

CONSTRUCTION TESTING CORPORATION

4815 Pembroke Road Hollywood, Florida 33021

Phone : 954-965-2579 Fax : 954-965-2659 Email : ctclab@gmx.com

Report No: 09-016

Notification No 09-016

12 October 2009

Test Dates: 9 July 2009

TESTING of PANEL W[®] Construction Panels



Client:

Concreto W S.A. DE C.V.

AV, Vallarta 5305-A

COL REAL VALLARTA CP 45020

ZAPOPAN JALISCO

CWX-990331-CC6

Phone : 305-749-3114 Fax : 305-397-1910

General: Large Missile Impacts, per FBC 2007, TAS 201-94 & ASTM E 1886-05 & E 1996-05 @ Missile Level D

Witness to Testing:

Yamil G. Kuri, P.E. : Official Witness

Raina Williams, CTC Test Assistant

George Dotzler, CTC Test Engineer

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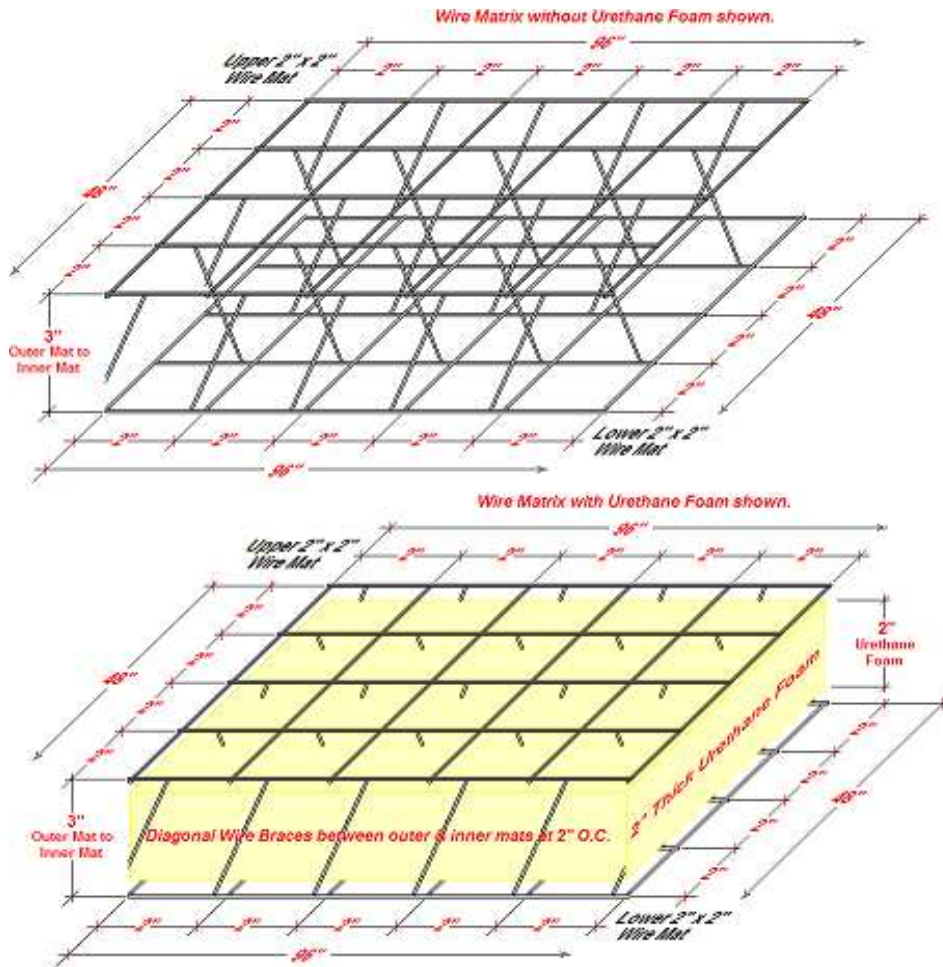
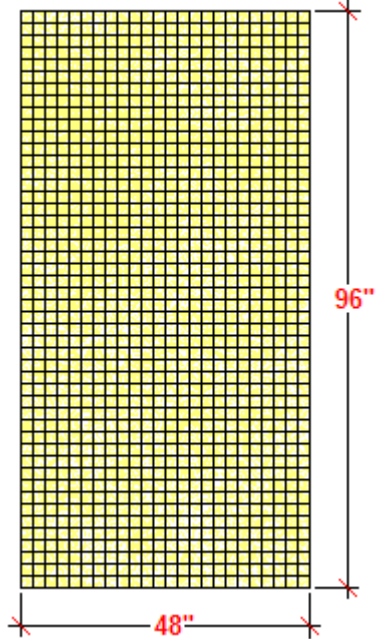
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Description of Specimen: Specimens were walls 8 feet wide by 12 feet tall created from PANEL W^(R) Construction Panels of Steel-Wire with Foam Core Covered with Cement-Sand Mortar. Basic panels were 4 feet wide by 8 feet tall and 3 inches thick (as shown in diagram at right) and consisted of a steel wire matrix with a core of polyurethane foam.

The wire utilized in the fabrication of this panel was drawn steel of 0.077" diameter, round. This wire was welded into a matrix of two flat planes in a 2" x 2" grid pattern separated 3" apart and secured to each other with segments of the same wire installed on a diagonal at 2" on center across the height and width of the wire matrix. Central to the wire matrix is a cast in place bed of urethane foam 2" thick. This bed of foam is central to the wire matrix and runs the full width and height of the 48" x 96" panel. The wire matrix extended outward from the foam core front and back approximately a half inch.

The isometric diagrams on the following show the geometry of the wire matrix both without the polyurethane foam core and with the polyurethane foam core.

Panel as Delivered



To form the 96" wide by 144" tall wall two 48" wide by 96" tall panels were joined to two 48" wide by 48" tall panels in a staggered pattern as shown. A Zig Zag Mesh of 0.077" diameter, round, wire shaped into a sign wave 4" between peaks and 6" deep from peak to valley was laid along and across both sides of each seam and secured with steel tie wire at each peak and valley, this as per manufactures instructions



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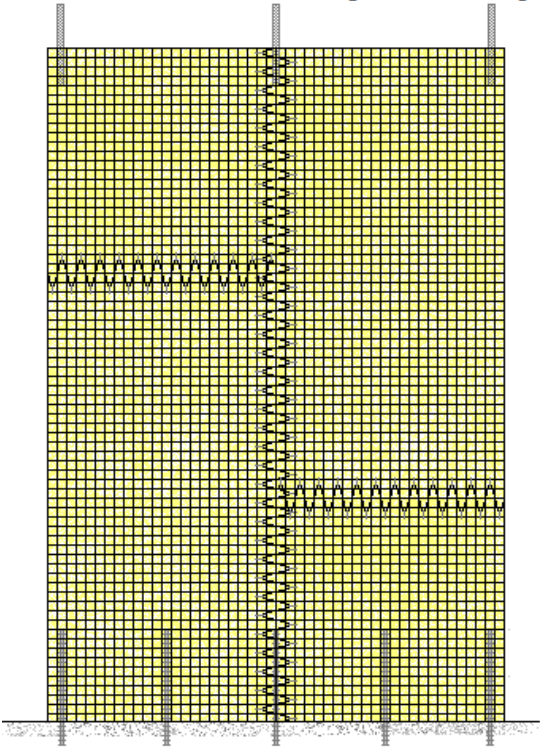
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After the basic panels had been joined together they were stood into position and secured at the head with steel hurricane straps (see photograph at right) at ~ 48" on center integrated behind the face of the wire matrix with tie wire and nailed to rafters used to prevent overturning of the wall and at the head and with # 3 steel reinforcement bar at 24" on center along the wall sill integrated behind the face of the wire matrix with tie wire and placed down into holes drilled in the laboratory floor.

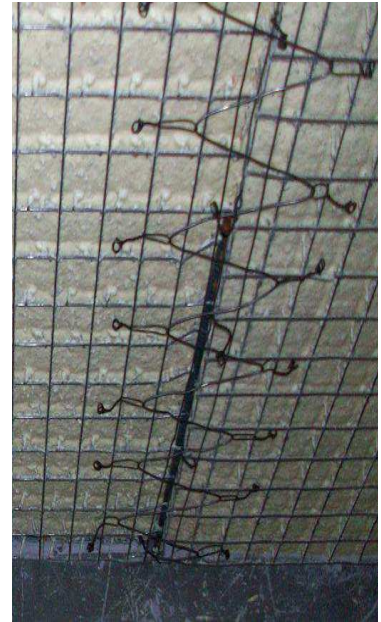
Hurricane straps were utilized @ ~ 48" O.C. to stabilize the fabricated 96" x 144" wall against overturning.



#3 Rebar @ 24" O.C into Floor Slab



Hurricane Strap



3 Rebar

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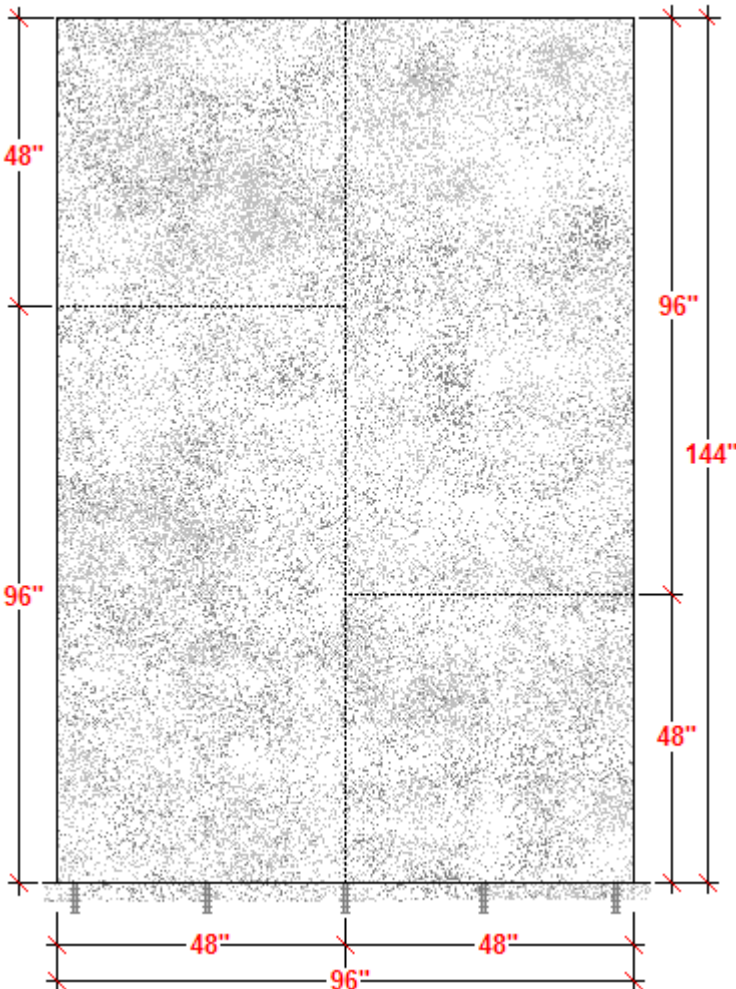
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After the wall was erected sanded mortar of cement, sand and water was troweled over both the interior and exterior sides of the prefabricated construction panel assembly in two layers bringing the walls total thickness out from 3" to 4" overall.

(This sanded mortar was approximately 1" thick on each side with the wire mesh embedded 1/2" into the mortar layer on each side. The first layers applied to each side, was approximately 5/8" thick and the second layers applied approximately 3/8" thick.

Each batch of sanded mortar consisted of one 94 pound bag of AMERIMIX PORTLAND CEMENT Type I & II, Type GU made to Specification ASTM C-150 & C-1157, eight 50 pound bags (400 lbs.) of SAKRETE Natural Play Sand and 62 pounds of water (7.5 gallons).



Fabrication of the specimens was completed on 11 June 2009 and testing was performed 9 July 2009. This permitted the specimen 28 days to cure before testing was performed.

The completed test specimen were (as shown in the diagram left) 96" wide by 144" tall and 4" thick and formed from prefabricated foam core construction panels which were 48" wide by 96" tall. The diagram shows the size and location of the various internal components.

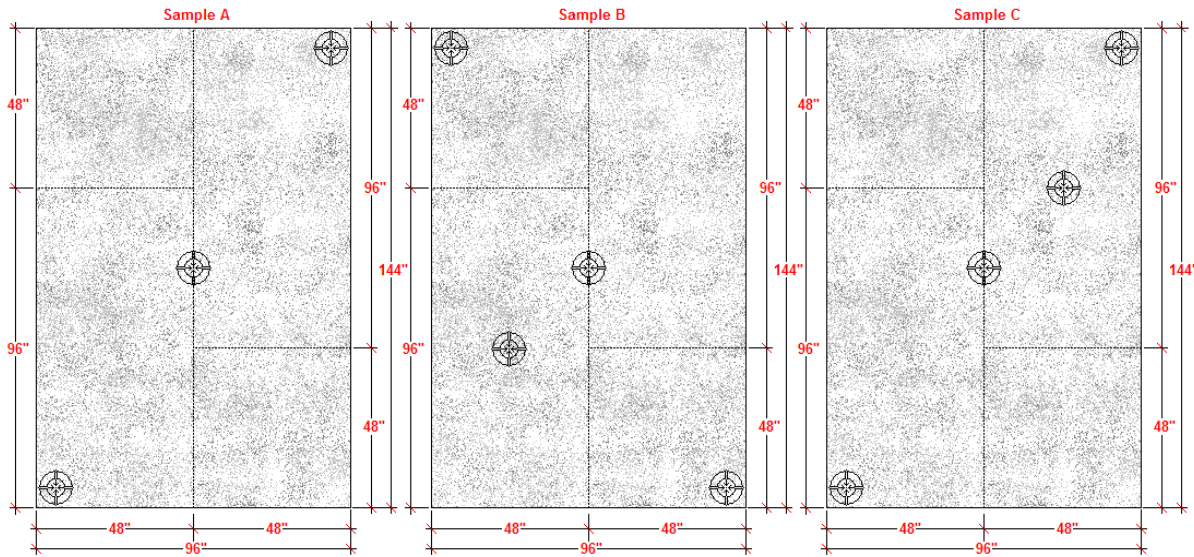


Typical Completed Specimen

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Large Missile Impact / Manner of Testing: In accordance with the **FLORIDA BUILDING CODE 2007, TAS 201-94, IMPACT TEST PROCEDURES** and **TAS 203-94, CRITERIA FOR TESTING PRODUCTS SUBJECT TO CYCLIC WIND PRESSURE LOADING & ASTM E 1886-05 Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials** and in conformance to **ASTM E 1996-05 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes**. The specimens, as previously described, were impacted (as shown in the diagram above) with a 9.05 lb, 96" long, S4S, 2x4, of No. 2 Southern Pine lumber, in locations as directed in the reference specification **ASTM E 1996-05** and in additional locations as directed by the client consulting engineer all impacts at **Missile Level D**. Data follows:

Impact Test Results		Location	Location	Velocity	Deflection	Permanent Set
ID	Size	Rt(in), Up(in)	Description	Ft/Sec	Inches	Inches
		{1}	{2}	{3}	{4}	{5}
A	96" x 144"	49, 70	Center	50.5	NA	1 1/2
A	96" x 144"	8, 10	Lower Left Corner	49.8	NA	1 1/2
A	96" x 144"	90, 138	Upper Right Corner	49.5	NA	3/4
B	96" x 144"	26, 48	Lower Left Center	52.0	NA	1 3/4
B	96" x 144"	48, 72	Center	50.8	NA	3/8
B	96" x 144"	90, 7	Lower Right Corner	49.6	NA	1
B	96" x 144"	5, 137	Upper Left Corner	49.7	NA	7/8
C	96" x 144"	48, 71	Center	49.8	NA	2
C	96" x 144"	5, 8	Lower Left Corner	49.8	NA	5/8
C	96" x 144"	73, 95	Upper Right Center	49.2	NA	1
C	96" x 144"	89, 137	Upper Right Corner	49.7	NA	1 1/4

(1) : Impact location given on Cartesian grid, right and up from lower left hand corner.

(2) : The location description relative to the product assembly.

(3) : Impact velocity measured with an Oehler Chronometer model 35P, verified by the video method.

(4) : Deflections recorded by the change in height of a collapsed aluminum foil cylinder.

(5) : Set readings made from the deformed product to a reference plane with a steel ruler.

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IMPACTS: Specimens A, B & C were impacted in accordance with FBC 2007 TAS 201-94 & ASTM E 1886-05 as specified in ASTM E 1996-05 at Missile Energy Level D for HV Wind Zones. None failed as a result impacts.

CONCLUSION: Following testing specimens were carefully examined. No failures were observed the wall or anchorages.

The PANEL W^(R) Construction Panels of Steel-Wire with Foam Core Covered with Cement-Sand Mortar was only tested to prove large missile impact resistance. Impacts were directed at corners, seam centers and panel centers. Other than surface deformations at the impacted locations the specimen did not suffer significant damage. The rear side of impacted locations showed no evidence of even cracking from the large missile impacts.

The product described here in complies with **Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes at Missile Level D** with the **Wind Zone 4** (additional impact locations option exercised). Except that wind load cycling was omitted this product was tested in accordance with and meets the requirements to comply with the Florida Building Code 2007, section 1626.



Respectfully submitted,

CONSTRUCTION TESTING CORPORATION

(Miami-Dade Certification # 07-0621.08)

Report by George Dotzler: _____

Test witnessed & report reviewed

by Yamil G. Kuri, P.E.: _____

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