



**CONSTRUCTION
MATERIALS
SERVICES, INC.**

105 Park 42 Drive, Suite A
Locust Grove, GA 30248-2545

Phone (770) 914-1744

Fax (770) 914-0412

E-mail anna6598@bellsouth.net

February 1, 2008

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

RE: American Step Company, Inc.
Lift Eye – Product Evaluation Round 3
CMS # 07393

Dear Mr. Williams,

As authorized by you, Construction Materials Services, Inc. (CMS) has performed load tests on various lifting eye systems 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

There were various parts tested for this evaluation; in all there were twenty (20) different parts or prisms tested as part of this evaluation. As in the past several Lifting Eye Wire Rope Lifting Systems (LEWRLS) made by American Step Company (ASC), several pulling Irons also made by ASC were tested as well as numerous anchors some manufactured by ASC and some imported from China (CA). For a list of anchor types please see **Appendix 1 – Test Results of Pulled Anchors by Anchor Type**.

The manufacturer of the wire rope provided a mill certificate for the wire rope used in this testing. This mill certificate can be reviewed by contacting ASC. During normal application of the subject parts, the LEWRLS, anchors and/or pulling Irons will be embedded into 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 various lifting mechanisms are illustrated in the attached photographs (See **APPENDIX 2**.) For pre cast systems requiring steel reinforcement, the LEWRLS or other lifting part 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 or leg during member fabrication.

TEST SPECIMENS

As instructed by ASC, each of the various anchors was encased into 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 diagrams in **APPENDIX 3** for the final measurements/specifications of the concrete rectangular prisms (test blocks) utilized for this product evaluation. Also, see photographs of prism formwork in Appendix 2, dated October 15, 2007. The test specimen (prism) fabrication was performed by ASC and witnessed and documented by CMS.

During the fabrication of the PCC test prisms on October 15, 2007, fourteen 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 system. Twelve concrete cylinders were made from the concrete used in specimen numbers 20 and 1 through 17; while two cylinders were made from the 2nd truck of concrete which was used to make specimens 18 and 19. A total of ten cubic yards of concrete was ordered for this evaluation and was

S:\CMS Lab\General Testing - MATERIAL TESTING RESULTS\07393 - Lift Eye Product Research Round 3
(American Step Company)\Lift Eye Report - 2-1-08.doc

manufactured at Walker Concrete's plant in Griffin, Georgia. The concrete test cylinders were tested with standard ASTM protocol. The mix design and our PCC compressive strength results can be found in **APPENDIX 4**. The concrete prisms were fabricated from 1:30pm to 4:30 pm on October 15, 2007 and specimen number 20 which was a reinforced Concrete test prism was load tested between 1pm and 2pm on October 16, 2007. The compressive strength of the concrete during the testing of test specimen 20 was approximately 3250 psi as determined by Laboratory Testing on the same day. During testing, the 10.5" Pulling Iron made from 7 wire 270 grade PC Strand was loaded to failure. The ultimate load at failure of test specimen 20 was approximately 30,000 lbs.

CMS continued to test the concrete test cylinders until an ultimate compressive strength of 4000 psi was achieved; this occurred at around mid-day on 10/18/07. Test prisms numbers 1 through 18 were then tested using the following procedures. It should be noted that test specimen number 18 which was made from the second truck had only a 2000 psi compressive strength. Test specimen number 19 also made from the second truck was tested pm December 20, 2007 and failed as most other test specimens, but only after applying a load of approximately 3000 lbs. The concrete material displayed high slump during sample fabrication. The concrete was tested with a concrete hammer to verify the ultimate strength of the specimen; approximately 2000 psi was measured. It should also be noted that the lifting eye for specimen number 19 was accidentally hit with the fork lift causing the PCC to crack. Therefore, the validity of the test data for this specimen is suspect and should not be used.

TEST CONFIGURATIONS

The pull out capacity was determined by engaging the loop formed by the Lifting Eye imposing a load perpendicular 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 type failure for each lifting eye is listed in **Appendix 1**. The load test procedure is illustrated in the attached photographs (See **APPENDIX 5**).

RESULTS

The load test (pull out) results are summarized in the table in **APPENDIX 1**.

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

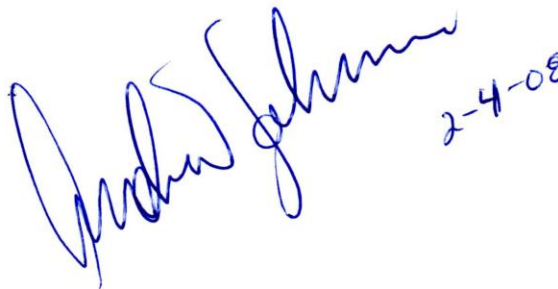
If you have any questions concerning this report, please contact me at (770) 914-1744.

Respectfully submitted,


Andrew Johnson, P.E.
President

Attachments

AJ:ns


2-4-08

List of Appendices

- Appendix I Test Results of Pulled Anchors by Anchor Type**
- Appendix II Pictures of Test Prisms with Anchors**
- Appendix III Test Prisms Diagrams**
- Appendix IV Concrete Mix Design and Strengths**
- Appendix V Pictures of Load Test Procedures**

Appendix I

Test Results of Pulled Anchors By Anchor Type

American Step Company
 Test Results of Pulled Anchors by Type
 Tested by Construction Materials Services, Inc.

Test Specimen Number	Prism LxWxH (inches)	Date Fabricated Tested		Type Anchor Pulled			Embed Depth (inches)	Steel Reinforced	Ultimate Load @ Failure (lbs)	Type Failure
				LEWRLS DxL (inches)	Pulling Iron DxWxL (inches)	Anchor DxWxL (inches)				
1	48"x48"x6"	10/15/2007	10/18/2007		9.5"		5.125	no	19,000	PCC
2	48"x48"x6"	10/15/2007	10/18/2007		6"		4.25	no	19,000	PCC
3	48"x18"x5"	10/15/2007	10/18/2007			ASC .625x3.5x11		no	14,000	PCC
4	48"x18"x5"	10/15/2007	10/18/2007			ASC .5x3.6x9.75		no	13,000	PCC
5	48"x18"x6"	10/15/2007	10/18/2007			ASC .625x4.75x12		no	15,800	PCC
6	48"x18"x6"	10/15/2007	10/18/2007			ASC .5x4.55x15		no	18,000	PCC
7	48"x18"x6"	10/15/2007	10/18/2007			CA .670x4.73x7.25		no	18,000	PCC
8	48"x18"x12"	10/15/2007	10/18/2007			CA .86x11.1x15.93		no	28,000	PCC
9	48"x18"x6"	10/15/2007	10/18/2007			CA .470x4.75x7.5		no	17,000	PCC
10	48"x18"x5"	10/15/2007	10/18/2007			ASC .5x4x12.25		no	14,000	PCC
11	48"x18"x5"	10/15/2007	10/18/2007			CA .670x3.8x6.42		no	15,800	PCC
12	48"x18"x5"	10/15/2007	10/18/2007			CA .470x3.75x6.2		no	15,800	PCC
13	48"x18"x5"	10/15/2007	10/18/2007			CA .470x3.23x5.3		no	5,000	PCC
14	48"x48"x12"	10/15/2007	10/18/2007	.5x14.5(6x26)			10	no	35,000	cable
15	48"x48"x12"	10/15/2007	10/18/2007	.5x14.5(6x19)			10.5	no	35,000	cable
16	48"x48"x6"	10/15/2007	10/18/2007		7"		5	no	15,800	PCC
17	48"x48"x6"	10/15/2007	10/18/2007		3.5"		1.75	no	10,000	PCC
18*	48"x48"x4"	10/15/2007	10/18/2007	.125x6.5				no	7000	cable
19*	48"x48"x8"	10/15/2007	12/20/2007		10.5"			yes	3000	PCC
20	48"x48"x8"	10/15/2007	10/16/2007		10.5"			yes	30,000	PCC

LEWRLS = Lift Eye Wire Rope Loop System

ASC = American Step Company

CA = China Anchor

* Prisms 18 and 19 were made from the second truck of PCC which was too wet at time of discharge and yielded approximately 2000 psi.

** Prism 19 was also tested with a concrete hammer to verify the ultimate strength, approximately 2000 psi was measured.