

MAYES TESTING ENGINEERS, INC.

April 19, 2016

Mark Borchardt
Anchor Tabs NW
5527 33rd Avenue SE
Seattle, WA 98105

Re: Anchor Tab in Concrete Panel Load Testing
Mayes Testing Engineers Project Number Q14017

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
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Tacoma Office
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Portland Office
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Suite 190
Portland, OR 97211
ph 503.281.7515
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Dear Mr. Borchardt:

As requested, on April 14, 2015 Mayes Testing Engineers performed load testing of your Anchor Tab product installed in a concrete slab mockup delivered to our laboratory in Lynnwood, WA

Background

The Anchor Tab is a proprietary fall arrest tie-off point installed during the construction phase of a building. One end of the Anchor Tab is restrained by a reinforcing steel bar cast into a concrete building element, and the other end is used as an attachment point to secure a personal fall arrest lifeline.

The particular version tested is encased in a plastic housing secured to the formwork during concrete placement. The tab has one long-slotted hole, allowing it to be installed flush with the concrete surface then project beyond the formed surface when deployed.



Anchor Tab in
Cast Position
(Cutaway View)



Anchor Tab in
Deployed Position
(Cutaway View)

Per ANSI / WISHA / OSHA standards, we understand that an anchorage used for personal fall arrest must be designed for or demonstrate a minimum ultimate capacity of 5,000 pounds-force.

In order to demonstrate the capacity of the Anchor Tab, you provided a test specimen consisting of an Anchor Tab cast into a concrete mockup slab 2-feet by 2-feet by 7-inches thick. The Anchor Tab had a 6-inch long #4 ($\frac{1}{2}$ -inch diameter) reinforcing bar passed through the opening provided in the plastic case. Three other perpendicular #4 bars were also included to represent typical slab reinforcement, as shown in the photo (right).



Anchor Tab in Test Panel Form

The concrete cast in the mockup slab was Cadman 8,500-psi (at 90 days) mix #S2D35428S placed on April 7, 2016 on our Lincoln Square II project in Bellevue, Washington. The laboratory report for the 7-day strength is attached and indicates 6,000-psi ultimate compressive strength at that time.

Test Procedures

The test load was applied in direct tension to the exposed end of the deployed Anchor Tab via a calibrated hydraulic ram and digital pressure gauge assembly. A reaction beam assembly was used to provide clearance around the Anchor Tab to allow the possibility of concrete breakout as a failure mechanism and to also allow sufficient space for connecting hardware between the Anchor Tab and the hydraulic ram.

Each selected test load increment was held for a minimum 5-minute duration.



Anchor Tab Mockup in Direct Tension

Test Results

The Anchor Tab was subjected to a direct tension load of 5,000 lb-f, which was maintained for 5-minutes without indication of damage or overstress. The load was then increased to 10,000 lb-f which was also maintained for 5-minutes without indication of damage or overstress. Review of the mockup after completion of the testing did not indicate any notable cracking or other damage.

Summary

This Anchor Tab mockup easily met the ANSI / WISHA / OSHA standard that an anchorage used for personal fall arrest must demonstrate a minimum ultimate capacity of 5,000 pounds-force. For field use, we recommend that the structural engineer of record be consulted regarding the acceptable capacity of the structural element to which the Anchor Tab is being connected.

We trust this provides you with the information you require at this time.

Respectfully Submitted,
MAYES TESTING ENGINEERS


Stuart J. Carter, P.E.
Special Projects Manager



Michael S. Dolder, P.E.
Vice President

Encl: Concrete Laboratory Test Report

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Lynnwood

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CONCRETE LABORATORY TEST REPORT

Project Name: Lincoln Square II North Tower
Site Address: 500 Bellevue Way NE
Bellevue, WA
Client: Bellevue Properties LP
Engineer: Cary Kopczynski and Company, Inc.
Contractor: GLY Construction Company, Inc.

Project No: L14378-NT
Issued on: 04/15/16
Sample Set ID: 1659
Permit # (s): 14 143813 BG
Original: ☒
Revised: ☐

FIELD DATA

ASTM C31 and C172

Air Temperature: 50°F
Weather: Overcast
Product: Concrete
Supplier: Cadman
Batch Plant Location: 50
Ticket Number : 295992
MixDesign ID : S2D35428S

Actual

Mix Proportions:

Ingredient	Weight (per cu.yd)
Cement Slag	120.0 lbs
Cement--Type I & II	658.0 lbs
Coarse Aggregate 3/4"	1,292.0 lbs
Coarse Aggregate 3/8"	548.0 lbs
Fine Aggregate	1,206.0 lbs
HRWRA	40.0 oz
Water	271.0 lbs
Non Chloride Accelerator	59.0 oz
VMA	21.0 oz

Sample Temp.
(ASTM C1064)

65°F

Initial Storage Temp.
(ASTM C31)

70 ° F

Entrained Air
(ASTM C231)

NR

Water/Cement Ratio:

0.348

Slump (ASTM C143)

8"

Sample(s) Rec'd:

04/13/16

Required Strength (f'c):

8500 psi @ 90 days

Placement Location and Notes:

Set 1 of 6. Placed into the N. Tower Level L20N PT Slab D.7-F.3/3-6.8. Sample obtained at 40 of 170 total yards placed.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Set #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Surface	Strength (psi)	Type of Fracture
04/12/16	0913-FC	1	9192	04/13/16	1	4 x 8	38805	4.00	12.57	3090	Type 2 *
04/12/16	0913-FC	1	9193	04/13/16	1	4 x 8	32590	4.00	12.57	2590	Type 2 *
04/12/16	0913-FC	1	9194	04/14/16	2	4 x 8	45100	4.01	12.63	3570	Type 5 *
04/12/16	0913-FC	1	9229	04/14/16	2	4 x 8	43315	4.01	12.63	3430	Type 5 *
04/12/16	0913	1	9195	04/19/16	7	4 x 8		0.00	0.00		NA *
04/12/16	0913	1	9196	05/10/16	28	4 x 8		0.00	0.00		NA *
04/12/16	0913	1	9197	06/07/16	56	4 x 8		0.00	0.00		NA *
04/12/16	0913	1	9198	07/11/16	90	4 x 8		0.00	0.00		NA *
04/12/16	0913	1	9199	07/11/16	90	4 x 8		0.00	0.00		NA *
04/12/16	0913	1	9200	07/11/16	90	4 x 8		0.00	0.00		NA *

NOTES: See ASTM C39, Fig. 2 on page 25 for full description of the Type of Fracture

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature

Information in this report applies only to the actual samples tested and shall not be reproduced without the approval of Mayes Testing Engineers, Inc.

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Remarks:

Inspector(s): Martin, F. Defoor, H.
Tested by: Harrington, C.

Reviewed by:



Robert Gardner
Senior Project Manager

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