Product Evaluation Report

Hurri-Bolt Mega Rod System

For State Wide Product Approval for the 2004 Florida Building Code

Carson Bennett Wright, AR0004020

Product Name: Hurri-Bolt Mega Rod System

1) Scope of Evaluation

Load Evaluation as a Structural Component using the requirements of the 2004 Florida Building and residential codes.

2) Description

The Mega Rod System is a fabricated wall anchoring system consisting of Hurri-Wedge anchors, coupling nuts, steel threaded rods, plate washers, and finished hex nuts. The Hurri-Wedge anchor is driven into a hole drilled with a standard ½" ANSI masonry bit using an impact wrench or hand wrench on the Mega Rod reducer coupler. The Mega Rod threaded rod is threaded to the reducer coupler. If necessary, additional couplers and rods may be joined to accommodate taller structures. The highest rod extends through the top plates and is secured with the plate washer and nut. The roof trusses must be anchored to the top plate to resist their design loads. See Figure 1.

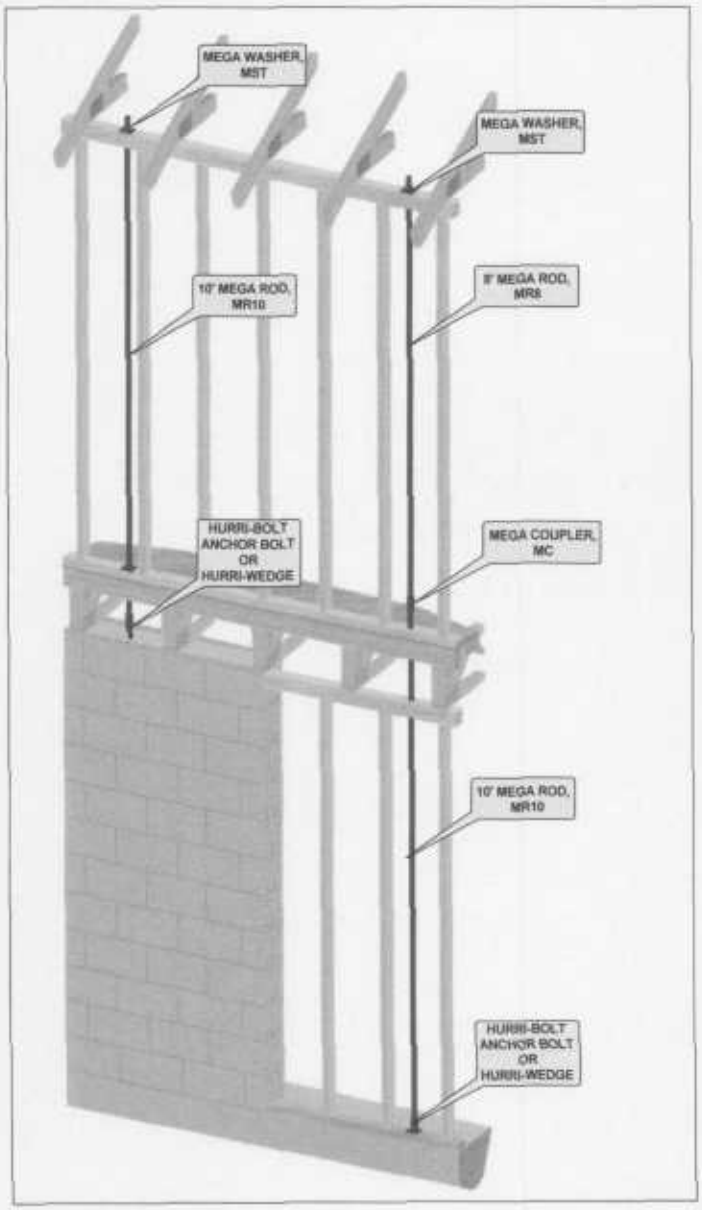

Figure 1 - The Mega Rod System

3) Materials

3.1) Hurri-Wedge anchors are ½" diameter anchors, SAE C 1038/1040 steel with Epoxy Electrocoat coating. Length 9 inches with a 6-5/8" embedment. A pilot hole is pre-drilled using a standard ½" ANSI masonry bit. The hole must be drill ¾" deeper than the required embedment. After the dust is removed from the drilled hole, the Hurri-Wedge is driven using an impact wrench and Mega Rod reducer couplers. Anchors shall not be installed before the concrete has developed its design strength.

3.2) Mega Rod Reducer Couplers – ½" UNC x 3/8 UNC conforming to ASTM A 563 Grade A coated with olive drab chromate over ASTM B633 zinc plating.

3.3) Mega Rod Theaded Rod – 3/8" UNC Threaded Rod of SAE C 1045 steel coated with olive drab chromate over ASTM B633 zinc plating.

3.4) Mega Rod Nuts – 3/8" UNC conforming to ASTM A 563 Grade A/ANSI B 18.2.2 coated with olive drab chromate over ASTM B633 zinc plating.

3.5) Mega Rod Couplers - 3/8" UNC conforming to ASTM 563 Grade A coated with olive drab chromate over ASTM B633 zinc plating.

3.6) Mega Rod Plate Washers – 3" x 3" x 3/16" with 3/8" x 1" punched slot complying with ASTM A563 coated with olive drab chromate over ASTM B633 zinc plating.

4) Design Loads

The design load for the Mega Rod system were determined by testing to failure the components of the system then applying an appropriate factor of safety. No increases for short duration loads are used. The ½" Hurri-Wedge anchor governs. (See Table 4.1). The Hurri-Wedge anchor capacity for 3000 psi concrete was interpolated per ICBO AC01. (See Table 4.2). The top plate washer size was determined using the methodology from the National Design Specification for Wood. (See Table 4.3).

Design Load for the Mega Rod System is 3600 lbs per assembly.

Table 4.1 Design Loads for Individual Components:

Component	Average Ultimate	Specification	Test Report	Component Design Load (Tension)
½" Hurri-Wedge, CMU	14,412 lbs	SAE C1038/1040	Job No. 05-5266	3603 lbs
½" Hurri-Wedge, S.O.G.	15,620 lbs.	SAE C 1038/1040	Report 30181 Report 30187	3905 lbs
3/8" Mega Rod Reducer	12,050 lbs.	ASTM A 563	Job No. 05-5269	4820 lbs
3/8" Mega Rod	10,786 lbs.	SAE C1045	Test Report 30366	4314 lbs.
3/8" Mega Rod Nut	11,167 lbs.	ASTM A 563	Job No. 05-5289	4467 lbs.
Mega Rod Plate Washer	N/A *	ASTM A 563	N/A *	See Below*

Table 4.1 Notes:
All loads are from testing reports signed and sealed by a Professional Engineer Registered in the State of Florida, unless noted otherwise.
S.O.G. refers to slab on grade.

Table 4.2 Interpolation for 3000 psi Concrete Slab on Grade Hurri-Wedge

Hurri-Wedge Pullout, 2000 psi Concrete

Diameter	Average Ultimate	Allowable Load,lbs	Minimum Embedment	Edge Distance
1/2"	11,867	2966.75	6 5/8"	1 3/4"

Notes:

Allowable load reflects 4 to 1 Factor of Safety

Hurri-Wedge Pullout, 4000 psi Concrete

Diameter	Average Ultimate	Allowable Load, lbs	Minimum Embedment	Edge Distance
1/2"	19,370	4843	6 5/8"	1 3/4"

Notes:

Allowable load reflects 4 to 1 Factor of Safety

Hurri-Wedge Pullout Concrete Strength Linearly Interpolated

Anchor Location	Allowable Load, lbs				
	Concrete Strength, psi				
	2000	2500	3000	3500	4000
Edge	2967	3436	3905	4374	4843
Middle	4623	4768	4913	5057	5202

Notes:

Linearly interpolated per ICBO AC01 Section 6.5

Interpolation formula:

Given:

Concrete Strength, interpolated = **Ci**

Allowable Load, interpolated = **Ai**

Concrete Strength, high = **Ch**

Allowable Load, high = **Ah**

Concrete Strength, low = **Cl**

Allowable Load, low = **Al**

Ai = Al +((Ah-Al)/(Ch-Cl))*(Ci-Cl)

Table 4.3 Plate Washer Capacity

Purpose: To find the minimum allowable bearing pressure perpendicular to grain for a 3" square washer with a 3/8" x 1" slot and a design load of 3600 lbs.

Ref: 1997 Edition of National Design Specification for Wood Construction.(NDS)

1997 Edition of National Design Specification for Wood Construction Supplement.(NDSS)

Find the Bearing Area Factor, **Cb**
Section 2.3.10, Page 10 NDS

$C_b=(l_b+0.375)/l_b$

where l_b=bearing length measured parallel to grain, inches

l_b	2	2.5	3	3.5	4
C_b	1.19	1.15	1.13	1.11	1.09

Find the Area of Washer Bearing, A_b

A_b = 3" * 3" -(pi/4)*(7/16)^2*(7/16*9/16)

A_b = 8.604

Find the minimum allowable bearing pressure based on load and washer size, F_{c+}.

$P_{wb} = C_b * A_b * F_{c+}$ From NDS

where A_b = Area of washer bearing
F_{c+} = Allowable bearing pressure perpendicular to grain

Solve for F_{c+}

$F_{c+} = P_{wb} / (C_b * A_b)$

F_{c+} = (3600 lbs) / (1.13*8.604in^2)

F_{c+} = 370 lbs / sq. in.

Therefore Washer size is appropriate for any wood species with a Bearing Pressure Perpendicular to Grain, F_{c+}, of 370 psi or greater.

5) Limitations

5.1) Installation of ½" Hurri-Wedge in CMU Tie Beam. CMU Tie-Beam require 2500 psi concrete fill as minimum and (1) continuous #5 reinforcing bar. Maintain 2-1/2" minimum distance from edge of CMU to centerline of Hurri-Wedge anchor. Use ½" Masonry Drill bit manufactured to ANSI standards.

5.2) Installation in Slab on Grade (S.O.G.) of ½" Hurri-Wedge. Concrete strength shall be at a minimum 3000 psi. Maintain 1-3/4" minimum distance from edge of slab to centerline of Hurri-Wedge anchor with 6" minimum distance from end of slab. Use ½" Masonry Drill bit manufactured to ANSI standards.

5.3) Must use genuine Mega Rod Components as identified by olive drab coating on all components except ½" Hurri-Wedge which is gloss black with "H" stamped in head.

6) Substantiating Data

Lab Report 30366 by Applied Research Laboratory,
Signed and Sealed by Christopher A Hammond, P.E. FL #43971
Lab Report 30181 by Applied Research Laboratory,
Signed and Sealed by Christopher A Hammond, P.E. FL #43971
Lab Report 30187 by Applied Research Laboratory,
Signed and Sealed by Christopher A Hammond, P.E. FL #43971
Job Number 05-5269 by Product Testing, Inc.,
Signed and Sealed by C.R. Caudel, P.E. FL #45170
Job Number 05-5289 by Product Testing, Inc.,
Signed and Sealed by C.R. Caudel, P.E. FL #45170
Job Number 05-5266 by Product Testing, Inc.,
Signed and Sealed by C.R. Caudel, P.E. FL #45170