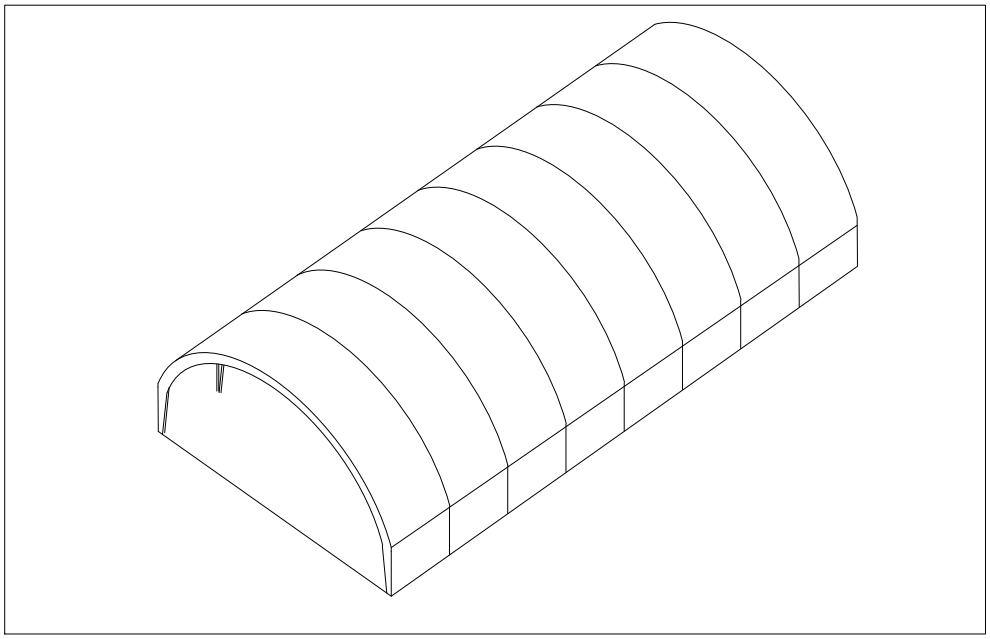
NORSEMAN™ STRUCTURES
Fiercely Reliable™

ARCH-SERIES
(Commercial Product Line)

INSTALLATION MANUAL
60L / 70L



THIS MANUAL INCLUDES:
FRAMEWORK
COVER

SEPARATE MANUALS ARE SUPPLIED FOR:
END ENCLOSURES
DOORS
WARRANTY

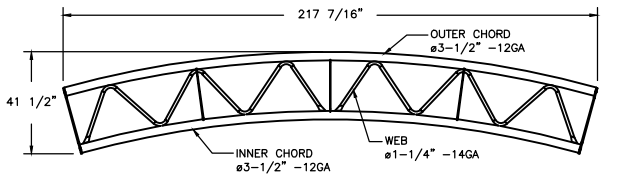
CWB CERTIFIED CSA W47.1 | CWF AWS CERTIFIED WELDING FABRICATOR | QUASAR CERTIFIED CSA A660 | IFAI Industrial Fabrics Association International Proud Member | Developed and manufactured in Canada

2019-04-19

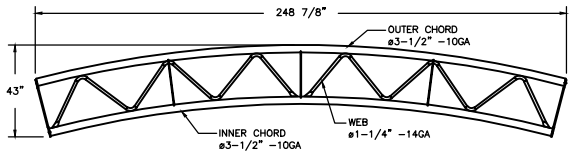
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ITEM 810673
Version 1.0

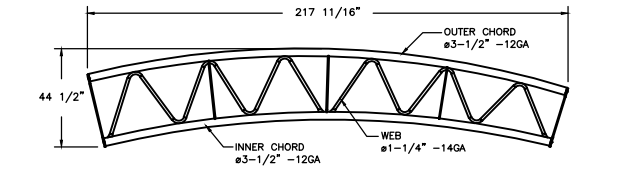
BUILDING COMPONENTS



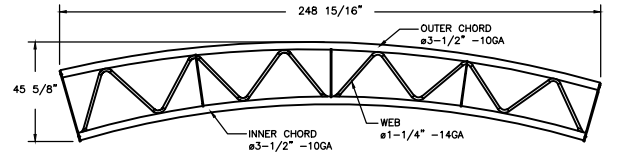
60 LEG ROOF END TRUSS — A60351210
60 LEG ROOF COMMON TRUSS — A60351200



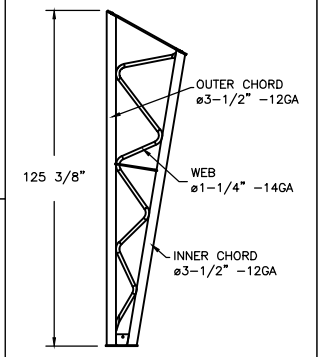
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70 LEG ROOF COMMON TRUSS — A70351000



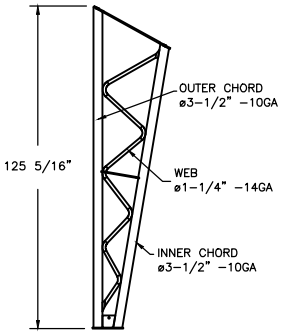
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60 LEG ROOF TAPER END RIGHT TRUSS — A60351240
60 LEG ROOF TAPER COMMON TRUSS — A60351220



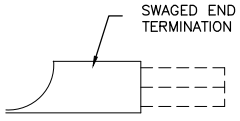
70 LEG ROOF TAPER END LEFT TRUSS — A70351030
70 LEG ROOF TAPER END RIGHT TRUSS — A70351040
70 LEG ROOF TAPER COMMON TRUSS — A70351020



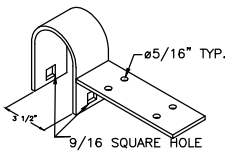
60 LEFT LEG END — A60351235
60 RIGHT LEG END — A60351245
60 LEG COMMON — A60351225



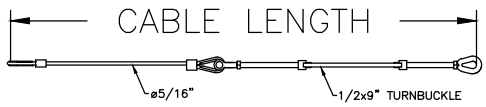
70 LEFT LEG END — A70351035
70 RIGHT LEG END — A70351045
70 LEG COMMON — A70351025



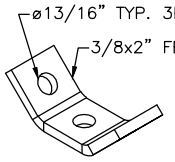
HSS 2"x3" – Ø3-1/2"
CHORD TERMINATION — D33300219



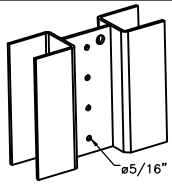
Ø3-1/2" SADDLE BRACKET
FOR 2"x3" BUFFER TUBE — D30003456



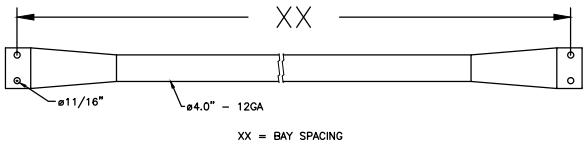
CROSS CABLE ø5/16" — 866XXX-9



CROSS CABLE DOUBLE TAB — 32200057

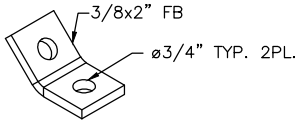


FASTENING TUBE
STABILIZER BRACKET — D30005005

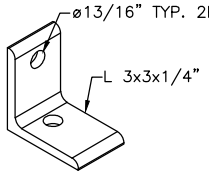


XX = BAY SPACING

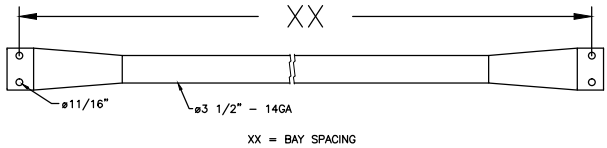
COMMON PURLIN — PA4.0-XXS



CROSS CABLE SINGLE TAB — 82200055

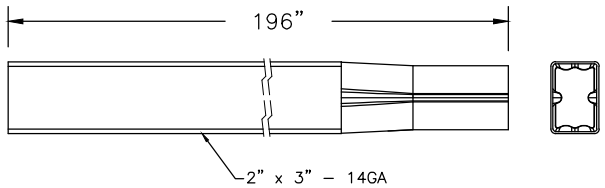


WINCH MOUNT — 33300218

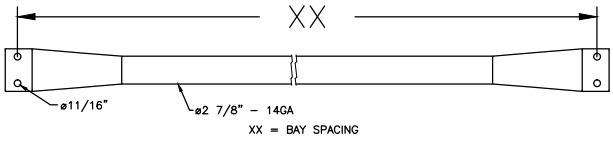


XX = BAY SPACING

COMMON PURLIN — PA3.5-XXS



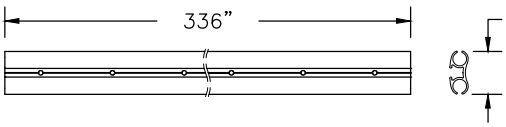
FASTENING TUBE 2" x 3" -14 GA x 196" — FT2x3-196S



XX = BAY SPACING

COMMON PURLIN — PA2.875-XXS

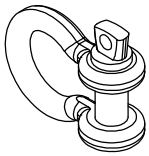
BUILDING COMPONENTS CONT.



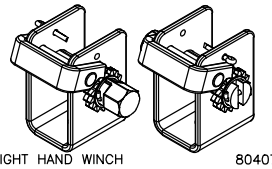
ALUMINUM EXTRUSION 85300336



RUBBER FLAP PROTECTOR 890375

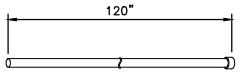


SHACKLE – ø3/8” 890029
SHACKLE – ø1/2” 893685

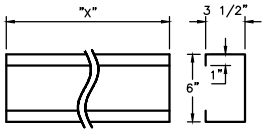


RIGHT HAND WINCH 804073
LEFT HAND WINCH 804074
6’ TIE DOWN STRAP 350072
16’ TIE DOWN STRAP 350192

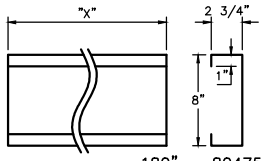
HARDWARE



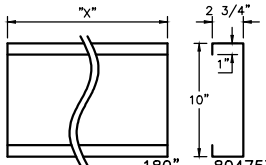
1" BELTING 100FT ROLLS 804540
ø1" WHITE PVC TUBE 900308



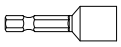
HEADER / JAMB CEE CHANNEL 6"x14GA
180" – 804759
240" – 804758



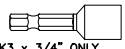
HEADER / JAMB CEE CHANNEL 8"x14GA
180" – 804756
240" – 804754



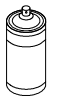
HEADER / JAMB CEE CHANNEL 10"x13GA
180" – 804757
240" – 804755

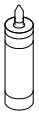


USE FOR TEK5 & TEK3 MAG CHUCK 5/16" x 1 1/2" 840005

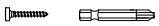


USE FOR TEK3 x 3/4" ONLY MAG CHUCK 3/8" x 1 1/2" 804100

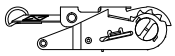




CROWN COLD GALV PAINT 804512
WINTERGEL LUBE 804508

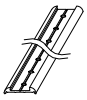


SQ BIT 804000
#8–18 SQ SCREW 894004

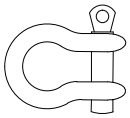


RATCHET c/w D–RINGS 321020
36" CAM BUCKLE 33100621
48" CAM BUCKLE 33100623
60" CAM BUCKLE 33100624
LINER CLIP BUCKLE 33100622
1" HEAVY DUTY QC RATCHET 403308
1" RATCHET W/ 6FT STRAP 403307

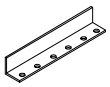




1" TEMINATION TUBE 893592
12GA J–CHANNEL 890759
POLY EXTRUSION TERMINATION 891910
WHITE TERMINATION TEKS 890074



SHACKLES
1/4" – 804210
3/8" – 890029
1/2" – 893685
5/8" – 895000
3/4" – 893716





2 1/2" ANGLE TERMINATION 691210
1" ALUMINUM BAR 800011



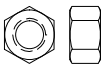
FLAT EXTRUSION 85301336
ROUND EXTRUSION 85300336
20FT PVC EXTRUSION CAP 890031
100FT FOAM TAPE 804533



FENDER WASHER – 802000
3/8" – 802005
7/16" – 802015
1/2" – 893154
5/8" – 802010
STR 3/4" – 890395
7/8" – 893386
1" – 893150
FLAT WASHER 1 1/8" – 893064



3/8" – 894153
1/2" – 894154
5/8" – 894155
3/4" – 894158
7/8" – 893485
NYLOC NUT



1/4" – 801010
5/16" – 801030
3/8" – 801000
7/16" – 801040
1/2" – 893153
5/8" – 801050
3/4" – 801055
7/8" – 893385
NUT 1" – 893155



LENGTH
1" – 800201
2" – 800202
2 1/2" – 800205
3 1/2" – 800030
4" – 800200
5" – 800195
5 1/2" – 800196
6" – 800197
ø3/8" HEX BOLT 7" – 890045



LENGTH
2" – 800035
2 1/2" – 893434
3" – 800034
6" – 800036
6" (Gr8) – 893101
7" (Gr8) – 893100
8" – 893229
ø3/4" HEX BOLT



LENGTH
1" – 800301
ø3/8" CARRIAGE BOLT 3 1/2" – 800175



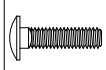
LENGTH
2" – 893143
2 1/2" – 893142
3" – 890041
3 1/2" – 890542
4" – 893821
4 1/2" – 893822
5" – 893828
5 1/2" – 893148
6" – 890016
ø1/2" HEX BOLT 6 1/2" – 890017



LENGTH
2" – 893366
3" – 893365
4" – 800920
4 1/2" – 893363
5" – 800183
6" – 800184
ø1/2" CARRIAGE BOLT 6 1/2" – 800185



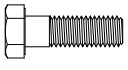
LENGTH
8" – 800901
1 1/4" – 800037
2" – 800218
2 1/2" – 800055
3" – 800050
4" – 800065
4 1/2" – 800038
5" – 800070
5 1/2" – 800039
6" – 800075
ø5/8" HEX BOLT 6 1/2" – 800076



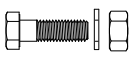
LENGTH
2" – 893282
3" – 893840
4" – 800179
5" – 800181
6" – 800177
7" – 800178
ø5/8" CARRIAGE BOLT



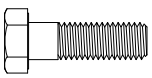
LENGTH
2 1/2" – 893332
3" – 893331
4" – 893226
6" – 893227
7" – 893228
ø3/4" CARRIAGE BOLT



LENGTH
2 1/2" – 893481
3" – 893483
3 1/2" – 893384
4" – 893482
4 1/2" – 893484
5" – 893486
5 1/2" – 800012
6 1/2" – 800014
ø7/8" HEX BOLT 7" – 893549



5/8" x 2" – 894053
1/2" x 2" – 894054
3/4" x 2 1/2" – 894052
1 1/4" x 3 1/2" – 800750
A325 HEAVY HEX BOLT ASSEMBLY



1 1/4"x3 1/2" – 894102
1 1/4" NUTS – 893189
3" – 893479
LARGE HEX BOLT 3 1/2" – 893149



1 1/2" – 803015
#12 WOOD SCREW 2 1/2" – 803010



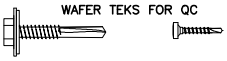
2" – 800510
3" – 800520
4" – 800525
ø3/8" LAG BOLT 5" – 800530



SELF–DRILLING SCREW TEK 3
#12 – 14 x 1 1/4" 803040
#12 – 14 x 3" 800025
#12 – 14 x 3/4" 800020



STRUCTURAL SCREW TEK 5
#12 – 24 x 1 1/4" 803020
#12 – 24 x 2" 803030



WAFER TEKS FOR QC
#12–24 x 3" – 406040
#10–24 x 1" – 406039
#8 x 1/2" – 403707
#14 x 1" W/ WASHER – 403290

IMPORTANT - READ MANUAL FIRST

Failure to precisely follow all steps in this manual may create unsafe conditions and will void the building Owner's Warranty.

MAINTENANCE SCHEDULE

See Owners Warranty & Maintenance Package for Maintenance Schedule

FIRE PROTECTION SYSTEM

1) The building user must ensure that storage does not prohibit access to any exits or main aisles and all egress travel is maintained as per applicable fire and building code requirements.

2) The building user shall ensure that all fire protection requirements such as, but not limited to, flue spaces and sprinkler head clearances comply with applicable fire codes based on the height, and commodities being stored. Contact a qualified professional or the local fire department to determine the applicable limitations for the intended use and occupancy.

BOLT TORQUE

All non-nyloc nuts must be properly tightened. Nyloc nuts do not require any torque and only require tightening until all components are secure. Do not over tighten nyloc nuts to the point of deformation on the tube. See engineered drawings for tightening requirements.

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STEP 1 EQUIPMENT

Required:
- String and string level.
- Stakes and tape.
- Movable scaffolding or a platform lift.
- Crane or equivalent to lift arches.
- Temporary bracing - dimensional lumber or rope.
- Square level.
- Cover pull rope - 2 to 4 lengths (100')
- Torque wrench.
- Hacksaw.
- Wrenches and sockets - 3/4", 15/16", 1-1/8", 1-1/4", 1-5/8",1-15/16"

Concrete Foundation:
- Drill capable of drilling concrete for specified anchor by foundation engineer

Optional:
- Transit.
- Impact.
- Reciprocating saw.

Required on buildings over 144'
- Drill (Max 1750rpm).
- Rubber mallet.

STEP 2 ASSESS THE SITE

2.1 - Review site plan, building location and orientation with the customer.

2.2 - Inform all required personnel of installation steps and critical construction points.

STEP 3 BASEPLATE AND ANCHOR INSTALLATION

REFER TO ENGINEERED DRAWINGS FOR DIMENSIONS

3.1 - Review all supporting documentation on applicable anchors.

3.2 - Inform all required personnel of proper anchor installation techniques and cure time and temperature requirements if applicable.

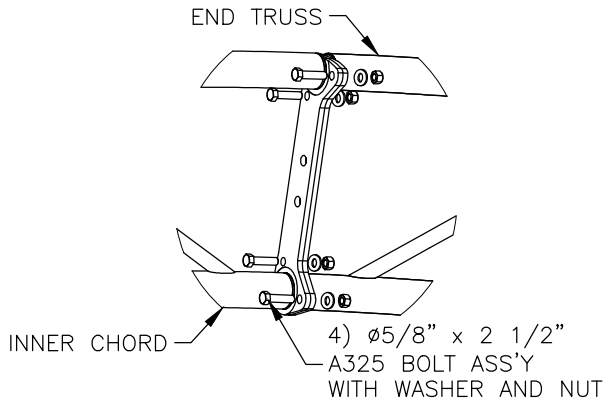
ANCHORS MUST BE INSTALLED AS PER FOUNDATION DRAWINGS AND MANUFACTURING SPECS

3.3 - Locate anchors on foundation using the baseplate layout and baseplate detail from the engineered drawings. See engineered drawings for anchor bolt projection requirements.

STEP 4 ASSEMBLE THE ARCHES

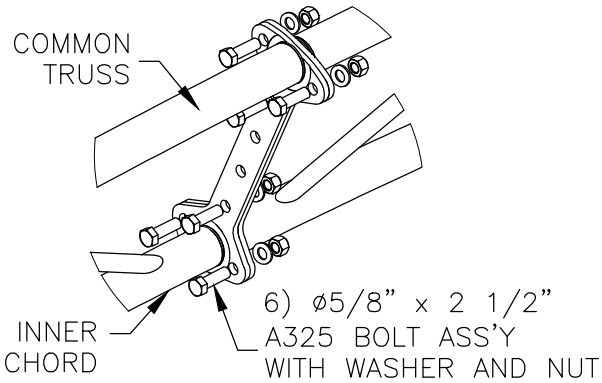
REFER TO ENGINEERED DRAWINGS FOR TRUSS CONFIGURATIONS

4.1 - End Truss Coupler



ø5/8" Hex Bolt/Nut Torque Value: Turn of Nut

4.2 - Common Truss Coupler



ø5/8" Hex Bolt/Nut Torque Value: Turn of Nut

ALL BOLTS/NUTS MUST BE TIGHTENED IN ACCORDANCE WITH ENGINEERED DRAWINGS

STEP 5 INSTALL COUPLER PROTECTORS

The coupler protectors stick onto the TOP of the outer chord of the ASSEMBLED arches.

The coupler protectors ARE REQUIRED to protect the fabric cover.

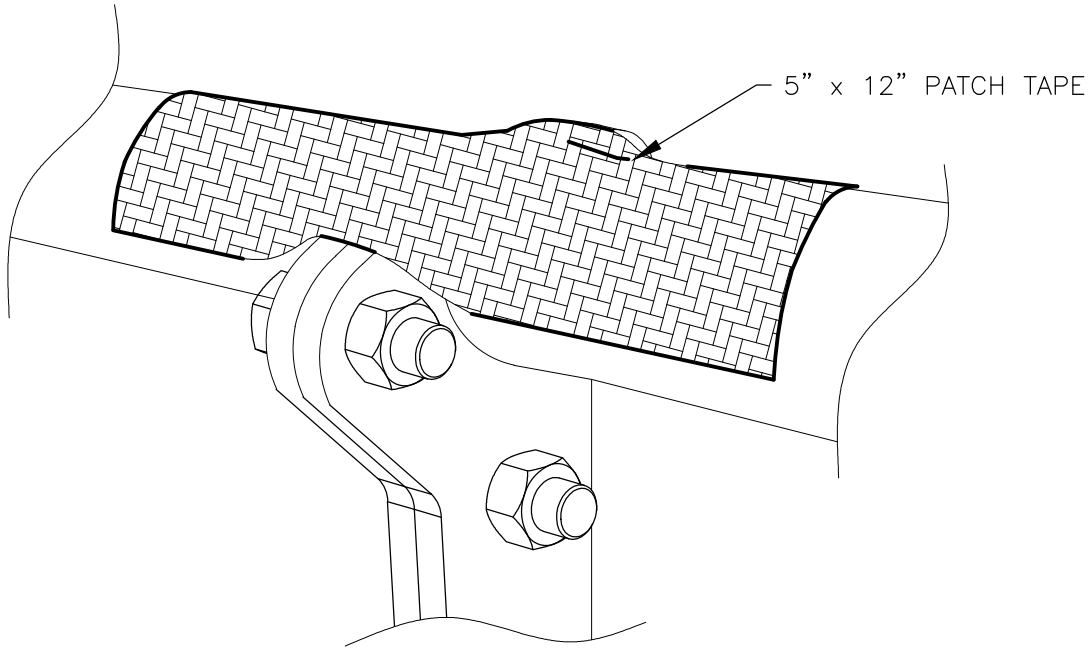
WARNING: FABRIC DAMAGE WILL OCCUR IF NOT INSTALLED. REMOVE OR SMOOTH ANY BURS OR IRREGULARITIES BEFORE INSTALLING.

5.1 - Cut patch tape into 5" strips for a 12" x 5" piece to be placed on each outer chord coupler connection.

5.2 - Stick patch tape on chord coupler as shown below to allow a more smooth application.

PATCH TAPE MUST BE KEPT AT ROOM TEMPERATURE FOR PROPER APPLICATION

5.2



STEP 6 INSTALL COVER EXTRUSION

COVER EXTRUSION IS ONLY REQUIRED ON BUILDINGS OVER 160' IN LENGTH. REFER TO ENGINEERED DRAWINGS FOR LOCATIONS

ALWAYS SPAN COUPLERS WITH EXTRUSION

REAM OUT ALL ENDS AND CUTS

IT IS RECOMMENDED THAT THE EXTRUSION AND FOAM TAPE ARE INSTALLED ON THE GROUND AFTER ARCHES ARE ASSEMBLED

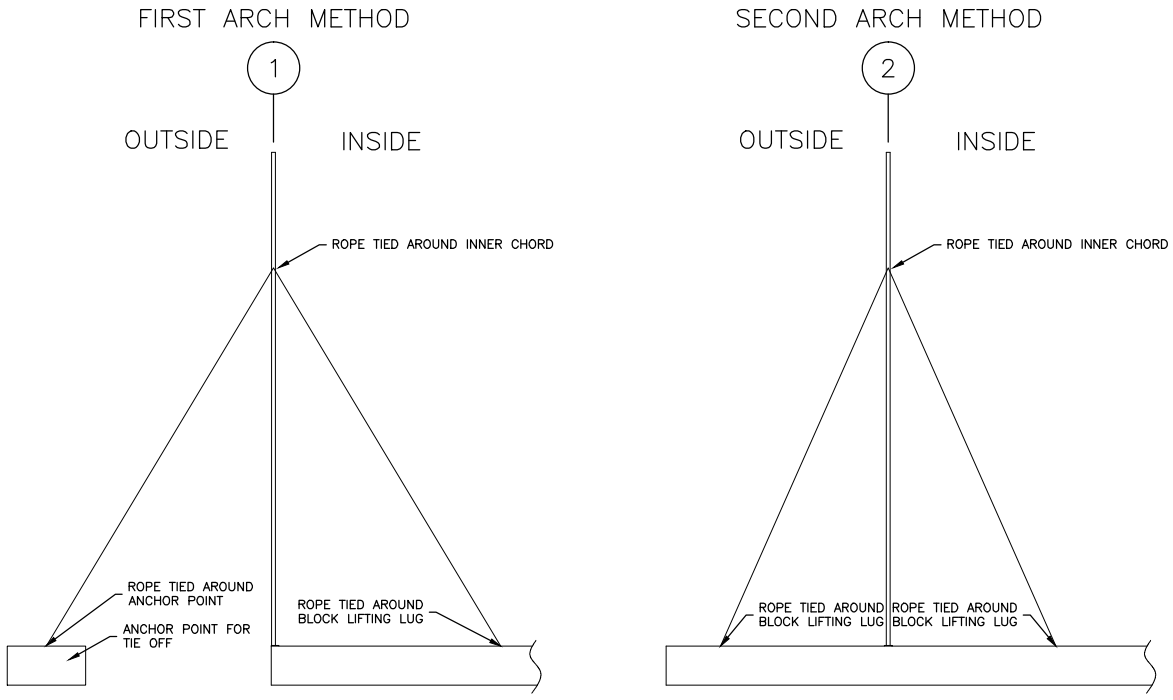
6.1 - Install foam tape on top of the outer chord.

6.2 - Install extrusion on top of the foam tape on the outer chord.

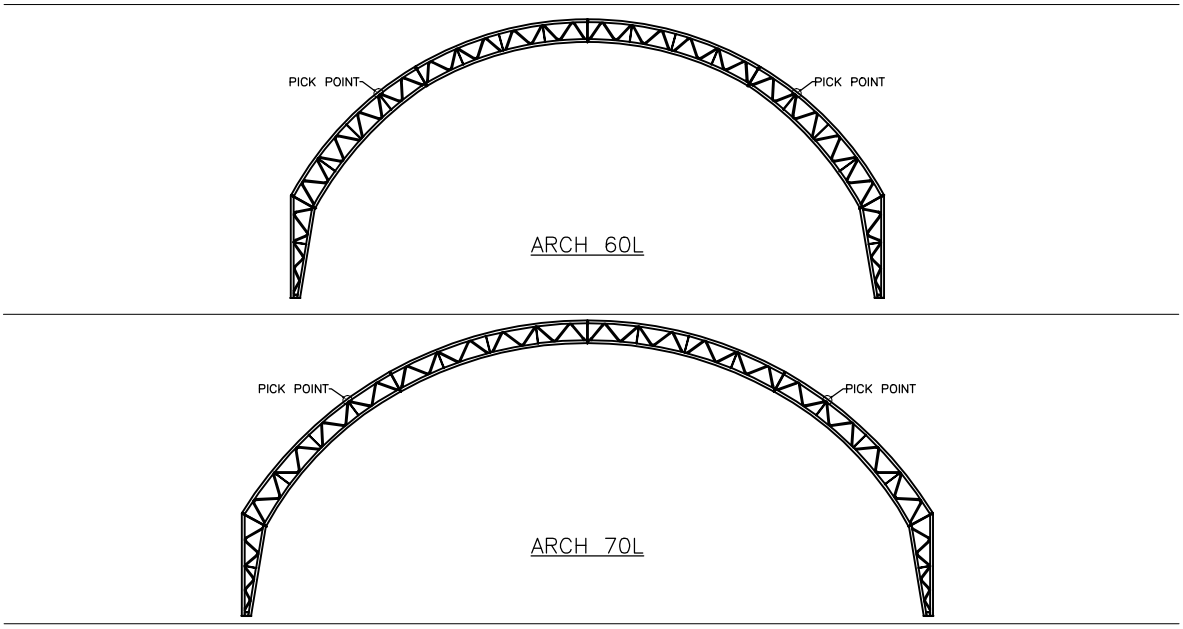
IF EXTRUSION IS REQUIRED SEE STEPS 16 AND 17

STEP 7 ERECT FIRST ARCH

7.1 - Determine if extra concrete blocks are available. If extra blocks are available first arch method can be used, if not the second arch must be raised first.



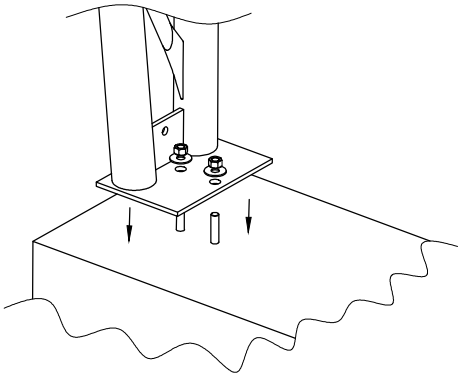
7.2 - Use a crane or equivalent with 2 point pick and sling to elevate the truss into its upright position and center it on top of the baseplates.



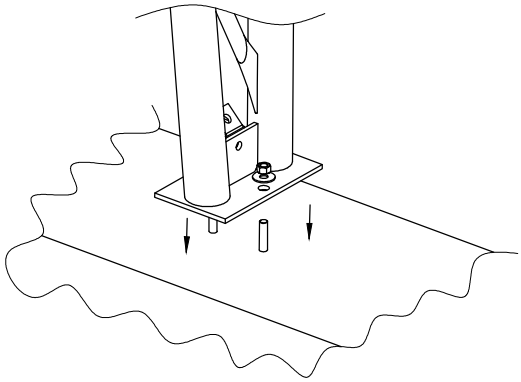
STEP 7 ERECT FIRST ARCH CONT.

7.3 - Lower the arch into position and anchor bolt washers and nuts as shown below.

7.3 - First Arch Method

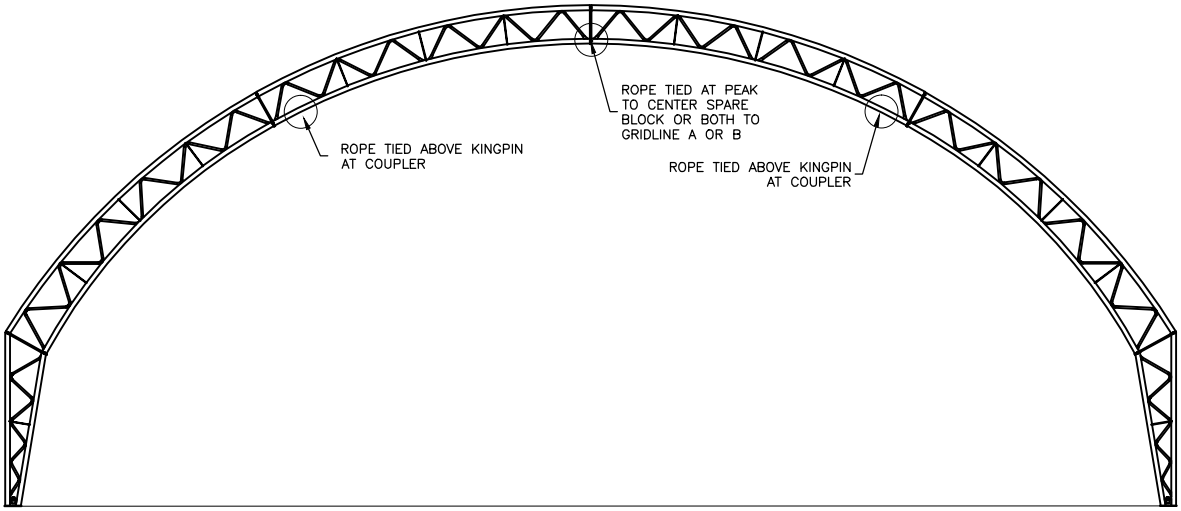


7.3 - Second Arch Method



7.4 - While still supported by equipment tie two ø1/2" poly ropes tied securely at each location shown below on truss and secure anchor points determined previously in step 7.1.

TEMPORARY BRACING ROPES ARE NOT TO BE REMOVED UNTIL SPECIFIED BY THE CREW FOREMAN

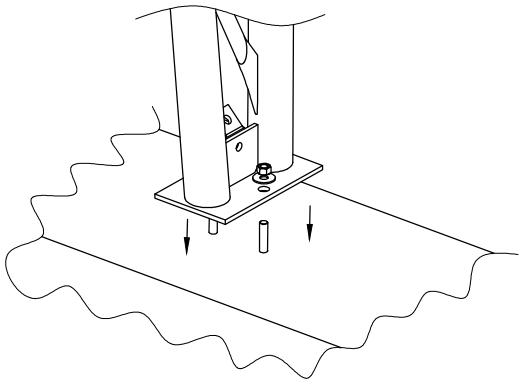


STEP 8 ERECT THE NEXT ARCH

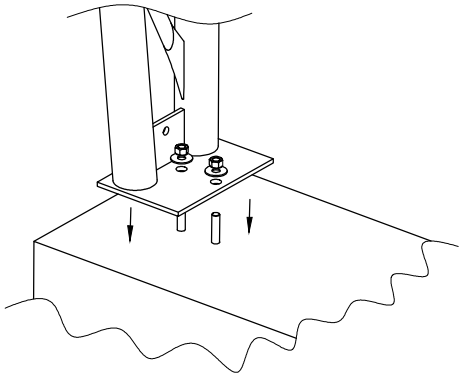
8.1 - Use a crane or equivalent with 2 point pick and sling to elevate the truss into its upright position and center it on top of the baseplates.

8.2 - Lower the arch into position and install washers, and nuts as shown below.

8.2 - First Arch Method



8.2 - Second Arch Method



8.3 - Keep lifting equipment in place to support the truss while the next step is completed.

STEP 9 INSTALL END BAY PURLINS

WARNING: DO NOT SUSPEND
OBJECTS FROM PURLINS

INSTALL ALL PURLINS IN CURRENT BAY
BEFORE ERECTING THE NEXT ARCH

REFER TO ENGINEERED DRAWINGS FOR
PURLIN SIZES AND LOCATIONS

ALL PURLINS USE ø5/8" x 2-1/2" FULL THREAD
GR. 5 HEX BOLTS

ALL BOLTS/NUTS MUST BE TIGHTENED IN
ACCORDANCE WITH ENGINEERED DRAWINGS

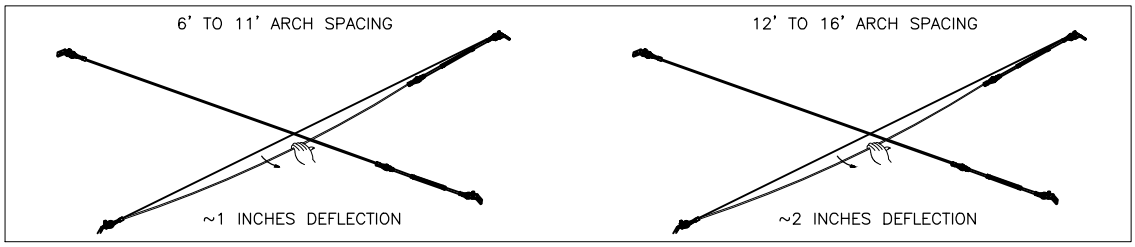
9.1 - While the arch is still held in place by equipment, install all the purlins required in the end bay. Install alternating cable tabs, may requiring deburring for 5/8" bolt clearance. See engineered drawings for purlin layout.

STEP 10 INSTALL END BAY CROSS CABLES

REFER TO BUILDING PROFILE IN ENGINEERED DRAWINGS FOR CABLE LOCATIONS AND SIZE

10.1 - While arch is still held in place by equipment, install cables on to the center hole of coupler or kingpin. Use ø5/8" x 2-1/2" bolts at all locations except the base, use a ø5/8" x 2" bolt at the base connection.

10.2 - Tension cross cables



Make cross cable lengths equal to square the building.

10.3 - Tighten cable turnbuckle locknuts.

ENSURE THE CABLES ARE INSTALLED AND TIGHTENED PRIOR TO CRANE DETATCHMENT

STEP 11 ERECT REMAINING ARCHES

11.1 - Repeat STEP 8 to erect the third arch.

11.2 - Repeat STEP 9 to install interior bay purlins.

11.3 - Repeat STEP 8 to erect an interior arch.

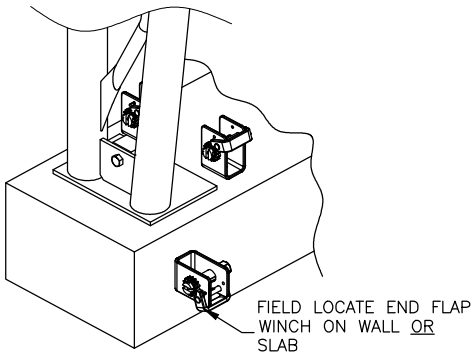
11.4 - Repeat STEP 10 to install end bay and interior bay cables if required.

11.5 - Continue erecting and installing purlins/cables according to engineered drawings.

STEP 12 INSTALL END FLAP WINCHES

12.1 - Attach an end flap lashing winch to the winch mount bracket as shown below. Only install end flap winches on the end arches.

12.1

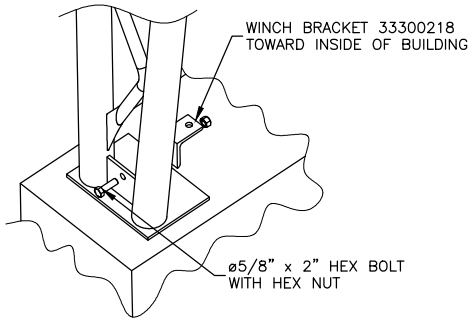


ALL BOLTS/NUTS MUST BE TIGHTENED IN ACCORDANCE WITH ENGINEERED DRAWINGS

STEP 13 INSTALL COVER LASHING WINCHES

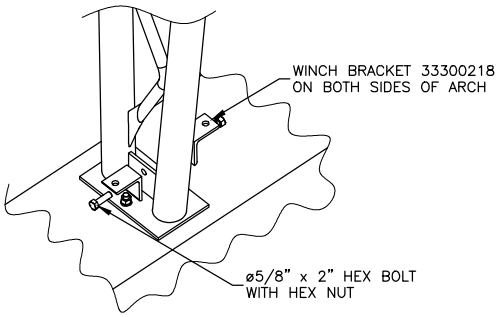
13.1 - Install lashing winch brackets on the gusset at the base of each leg using ø5/8" x 2" bolts as shown below.

13.1 - End Lashing Winch Connection



ø5/8" Hex Bolt/Nut Requires Snug Tight

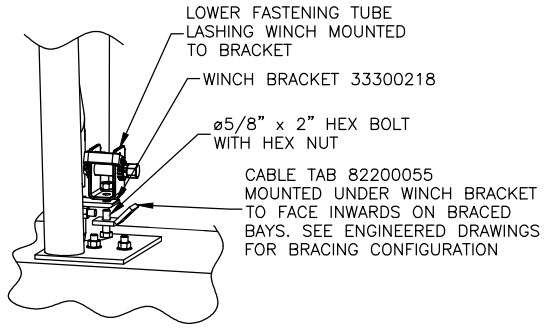
13.1 - Common Lashing Winch Connection



ø5/8" Hex Bolt/Nut Requires Snug Tight

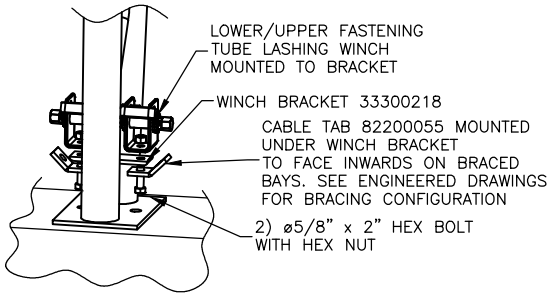
13.2 - Install lashing winches on the bracket using ø5/8" x 2" bolts as shown below.

13.2 - End Lashing Winch Connection



ø5/8" Hex Bolt/Nut Requires Snug Tight

13.2 - Common Lashing Winch Connection



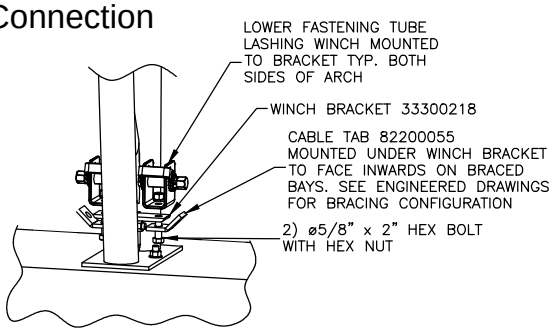
ø5/8" Hex Bolt/Nut Requires Snug Tight

ALL BOLTS/NUTS MUST BE TIGHTENED TO THE CORRECT TORQUE VALUE

STEP 13 INSTALL COVER LASHING WINCHES

13.3 - If there is two or more covers, two winches need to be installed at the joint arches. Install winch brackets on gusset at the base of the leg and the winches on top of the brackets using ø5/8" x 2" bolts as shown below.

13.3 - Cover Lap Lashing Winch Connection



ø5/8" Hex Bolt/Nut Requires Snug Tight

ALL BOLTS/NUTS MUST BE TIGHTENED IN ACCORDANCE WITH ENGINEERED DRAWINGS

STEP 14 INSTALL COVER FASTENING TUBES

USE A GROUND SHEET TO PROTECT THE COVER WHILE IT IS BEING PREPARED FOR INSTALLATION

FASTENING TUBES ARE SUPPLIED IN FACTORY CUT LENGTHS AND WILL REQUIRE MEASURED CUTS

THIS BUILDING USES 2" x 3" FASTENING TUBE

BUILDINGS OVER 160' HAVE MORE THAN ONE COVER PIECE, SEE STEP 16, 17 FOR ADDITIONAL INFORMATION

REFER TO ENGINEERED DRAWINGS FOR FASTENING TUBE CONNECTIONS

14.1 - Place cover at grid line 1A.

14.2 - Roll out the cover so the fastening tube pockets face the building and there is a small walk area along the building.

14.3 - Align the cover equal distance from each end frame of the building.

14.4 - Pull out the cover to expose the bottom pipe pocket.

14.5 - Wrap or cap the leading edge of the fastening tube to avoid damage to the pocket during installation.

14.6 - Begin pushing the fastening tube down the bottom pocket.

14.7 - Add new fastening tube lengths as needed. Wrap fastening tube joints with duct tape to avoid damage to the pocket during installation.

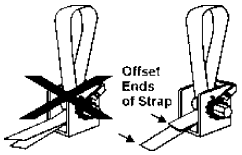
14.8 - Repeat STEPS 14.4, 14.5, 14.6 and 14.7 for the bottom pocket on the other end of the cover.

STEP 15 INSTALL THE COVER

DO NOT INSTALL THE COVER IN HIGH WIND CONDITIONS. A SLIGHT BREEZE FROM THE NON-PULL SIDE IS THE MOST ADVANTAGEOUS FOR COVER INSTALLATION

DO NOT LEAVE THE COVER UNATTENDED UNDER ANY CIRCUMSTANCES UNTILL FINAL ASSEMBLY HAS BEEN COMPLETED

15.1 - Loop the lashing straps around the inner fastening tube and secure both ends of the straps in the lashing winches.



15.2 - On the opposite end of the cover tie several ropes, approximately 30' apart to the steel fastening pipe through the notched hole.

15.3 - Throw the free end of the ropes over the frame to the opposite side of the building.

15.4 - Ready the lashing straps on the opposite side of the building.

15.5 - Complete the pull checklist:

- ☐ Ensure that the cover is pocket side up.
- ☐ Ensure both bottom pocket fastening tubes are in place.
- ☐ Ensure fastening straps on the near side are secured in the lashing winches.
- ☐ Ensure ropes are secured to the second fastening pipe and are passed over the frame.
- ☐ Ensure there is no or light wind conditions.

15.6 - Pull the cover over the frame carefully, evenly and slowly.

15.7 - Loop the lashing straps around the fastening pipe and loosely secure them in the lashing winches. DO NOT TIGHTEN. Adjust the cover so that it is square and evenly centered on the frames. End flaps should overhang evenly at both ends.

STEP 16 TWO COVER INSTALLATION

16.1 - When installing the cover, shift the pull-over fastening tube 3' away from the keeder rope edge of the cover.

16.2 - Feed the lead rope through the extrusion.

16.3 - Charge the extrusion with lubricant.

16.4 - Pull the cover with the fastening tube and lead rope.
- Fastening tube end brackets are not required at the arch with extrusion.

16.5 - Push the fastening tube back to line up with winch tension location.

STEP 17 INSTALL TOP FASTENING TUBES

17.1 - Locate the top fastening tube pockets on both sides of the building.

17.2 - Wrap or cap the leading edge of the fastening tube to avoid damage to the pocket during installation.

17.3 - Begin pushing the fastening tube down the bottom pocket.

17.4 - Add new fastening tube lengths as needed. Wrap fastening tube joints with duct tape to avoid damage to the pocket during installation.

17.5 - Cut upper fastening tube approximately 1/2" from end truss.

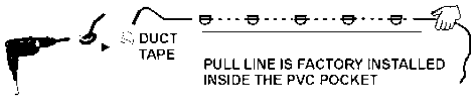
17.6 - Install fastening tube end saddle bracket using 4) Tek2x1-1/4" self drilling screws.

17.7 - Attach fastening tube saddle brackets to truss outer chord, above the leg coupler, using 1) 1/2"x5" carriage bolt and nut.

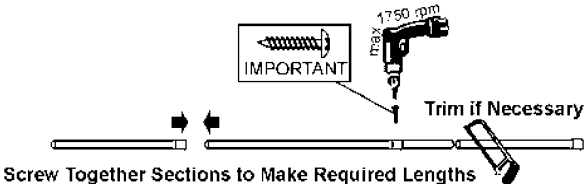
STEP 18 INSTALL COVER PVC PIPE

PVC TUBES SHOULD SLIDE EASILY INTO THE POCKETS. DO NOT FORCE. CHECK FOR TWISTED FABRIC OR MISALIGNED POCKET OPENINGS IF YOU EXPERIENCE DIFFICULTY

18.1 - Drill a hole in the male end of one PVC tube and tie the pull line to it. Wrap this leading edge with duct tape.

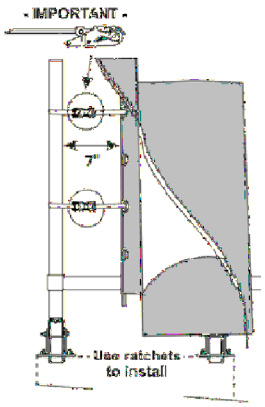


18.2 - Pull the PVC into the pocket, attaching new PVC pieces as required using 2 #8-18 x 1" pan head screws.



STEP 19 TENSION COVER ENDS

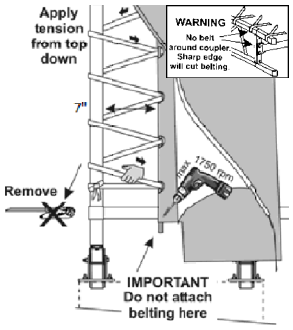
19.1 - Operate the cover fastening tube end arch winches to remove slack from the lashing straps. DO NOT TENSION.



19.2 - Use ratchet straps (not supplied) on both ends, evenly spaced, to tension and hold the cover lengthwise.

19.3 - Lace starting at the base, lace the 1" belting around the PVC tube through the notches and then back to the outer chord on the truss all the way up to the center of the building. Tie off each section. Repeat lacing from other base. Alternatively ratchet straps can be supplied for all notch locations.

19.4 - Tension starting at the top center. Work your way down from the secured end using force to tighten the belting and finish by tying the belting off at the base. The PVC should be parallel with the end arch all the way around.

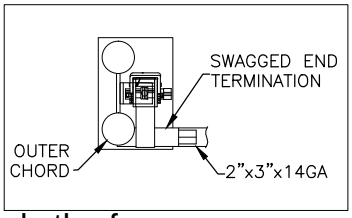


19.5 - Repeat STEPS 19.1, 19.2, 19.3, 19.4 on the other side of the building.

19.6 - After the cover has been tensioned drive pan head screws through the pocket into the PVC pipe to ensure it stays in place.

STEP 20 TRIM THE COVER FASTENING TUBE

20.1 - Cut the ends of the fastening pipe approx 4" from inside edge of inner chord



20.2 - Install swagged end termination as shown on the right. Secure to fastening tube with 3 Tek2 x 1-1/4" screws.

20.3 - Remove all ropes used to install the cover and steady the frame.

STEP 21 TENSION THE COVER

21.1 - Use a 1-1/8" wrench to tighten the cover lashing straps evenly on both sides of the building. Adjust the cover lashing winches to achieve a wrinkle free drum tight appearance over the entire building. For most buildings 35-45ft-lbs provides adequate cover tension.

21.2 - Adjust the end lashing straps tension until the cover fastening tubes are level.

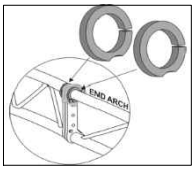
21.3 - Install a cotter pin in all the lashing winch pilot holes to lock the release lever.

21.4 - Attach cam buckles through belting strip notch on the cover fabric to the leg trusses on every second arch. Not required on top and bottom notch.

STEP 22 INSTALL RUBBER FLAP PROTECTORS

DO NOT TENSION THE END FLAP WITHOUT INSTALLING THE RUBBER FLAP PROTECTORS. DAMAGE WILL OCCUR.

22.1 - Two rubber flap protectors are required and installed on the outer chord at all connected coupler locations on the end arches. Wrap with fabric tape where required.



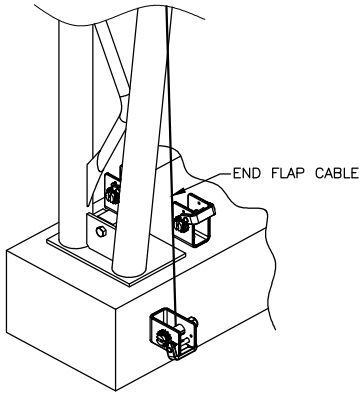
22.2 - Install 6" rubber angle flap protector at the top of the leg on the end arch corner wear points.

STEP 23 TENSION THE END FLAP CABLE

23.1 - Trim the coated cable casing.

23.2 - Thread the end flap cable into the end flap winch.

23.2

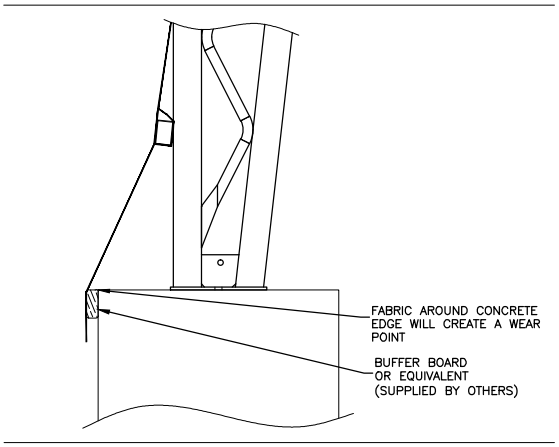


IT MAY BE NECESSARY TO REPEAT THE TIGHTENING SEVERAL TIMES FOR BOTH WINCHES

23.3 - Tighten the winches on both sides until the end flap is tight.

23.4 - Repeat STEPS 23.1, 23.2 and 23.3 on the other end of the building.

STEP 24 SECURE THE APRON



ALWAYS INSTALL A BUFFER BOARD

NEVER INSTALL FABRIC OVER CONCRETE EDGES

24.1 - Finish the apron of the cover according to the design of the building.

24.2 - Apply tension to the apron and fasten to the building, base or foundation using an accepted method of construction.

STEP 25 READ OWNER'S WARR. & MAINT. PKG.

STEP 26 COMPLETE WARRANTY REGISTRATION

GLOSSARY

Anchor bolt - A fastener used to attach objects to concrete

Anchor bolt projection - The amount of distance required that an anchor bolt must stick out above the foundation. Sometimes a max distance is also stated due to clearances.

Apron - The portion of fabric on a cover after the fastening tube pocket.

Arch - An assembly of trusses.

Baseplate - A bracket or part of the arch that is secured to the foundation.

Coupler - The member that allows attachment of one truss to another. Commonly a plate at the end of a truss, or a tube that is inserted into inner and outer chords.

Cross Cables - A cable assembly that spans from the end of one purlin to the opposite end of another purlin and likewise in the other direction to make a cross.

End Flap - The portion of fabric on a cover that folds over the end arch's outer chord down vertically on the endwall.

Extrusion - Aluminum keeder rail used to secure the fabric to the truss sections.

Fastening Tube - A tube that is inserted into a pocket on the fabric that is tensioned down with lashing winches.

Inner Chord - The member on the inside of the truss.

Kingpin - The members in a truss spanning perpendicular between inner and outer chords.

Outer Chord - The member on the outside of the truss.

Purlin - A horizontal member connecting two arches together.

Shackle - A metal link which is typically U-shaped and closed by a bolt or pin used to secure a chain or rope to something.

GLOSSARY

Torque - The amount of twisting force required or applied to a given bolt connection.

Truss - A structural frame composed of members.

Turnbuckle - A coupling with female screw threads used to connected two rods or cables lengthwise to regulate their length or tension.

Web - The members in a truss spanning diagonally between inner and outer chords.