

# RESULTS OF GEOTECHNICAL LABORATORY TESTING

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## VERIFICATION OF BAR-LIFT APPARATUS



**GEOCON**  
INLAND EMPIRE, INC.

GEOTECHNICAL  
CONSULTANTS

PREPARED FOR

**BAR-LIFT, INCORPORATED**  
**SYLMAR, CALIFORNIA**

**GEOCON PROJECT NO. A8426-06-01**

**JUNE 6, 2006**



June 6, 2006  
Project No. A8426-06-01

Mr. Ruben DeLeon  
Bar-Lift, Incorporated  
6900 N. 10<sup>th</sup> Street, Suite 3  
McAllen, Texas 78504-3151

Subject:       RESULTS OF GEOTECHNICAL LABORATORY TESTING  
                  VERIFICATION OF BAR-LIFT APPARATUS

Dear Mr. DeLeon:

This report presents the results of the axial load and void/honeycombing testing of the Bar-Lift apparatus (rebar-chair supports) performed by Geocon Inland Empire, Inc. in May and June 2006. Geocon was requested to perform laboratory testing on the rebar chair supports because of our laboratory testing certification by the City of Los Angeles. The purpose of the testing was to verify the suitability of the Bar-Lift apparatus as well as to confirm the general findings of a larger testing program performed by Drash Consulting Engineers, Inc. located in Texas. A copy of the report by Drash Consulting Engineers, dated February 14, 2005, is included herein.

### **TESTING DESCRIPTION**

The Bar-Lift apparatus were tested for two different properties:

- The ability of the apparatus to withstand axial load; and
- The ability of the apparatus to allow concrete to fill the inside of it without any voids and/or honeycombing.

#### **Axial Load Testing**

The axial load testing was performed using a precision, 250,000 lb. digital compression testing instrument of constant speed displacement. A micro-processor-controlled digital system recorded the peak load. The apparatus was tested without using rebar to ensure uniform compression. It is important to note that this test applies a vertical force at a controlled speed. In the field, the apparatus may be exposed to different loading conditions such as: torsion and/or lateral forces.

#### **Void/Honeycombing Testing**

The void testing was performed by casting two (2) different arrangements using the Bar-Lift apparatus. The molds used were approximately 6"D x 6"H, and rebar was not used. The different arrangements included testing the Bar-Lift apparatus for two (2) different orientations. The first orientation was for support of wire mesh, and the second was for support of rebar.

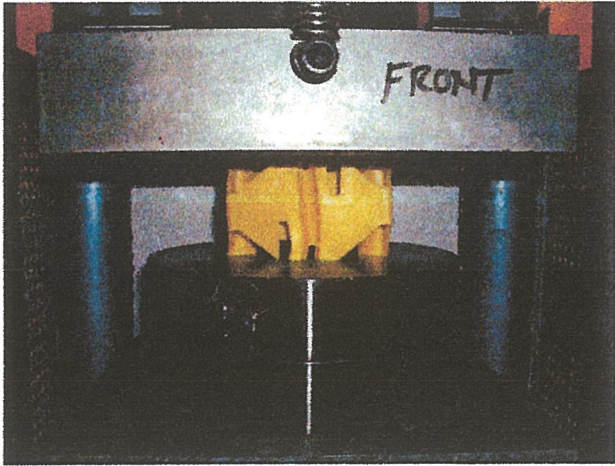
The sample of concrete used in the analyses was a mixture of Portland cement, sand, and gravel ranging in size from 1/4-inch to 1-inch diameter. The concrete was consolidated using only a standard 5/8-inch diameter tamping-rod that is 24 inches long with rounded ends (no vibration was used). Consolidation was done by penetrating the concrete with the tamping rod in multiple locations as many times as needed to provide a uniform distribution and proper consolidation of the concrete. Consolidation was done in a single layer to better represent field conditions.

The hardened concrete samples were saw-cut, using a diamond blade. A cut was made at the approximate center of the Bar-Lift apparatus where honeycombing and/or voids have the greater potential to appear.

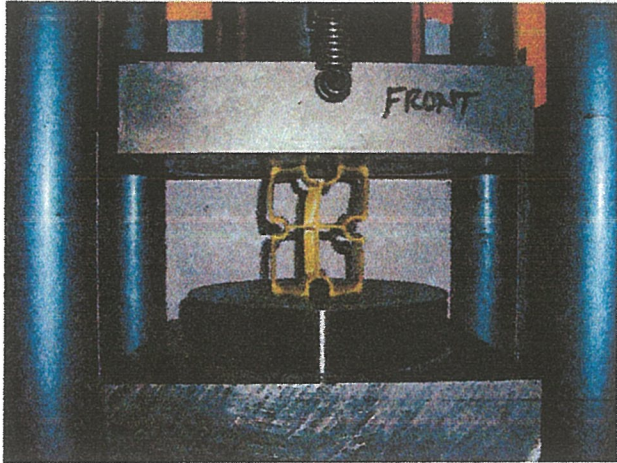
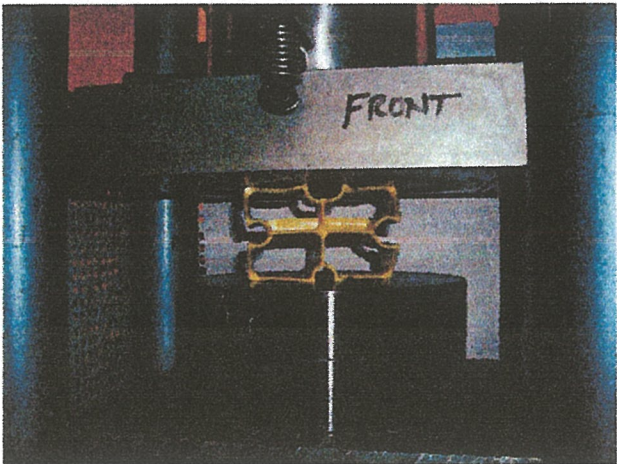
## TESTING RESULTS

### Axial Load Testing

Photographs of the Bar-Lift apparatus and orientation are depicted during testing and presented below along with the peak load to induce deformation.

Test #1	<p>The apparatus oriented vertically. In this configuration, the apparatus is capable of holding #6, 8, and 10 gauge wire mesh. The height of the device at this orientation is 2 ½”.</p> <div style="text-align: center;">  </div>	Peak Load (lb) 2150
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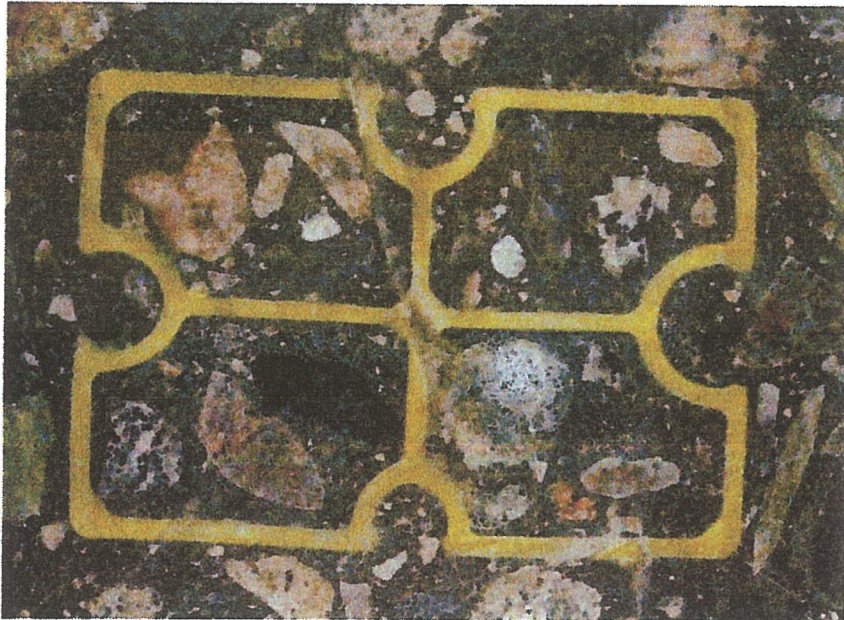


<p>Test #2</p>	<p>The apparatus oriented horizontally along its long axis. In this configuration, the apparatus is capable of holding #4 and #5 rebar. The height of the device at this orientation is 3 ½”.</p> 	<p>Peak Load (lb) 510</p>
<p>Test #3</p>	<p>The apparatus oriented horizontally along its short axis. In this configuration, the apparatus is capable of holding #3 and #4 rebar. The height of the device at this orientation is 2 ½”.</p> 	<p>Peak Load (lb) 520</p>

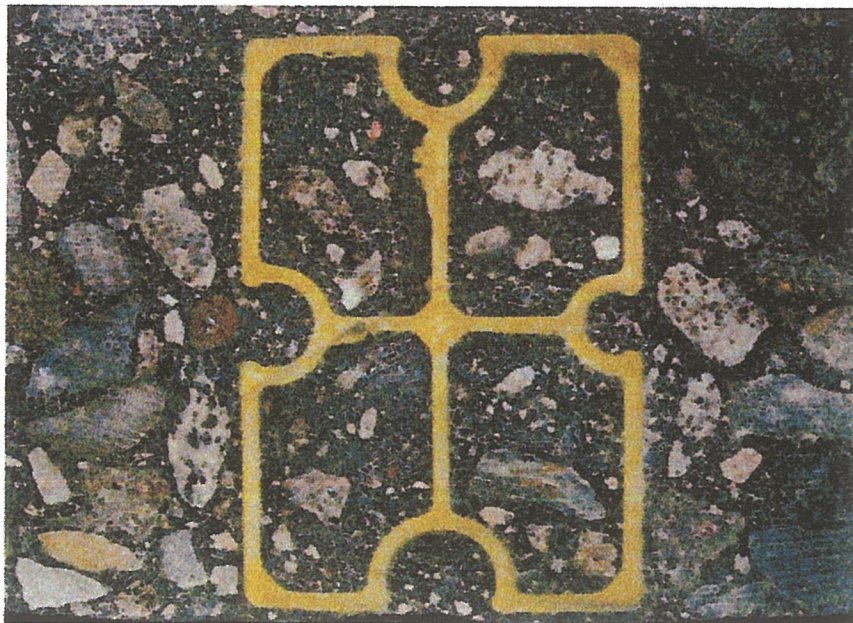
### Void/Honeycombing Testing

Photographs indicate that significant voids/honeycombs are essentially nonexistent in both alignments of the Bar-Lift apparatus. More aggressive vibration of the concrete, such as the use of a mechanical vibrator, should increase the degree of consolidation (decrease voids). Appropriate use of a spud vibrator is considered good practice for concrete placement.

In this casting, cut horizontally, the Bar-Lift apparatus would be used to support wire mesh.



In this casting, cut vertically, the Bar-Lift apparatus would be used to support rebar.





## CONCLUSIONS

Based on the testing performed by this office, the Bar-Lift apparatus can withstand axial loads of over 500 pounds in both the 2-inch and 3-inch orientations without significant deflection. When the Bar-Lift apparatus is used for holding wire mesh it can withstand loads of over 2,100 pounds without significant deflection. One of the main advantages that the Bar-Lift apparatus presents over many of the commonly used rebar support chairs is that, due to its geometry, the Bar-Lift apparatus is more capable of supporting torsion and lateral forces.

The Bar-Lift apparatus is capable of holding its position by clamping into the reinforcing steel without falling or moving. This is especially important when job personnel walk over the reinforcing steel. The Bar-Lift apparatus is capable of providing a constant clear cover of the reinforcing steel in the concrete with insignificant voids as long as proper techniques are used in placing the concrete.

In addition to the testing performed by Geocon, we have reviewed and concur with the testing results presented in the attached report by Drash Consulting Engineers.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

**GEOCON INLAND EMPIRE, INC.**

Neal D. Berliner  
GE 2576



NDB:kor

Attachments: Bar-Lift Schematic  
Report by Drash Consulting Engineers, Inc.

(7) Addressee

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**Bar-Lift Inc.  
6900 N 10 th, Suite # 3  
McAllen, TX 78504**

**RESEARCH REPORT: RR 25627**

**Attn: Ruben De Leon  
(956) 533-9996**

**Local Representative: Israel Ceballos  
(818) 442-1719**

**GENERAL APPROVAL - Renewal - Bar-Lift, Inc. Plastic Chair to support reinforcement for concrete placement.**

**DETAILS**

There are two sizes of Plastic Chair being manufactured : 2 ½ " height and 3 ½" height. The Plastic Chair is used for the concrete placement of residential and commercial foundation to support: 6 Ga., 8 Ga. and 10 Ga. wire mesh, and #3, #4 and #5 rebar.

**Conditions of Approval:**

1. Bar-Lift Plastic Chair is used to support reinforcement for concrete placement of residential and commercial foundation.
2. The Plastic Chair delivered to the job site shall be in a green nylon bag labeled with Bar-Lift Inc. and product specification.

**DISCUSSION**

The approval is based on tests of the ability of the chair to withstand axial load; and the ability of the chair to allow concrete to fill inside of it without any voids and/or honeycombing. Test reports, details and other pertinent data on file in the office of the Engineering Research Section.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.


**RR 25627  
Page 1 of 2**

Bar-Lift Inc.  
RE: Plastic Chair

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.



YEUAN CHOU, Chief  
Engineering Research Section  
2319 Dorris Place  
Los Angeles, CA 90031  
Phone (213) 485-2376  
Fax (213)847-0985



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**Texas Department of Transportation**

**RESEARCH AND TECHNOLOGY IMPLEMENTATION OFFICE  
P.O. BOX 5080 • AUSTIN, TEXAS 78763-5080 • (512) 416-4730**

September 9, 2011

Mr. Ruben De Leon  
Bar Lift Inc.  
6900 N. 10<sup>th</sup>, Suite #3  
McAllen, Texas 78704

Re: Product Evaluation 12-2756  
"Bar-Lift Rebar Chair"

Dear Mr. De Leon:

The product information you submitted has been reviewed by engineers in our Construction Division. They have determined that your product, the Bar-Lift Rebar Chair, may be used on TxDOT work. The supervising TxDOT Engineer's concurrence will be required before the use of your product on a specific job. This letter may be used in the request for the Engineer's job or site specific approval.

The reviewer's comments follow:

Standard Specification 360 only requires the following:

B. Reinforcing Steel. Provide Grade 60 deformed steel for bar reinforcement in accordance with Item 440, "Reinforcing Steel." Provide approved positioning and supporting devices (baskets and chairs) capable of securing and holding the reinforcing steel in proper position before and during paving. Provide corrosion protection when shown on the plans.

There are no specific materials specification requirements for the chairs and TxDOT has no approved list. The project engineer approves on a project by project basis.

If you have questions, please contact me at 512-416-4739.

Sincerely,

*(original signature on file)*

Duncan Stewart, P.E., Ph.D.

Research and Technology  
Implementation Office

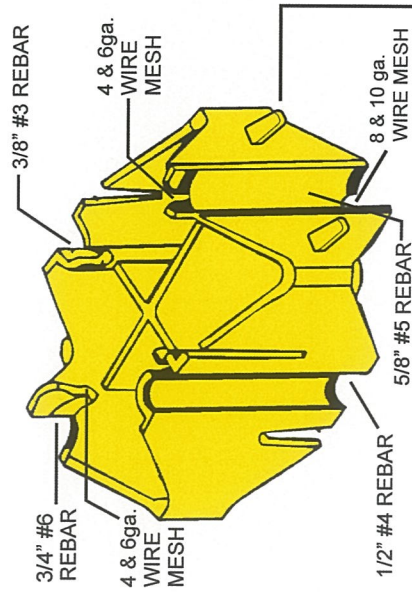
cc: Darren Hazlett, PE, CST

## Universal Functions of the Bar Lift Plastic Support

1. Snaps on to stirrup 3/8"
2. Snaps on to 4, 6, 8 and 10 gauge wire mesh
3. Snaps on to 1/2" post tension cable
4. Used in driveways, walkways, slabs for residential and commercial buildings, columns, bridge construction, swimming pool foundations.
5. Versatile application, three elevations  
 2 1/2" elevation: snaps on to 3/8" rebar, 1/2" rebar, 4, 6, 8 and 10 gauge wire mesh and 3/8" stirrup.  
 3 1/2" elevation: snaps on to 1/2" rebar, 5/8" rebar and 3/4" rebar.
6. Specifications:  
 3/32" wall thickness strong enough to stand on. Fills in with concrete gravel size up to 1". Designed for 100% filling with PSI 2500, 3000, 4500 concrete.

## A revolutionary universal plastic support for use in commercial and residential foundations

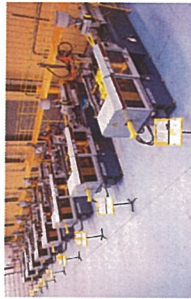
Product # 004



2 1/2" x 2 1/2" x 4" Elevation

Also used for Panel Walls, Retaining and Tilt Top Walls

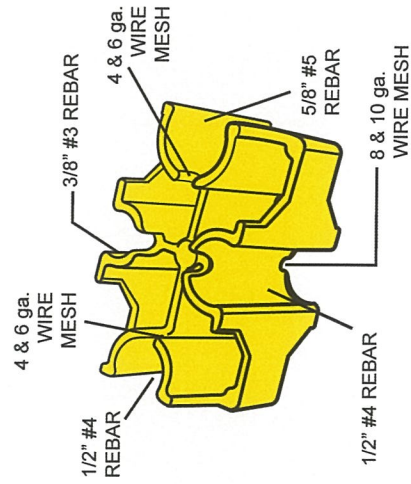
The BAR-LIFT reinforcement chair has been engineered and manufactured to support torsion and lateral forces without failing.



EMU Plastics of Texas  
 6100 So. 35th  
 McAllen, TX 78503

Bar-Lift Support Tested by Drash (Terracon)  
 Consulting Engineers of Texas and Geocoin  
 Inland Empire, Inc. of California for Voids and PSI  
**PATENT No. US 6,732,484B1**

Product # 003



1 1/2" x 1 1/2" x 2 1/2" Elevation

Also used for Driveways, Sidewalks & Multi-Level floors

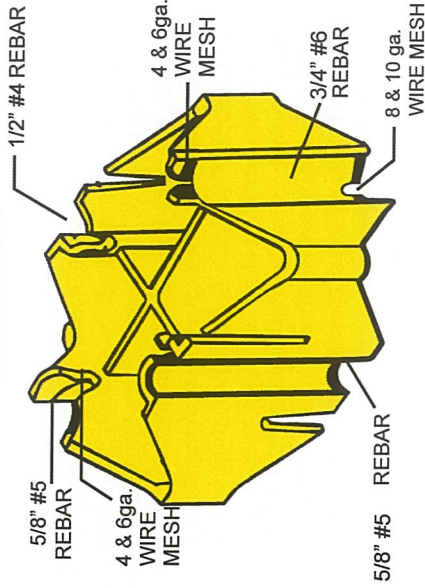
**Bar Lift**  
 INCORPORATED

A Stronger Rebar Support For A Stronger Foundation

www.bar-lift.com

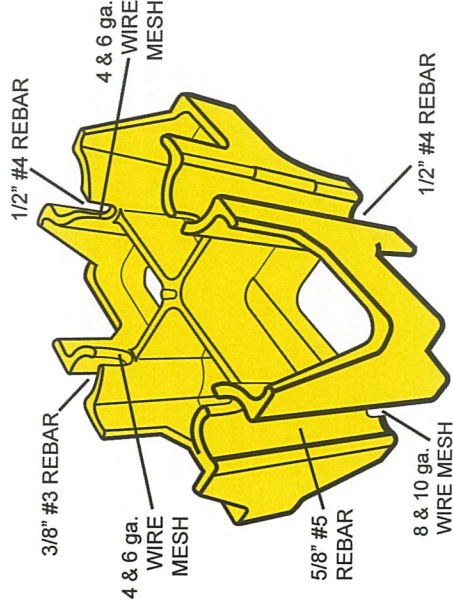
*Specs*

Product # 001



2 1/2" x 2 1/2" x 3 1/2" Elevation

Product # 002



2 1/2" x 2 1/2" x 3 1/2" Elevation

To Order Call:

Cell: (956) 533-9996

Fax: (956) 682-1592

E-mail: barliftinc@aol.com