CONSTRUCTION
MATERIALS
SERVICES, INC.
105 Park 42 Drive, Suite A
Locust Grove, GA 30248-2545
Phone 770-914-1744 Fax 770-914-0412

September 9, 2005

American Step Company, Inc.
Mr. Craig Williams
830 East Broadway
P.O. Box 137
Griffin, Georgia 30223

RE: American Step Company, Inc.
Wire Rope Lift Eye – Product Evaluation
CMS # 05254
Revised 9-9-05

Dear Mr. Williams,

As authorized by you, Construction Materials Services, Inc. (CMS) performed load tests on lifting eye wire rope loop systems (LEWRLS) for the American Step Company, Inc. (ASC). The primary purpose of this testing is to determine safe load ratings for the specified systems. This report describes the systems tested and presents the testing procedures along with the final test results.

DEVICE

Three different diameter LEWRLS were tested as part of this product evaluation. The diameters of wire ropes tested were nominally 3/8", 5/16" and 1/4". The manufacturer of the wire ropes tested is Loos and Company, Inc. of Pomfret, Connecticut. All wire rope tested was 7 X 19 preformed galvanized cable.

Loos and Company provided mill certificates for each wire rope diameter used in this testing. These mill certificates can be reviewed in **APPENDIX I**. The Minimum Breaking Strength (tensile strengths) of the individual wire ropes published by Loos and Company is 16,560 lbs., 10,810 lbs., and 7,700 lbs. respectively. The LEWRLS will be embedded into steel reinforced pre cast Portland Cement Concrete (PCC) members, while the PCC is in the plastic state, for the purpose of lifting the pre cast member once cured. The lifting mechanism of the LEWRLS is typically an exposed wire rope loop as illustrated in the attached photographs **(SEE APPENDIX II)**. For pre cast systems requiring steel reinforcement, the LEWRLS is to be integrated into the pre cast member such that steel reinforcement of the member shall be placed through or tied to the loop during member fabrication. Reinforcing steel was not placed through or tied to the imbedded wire rope loops used for any of this testing for the purpose of obtaining as conservative load ratings (test results) as possible.

TEST SPECIMENS

As instructed by ASC, each of the LEWRLS was encased in cast in place concrete rectangular prisms (test blocks). All the forms for this testing were constructed by ASC at their facility in Griffin, Georgia. Please see the table in **APPENDIX III** for the final field measurements/specifications of the concrete rectangular prisms (test blocks) utilized for this product evaluation. The test specimen fabrication was performed by ASC and witnessed and documented by CMS. This process is shown in the attached photographs in **APPENDIX II**.

During the fabrication of the PCC test prisms on August 19, 2005, sixteen 6"X12" PCC test cylinders were molded from the plastic concrete so that the compressive strength of the concrete could be determined before load testing the lifting eye. A total of fourteen cubic yards of concrete was ordered for this evaluation and was manufactured at Walker Concrete's plant in Locust Grove, Georgia. We had the total concrete order split into two even seven yard batches. Eight test cylinders were made from each seven yard load. The concrete test cylinders were laboratory cured and tested with standard ASTM protocol. The batch tickets and our PCC compressive strength results can be found in **APPENDIX IV.** The load testing was performed after seven days of PCC curing. The average 7 day compressive strength of the mixture used for this testing was 4420 psi, as determined by Laboratory Testing on August 26, 2005.

TEST CONFIGURATIONS

Three configurations of the LEWRLS were tested as indicated on drawings in **APPENDIX V.**

TEST PROCEDURES

The pull out capacity was determined by engaging the loop formed by the LEWRLS imposing a load perpendicular or parallel to the surface of the concrete from which the loading device protruded. The load was imposed with a calibrated 60 ton jack supported by a 4 legged frame, which reacted against the surface of the concrete. As the load was applied, the surface of the concrete was observed for evidence of distress. The ultimate pull out capacity was recorded when the lift eye system failed. In each case (for each test block) the failure was abrupt. The exposed wire rope loop lifting eye failed for every test prism. The cable failed in tension. The load test procedure is illustrated in the attached photographs **(See APPENDIX III)**.

RESULTS

The load test (pull out) results are summarized in the table in **APPENDIX VI.**

CMS appreciates the opportunity to perform this service for American Step Company.

If you have any questions concerning this report, please contact me at (770) 914-1744.

Respectfully submitted,

Andrew Johnson, P.E.
President

9-9-05

Attachments

AJ:ns

Test Specimens - Rectangular Concrete Prisms

Specifications

Project: American Step
CMS#: **05254**

Date Samples Fabricated: 8/19/2005
Date Samples Tested: 8/26/2005

Test Specimen Number	Prism LXWXH (inches)	Lift Wire Nominal Diam. (inches)	Cable Loop imbed depth (inches)	Steel reinforced.
1	54 54 8	1/4	5.50	*yes
2	54 54 8	1/4	5.75	*yes
3	54 54 10	5/16	6.50	*yes
4	54 54 10	5/16	6.50	*yes
5	54 54 12	3/8	8.00	No
6	54 54 12	3/8	8.00	No
7	60 60 18	1/4	6.00	No
8	60 60 18	1/4	6.00	No
9	60 60 18	5/16	6.50	No
10	60 60 18	5/16	7.50	No
11	60 60 18	3/8	8.00	No
12	60 60 18	3/8	8.00	No

* steel reinforcement was 4 - #4 steel bars e.w. @ 1.5" from bottom of prism.

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FIELD DATA ON CONCRETE COMPRESSION TEST SPECIMENS

Data for: American Step Company, Inc. **Date :** 8/19/2005
Project # / Description: 05254 - Lift Eye Test Molds
Name & Nature of Structure: Molds #1 - ⅝ of #7
Concrete Sampled From: Chute

Date Sampled:	8/19/2005	**Specified 28 Day Strength (psi):**	4000
Sampled by:	John Turner	**Mix Design:**	8 Bag
Plant:	Walker	**Gals. Water Added at Site:**	0
Truck #/Ticket #:	193 / 7-265-3416B424760	**% Air by Vol.:**	1.6
Time Mixed:	2:13pm	**Unit Weight:**	146.2 Lb./ Ft.^{3}
Time Sampled:	2:50pm	**Revs. at Time of Sampling:**	
Air Temperature °F:		**Placing Method:**	Chute
Concrete Temperature °F:		**Date Received in Lab:**	8/22/2005
No. Concrete Cylinders Made:	8	**Slump in.:**	7

Lab Date No. Marked	ASTM-C-31-33 Curing	Date Received	Age Days	Date Break	Compressive Strength lbs. per sq. in. of break	Type
C-10265		8/22/2005	3	8/22/2005	3946	
C-10266		8/22/2005	3	8/22/2005	4080	
C-10267		8/22/2005	7	8/26/2005	4456	
C-10268		8/22/2005	7	8/26/2005	4382	
C-10269		8/22/2005	7	8/26/2005	4506	
C-10270		8/22/2005	7	8/26/2005	4405	
C-10271		8/22/2005	28	9/9/2005		
C-10272		8/22/2005	28	9/9/2005		

Construction Materials Services, Inc.

9-1-05

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FIELD DATA ON CONCRETE COMPRESSION TEST SPECIMENS

Data for: American Step Company, Inc. **Date :** 8/19/2005
Project # / Description: 05254 - Lift Eye Test Molds
Name & Nature of Structure: Molds ⅜ of #7 - 12
Concrete Sampled From: Chute

Date Sampled:	8/19/2005	**Specified 28 Day Strength (psi):**	4000
Sampled by:	John Turner	**Mix Design:**	8 Bag
Plant:	Walker	**Gals. Water Added at Site:**	0
Truck #/Ticket #:	195 / 265-3416A424684	**% Air by Vol.:**	2
Time Mixed:	1:19pm	**Unit Weight:**	144.6 Lb./ Ft.^{3}
Time Sampled:	2:15pm	**Revs. at Time of Sampling:**	
Air Temperature °F:		**Placing Method:**	Chute
Concrete Temperature °F:		**Date Received in Lab:**	8/22/2005
No. Concrete Cylinders Made:	8	**Slump in.:**	5½

Lab Date No. Marked	ASTM-C-31-33 Curing	Date Received	Age Days	Date Break	Compressive Strength lbs. per sq. in. of break	Type
C-10257		8/22/2005	3	8/22/2005	3901	
C-10258		8/22/2005	3	8/22/2005	3975	
C-10259		8/22/2005	7	8/26/2005	4551	
C-10260		8/22/2005	7	8/26/2005	4434	
C-10261		8/22/2005	7	8/26/2005	4173	
C-10262		8/22/2005	7	8/26/2005	4455	
C-10263		8/22/2005	28	9/9/2005		
C-10264		8/22/2005	28	9/9/2005		

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9-1-05
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President

Results From Load Testing the Lifting Eye Wire Rope Loop System(LEWRLS)
(Pullout test)

CMS# 05254
Date Tested: 8/26/2005

Test Prism Number	Wire Rope Diam. Nominal (inches)	Ultimate Load @ Failure (lbs.)	Failure Mode*
1	1/4	12000	A
2	1/4	13300	A
3	5/16	14500	A
4	5/16	13300	A
5	3/8	22900	A
6	3/8	24100	A
7	1/4	13300	A
8	1/4	9700	A
9	5/16	14500	A
10	5/16	15100	A
11	3/8	22900	A
12	3/8	22900	A

Failure Mode*:

A	cable failure
B	slab failure
C	combination failure A+B