City of Puyallup
Development & Permitting Services
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Building	Planning
Engineering	Public Works
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City of Puyallup
Building
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FOR
COMPLIANCE
SKinnear
11/22/2024
1:32:36 PM

PRPF20241230

MINUTE MAN ANCHORS

305 WEST KING STREET
EAST FLATROCK, NC 28726
PH: (800) 438-7277

ENGINEERED TIE DOWN SYSTEM

DESIGN & GENERAL NOTES

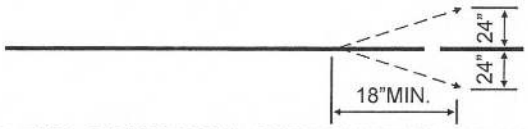
Calculations required to be provided by the Permittee on site for all Inspections

DESIGN LOADS:

*WIND----------15 PSF (70 MPH EXPOSURE "C") CAC T-25 and COMPLIES WITH THE 2022 CBC
Vult = 110 MPH EXT "C" AND THE 2021 IBC Vult = 115 MPH EXP "C"
*SOIL BEARING----------1500 PSF
*TIE DOWN STRAP---------3150# WORKING LOAD
*SEISMIC----------CAC T-25 AND 2022 CBC. S_s=1.5 Fa=1.4 S_{DS} 1.41 Site Class D
TIE DOWN STRAPS TO BE MIN. 1 1/4" WIDE X 0.035 THICKNESS ZINC PLATED AND MEET ASTM D-395391
EARTH AUGERS----------3150# (tested to 4725# min) CROSS DRIVES (soil)---1575# Stabilizer Plate Required
CROSS DRIVES (asphalt)---1800# (tested to 3600#) asphalt min 2.5" thick
CROSS DRIVES (solid rock)---3150# (tested to 4725# min)
CONCRETE SLAB ANCHORS---3150# (tested to 4725# min) drill proper size pilot hole min 4" from any edge

GENERAL NOTES:

1. THE CHARTS SHOWN HEREIN ARE FOR THE REQUIRED NUMBER OF TIE DOWNS ON THE SIDES OF THE MANUFACTURED HOME.
2. TIE DOWNS ARE REQUIRED AT EACH CHASSIS BEAM, EACH END OF EACH TRANSPORTABLE SECTION OF THE MANUFACTURED HOME AND CAN BE ANY OF THE TYPES SHOWN HEREIN.
3. COMBINATIONS OF THE DIFFERENT TYPES OF THE TIE DOWNS CAN BE USED.
4. IN THE EVENT AN EARTH AUGER CANNOT BE INSTALLED DUE TO AN OBSTRUCTION, USE OF CROSS DRIVE ANCHORS IS PERMITTED, PROVIDED (2) CROSS DRIVES ARE INSTALLED FOR EACH EARTH AUGER THAT CANNOT BE INSTALLED.
5. FOR ALL TIE DOWN INSTALLATIONS, THE MFG'D HOME CHASSIS MEMBERS ARE SHOWN AS "I" BEAMS. FOR ILLUSTRATION PURPOSES ONLY. CHASSIS BEAMS CAN ALSO BE "C" SHAPED OR "RFC" SHAPED.
6. END TIE DOWNS CAN BE LOCATED WITHIN 24" OF EITHER SIDE OF CHASSIS BEAM AXIS AS SHOWN.



7. THE SIZES, TYPES, LENGTHS, ETC. OF MATERIAL SHOWN HEREIN ARE MINIMUM. LARGER, LONGER, HEAVIER MATERIALS SUPPLIED BY MINUTE-MAN PRODUCTS MAY BE USED AT THE SAME SPACING & LOCATION SHOWN.
8. ALL PARTS ARE STAMPED MMA- WITH THE APPROPRIATE PART NUMBER.
9. THIS TIE DOWN SYSTEM CAN BE USED WITH 10' WIDE MANUFACTURED HOME SECTIONS WITH 100" CHASSIS CENTERS PROVIDED THE HEIGHT FROM GRADE TO THE BOTTOM OF THE CHASSIS BEAM DOES NOT EXCEED 19".
10. TIE DOWN STRAPS IN THE LONGITUDINAL OR TRANSVERSE DIRECTION CAN BE BOLTED TO THE HITCH ATTACHMENT PLATE THAT IS WELDED TO THE CHASSIS BEAM.

ENGINEER APPROVAL

By Yuri at 9:50:11 AM, 7/19/2023

STATE APPROVAL

STRUCTURAL CONSULTANT
YURIANTO YURIANTO, S.E., P.E.
S.E. in the State of IL, NV, MA, HI, OK.
5760 LEGACY DR. B3-333. PLANO, TX 75024
Yurianto@gmail.com

INSTALLATION INSTRUCTIONS

FIRST CHECK FOR UNDERGROUND UTILITY LOCATION:

EZDH EARTH AUGERS

1. SEE DETAIL THIS BOOKLET FOR INSTALLATION INSTRUCTIONS.

EARTH AUGERS

1. INSTALL AUGERS INTO SOIL WITH CONSTANT DOWNWARD PRESSURE TO MINIMIZE SOIL DISTURBANCE LEAVING APPROX. 12" OF SHAFT EXPOSED.
2. INSTALL STABILIZER PLATE - DRIVE FLUSH WITH GROUND SURFACE.
3. COMPLETE TURNING AUGER INTO GROUND UNTIL AUGER HEAD IS FLUSH WITH GROUND SURFACE AND TOP OF STABILIZER PLATE.

CROSS DRIVE ANCHORS

1. CROSS DRIVES ARE USED WHERE HARD ROCKY SOIL OCCURS. IF THE GROUND SURFACE IS OTHER THAN ROCK OR MIN 2.5" ASPHALT, INSTALL MMA-SD2 STABILZER PLATE, OR PLACE 12"x12"x12" DEEP CONCRETE.

CONCRETE SLAB ANCHORS

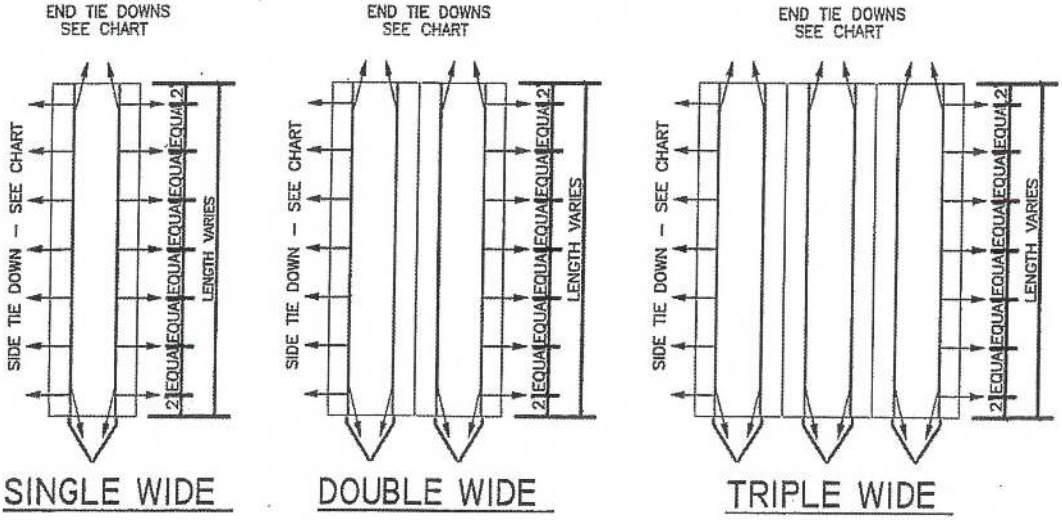
1. CONCRETE SLAB TO BE MINIMUM 3 1/2" THICK AND IN GOOD CONDITION.
2. MINIMUM SLAB AREA REQUIRED FOR EACH ANCHOR IS 28 SQ. FEET.
3. DRILL PROPER SIZE HOLE IN SLAB MINIMUM 4" FROM ANY EDGE.

ALL APPLICATIONS

1. ATTACH STRAPS TO CHASSIS BEAM IN MANNER SHOWN.
2. INSERT STRAP THROUGH SPLIT NUT, CUT OFF EXCESS STRAP AND TIGHTEN UNTIL SNUG.

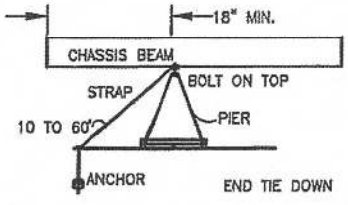
THIS PLAN MAY BE USED FOR MANUFACTUED HOMES PLACES IN FEMA FLOOD HAZARD ZONES A, AE & AH, PROVIDED THE GROUND ANCHORS ARE THE MMA-650, 50" EARTH AUGERS. UNDER FLOOR VENTS AT THE PERIMETER SKIRTING SHALL BE PLACED WITH THE BOTTOM OF THE VENT MAX 12" ABOVE THE UNDER FLOOR GROUND SURFACE

TIE DOWN LOCATIONS



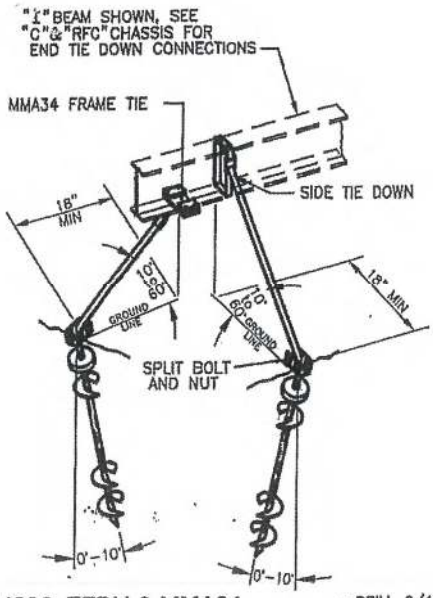
EARTH AUGERS						CROSS DRIVE ANCHORS						CONCRETE SLAB ANCHORS					
MAX. LENGTH OF MFG'D HOME	32'	42'	52'	62'	73'	MAX. LENGTH OF MFG'D HOME	32'	42'	52'	62'	73'	MAX. LENGTH OF MFG'D HOME	34'	42'	50'	59'	68'
MAX. NO. OF SIDE TIE DOWNS	3	4	5	6	7	MAX. NO. OF SIDE TIE DOWNS	3	4	5	6	7	MAX. NO. OF SIDE TIE DOWNS	4	5	6	7	8

NOTE: IF OBSTRUCTIONS PRECLUDE THE PLACEMENT OF THE SIDE TIE DOWNS AT THE 2' LOCATION SHOWN SIDE TIE DOWNS AT 2'-0" FROM EACH END HAVE A TOLERANCE OF 1'±

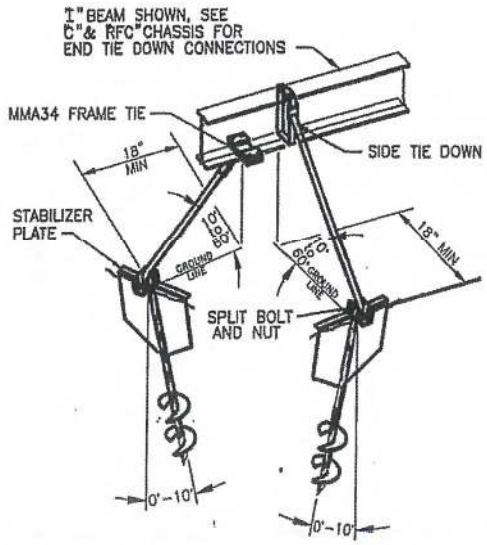


MINUITE MAN PRODUCTS
LISTED BY: **RADCO**
3220 E. 59th Street
Long Beach, CA 90805
LISTING NUMBER AT 1344
TIE DOWN SYSTEM TO BE IDENTIFIED BY A STICKER PLACED ON THE STEEL STRAPS MM-32 OR MMA-71 - STICKER TO CONTAIN THE FOLLOWING.
MINIUTE MAN PRODUCTS ETS-119
RADCO
Listing Number 1344

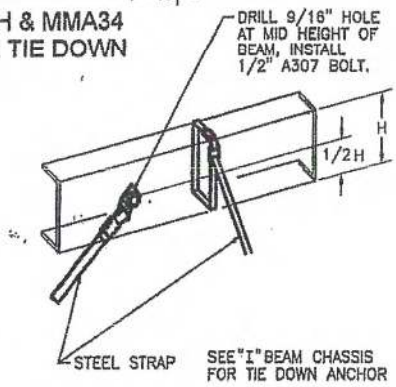
NOTE: TIE DOWN STRAPS AT THE CHASSIS BEAM ENDS (END TIE DOWNS) CAN BE ATTACHED TO A CHASSIS SUPPORT PIER WITH A PIER BOLT ON TOP. (SEE SKETCH ABOVE).



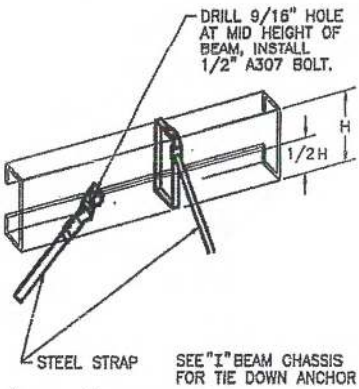
NC4636, EZDH & MMA34
EARTH AUGER TIE DOWN



EARTH AUGER TIE DOWN



"C" BEAM CHASSIS

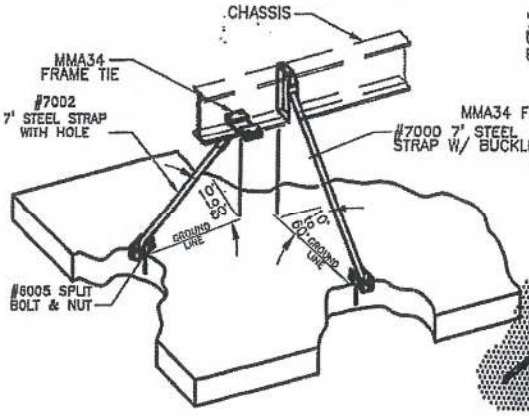


"RFC" BEAM CHASSIS

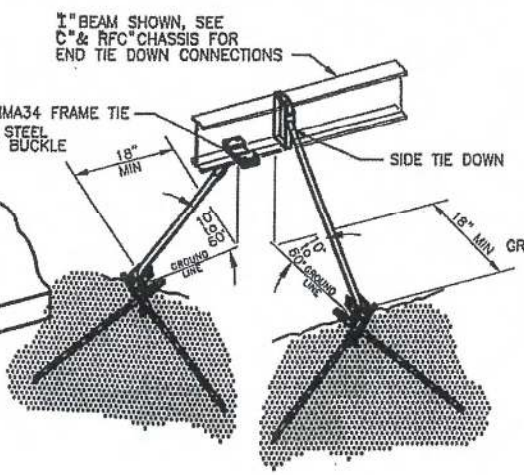
INSTALLATION INSTRUCTIONS

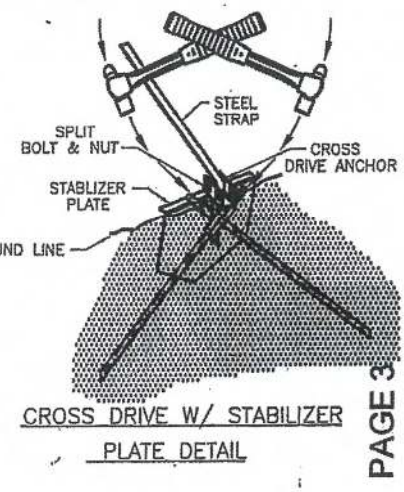
1. THE DRIVE MACHINE IS STARTED AND THE ANCHOR IS TURNED INTO THE GROUND TO A POINT WHERE THE TOP (STABILIZER HEAD PLATE) IS FLUSH OR SLIGHTLY BELOW GROUND LEVEL. THIS INSURES THAT THE E-Z ANCHOR STABILIZER WILL BE AT ITS REQUIRED INSTALLATION POSITION.
2. FOR THE E-Z ANCHOR/STABILIZER TO ACHIEVE FULL POTENTIAL, INSTALL THE ANCHOR VERTICALLY WITH NO DEVIATION GREATER THAN 10 DEGREES. NOTE: A SLIGHTLY GREATER ANGLE MAY BE USED TO START THE ANCHOR TO AVOID CONTACT WITH THE HOME & STRAIGHTENED AS THE ANCHOR IS GROUND SET.
   THE SPLIT BOLT IS INSERTED, STRAP FASTENED, AND TIGHTENING ADJUSTMENT MADE.
   NOTE: WITH MACHINE INSTALLATION, A MINUTE-MAN ADAPTER DESIGNED TO FIT BOTH THE ANCHOR HEAD AND DRIVE MACHINE SHAFT IS AVAILABLE. INSTALLERS DO NOT NEED ADDITIONAL OR SPECIAL EQUIPMENT FOR E-Z ANCHOR INSTALLATION.

CONCRETE TIE DOWN



CROSS DRIVE TIE DOWN





CROSS DRIVE W/ STABILIZER
PLATE DETAIL

City of Puyallup
Development & Permitting Services
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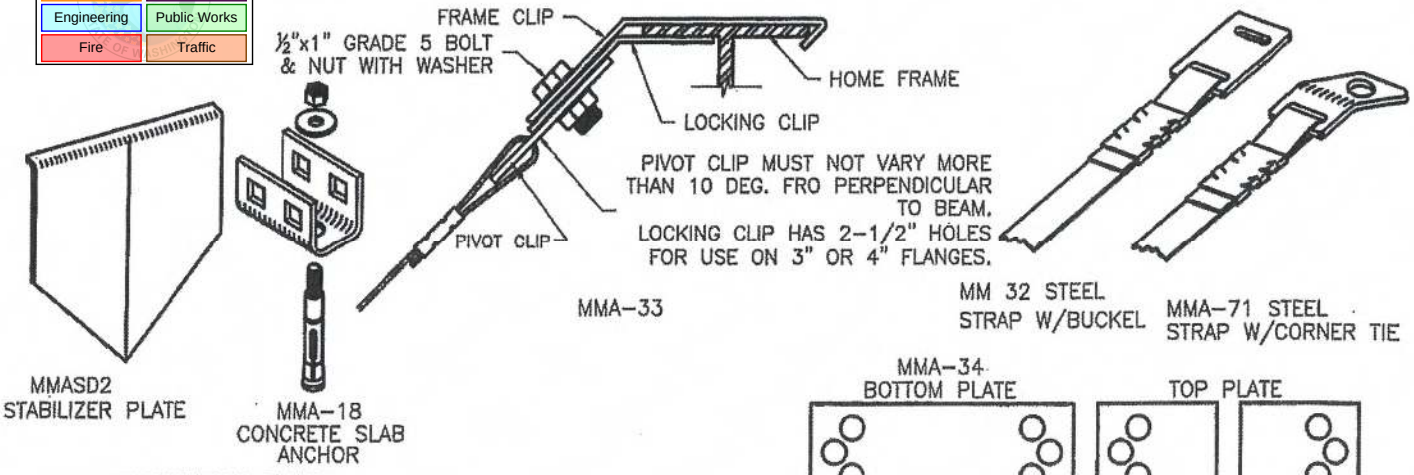
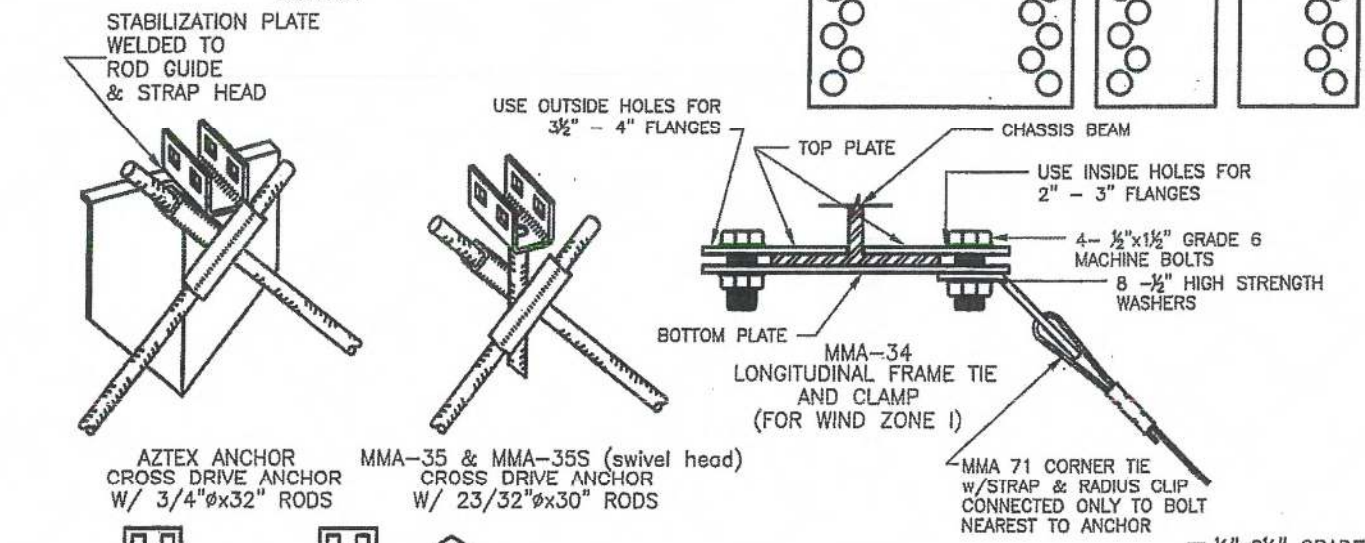
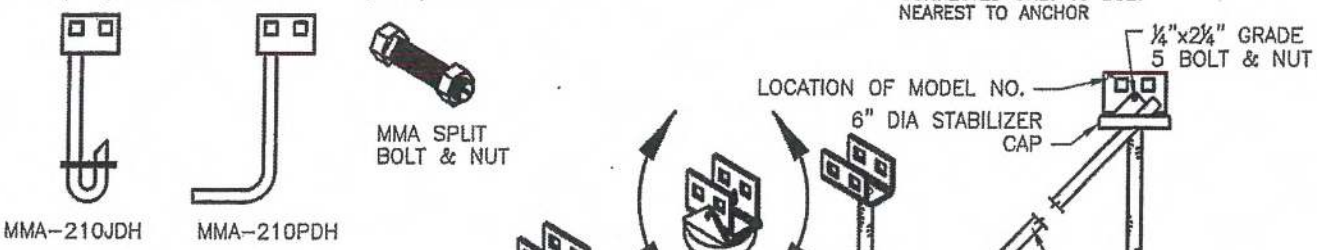
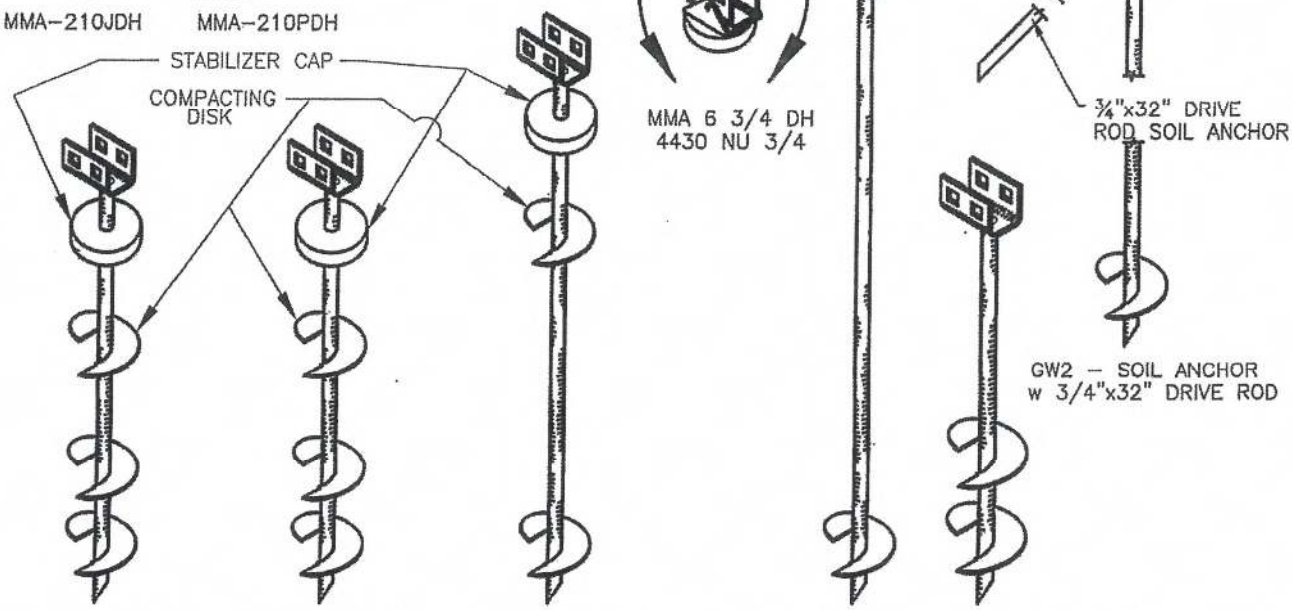
Building	Planning
Engineering	Public Works
Fire	Traffic









TLW 10-05

SINCE 1881

FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881

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18 Woods Lake Road
Greenville, South Carolina 29607
T 864.271.2840 I F 864.271.8124

May 6, 2013

Minute Man Anchors, Inc.
305 West King Street
East Flat Rock, North Carolina 28726-2318

Attention: Mr. Scott Moreno

Reference: Results of Cross Drive Asphalt Anchors
F&R Project Number 65R-0004

Scott:

Froehling & Robertson, Inc. (F&R) is pleased to submit the results of our load testing on the Cross Drive asphalt anchors. After the anchors were installed in the asphalt, the testing was performed by loading the anchors and pulling them at predetermined angles to the asphalt surface. A series of tests were performed on the Cross Drive anchors at a 60° angle and at a 30° angle to the asphalt surface. The anchors were tested both with and without a stabilizer plate at the 60° and 30° angles. The testing was performed in the asphalt pavement behind the F&R office in Greenville.

The tests were conducted by connecting a hand pump and chain to an existing structure, and applying a load to a gauge with the hand pump. The hand pump was used to generate the hydraulic pressure, and the tests were performed with a 1.3 to 1 ratio jack and a 10,000 lb. gauge.

The following table summarizes the results of the testing for the anchors.

Cross Drive Anchors – 60° Angle		
Test No.	Load (lbs.) Without Stabilizer Plate	Load (lbs.) With Stabilizer Plate
1	3,640	3,380
2	3,640	3,640
3	3,510	Discontinued*
Average	3,600	3,510

Cross Drive Anchors – 30° Angle		
Test No.	Load (lbs.) Without Stabilizer Plate	Load (lbs.) With Stabilizer Plate
1	3,120	3,380
2	3,250	3,640
3	3,900	Discontinued*
Average	3,420	3,510

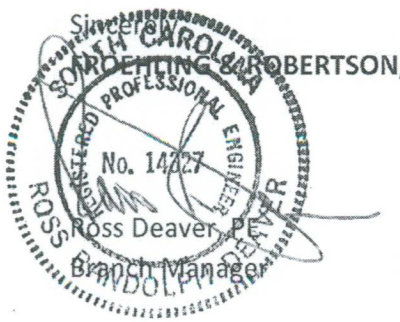
***The anchor began to pull out by pivoting on the stabilizer plate and a sustained load could not be measured.**

Attached with this letter are photos of the tests in progress, the testing setup, and various anchors installed with and without the stabilizer plates.

F&R appreciate the opportunity to assist you on this project. If there are any questions or if you need additional information, please do not hesitate to contact us.

Sincerely,

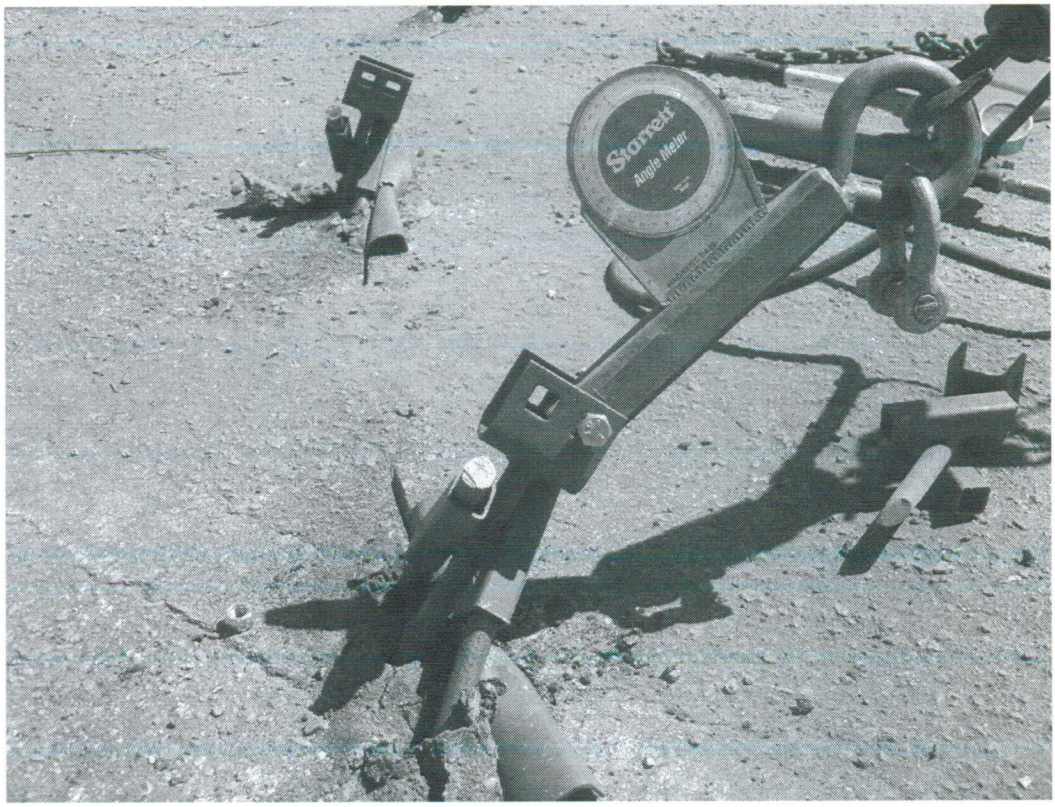
FRUEHLING & ROBERTSON, INC.

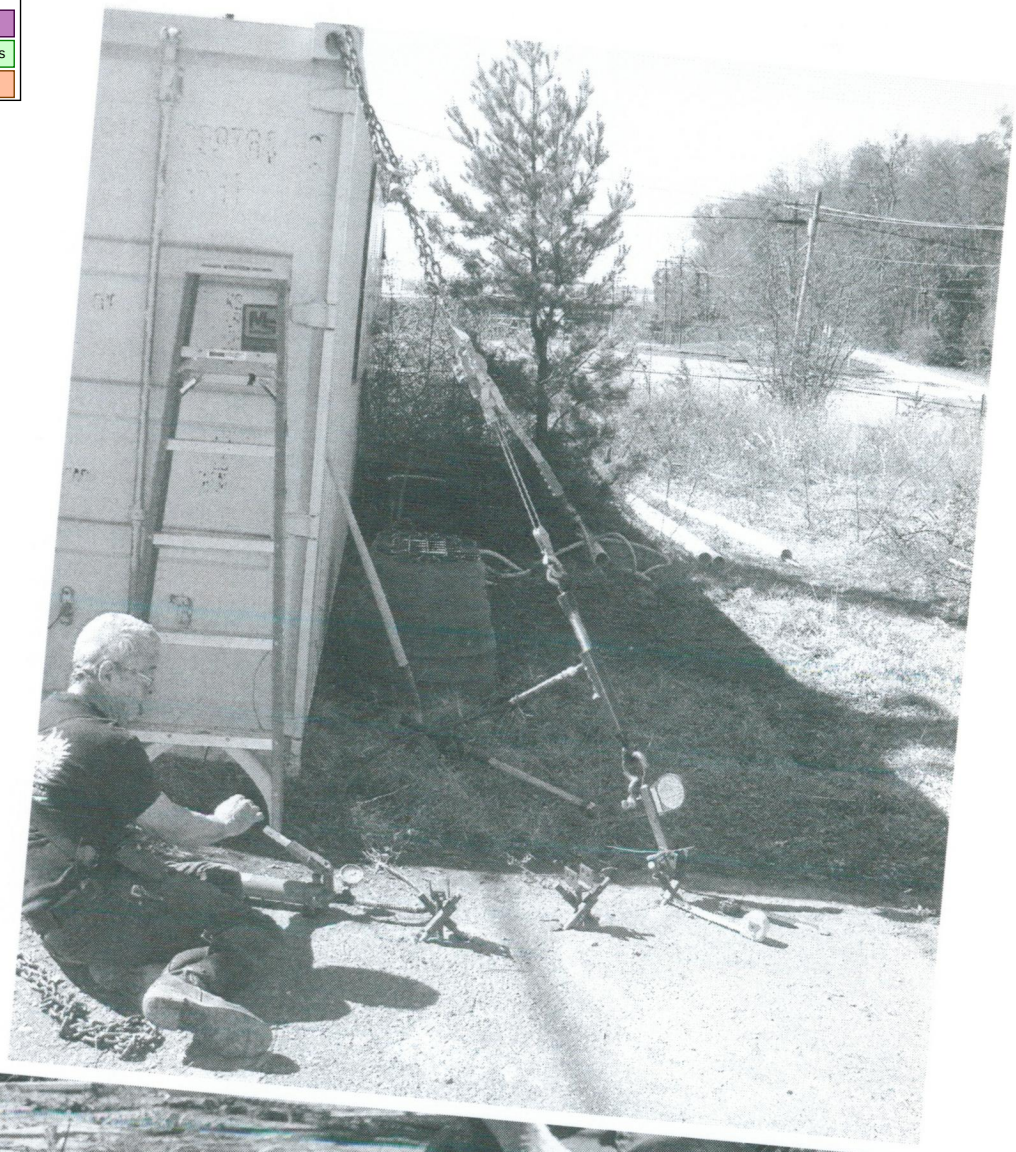


Ross Deaver, PE
Branch Manager

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

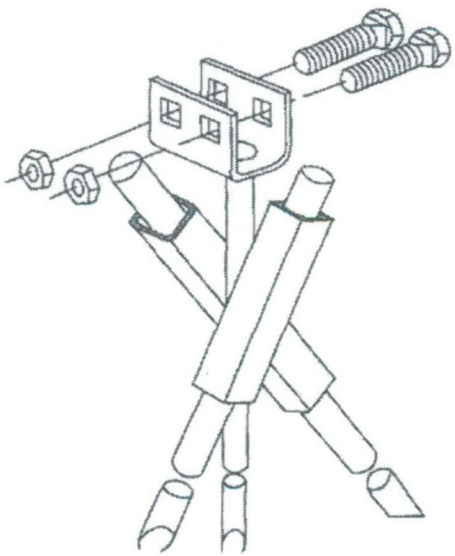
Building	Planning
Engineering	Public Works
Fire	Traffic



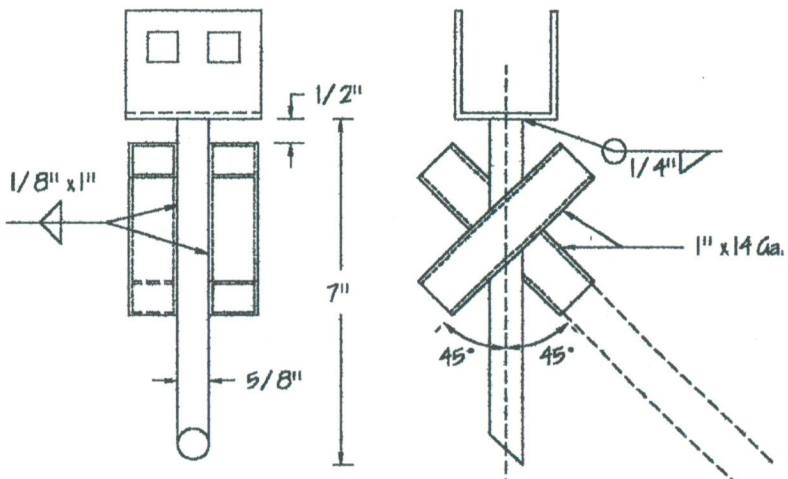


Minute Man Anchors, inc.

CROSS DRIVE ASPHALT ANCHOR INSTALLATION INSTRUCTIONS

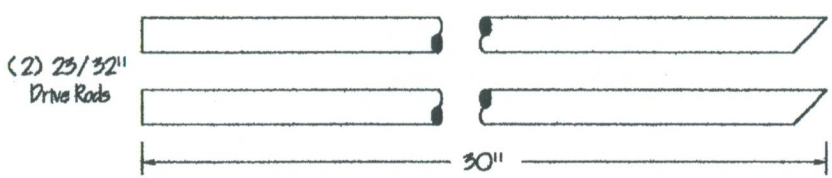


1. Drill 5/8" diameter hole 5 1/2" deep in center of anchor location, for pilot stud. Insert pilot stud of cross drive anchor into hole.
2. Drill 2 - 3/4" Diameter holes in asphalt at 45 degree angles using square tubing on anchor head as guides, Place rod through top of (1) square tube and into hole. Drive rod required depth. (*Rod must be driven into asphalt at least 80% of its length in order to achieve minimum allowable pull out resistance.*) Place second rod through top of remaining tube and drive rod to required depth to lock.
3. Maximum pullout resistance is developed when anchor head is as low as possible on top of the asphalt surface. Bottom of square tubes must rest on top of asphalt surface.
4. Attach strap to anchor using strap bolt & nut. Strap angle must be 45 degrees ±10.
5. Minimum 2.5" thick asphalt required to achieve minimum pullout resistance. Resistance may be reduced in uncured asphalt or asphalt exposed to high temperatures.
6. Allowable working load equal to or exceeding 1,800 lbs. and are capable of withstanding a 50% overload of 3,600 lbs.



Notes:

1. All steel conforms to ASTM A-36 MIC20
2. Mark: MMA -35
3. Pain to be Low Gloss, Water Resistant Coating Tubes and Head Only



MINUTE MAN ANCHORS, INC.
305 West King Stree
East Flat Rock, NC 28726
Phone: (828) 692-0256
Fax: (828) 692-0258

Title: Dabble Head Rock Anchor Date: 8 / 21 / 08

Model MMA - 35 Drawn By: R D J

PRODUCT TESTING, INC.

Street Address
111 Spring Street, Unit D
Jacksonville, Florida 32254

(904) 384-8150
FAX (904) 384-8154

Mailing Address
P.O. Box 37634
Jacksonville, Florida 32236

Minute Man Anchors, Inc.
305 West King Street
East Flat Rock, NC 28726
Attn: Mr. Albert Moreno, President

April 7, 2003
Job No. 03-4260

RE: Field Pull Testing of Three (3) Concrete Anchor Model Nos. 210PDH, 210JDH and THDHLS for Certification w/States of Florida, Alabama, Missouri and Texas

Dear Mr. Moreno:

Product Testing, Inc. was authorized by Mr. Albert Moreno, President of Minute Man Anchors, Inc., to conduct field pull testing on three (3) different concrete anchors, Model Nos. 210PDH, 210JDH, and THDHLS material certification for the States of Florida, Alabama, Missouri and Texas.

During the period of March 10 through 17, 2003, Product Testing, Inc. dug and formed a concrete foundation footer and floor slab section. Then a wet concrete mix of three thousand (3,000) psi concrete strength was poured, with the footer section being ten inches (10") thick and the floor slab section being four inches (4") thick. All three (3) of the concrete anchor models were installed according to the manufacturer's installation instructions and pull tests were conducted in sets of three (3) each, with a four inch (4") center line from the edge of the concrete.

On March 19, 2003, the field pull tests were conducted at an inward pull direction of forty-five degrees (45^0) +/- 2^0, with testing being witnessed by three (3) different state representatives. The following is a list of the people that were onsite and witnessed the field pull testing conducted: Mr. Phil Bergelt, representative for the State of Florida, Mr. Chuck Gilliland, II, representative for the State of Alabama, Mr. Gene Winn and Mr. Ron Plus, both representatives for the State of Missouri, Mr. Frank Cockman, representative for Minute Man Anchors, Mr. Mike Dalton, representative for Style Crest Products (upon invitation by Minute Man Anchors) and Mr. Bob Caudel, P.E. for Product Testing, Inc. Then on March 20, 2003, additional upward pull tests were conducted and witnessed by Mr. Chuck Gilliland, II, on Model Nos. 210PDH and 210JDH.

The field pull testing was conducted by Bob Prophet, Scott Prophet and Joe Guy, Sr., all personnel of Product Testing, Inc. Upon completion of all testing, the Model Nos. 210PDH, 210JDH, and THDHLS were all found to meet the minimum specification requirement of 4,725 pounds for the inward horizontal pull direction, and Model Nos. 210JDH and 210PDH also met the minimum requirement of 4,725 lbs for the upward vertical pull, which is in accordance with the following regulations:

* Rules of the State of Florida, Department of Highway Safety and Motor Vehicles, Chapter 15C-1, Section 1.0108 "Anchor and Anchor Component Test Specifications

* Rules of the State of Alabama Manufactured Housing Commission, Code of Alabama, Chapter 535-X-13.09 "Standards for the Manufacture of Anchor and Tiedown Devices

* Rules of the State of Missouri Public Service Commission, Department of Economic Development, Chapter 124 - Manufactured Home Tiedown Systems which adopted the standards for the Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280).

* Administrative Rules of the Texas Department of Housing & Community Affairs, Division of Manufacturing Housing, Rule 80.62(c)(13) which adopted the standards for: Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280) and the 2000 International Residential Code, Appendix E

Attached to this cover letter, are actual measurements of the concrete anchors, installation instructions, load vs deflection, material information, procedure, equipment calibration information, drawings and photographs. Product Testing, Inc. is appreciative of the opportunity to provide this service to your Company. If you should have any questions concerning this report, please don't hesitate to contact me at (904) 384-8150.

Respectfully submitted,
PRODUCT TESTING, INC.

R.K. Prophet,
VP & General Mgr

C.R. Caudel, P.E. #45170
Sr. Registered Engineer

PRODUCT TESTING, INC.

Street Address
111 Spring Street, Unit D
Jacksonville, Florida 32254

(904) 384-8150
FAX (904) 384-8154
EMAIL productinc@bellsouth.net

Mailing Address
P.O. Box 37634
Jacksonville, Florida 32236

Minute Man Anchors, Inc.
305 West King Street
East Flat Rock, NC 28726
Attn: Mr. David S. Moreno, Vice President

May 25, 2010

RE: Response to Installation Instructions of THDHLS Expansion Bolt From State of Florida Bureau Mobile Home & Recreational Vehicle Construction, Division Motor Vehicles

Dear Mr. Moreno:

This letter is in response to a letter you received from Mr. Wayne Jordan, Program Mgr for the Bureau of Mobile Home and Recreational Vehicle Construction Division of Motor Vehicles that was dated March 4, 2010 in regards to your THDHLS Expansion Bolt Installation Instructions.

After reading the letter and researching our test results of the Minute Man Anchors, Inc. THDHLS Expansion Bolt, specifically Job No. 03-4260 dated April 7, 2003 determined that the test results which were witnessed by Mr. Phil Bergelt, representative for the State of Florida was not tested with any reinforcement steel. Fiber mesh was used in the 3,000 psi concrete mix design for the four inch (4") thick concrete floor slab.

At the time of testing, it was an oversight that we missed the fact that rebar was shown in the installation instructions concrete drawing. Per the site information on Page 6 of the test report, it states that the Model THDHLS expansion bolt was tested using three (3) pounds of Fibermesh Inforce 6891 per yard in the concrete slab.

In summary, no re-certification is needed for this Model THDHLS expansion bolt because it was tested without rebar and you just need to submit to the State of Florida the correct installation instructions for this test report.

If there is any additional information needed, please do not hesitate to contact us at (904) 384-8150.

Respectfully submitted,
PRODUCT TESTING, INC.

R.K. Prophet,
VP & General Mgr.

C.R. Caudel, Licensed P.E. #45170
Sr. Registered Engineer

TABLE OF CONTENTS

C.R. Caudel, P.E. #45170
Sr. Registered Engineer

SECTION A

Summary of Testing

Two (2) sets of three (3) wet concrete anchors, Model Nos. 210JDH - Swivel Concrete Anchor and 210PDH Patio Concrete Anchor were tested in the forty-five degree (45^0) (+/- 2^0), inward horizontal pull from the concrete edge and also in the ninety degree (90^0) (+/- 2^0) vertical direction, for their load capacities. These two (2) anchor models were placed into a wet concrete footer section that was ten inches (10") thick, at the edge and six inches (6") wide at the bottom with a forty-five degree (45^0) angle tapered upward to reach the six inch (6") width. The concrete mix was approximately 3,000 pounds per square inch.

One (1) set of three (3) concrete anchors, Model No. THDHLS - Concrete Anchor with the use of one (1) 3.5"x5/8" diameter Kofix sleeve anchor was tested in the forty-five degree (45^0) (+/- 2^0), inward horizontal from the concrete edge for their load capacities. This anchor bolt hole was drilled to a depth of 3.5" using a 21/32" diameter drill bit. The anchor bolt, sleeve, washer and nut were placed in the hole and snugged up. Then the washer and nut were removed and the anchor head set. The washer and nut were set and the nut was tightened using a socket and ratchet. This concrete anchor was placed into a hardened concrete floor slab section that was four inches (4") thick., with the mix being approximately 3,000 psi concrete strength.

The three (3) anchor Model Nos. 210JDH, 210PDH, and THDHLS that were manufactured by Minute Man Anchors, Inc., were found to meet the inward minimum specification requirements of 4,725 pounds, without displacement exceeding two inches (2"). Also, the Model Nos. 210JDH and 210PDH were found to meet the upward minimum specification requirement of 4,725 pounds.

The minimum specification requirement is accordance with the following regulations:

* Rules of the State of Florida, Department of Highway Safety and Motor Vehicles, Chapter 15C-1, Section 1.0108 "Anchor and Anchor Component Test Specifications
* Rules of the Alabama Manufactured Housing Commission, Code of Alabama, Chapter 535-X-13.09 "Standards for the Manufacture of Anchor and Tiedown Devices"
* Rules of the State of Missouri Public Service Commission, Department of Economic Development, Chapter 124 - Manufactured Home Tiedown Systems which adopted the standards for the Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280).
* Administrative Rules of the Texas Department of Housing & Community Affairs, Division of Manufacturing Housing, Rule 80.62(c)(13) which adopted the standards for: Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280) and the 2000 International Residential Code, Appendix E

The field pull testing was witnessed by state representatives from Florida, Alabama, and Missouri. The testing was conducted by Bob Prophet, Scott Prophet, Joe Guy, Sr. and Bob Caudel, P.E., all personnel of Product Testing, Inc., Jacksonville, Florida.

SECTION B

Site Information - Field Pull Testing

The field pull testing was conducted at Product Testing, Inc., located at 111 Spring Street, Jacksonville, Fla. A section of the ground was selected and formed that was approximately seven feet (7') wide by twenty-eight feet (28') in length. The soil was removed from the center of the formed area and then divided into two (2) different sections. One (1) section was to be made into a seven foot (7') by twelve foot (12') foundation footer slab and the other section was made seven foot (7') by sixteen foot (16') as a floor slab section. Prior to testing, a small section remained from some original R&D testing that was conducted previously.

The foundation footer slab section was ten inches (10") thick on the edge and a minimum of six inches (6") across at the bottom. The soil was then tapered at a forty-five degree (45^0) upward angle to four inches (4") thick from the surface. This area was for the placement of the wet concrete anchor Model Nos. 210JDH and210PDH, along with two (2) No. 4 rebar that were thirty-six inches (36") in length. The remainder of the sixteen foot (16') length concrete slab was only four inches (4") thick using and consisted of three (3) pounds of Fibermesh Inforce 6891 per yard, in the concrete mix. This section was for testing of the anchor Model No. THDHLS, concrete anchor with 3.5" long Kofix 5/8" diameter sleeve anchor bolt.

Due to the dead weight of the concrete being below the 5,000 and 6,000 pounds upward load force, the anchors were installed with the head and part of the anchor shaft exposed, to help the concrete from being lifted upward during the loading. Soil ground anchors were placed in Soil Classification 3 and 4. No anchors were placed directly under the anchors tested.

SECTION C

Concrete Information, Concrete Strength & Tensile Properties of Rebar

Concrete Information

The concrete was a uniform mix using a super plasticizer with a water reducing agent to make a concrete strength of approximately three thousand (3,000) psi, on the day of testing. At the time of the concrete pour, six (6) test cylinders of the concrete mix were obtained and compressive tests were conducted for the actual strength of the concrete. The concrete cylinders were tested in accordance with ASTM C39/C 39M - 01 Standard Test Method for Compressive Strength fo Cylindrical Concrete Specimens

Concrete Strength (in psi)

Test Cylinder No.	Breaking Load (lbs)	4x8 Cylinder Area (sq in)	Compressive Strength (psi)
1	35,000	12.57	2,780
2	33,750	12.57	2,680
3	38,000	12.57	3,020 *
4	39,000	12.57	3,100 *
5	40,750	12.57	3,240 *
6	41,250	12.57	3,280 *
* **Note:** Testing started at 3,020 psi and completion was at 3,280 psi			

Tensile Tests of Rebar

Tensile tests were conducted, on the No. 4 rebar that was placed in the concrete, in accordance with ASTM A615/A 615M - 96a Standard Specification for Deformed & Plain Billet Steel Bars for Concrete Reinforcement

Bar Type	Cross Section Area (sq in)	Yield Strength (psi)	Tensile Strength (psi)	Percent Elongation (at 8")	Type of Break Occurred
4	0.20	66,500	105,750	9.4%	Angular
4	0.20	67,130	106,000	8.9%	Angular

SECTION D

Anchor Material & Hardness Information

Description	Model No.	Part Description & Maring	Type of Steel
Wet concrete anchor	210JDH	Head / Stamped MMA42	A36 modified
Wet concrete anchor	210JDH	Rod - 5/8" diameter	A36 modified
Wet concrete anchor	210JDH	Rubber clip	N/A
Wet concrete anchor	210JDH	Plate	A36
Wet concrete anchor	210JDH	Washer	A36
Wet concrete anchor	210PDH	Head / Stamped MMA14	A36 modified
Wet concrete anchor	210PDH	Rod - 5/8" diameter	A36 modified
Hardened concrete anchor	THDHLS	Head / Stamped MMA18	A36 modified
Hardened concrete anchor	Anchor bolt	Bolt	Grade 55
Hardened concrete anchor	Anchor bolt	Nut	A194
Hardened concrete anchor	Anchor bolt	Washer	A36
Hardened concrete anchor	Anchor bolt	Shield	A36

Hardness Test - Rockwell 'B' Scale

Material Description	Model No.	Hardness Value
210JDH Anchor Head	MMA42	78.8 HRB
210PDH Anchor Head	MMA14	82.5 HRB
THDHLS Anchor Head	MMA18	87.5 HRB
210 JDH Rod	5/8" diameter	78.8 HRB
210PDH Rod	5/8" diameter	82.8 HRB
Bolt ½" diameter	Kofix	89.5 HRB
Steel Plate	210JDH	88.8 HRB
Nut	Kofix	96.3 HRB
Washer	Kofix	65.0 HRB
Shield	Kofix	58.0 HRB
Type "D" Durometer Hardness		
Rubber Washer	210JDH	16.5 D

SECTION E

Actual Measurements on Anchors & Components

Anchor Description	Model No.	Head Marking	Head Length (inches)	Head Width (o.d. inches)	Head Thickness (inches)
Wet Concrete Anchor	210JDH	MMA42	2.78	2.21	0.187
Wet Concrete Anchor	210PDH	MMA14	2.76	2.20	0.189
Hardened Concrete Anchor	THDHLS	MMA18	2.77	2.23	0.197

Model No. & Washer/Rod Connection	Rod Diameter (inches)	Rod Depth Under Head (inches)	Rod Bend at Hook (degrees)	Washer Diameter (o.d. inches)	Plate Length (inches)	Plate Width (inches)
210JDH (Welded thru washer hold and around bottom)	0.6265	9.06	177.5	1.27	3.04	1.37
	Plate Hole Diameter (inches)	**Plate Thickness (inches)**	**Rubber Clip Diameter (o.d. inches)**	**Rubber Clip Thickness (inches)**	**Type of Coating**	
	0.82	0.112	1.05	0.203	Black painted	

Model No. & Head/Rod Connection	Rod Diameter (inches)	Rod Depth Under Head (inches)	Rod Bend at Hook (degrees)	Length of Hook Bend (inches)	Type of Coating
210PDH (Welded 360^0 under head)	0.625	8.71	86.5	2.59	Red painted

Model No.	Bolt Hole Diameter (inches)	Type of Coating
THDHLS	0.660	Black painted

Description	Bolt Shank Diameter (inches)	Bolt Length (inches)	Thread Length (inches)	Thread Diameter (inches)	Nut Height (inches)	Nut Diameter at Flats (inches)
Kofix 5/8" Diameter Concrete Anchor	0.449	3.495	1.87	0.493	0.427	0.743
	Washer Diameter (o.d. inches)	**Washer Hole Diameter (inches)**	**Washer Thickness (inches)**	**Shield Diameter (inches)**	**Shield Thickness (inches)**	**Shield Length (inches)**
	1.264	0.511	0.082	0.619	0.047	2.584

SECTION F

Installation Information of Anchors Tested

Anchor Model No.	Installation Method	Date Installed	Date Pulled
210JDH	Placed in wet concrete	03-17-03	03-19-03 & 03-20-03
210PDH	Placed in wet concrete	03-17-03	03-19-03 & 03-20-03
THDHLS	Drilled hold into hardened concrete slab	03-19-03	03-19-03

Listing of Test Equipment Used

Item	Description of Equipment	Date of Calibration
A	Trailer mounted hydraulic system to applied force	N/A
B	10,000 lb Dillon Dynamometer S/N APD890701	01-27-03 / Checked 3-19-03 & 3-20-03
C	Pro-Smart Level (+/- 0.1 degree)	3-17-03
D	Johnson Magnetic Angle Locator (0.5 degrees)	Checked 3-17-03
E	Newport Digital Readout (to 0.001")	3-14-03
F	Uni-Measure Measurement Gauge (0.001" to 10.000")	01-23-03
G	Starrett Ball Micrometer (0.001" to 0.750")	01-23-03
H	Fowler Micrometer (0.0001" to 1.000")	01-23-03
I	Mitutoyo Caliper (0.0005" to 6.0005")	01-23-03
J	Tempered Ridge Ruler (0.00" to 24.00")	01-23-03
K	Model 307L Type D Durometer Hardness Tester, S/N 12082	01-23-03 Checked 4-8-03
L	Tinius Olsen Testing Machine, S/N 95800 (200K lbs)	02-17-03
M	Forney Concrete Testing Machine, S/N 87064 (400K lbs)	02-17-03
N	Wilson Rockwell Hardness Tester, S/N 4MM695	02-04-03

SECTION F - Continued

Copy of Current Calibration for Dillon Dynamometer

Product Testing, Inc.
P.O. Box 37634
Jacksonville, FL 32236-7634

Calibration of 10,000 lb Dillon Dynamometer
S/N APD890701

Date Performed:	January 27, 2003
Next Calibration Due:	**January 27, 2004**
Calibration Equipment:	Tinius Olsen Testing Machine, S/N 95800 Calibrated February 17, 2003
Capacity & Division:	10,000 lb Capacity; 50 lb Division
Calibration Standard:	Load Cell with Traceability to N.I.S.T.

Dillon 10,000 lb Dynamometer S/N APD890701 (Readings in lbs)	Readings As Found Tinius Olsen Testing Machine S/N 95800 (Readings in lbs)	Readings As Adjusted Tinius Olsen Testing Machine S/N 95800 (Readings in lbs)
0	0	0
2,000	1,950	1,990
4,000	3,950	3,995
6,000	5,950	6,000
8,000	7,900	8,025
10,000	9,900	10,050

The 10,000 lb Dillon Dynamometer, S/N APD890701 was calibrated and found to be -1.0% of full range. The unit was adjusted and re-calibrated and then found to be +/- 0.5%, of full range. The calibration was performed in accordance with ANSI/NCSL Z540-1, at a room temperature of 76^0 Fahrenheit, with a relative humidity of 58%, by Scott Prophet. If you should have any questions concerning this report, please don't hesitate to give us a call at (904) 384-8150.

SECTION G

Lbs Force Exerted on Anchor at 45 Degree Inward Angle Tension Field Pull Test Data

Load Test (Pounds)	Test No. 1 (Movement Inches)	Test No. 2 (Movement Inches)	Test No. 3 (Movement Inches)
0	0.000	0.000	0.000
1,000	0.003	0.001	0.002
1,500	0.008	0.010	0.008
2,000	0.021	0.028	0.017
2,500	0.022	0.048	0.025
3,000	0.028	0.064	0.032
3,500	0.047	0.081	0.037
4,000	0.091	0.093	0.047
4,500	0.125	0.108	0.054
4,725	0.154	0.150	0.058
5,000	0.183	0.162	0.063
5,500	-	-	-
6,000	-	-	-
Avg Load (3 tests) 5,000 lbs.	**5,000 lbs at 0.183"**	**5,000 lbs at 0.162"**	**5,000 lbs at 0.063"**
Concrete Strength (psi)	3,060	3,060	3,060
Fiber Mesh or Rebar	No. 4 Rebar	No. 4 Rebar	No. 4 Rebar
Date Installed	03-17-03	03-17-03	03-17-03
Date Pulled	03-19-03	03-19-03	03-19-03
Head Marking	MMA 42	MMA 42	MMA 42
Anchor Model	210JDH	210JDH	210JDH
Angle Pulled Inward	46.0^0	47.0^0	45.0^0

***Note:** The dead weight of the concrete must equal or exceed the load of 4,725 lbs for each anchor used.

SECTION G - Continued

Lbs Force Exerted on Anchor at 45 Degree Inward Angle Tension Field Pull Test Data

Load Test (Pounds)	Test No. 1 (Movement Inches)	Test No. 2 (Movement Inches)	Test No. 3 (Movement Inches)
0	0.000	0.000	0.000
1,000	0.000	0.001	0.001
1,500	0.000	0.006	0.001
2,000	0.001	0.007	0.001
2,500	0.002	0.009	0.002
3,000	0.003	0.011	0.004
3,500	0.004	0.012	0.007
4,000	0.004	0.014	0.011
4,500	0.006	0.015	0.014
4,725	0.006	0.015	0.017
5,000	0.007	0.015	0.018
5,500	-	-	-
6,000	-	-	-
Avg Load (3 tests) 5,000 lbs.	**5,000 lbs at 0.007"**	**5,000 lbs at 0.015"**	**5,000 lbs at 0.018"**
Concrete Strength (psi)	3,060	3,060	3,060
Fiber Mesh or Rebar	No. 4 Rebar	No. 4 Rebar	No. 4 Rebar
Date Installed	03-17-03	03-17-03	03-17-03
Date Pulled	03-19-03	03-19-03	03-19-03
Head Marking	MMA 14	MMA 14	MMA 14
Anchor Model	210PDH	210PDH	210PDH
Angle Pulled Inward	46.0^0	46.5^0	45.5^0

***Note:** The dead weight of the concrete must equal or exceed the load of 4,725 lbs for each anchor used.

SECTION G - Continued

Lbs Force Exerted on Anchor at 45 Degree Inward Angle Tension Field Pull Test Data

Load Test (Pounds)	Test No. 1 (Movement Inches)	Test No. 2 (Movement Inches)	Test No. 3 (Movement Inches)
0	0.000	0.000	0.000
1,000	0.021	0.012	0.015
1,500	0.071	0.026	0.041
2,000	0.091	0.048	0.197
2,500	0.114	0.066	0.234
3,000	0.137	0.097	0.256
3,500	0.190	0.144	0.293
4,000	0.270	0.219	0.631
4,500	0.327	0.342	0.784
4,725	0.374	0.427	0.861
5,000	0.415	0.591	1.282
5,500	-	-	-
6,000	-	-	-
Avg Load (3 tests) 5,067 lbs.	**5,000 lbs at 0.415" Uplift at 0.37"**	**5,100 lbs at 0.591" Uplift at 0.27"**	**5,100 lbs at 1.282" Uplift at 0.73"**
Concrete Strength (psi)	3,060	3,060	3,060
Fiber Mesh or Rebar	Fiber Mesh	Fiber Mesh	Fiber Mesh
Date Installed	03-19-03	03-19-03	03-19-03
Date Pulled	03-19-03	03-19-03	03-19-03
Head Marking	MMA 18	MMA 18	MMA 18
Anchor Model	THDHLS	THDHLS	THDHLS
Angle Pulled Inward	45.0^0	45.5^0	46.0^0

***Note:** Care must be taken to drill a straight and proper hole size. Also, the dead weight of the concrete must equal or exceed the load of 4,725 lbs for each anchor used.

SECTION G - Continued

Lbs Force Exerted on Anchor at 90 Degree Upward Angle Tension Field Pull Test Data

Load Test (Pounds)	Test No. 1 (Movement Inches)	Test No. 2 (Movement Inches)	Test No. 3 (Movement Inches)
0	0.000	0.000	0.000
1,000	0.031	0.026	0.019
1,500	0.041	0.046	0.043
2,000	0.062	0.068	0.073
2,500	0.081	0.084	0.095
3,000	0.105	0.103	0.120
3,500	0.132	0.123	0.144
4,000	0.158	0.143	0.163
4,500	0.184	0.168	0.181
4,725	0.194	0.183	0.203
5,000	0.210	0.198	0.218
5,500	0.241	0.222	0.247
6,000	0.263	0.267	0.277
Avg Load (3 tests) 6,000 lbs.	**6,000 lbs Uplift at 0.263"**	**6,000 lbs Uplift at 0.267"**	**6,000 lbs Uplift at 0.277"**
Concrete Strength (psi)	3,260 / 3,300	3,260 / 3,300	3,260 / 3,300
Fiber Mesh or Rebar	No. 4 Rebar	No. 4 Rebar	No. 4 Rebar
Date Installed	03-17-03	03-17-03	03-17-03
Date Pulled	03-20-03	03-20-03	03-20-03
Head Marking	MMA 42	MMA 42	MMA 42
Anchor Model	210JDH	210JDH	210JDH
Angle Pulled Upward	90.0^0	89.0^0	89.5^0

***Note:** The dead weight of the concrete must equal or exceed the load of 4,725 lbs for each anchor used.

SECTION G - Continued

Lbs Force Exerted on Anchor at 90 Degree Upward Angle Tension Field Pull Test Data

Load Test (Pounds)	Test No. 1 (Movement Inches)	Test No. 2 (Movement Inches)	Test No. 3 (Movement Inches)
0	0.000	0.000	0.000
1,000	0.033	0.020	0.019
1,500	0.035	0.039	0.037
2,000	0.051	0.085	0.081
2,500	0.061	0.099	0.111
3,000	0.072	0.122	0.127
3,500	0.084	0.133	0.147
4,000	0.098	0.149	0.161
4,500	0.112	0.162	0.181
4,725	0.122	0.168	0.197
5,000	0.133	0.173	0.205
5,500	0.149	0.186	0.237
6,000	0.183	0.204	0.251
Avg Load (3 tests) 6,000 lbs.	**6,000 lbs Uplift at 0.183"**	**6,000 lbs Uplift at 0.204"**	**6,000 lbs Uplift at 0.251"**
Concrete Strength (psi)	3,260 / 3,300	3,260 / 3,300	3,260 / 3,300
Fiber Mesh or Rebar	No. 4 Rebar	No. 4 Rebar	No. 4 Rebar
Date Installed	03-17-03	03-17-03	03-17-03
Date Pulled	03-20-03	03-20-03	03-20-03
Head Marking	MMA 14	MMA 14	MMA 14
Anchor Model	210PDH	210PDH	210PDH
Angle Pulled Upward	90.0^0	90.0^0	90.0^0

***Note:** The dead weight of the concrete must equal or exceed the load of 4,725 lbs for each anchor used.

SECTION H

Manufacturer's Installation Instructions

CONCRETE ANCHOR INSTALLATION INSTRUCTIONS

NOTE:

Your set must be designed by a Registered Professional Engineer if the location is within 1500 feet of the coastline.

The maximum allowable working load on concrete anchor models 210 PDH, THDHLS, and 210 JDH is 3,150 pounds vertical for single or double ties in 3,000 PSI concrete. There must be a minimum 4" of distance from the edge of the concrete to the center of the anchor shaft.

NC
1.
2.
3.
4.

Minute Man Anchors, Inc.
Job No. 03-4260
April 7, 2003
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NORTH CAROLINA PROFESSIONAL 4672 ENGINEER RODERICK M. HUDGINS, JR.

MUM ANCHOR EMBEDMENT = 6"
MUM LOAD PER ANCHOR = 4750 lb.
UM SLAB PER ANCHOR:
AB = 95 S.F.
B = 65 S.F.
B = 48 S.F.
MMA 42

NOTE:
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The allow
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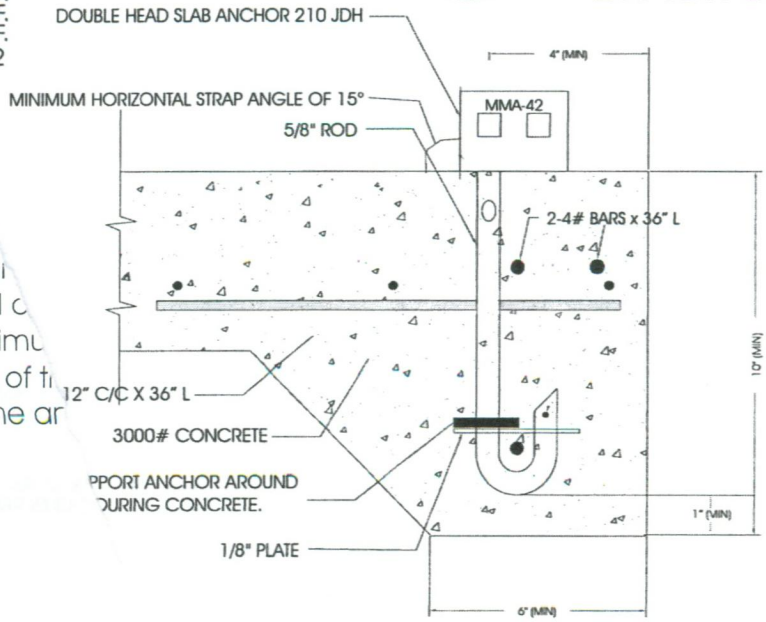
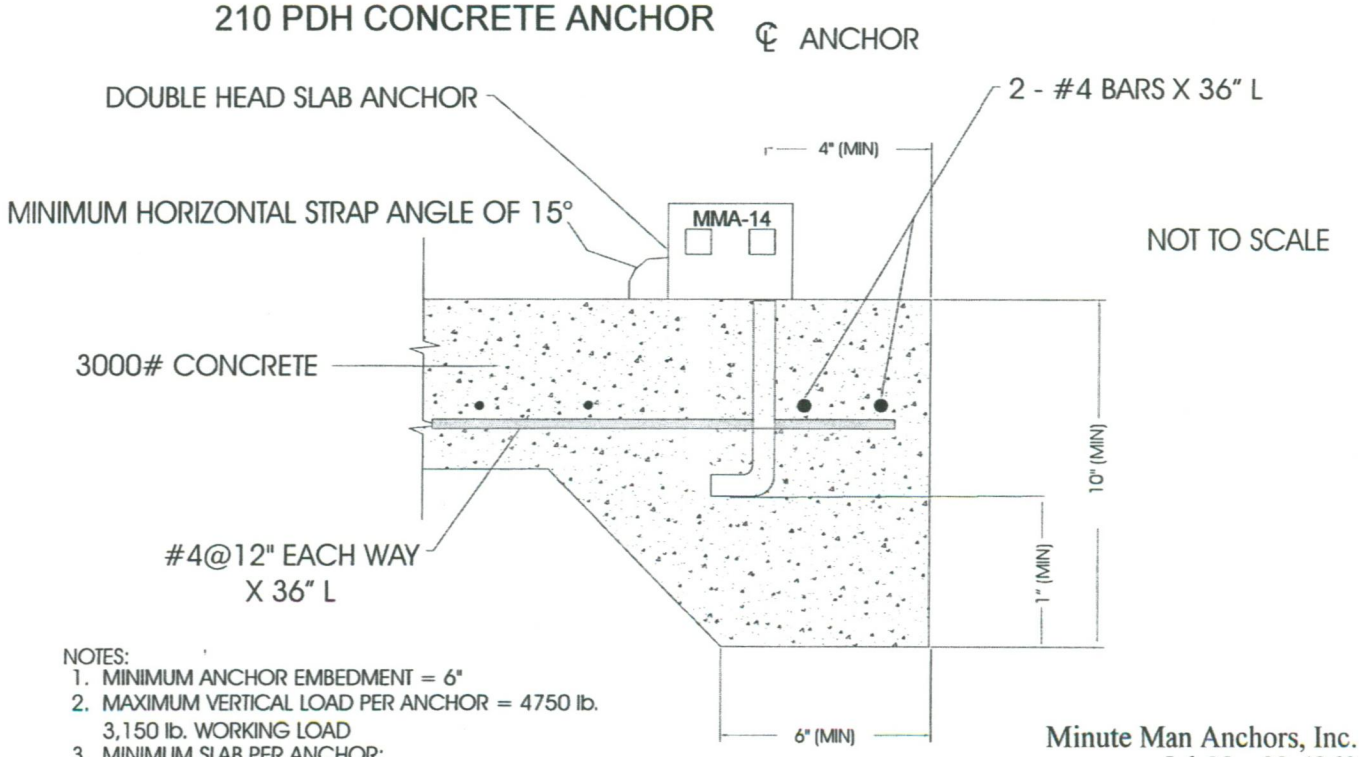
210 JDH CONCRETE ANCHOR



Revised 3-14-07

CONCRETE ANCHOR INSTALLATION INSTRUCTIONS

210 PDH CONCRETE ANCHOR



NOTES:
1. MINIMUM ANCHOR EMBEDMENT = 6"
2. MAXIMUM VERTICAL LOAD PER ANCHOR = 4750 lb.
   3,150 lb. WORKING LOAD
3. MINIMUM SLAB PER ANCHOR:
   4" SLAB = 95 S.F.
   6" SLAB = 65 S.F.
   8" SLAB = 48 S.F.
4. MARK: MMA-14

Minute Man Anchors, Inc.
Job No. 03-4260
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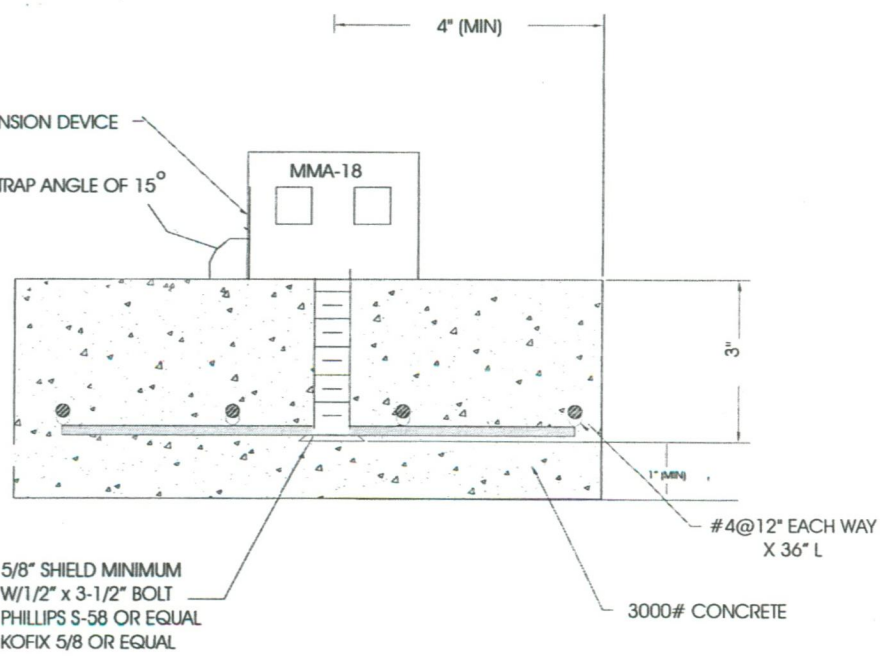
NORTH CAROLINA PROFESSIONAL 4672 ENGINEER RODERICK M. HUDGINS, JR.

THDHLS CONCRETE ANCHOR



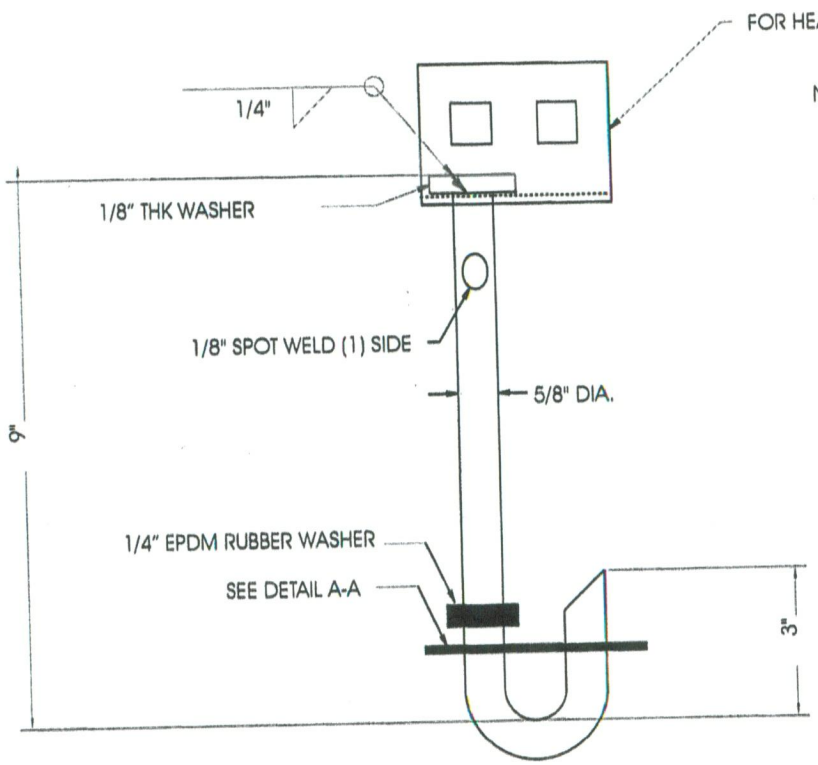
1. MAXIMUM VERTICAL LOAD PER ANCHOR = 4750lb
   3,150 lbs. WORKING LOAD.
2. MINIMUM SLAB AREA PER BOLT
   4" SLAB = 95 S.F.
   6" SLAB = 65 S.F.
   8" SLAB = 48 S.F.
3. MARK: MMA 18

INSTALLATION NOTE

1. DRILL 21/32" DIAM. HOLE MINIMUM OF 4" FROM EDGE OF SLAB AND INSERT 5/8 DIAM. SHIELD PER SHIELD MANUFATURER'S INSTRUCTIONS.
2. PLACE TENSION HEAD ON SLAB AND INSTALL 1/2" X 3-1/2" BOLT. TORQUE BOLT PER SHIELD'S MANUFACTURER'S INSTRUCTIONS.

SECTION I

Manufacturer's Drawings

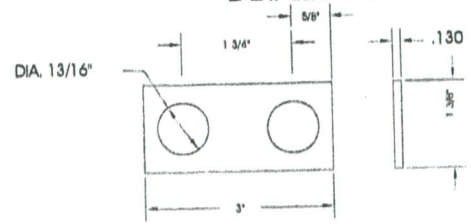


NOTES:

1. ALL STEEL CONFORM TO ASTM A-36 M1020
2. MARK: MMA 42
3. PAINT LOW GLOSS WATER REDUCIBLE BLACK DIP ENAMEL 8897255

NORTH CAROLINA PROFESSIONAL 4672 ENGINEER RODERICK M. HUDGINS, JR.

DETAIL A-A

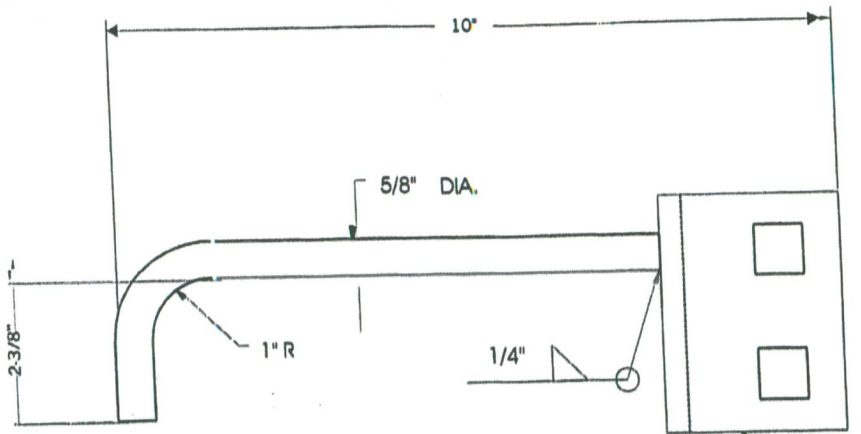


MINUTE MAN ANCHORS, INC.
305 WEST KING STREET
EAST FLAT ROCK, NC 28726
PHONE: (828) 692-0256
FAX: (828) 692-0258

TITLE: DOUBLE HEAD SLAB ANCHOR

DATE : 2/20/94

MODEL: 210 JDH MMA 42



FOR HEAD DETAIL SEE DWG MMA-DH

NOTES:

1. ALL STEEL USED IN ANCHOR ASSEMBLY CONFORMS TO A.S.T.M. M1020
2. MARK: MMA-14
3. PAINT LOW GLOSS WATER REDUCIBLE BLACK DIP ENAMEL 8897255

MINUTE MAN ANCHORS, INC.
305 WEST KING STREET
EAST FLAT ROCK, NC 28726
PHONE: (828) 692-0256
FAX: (828) 692-0258

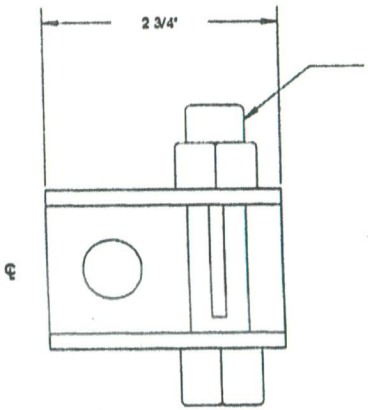
TITLE: DOUBLE HEAD PATIO SLAB ANCHOR

DATE: 2/20/94

MODEL: 210 - PDH MMA 14

Drawn By: M.G.

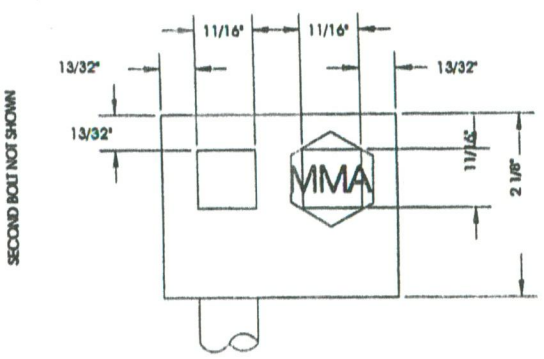
Minute Man Anchors, Inc.
Job No. 03-4260
April 7, 2003
Page No. 23

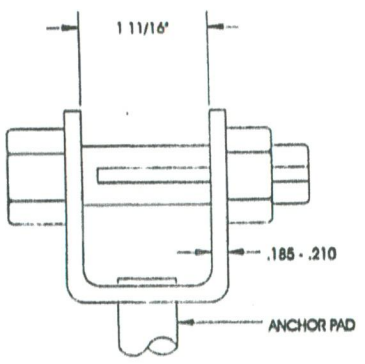


NOTES:

1. ALL STEEL CONFORMS TO A.S.T.M. A-36 M1020

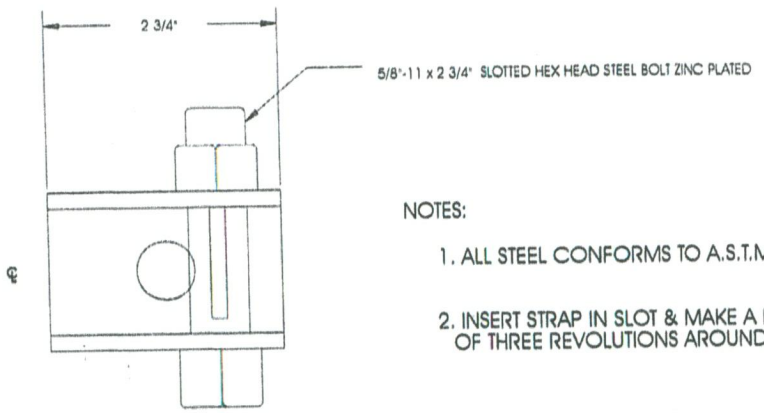
2. INSERT STRAP IN SLOT & MAKE A MINIMUM OF THREE REVOLUTIONS AROUND BOLT.





MINUTE MAN ANCHORS, INC.
305 WEST KING STREET
EAST FLAT ROCK, NC 28726
PHONE: (704) 692-0256
FAX: (704) 692-0258

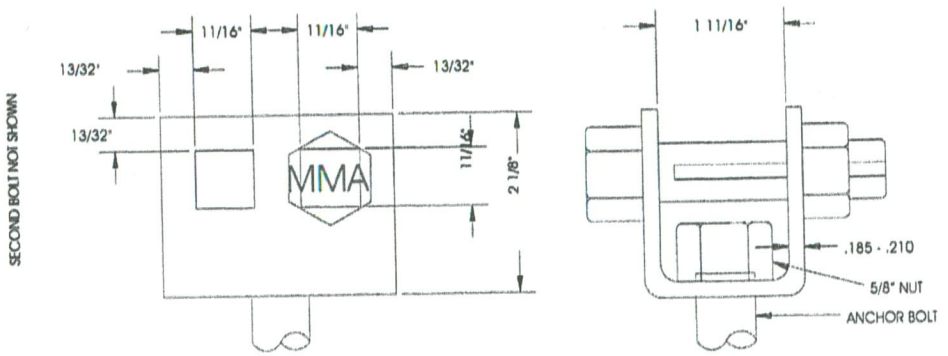
TITLE: DOUBLE HEAD TENSIONING DEVICE	DATE: 12/20/94
MODEL: MMA - DH	Drawn By: M.G.



NOTES:

1. ALL STEEL CONFORMS TO A.S.T.M. A-36 M1020

2. INSERT STRAP IN SLOT & MAKE A MINIMUM OF THREE REVOLUTIONS AROUND BOLT.



MINUTE MAN ANCHORS, INC.
305 WEST KING STREET
EAST FLAT ROCK, NC 28726
PHONE: (704) 692-0256
FAX: (704) 692-0258

TITLE: DOUBLE HEAD TENSIONING DEVICE

DATE: 12/20/94

MODEL: MMA - THDHLS

Drawn By: M.G.

SECTION J

Photographs w/Descriptions

Minute Man Products®, inc.

"Specializing in Anchoring Earth Bound Objects"

Certification Report for Minute Man Anchors, Inc. Concrete Anchors models THDHLS, 210 PDH, and 210 JDH.

Supplemental Certification Report Number 1-13-03B
For Previously Submitted Report Number 1-13-03B
Issue Date: 1-13-03
Report Expiration Date: 1-13-13

Product Testing, Inc.
P.O. Box 37634
Jacksonville, FL 32236
Phone: (904)384-8150
Fax: (904)384-8154

Rod M. Hudgins, Jr., P.E.
P.O. Box 5070
Asheville, NC 28813-5070
Phone: (828)274-9244
Fax: (828)274-9525

This report is certified to meet the Federal Manufactured Home Construction and Safety Standards as existed on 1-13-2003.

Contents of Certification Report:

1. Test Report from Product Testing #03-4260 45° Pull of models THDHLS, 210 PDH, and 210 JDH.

PRODUCT TESTING, INC.

Street Address
111 Spring Street, Unit D
Jacksonville, Florida 32254

(904) 384-8150
FAX (904) 384-8154

Mailing Address
P.O. Box 37634
Jacksonville, Florida 32236

Certification Report: Model Nos. 210JDH, 210PDH & THDHLS Concrete Anchors

Job Report No: Job No. 03-4260
Issue Date: April 7, 2003

Expiration Date: April 7, 2013

Manufactured By: Minute Man Anchors, Inc.
305 West King Street
East Flat Rock, North Carolina 28726

Contact Person: Mr. Albert Moreno, President
Phone: (828) 692-0256
Toll Free: (800) 438-7277
Fax: (828) 692-0258

Product Testing, Inc. certifies that the three (3) concrete anchors, Model Nos. 210JDH, 210PDH, and THDHLS meets the criteria of the Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280) and the 2000 International Building Code, Appendix E, Section AE 604.1, as adopted and required by the Texas Manufactured Housing Standards Act (Texas Revised Civil Status, Article 5221), Texas Department of Housing & Community Affairs, Chapter 80, Administrative Rule 80.62(c)(13).

Product Testing, Inc. gives authorization to the the Texas Department of Housing & Community Affairs the right to reproduce this certification report to as many copies as required.

At the request of Minute Man Anchors, Inc., please accept this Certification Report Job No. 03-4260 dated April 7, 2003, for product approval with the State of Texas for a period of ten (10) years, expiring on April 7, 2013. If there is any further questions, don't hesitate to contact us at (904) 384-8150 or Minute Man Anchors, Inc. at (800) 438-7277.

Respectfully submitted,
PRODUCT TESTING, INC.

J.L. Prophet, President
Certificate of Authorization #6775

R.K. Prophet
VP & General Mgr.

C.R. Caudel, P.E. FL #45170
Secy & Sr. Registered Engineer

Twining Consulting Inc.
dba RADCO
18071 Mount Washington St. Unit A,
Fountain Valley, CA 92708
twiningconsulting.com

Listing No.
RAD-1344

Twining Consulting Inc. Listing Report

Issued Date: Jan 2014
Revision Date: Feb 2024
Subjected to Renewal: Feb 2025

Product: Concrete, rock and soil ground anchors
Report Holder: Minute Man Anchors, Inc.
305 W. King St.
East Flat Rock, NC
www.minutemanproducts.com
(800)-438-7277
Plant Location: 305 W. King St.
East Flat Rock, NC

SECTION 1: INTRODUCTION

At the request of Minute Man Anchors, Inc., RADCO has examined the Minute Man Ground Anchor designed to provide support for HUD Code Manufactured Homes, Modular Homes and Industrialized Commercial Structures for various soil bearing capacities.

SECTION 2: DESCRIPTION

There are two categories of ground anchors that are specified in this listing. The first group is soil ground anchors, which pertain to all anchors designated for soil classes 2, 3, 4, and 5. The second group is rock and concrete (non-soil) ground anchors, which are designed for installation into class 1 conditions.

All Minute Man Ground Anchors are manufactured using steel in conformance with ASTM A-36. The models under this listing vary with respect to shaft diameter, number and location of helixes, length of shaft and stabilizer device. Table 1 shows a complete description of each ground anchor model, as well as a corresponding stabilizer device. All ground anchors have a minimum working load of 3,150 lbs. and a minimum ultimate load of 4,725 lbs.

SECTION 3: INSTALLATION

The application of Minute Man Ground Anchors is for use on HUD code manufactured homes, modular homes and industrialized commercial structures in engineered foundation systems. The system shall be installed in accordance with the manufacturer's installation instructions and the requirements of this listing for maximum soil capacities.as required by section 24 CFR § 3285.202 of the HUD Standards for Manufactured Housing, IRC Appendix E, Sections AE502, AE601, AE602, AE604 and AE605, to the IBC 2015,2018 and 2021 for commercial use and section 1806.2 Soil Bearing Values. Other applicable Engineered Connections for Modular and Industrialized Building Systems which will not exceed the product designs and / or the local jurisdiction requirements.
The Installation of the ground anchors is to be in accordance with the Manufacturer's Installation Instructions. In addition, each anchor must be installed as evaluated in accordance with the following:
a) The proper soil class. (Tables 1, 2 & 3, and notes)
b) Minimum angle of pull to the horizontal. (Tables 2 & 3)

SECTION 4: EVIDENCE SUBMITTED

a) Testing has been conducted to verify the compliance of Minute Man ground anchors to the Twining Consulting Inc. Listing Requirements for Ground Anchors.
b) The quality and process control system used in the manufacture has been submitted to Twining Consulting Inc. An adequate method of traceability is maintained by the manufacturer. A follow-up quality assurance audit program is maintained by Twining Consulting Inc.

SECTION 5: MARKINGS / IDENTIFICATION

Piers are to be Identified with one of the following criteria:

1) Model No.:
2) Worst Case Soil Tested:
3) Date:
4) Production Run Code:
5) RAD-1344
6) Twining Consulting Inc. Logo

(See Photo 1)

Minute Man Anchors. will also put Twining Consulting Inc. logo on their website to show that their quality assurance program is being monitored by an ISO/IEC 17020 inspection agency AA-650.

SECTION 6 - RECOMMENDATIONS

Twining Consulting Inc. recommends that Minute Man Anchors, Inc. standard steel piers be accepted for use in HUD code manufactured homes, modular homes, industrialized commercial structures in engineered foundation systems provided that:

a) Each ground anchor will be marked with a label, a facsimile of which is shown in figure 1. The label for each facility denotes the model number, Twining Consulting Inc. name, and Listing No. RAD-1344.
b) All products are produced only at the facility referenced in this listing.
c) The quality control procedures are maintained by the manufacturing facility as submitted.
d) The manufacturing audit system of Twining Consulting Inc. is maintained.
e) All products are installed per the manufacturer's installation instructions and section 3 of this listing.

SECTION 7: APPROVAL:

This listing is subject to annual re-examination and renewal.

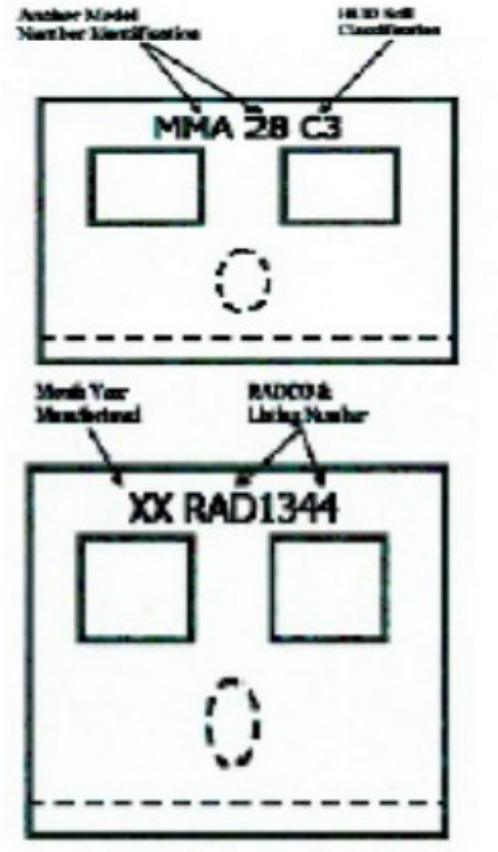


Photo 1: Example of labeling.

Table 1: Properties of Ground Anchors.

Model	Shaft Diameter (in.)	Shaft Length (in.)	Helix Dia (in.)	Minimum Stabilizer Device (in.) (See Note 2)
MMA-2 650 DH	5/8	48	1/6	12 Plate
MMA-4 650 DH	3/4	48	1/6	12 Plate
MMA-6 4430 DH	3/4	30	2/4	12 Plate
MMA-28 636 DH	3/4	33	1/6	12 Plate
MMA-30 4430 DH	5/8	30	2/4	12 Plate
MMA-52 4636 DH	3/4	33	1/4 & 1/6	12 Plate
MMA-55 4450 DH	3/4	48	2/4	12 Plate
MMA-71 1060 DH	3/4	60	1/10	12 Plate
MMA-75 760 DH	3/4	60	1/7	17 Plate
MMA-85 860 DH	3/4	60	1/8	17 Plate
MMA-92 4430 EZDH	3/4	30	2/4	6 Cap
MMA-93 4636 EZDH	3/4	33	1/4 & 1/6	6 Cap
MMA-94 636 EZDH	3/4	33	1/6	6 Cap
MMA-96 650 EZDH	3/4	48	1/6	6 Cap
MMA-GW2NU	3/4	20	1/4	See Note 3
MMA-8 48 XDH	3/4	48	N/A	X Drive (48 in. rods)
MMA-14 PDH	5/8	10	N/A	N/A
MMA-42S JDH	5/8	6	N/A	N/A
MMA-35 36 XDH	3/4	30	N/A	X Drive (30 in. rods)
MMA-35s 36 XDH	3/4	30	N/A	X Drive (30 in. rods)
MMA-18 THDH	5/8	3.5	N/A	N/A

Table 2: Soil Anchor Requirements

Model	Minimum Soil Class (See Note 1)	Min. Angle of Pull to Horizontal
MMA-2 650 DH	4a	45°
MMA-4 650 DH	4a	45°
MMA-6 4430 DH	4a	45°
MMA-28 636 DH	3	45°
MMA-30 4430 DH	3	45°
MMA-52 4636 DH	4a	45°
MMA-55 4450 DH	4a	45°
MMA-71 1060 DH	4b	45°
MMA-75 760 DH	4b	48°
MMA-85 860 DH	4b	46°
MMA-92 4430 EZDH	3	45°
MMA-93 4636 EZDH	4a	45°
MMA-94 636 EZDH	3	Vertical Only
MMA-96 650 EZDH	3	Vertical Only
MMA-GW2NU	3	45°

Table 3: Rock/Concrete Anchor (Soil Class 1) Requirements

Model	Max Test Load (lbs.)	Min. Angle of Pull (Horizontal)
MMA-8 48 XDH	10,000	Vertical Only
MMA-14 PDH	5,000	45°
MMA-42 JDH	5,000	45°
MMA-35 36 XDH	4,725	45°
MMA-35s 36 XDH	4,725	45°
MMA-18 THDH	5,000	45°

Note 1: See 24 CFR Part 3285 Model Manufactured Home Installation Standards, section 202: Soil Classification and Bearing Capacity & Table 3285.202 for an explanation of soil classification numbers. Please note that anchors approved for use in soil class 4 may be used in soil classes 3 or 2, and anchors approved for use in soil class 3 may be used in soil class 2.

Note 2: The stabilizer plates are available in 12" or 17" width. The stabilizer caps are 6" diameter. “X drive” refers to cross-driven anchors which utilize two rods angled at 45 degrees from the vertical.

Note 3: Anchor model MMA-GW2NU has a 6" stabilizer cap as well as a 32" long stabilizer rod which is driven through the stabilizer cap and downward at 45 degrees from the horizontal