unless otherwise noted in the test results the sample(s)/specimen(s) were prepared in accordance with the applicable test standards or generally accepted sampling procedures.
- (2) Contaminated/chemical samples and all related laboratory generated waste (i.e., test liquids, PPE, absorbents, etc.) will be returned to the client or designated representative(s), at the client's cost, within 60 days following the completion of the testing program, unless special arrangements for proper disposal are made with SGI.
- (3) Materials that are not contaminated will be discarded after test specimens and archived specimens are obtained. Archived specimens will be discarded 30 days after the completion of the testing program, unless long-term storage arrangements are specifically made with SGI.
- (4) The reported results apply only to the materials and test conditions used in the laboratory testing program. The results do not necessarily apply to other materials or test conditions. The test results should not be used in engineering analysis unless the test conditions model the anticipated field conditions. The testing was performed in accordance with general engineering testing standards and requirements. The reported results are submitted for the exclusive use of the client to whom they are addressed.

SGI6002REPORT.2008.01

MAIL TO: SGI TESTING SERVICES, LLC
P.O. Box 2427
LILBURN, GA 30048-2427

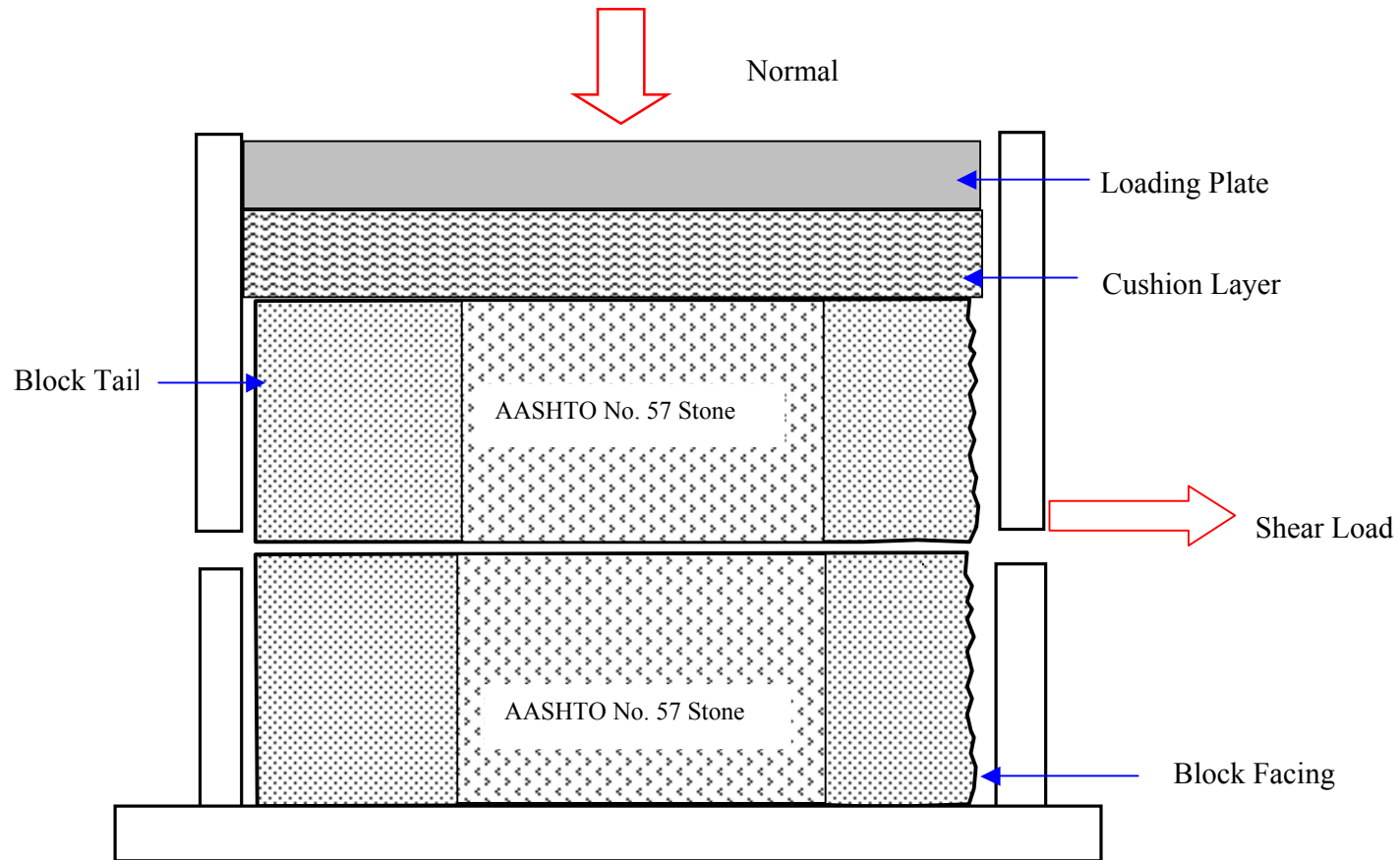
FACILITY LOCATION
4405 INTERNATIONAL BLVD., SUITE B-117
NORCROSS, GA 30093

WEB SITE: WWW.INTERACTIONSPECIALISTS.COM

PHONE: 770.931.8222 FAX: 770.931.8240

ATTACHMENT A
SUMMARY OF
BLOCK SHEAR TEST RESULTS

SCHEMATIC DIAGRAM OF CROSS-SECTION BLOCK SHEAR TESTING



(NOTE: Not to Scale)



SGI TESTING SERVICES, LLC

DATE REPORTED: 8/16/2008

FIGURE NO. A-1

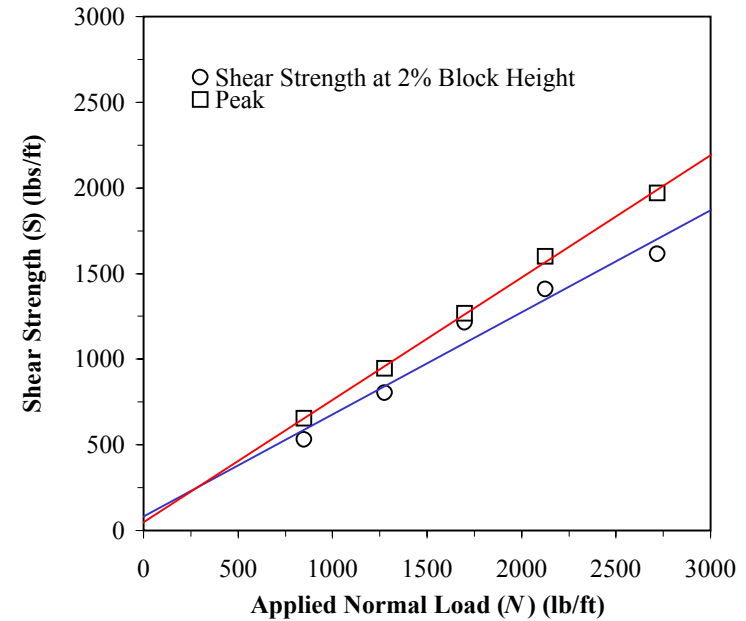
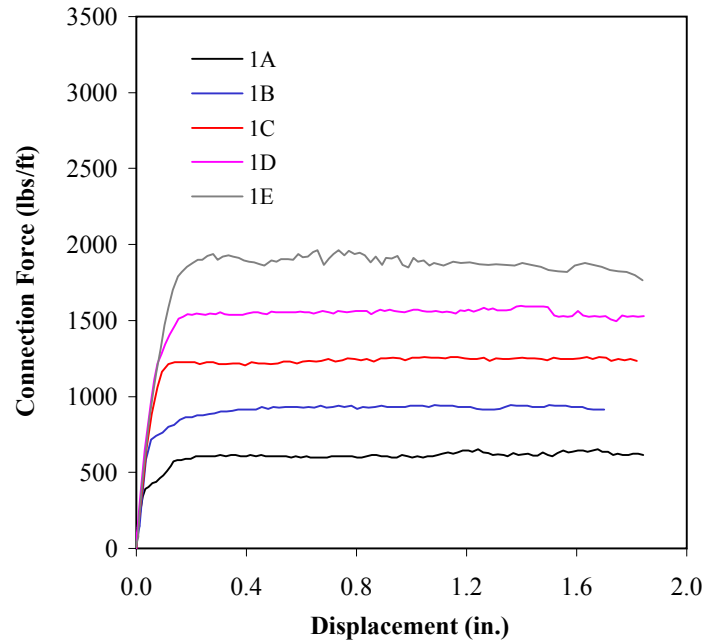
PROJECT NO. SGI6002

DOCUMENT NO.

FILE NO.

HERITAGE BLOCK BLOCK SHEAR TESTING (ASTM D 6916)

TEST SERIES NO.1: Heritage block unit / Heritage block units with compacted AASHTO #57 stone (gravel)



Test No.	Test Specimen Width (in.)	Test Normal Stress (psi)	Equivalent Normal Load (lb/ft)	Approx. No. of Blocks	Approx. Wall Height (ft)	Strength at 0.12 in. 0.02 x Block Height (lb/ft)	Peak Strength (lb/ft)	Connection Strength Equations (S)
1A	16.0	4.2	850	10	5.0	530	653	$S_{0.75-in.} = 80 + (N) \tan (31 ^\circ)$ $S_{peak} = 50 + (N) \tan (36 ^\circ)$
1B	16.0	6.3	1275	15	7.5	804	945	
1C	16.0	8.3	1700	20	10.0	1215	1266	
1D	16.0	10.4	2125	25	12.5	1407	1597	
1E	16.0	13.3	2720	32	16.0	1614	1970	

NOTES:

Dimensions of Block: 16 in. wide by 17 in. long and 6 in. high.
 Weight of Full-Size Block: .
 Unit Weight of Facing (Block & Gravel): 120 pcf
 Failure Mode of Block: None

DATE REPORTED: 8/16/2008



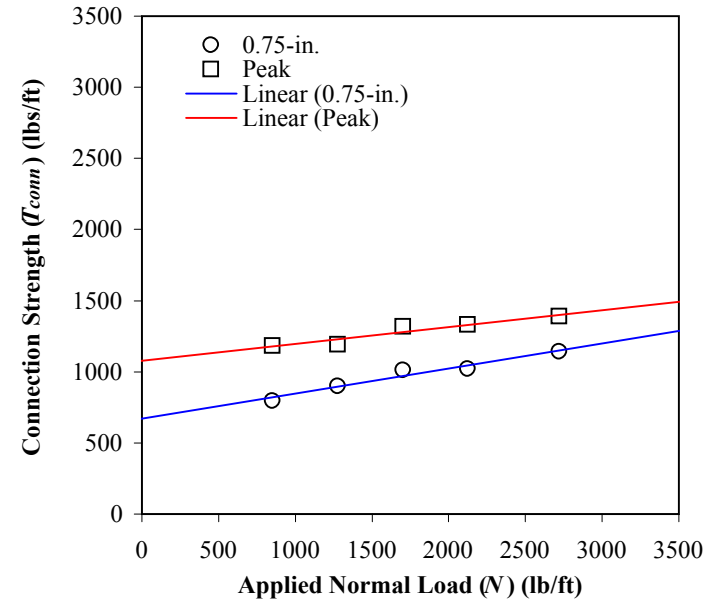
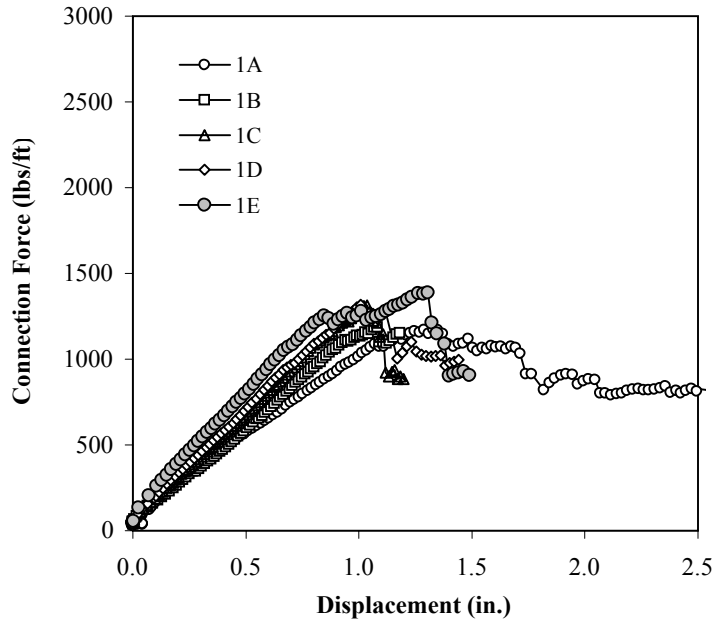
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FIGURE NO.	A-2
PROJECT NO.	SGI6002
DOCUMENT NO.	
FILE NO.	

ATTACHMENT B
SUMMARY OF
CONNECTION TEST RESULTS

HERITAGE BLOCK CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 1: Strata SG-150 Geogrid in machine direction between two courses of Heritage blocks with compacted AASHTO #57 stone
(Lower Course: 24", 16", and 24" wide by 6" thick blocks; Upper Course: 16", 24", and 16" wide x 4.5" thick blocks)



Test No.	Test Specimen Width (in.)	Test Normal Stress (psi)	Equivalent Normal Load (lb/ft)	Approx. No. of Blocks	Approx. Wall Height (ft)	0.75-in. Strength (lb/ft)	Peak Strength (lb/ft)	Connection Strength Equations (T_{conn})
1A	36.0	4.2	850	-	5.0	798	1185	$T_{0.75-in.} = 670 + (N) \tan (10^\circ)$ $T_{peak} = 1080 + (N) \tan (7^\circ)$
1B	36.0	6.3	1275	-	7.5	900	1191	
1C	36.0	8.3	1700	-	10.0	1013	1319	
1D	36.0	10.4	2125	-	12.5	1020	1331	
1E	36.0	13.3	2720	-	16.0	1143	1389	

NOTES:
 Dimensions of Block Units: varying
 Weight of Full-size Block: varying
 Failure Mode of Geogrid: abrasion and rupture of the geogrid in each test.

DATE TESTED: 21 to 24 December 2005

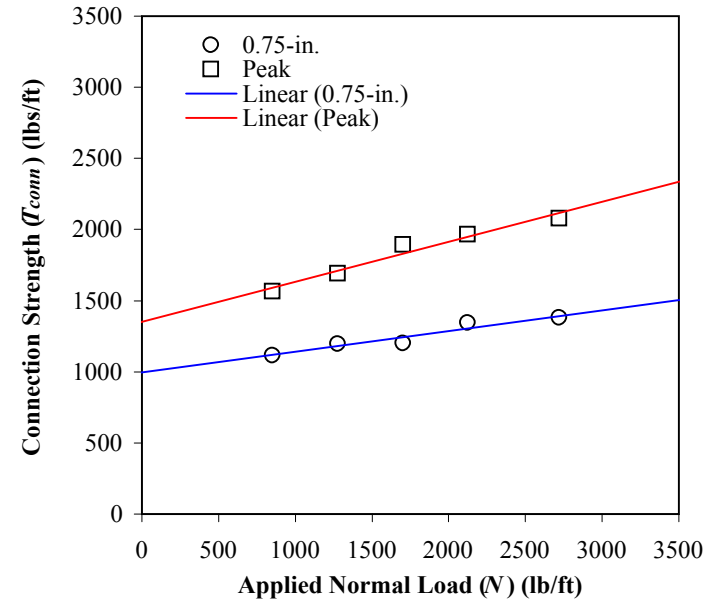
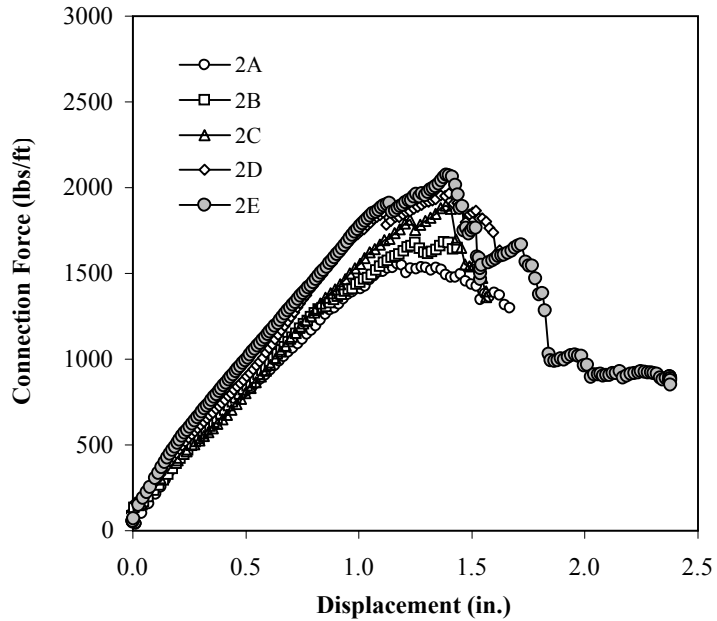


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FIGURE NO.	B-1
PROJECT NO.	SGI5047
DOCUMENT NO.	
FILE NO.	

HERITAGE BLOCK CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 2: Strata SG-200 Geogrid in machine direction between two courses of Heritage blocks with compacted AASHTO #57 stone
(Lower Course: 24", 16", and 24" wide by 6" thick blocks; Upper Course: 16", 24", and 16" wide x 4.5" thick blocks)



Test No.	Test Specimen Width (in.)	Test Normal Stress (psi)	Equivalent Normal Load (lb/ft)	Approx. No. of Blocks	Approx. Wall Height (ft)	0.75-in. Strength (lb/ft)	Peak Strength (lb/ft)	Connection Strength Equations (T_{conn})
2A	36.0	4.2	850	-	5.0	1117	1565	$T_{0.75-in.} = 995 + (N) \tan (8^\circ)$ $T_{peak} = 1350 + (N) \tan (16^\circ)$
2B	36.0	6.3	1275	-	7.5	1196	1692	
2C	36.0	8.3	1700	-	10.0	1203	1896	
2D	36.0	10.4	2125	-	12.5	1343	1967	
2E	36.0	13.3	2720	-	16.0	1380	2080	

NOTES:

Dimensions of Block Units: varying
Weight of Full-size Block: varying
Failure Mode of Geogrid: abrasion and rupture of the geogrid in each test.

DATE TESTED: 19 to 20 December 2005

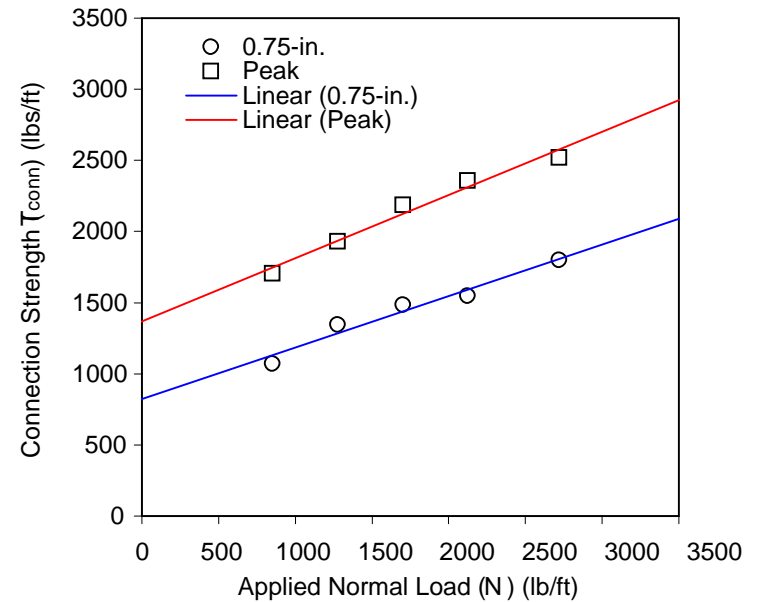
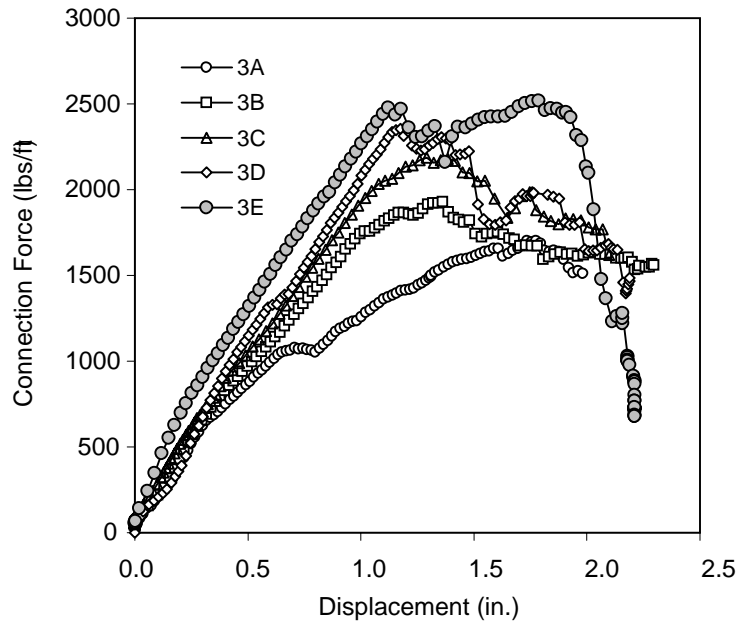


SGI TESTING SERVICES, LLC

FIGURE NO.	B-2
PROJECT NO.	SGI5047
DOCUMENT NO.	
FILE NO.	

HERITAGE BLOCK CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 3: Strata SG-350 Geogrid in machine direction between two courses of Heritage blocks with compacted Asphalt #5
(Lower Course: 24", 16", and 24" wide by 6" thick blocks; Upper Course: 16", 24", and 16" wide x 4.5" thick blocks)



Test No.	Test Specimen Width (in.)	Test Normal Stress (psi)	Equivalent Normal Load (lb/ft)	Approx. No. of Blocks	Approx. Wall Height (ft)	0.75-in. Strength (lb/ft)	Peak Strength (lb/ft)	Connection Strength Equations (T_{conn})
3A	36.0	4.2	850	-	5.0	1072	1705	$T_{0.75-in.} = 820 + (N) \tan (20^\circ)$ $T_{peak} = 1370 + (N) \tan (24^\circ)$
3B	36.0	6.3	1275	-	7.5	1343	1928	
3C	36.0	8.3	1700	-	10.0	1482	2188	
3D	36.0	10.4	2125	-	12.5	1549	2357	
3E	36.0	13.3	2720	-	16.0	1801	2521	

NOTES:
 Dimensions of Block Units: vary
 Weight of Full-size Block: vary
 Failure Mode of Geogrid: abrasion and rupture of the geogrid in each test.

DATE TESTED: 28 to 30 December 2005

FIGURE NO.	B-3
PROJECT NO.	SGI5047
DOCUMENT NO.	
FILE NO.	