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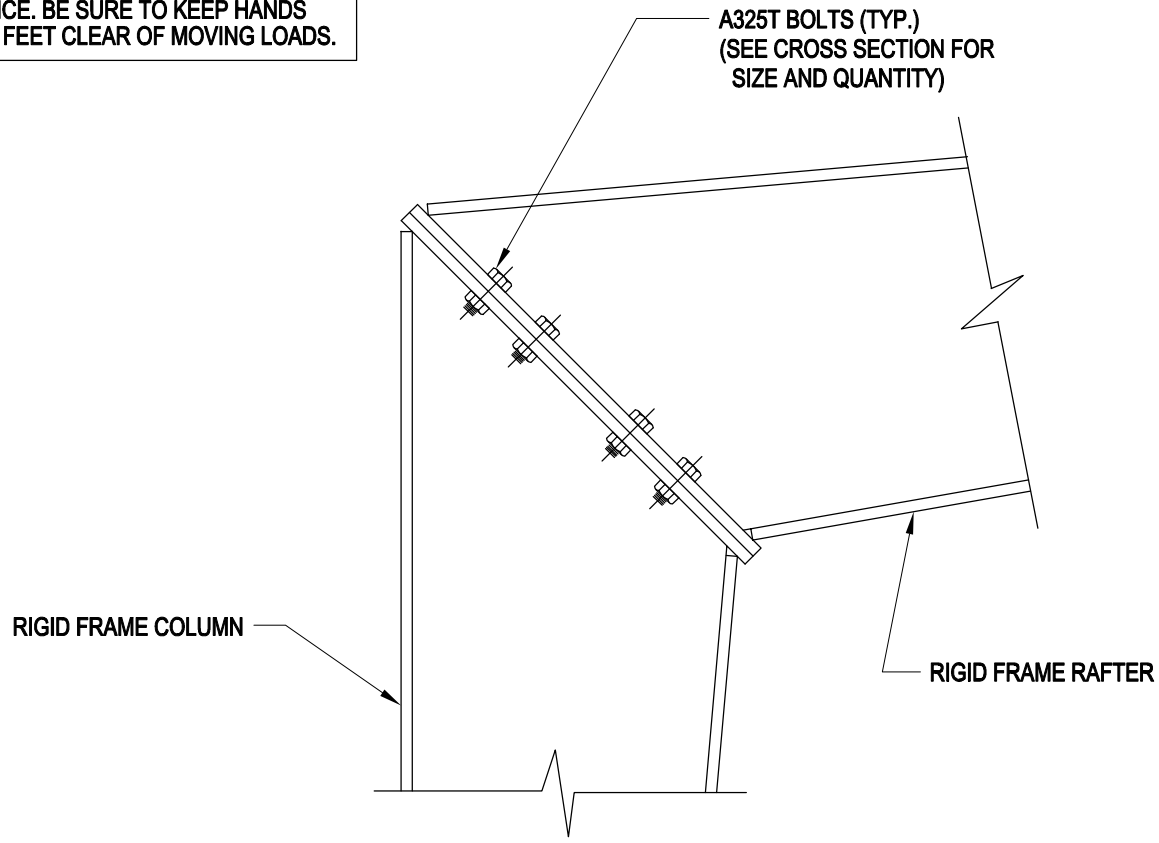
Diagonal Haunch Connection at Bldg. Eave
Rigid Frame
MF11/AA

SAFETY PRECAUTION:
STAY WELL IN THE CLEAR OF LOADS BEING MOVED BY ANY TYPE LIFTING DEVICE. BE SURE TO KEEP HANDS AND FEET CLEAR OF MOVING LOADS.



DIAGONAL HAUNCH CONNECTION AT BLDG. EAVE

MF11
AA

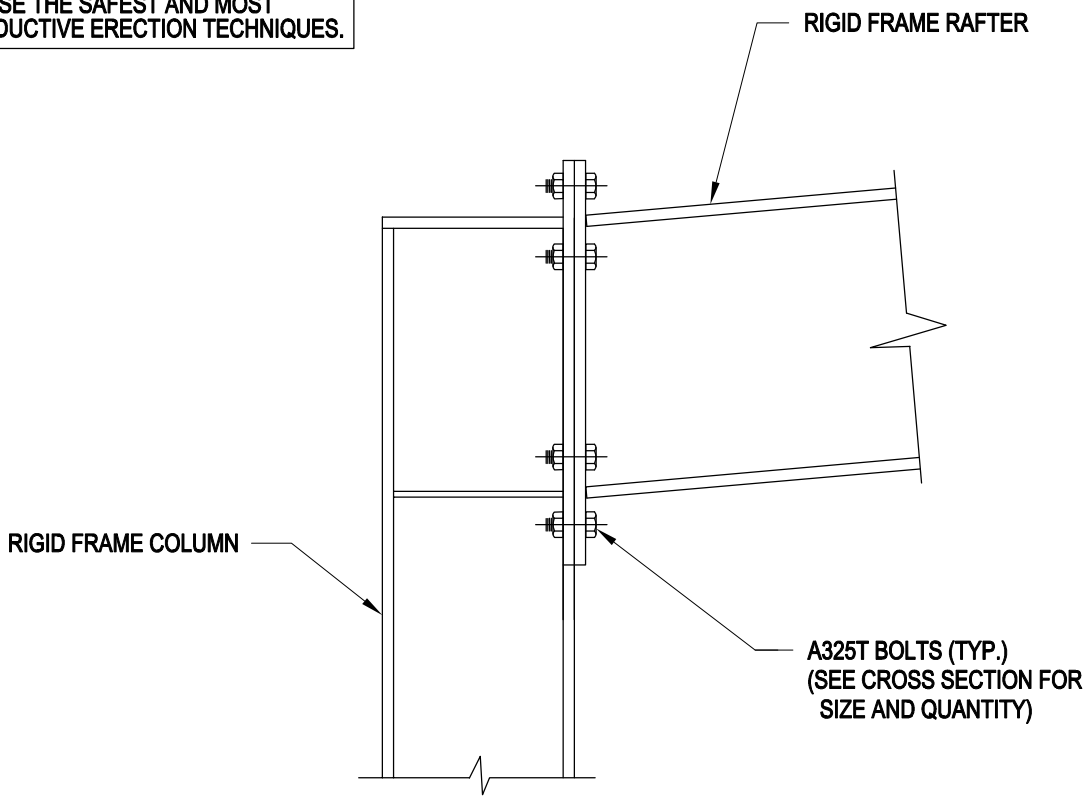
RIGID FRAME

Download the DWG file by clicking here.

To Section Index

Vertical Haunch Connection at Bldg. Eave
Rigid Frame
MF12/AA

SAFETY PRECAUTION:
EACH WORKER SHOULD BE TRAINED TO USE THE SAFEST AND MOST PRODUCTIVE ERECTION TECHNIQUES.



VERTICAL HAUNCH CONNECTION AT BLDG. EAVE
RIGID FRAME

MF12
AA

Download the DWG file by clicking here.

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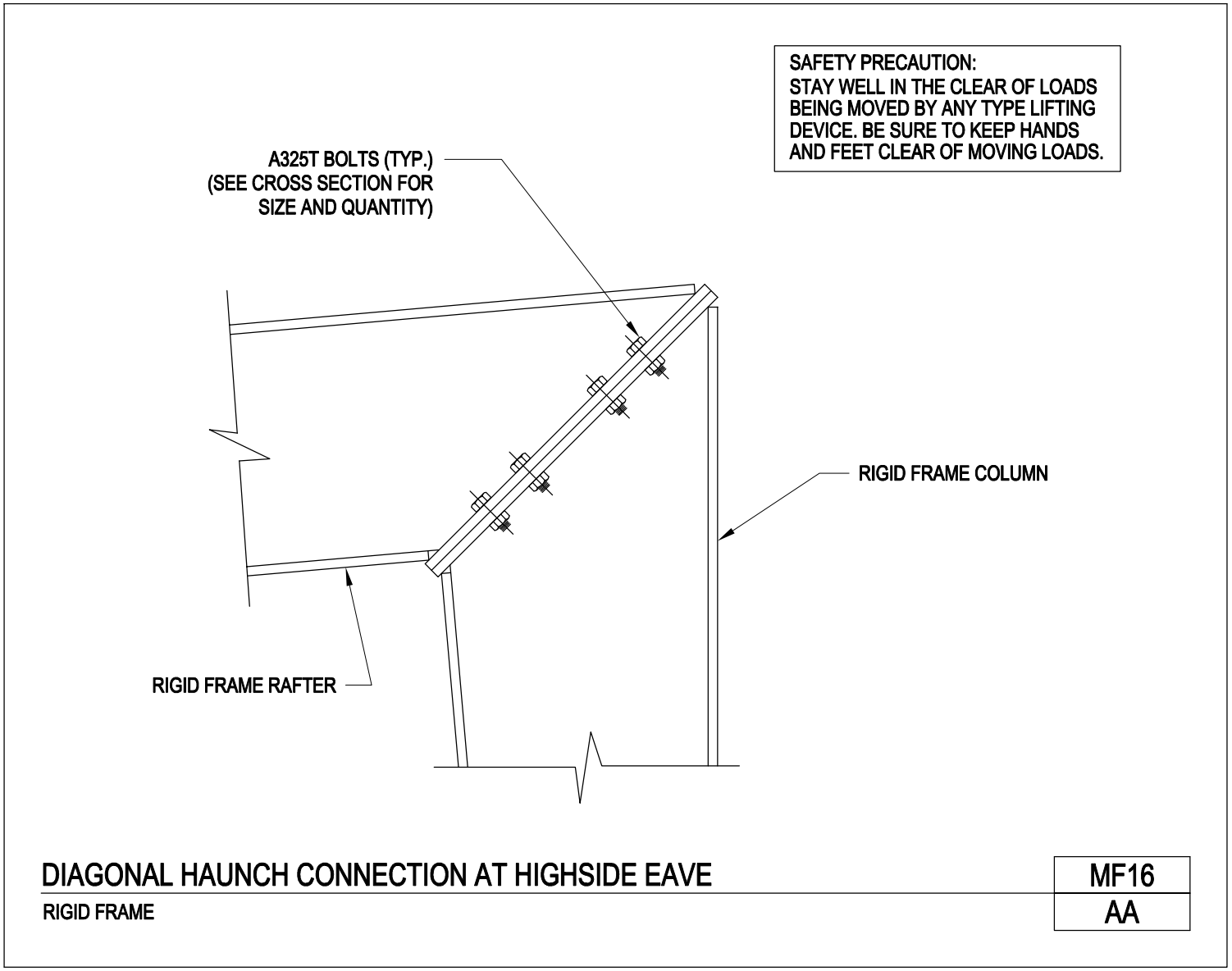
Diagonal Haunch Connection at Highside Eave
Rigid Frame
MF16/AA



Download the DWG file by clicking here.

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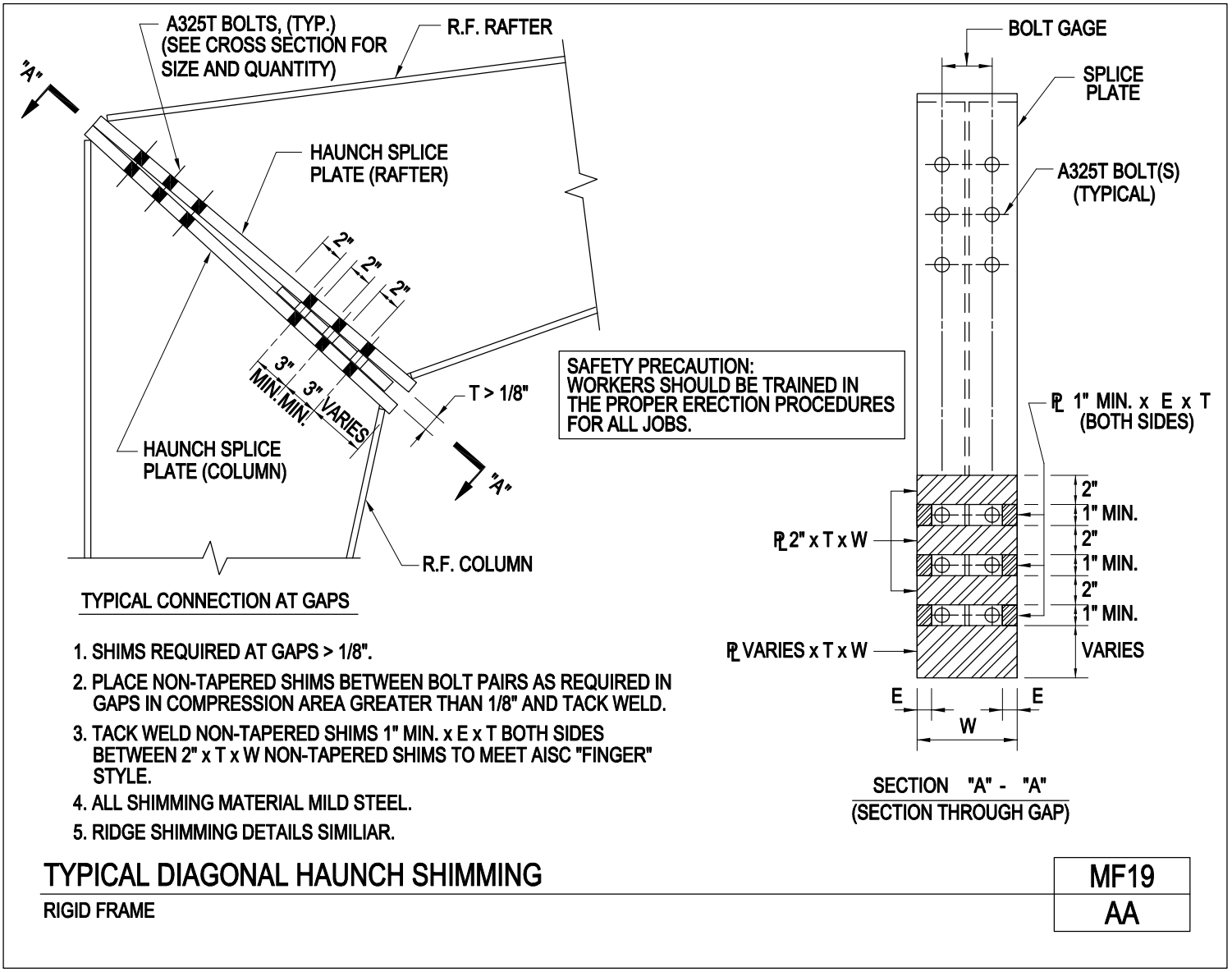
Typical Diagonal Haunch Shimming
Rigid Frame
MF19/AA



TYPICAL CONNECTION AT GAPS

SECTION "A" - "A"
(SECTION THROUGH GAP)

1. SHIMS REQUIRED AT GAPS > 1/8".
2. PLACE NON-TAPERED SHIMS BETWEEN BOLT PAIRS AS REQUIRED IN GAPS IN COMPRESSION AREA GREATER THAN 1/8" AND TACK WELD.
3. TACK WELD NON-TAPERED SHIMS 1" MIN. x E x T BOTH SIDES BETWEEN 2" x T x W NON-TAPERED SHIMS TO MEET AISC "FINGER" STYLE.
4. ALL SHIMMING MATERIAL MILD STEEL.
5. RIDGE SHIMMING DETAILS SIMILIAR.

TYPICAL DIAGONAL HAUNCH SHIMMING

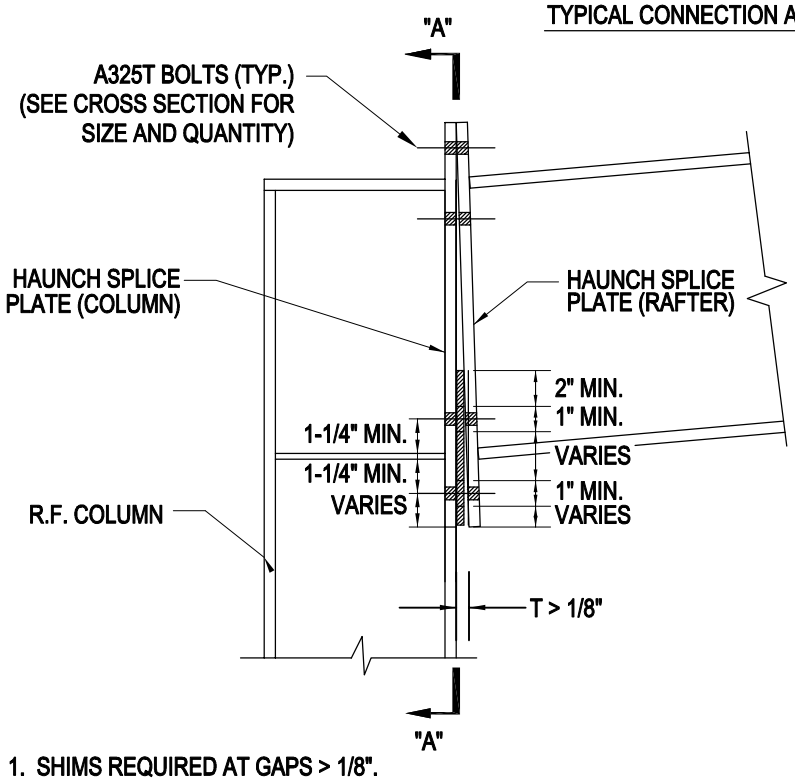
RIGID FRAME

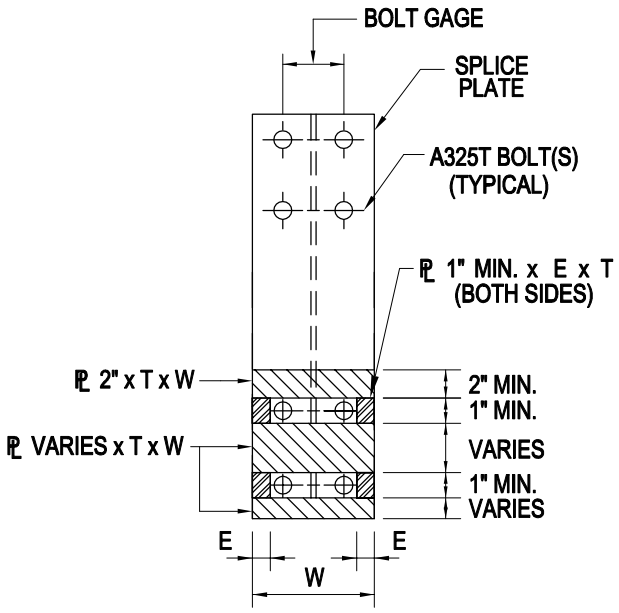
MF19
AA

Download the DWG file by clicking here.

To Section Index

Typical Vertical Haunch Shimming
Rigid Frame
MF19A/AA





SECTION "A" - "A"
(SECTION THROUGH GAP)

1. SHIMS REQUIRED AT GAPS > 1/8".
2. PLACE NON-TAPERED SHIMS BETWEEN BOLT PAIRS AS REQUIRED IN GAPS IN COMPRESSION AREA GREATER THAN 1/8" AND TACK WELD.
3. TACK WELD NON-TAPERED SHIMS 1" MIN. x E x T BOTH SIDES BETWEEN 2" x T x W NON-TAPERED SHIMS TO MEET AISC "FINGER" STYLE.
4. ALL SHIMMING MATERIAL MILD STEEL.
5. RIDGE SHIMMING DETAILS SIMILIAR.

SAFETY PRECAUTION:
WORKERS SHOULD BE TRAINED IN THE PROPER ERECTION PROCEDURES FOR ALL JOBS.

TYPICAL VERTICAL HAUNCH SHIMMING

RIGID FRAME

MF19A
AA

Download the DWG file by clicking here.

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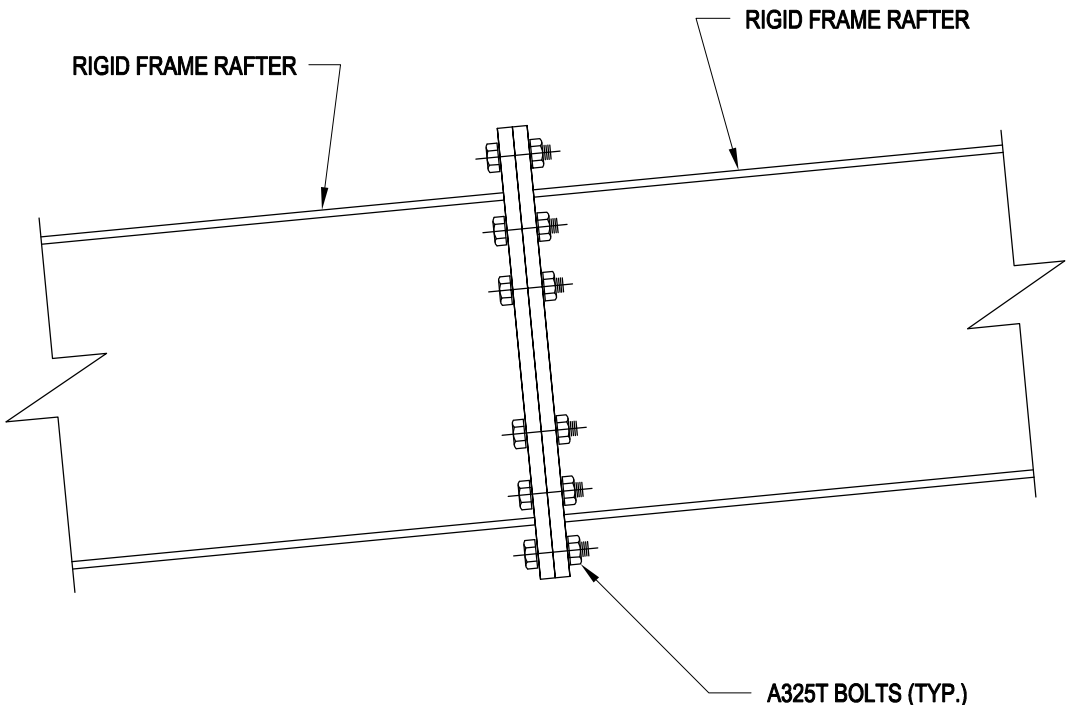
Intermediate Rafter Connection Detail
Rigid Frame Rafter
MF21/AA



SAFETY PRECAUTION:
AMERICAN BUILDINGS COMPANY RECOMMENDS THAT ALL WORKERS WEAR STEEL TOE SHOES WITH METOTARSAL GUARD, EYE PROTECTION AND HARD HATS.

INTERMEDIATE RAFTER CONNECTION DETAIL	MF21
RIGID FRAME RAFTER	AA

Download the DWG file by clicking here.

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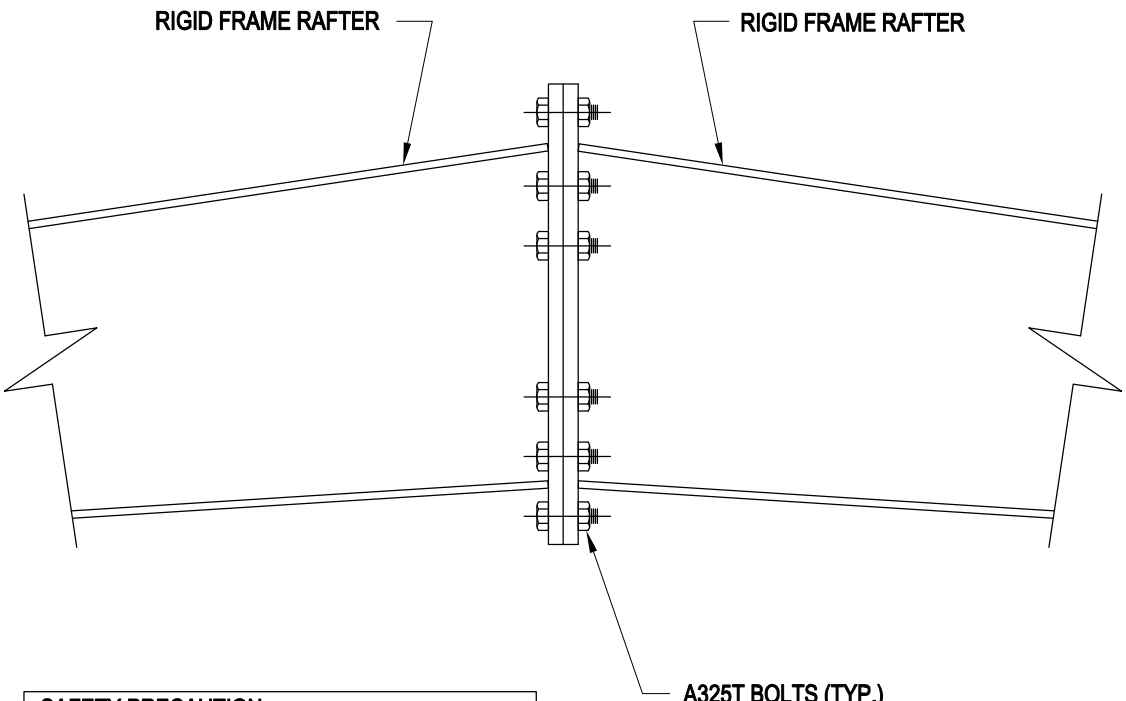
Ridge Rafter Connection Detail
Rigid Frame Rafter
MF22/AA



SAFETY PRECAUTION:
WORKER PERSONAL PROTECTION EQUIPMENT
SHOULD ALWAYS MEET OSHA STANDARDS.

RIDGE RAFTER CONNECTION DETAIL
RIGID FRAME RAFTER

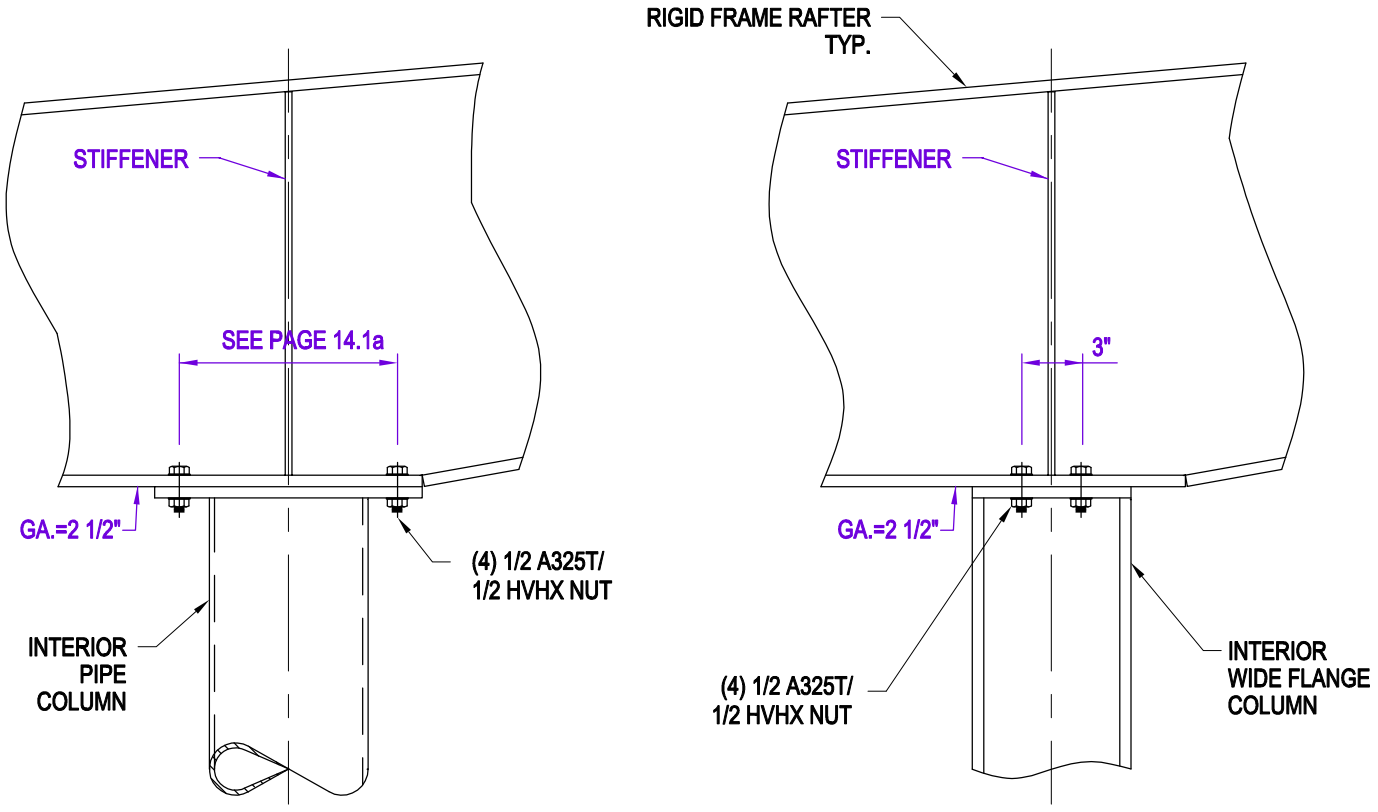
MF22
AA

Download the DWG file by clicking here.

To Section Index

Interior Column Cap Connection
Connection at Rigid Frame Rafter w/ Flat Bottom Flange
MF26/AA

SAFETY PRECAUTION:
STAY CLEAR OF ANY MOVING LOAD.
MAKE CERTAIN ALL FRAMING IS PROPERLY BRACED OR GUYED BEFORE LIFTING LINES ARE REMOVED.



INTERIOR COLUMN CAP CONNECTION

CONNECTION AT RIGID FRAME RAFTER W/FLAT BOTTOM FLANGE

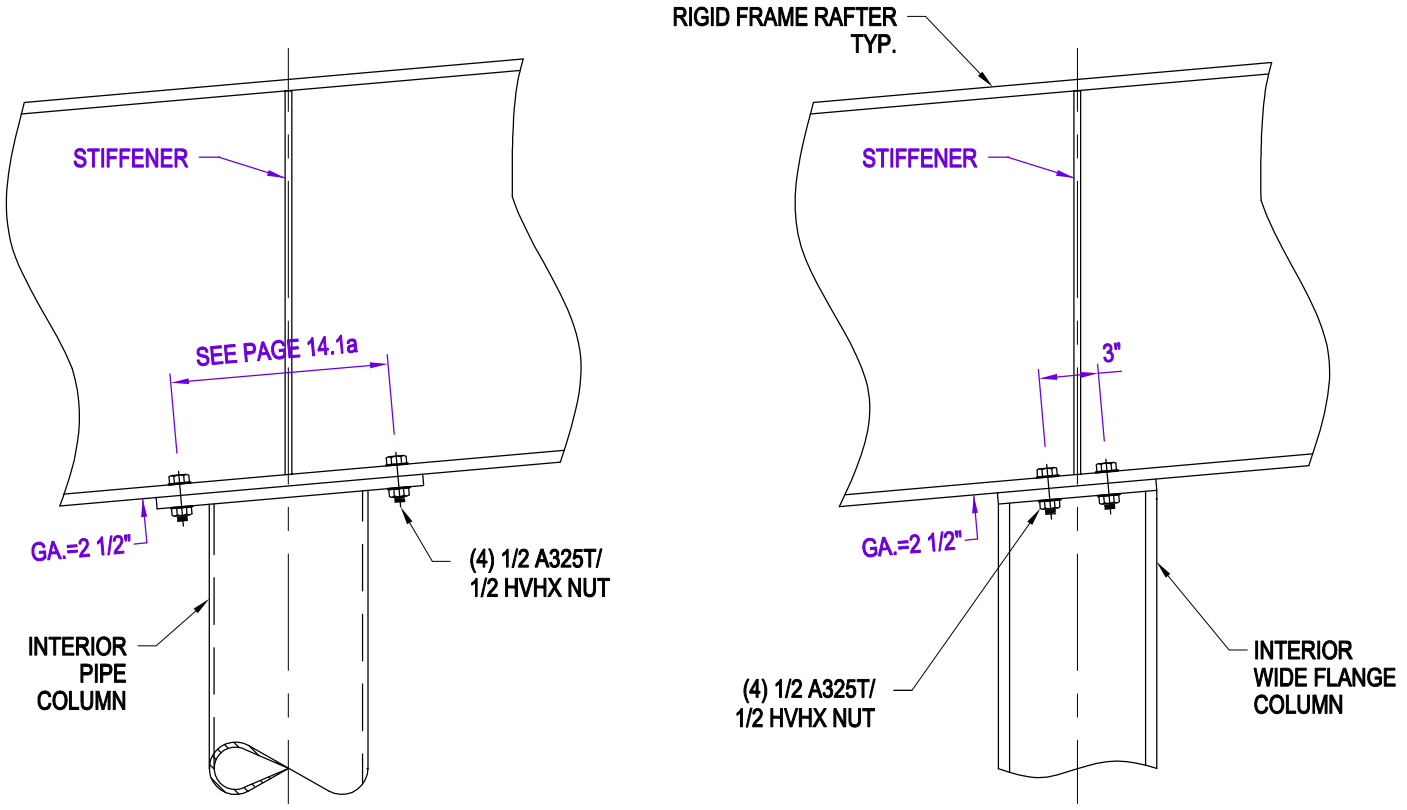
MF26
AA

Download the DWG file by clicking here.

To Section Index

Interior Column Cap Connection
Connection at Prismatic Rigid Frame
MF27/AA

SAFETY PRECAUTION:
STAY CLEAR OF ANY MOVING LOAD.
MAKE CERTAIN ALL FRAMING IS PROPERLY BRACED OR GUYED BEFORE LIFTING LINES ARE REMOVED.



INTERIOR COLUMN CAP CONNECTION

CONNECTION AT PRISMATIC RIGID FRAME

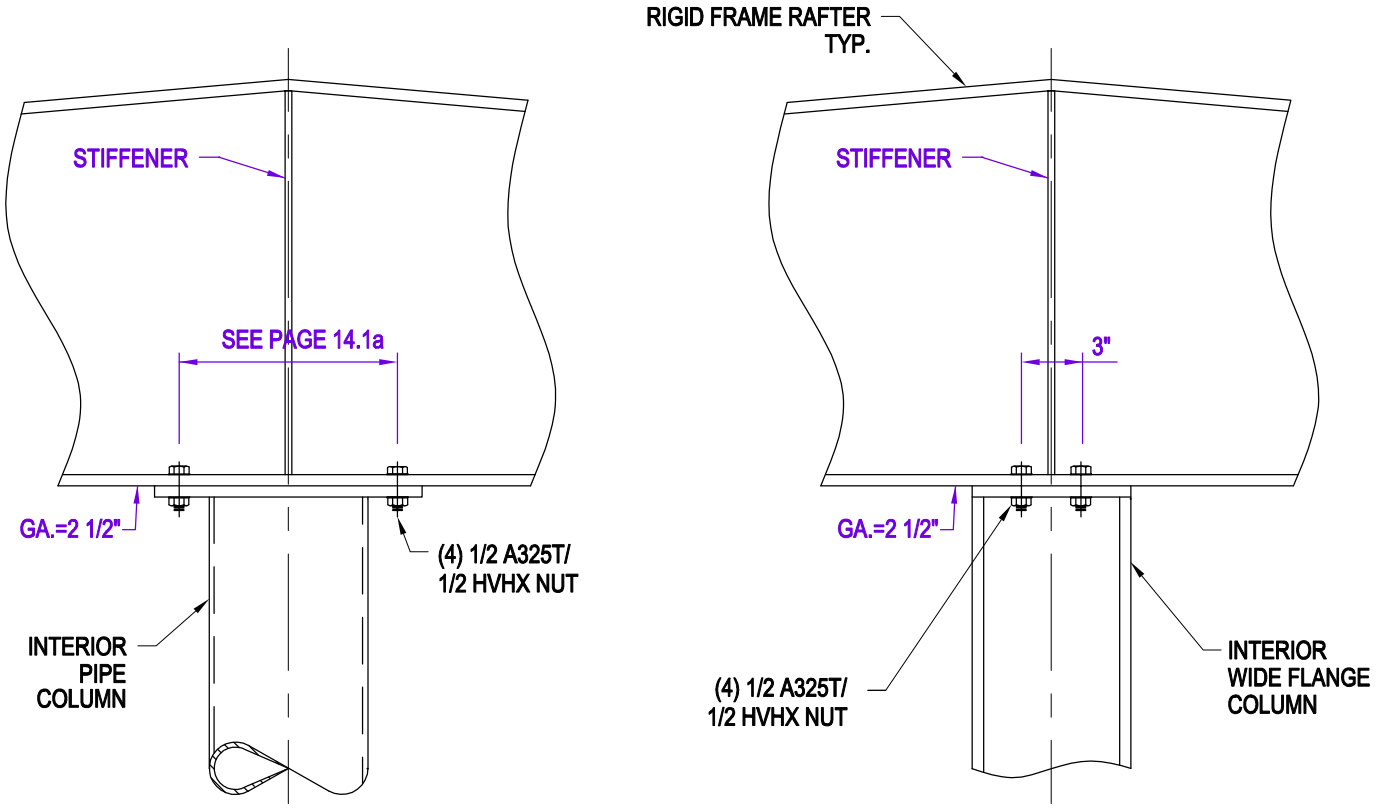
MF27
AA

Download the DWG file by clicking here.

To Section Index

Interior Column Cap Connection at Ridge
Connection at Rigid Frame Ridge Rafter
MF28/AA

SAFETY PRECAUTION:
STAY CLEAR OF ANY MOVING LOAD.
MAKE CERTAIN ALL FRAMING IS PROPERLY BRACED OR GUYED BEFORE LIFTING LINES ARE REMOVED.



INTERIOR COLUMN CAP CONNECTION AT RIDGE

CONNECTION AT RIGID FRAME RIDGE RAFTER

MF28
AA

Download the DWG file by clicking here.

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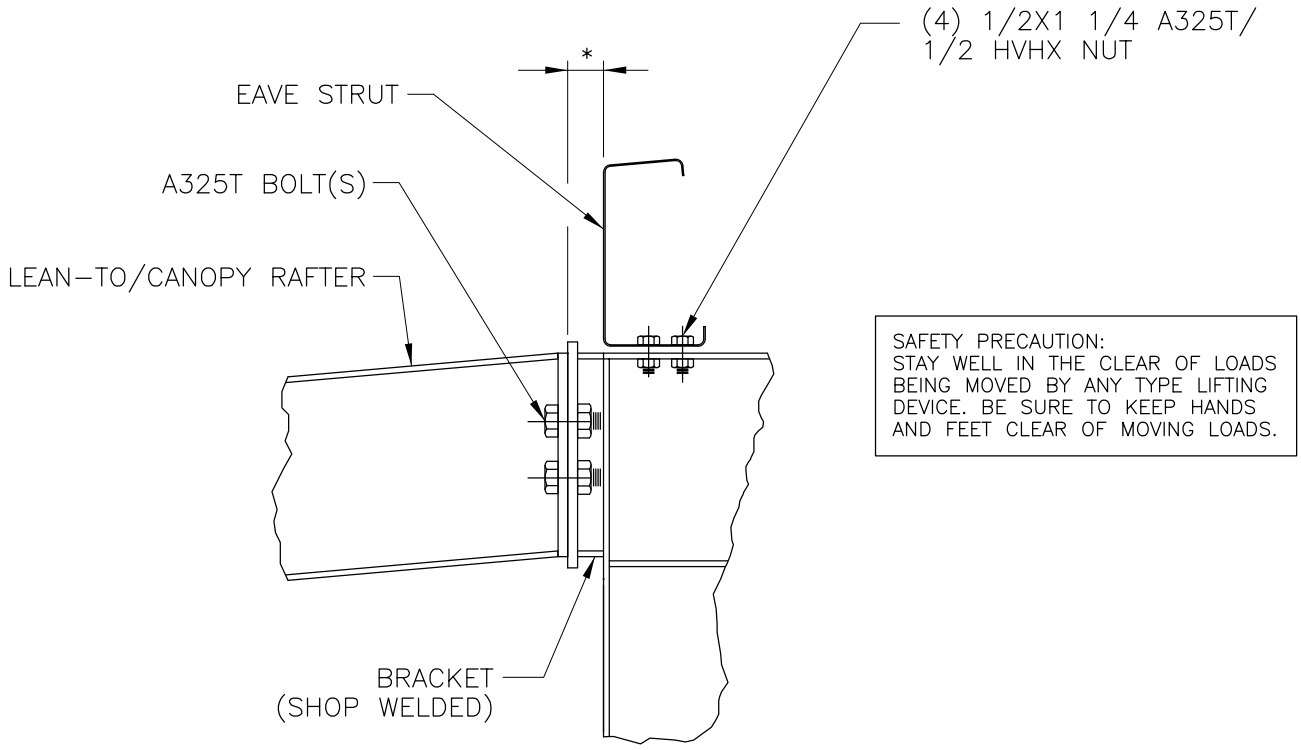
Lean-To/Canopy Connection to Main Bldg. at Eave
Flush Girts
MF30P/AA



* 1 1/4" FOR LONG SPAN III, ARCHITECTURAL III, & ARCHITECTURAL "V" RIB PANELS
* 3" FOR SHADOW PANELS

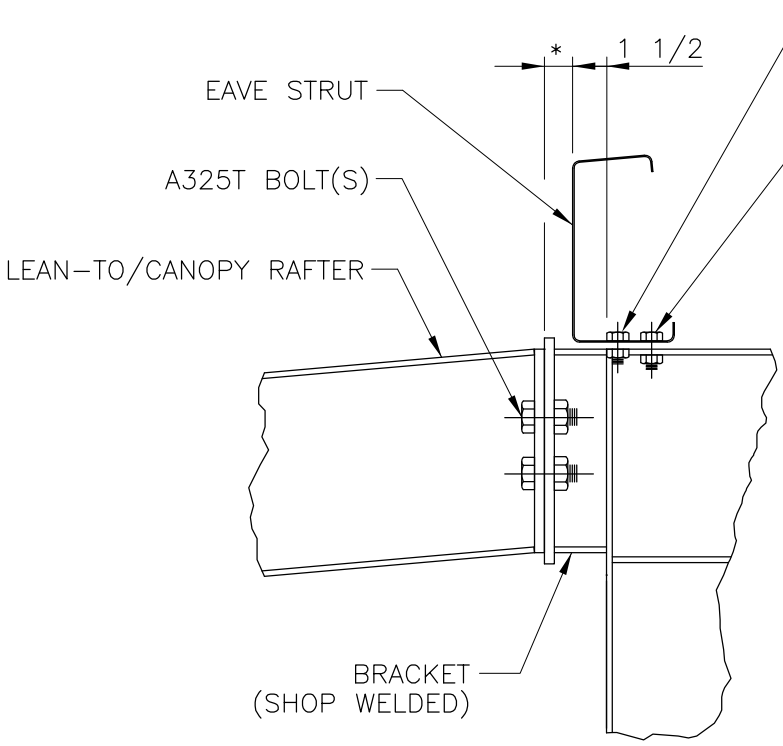
LEAN-TO/CANOPY CONNECTION TO MAIN BLDG. AT EAVE
FLUSH GIRTS

MF30P
AA

Download the DWG file by clicking here.

To Section Index

Lean-To/Canopy Connection to Main Bldg. at Eave
Inset Girts
MF30Q/AA



SAFETY PRECAUTION:
STAY WELL IN THE CLEAR OF LOADS BEING MOVED BY ANY TYPE LIFTING DEVICE. BE SURE TO KEEP HANDS AND FEET CLEAR OF MOVING LOADS.

* 1 1/4" FOR LONG SPAN III, ARCHITECTURAL III, & ARCHITECTURAL "V" RIB PANELS
* 3" FOR SHADOW PANELS

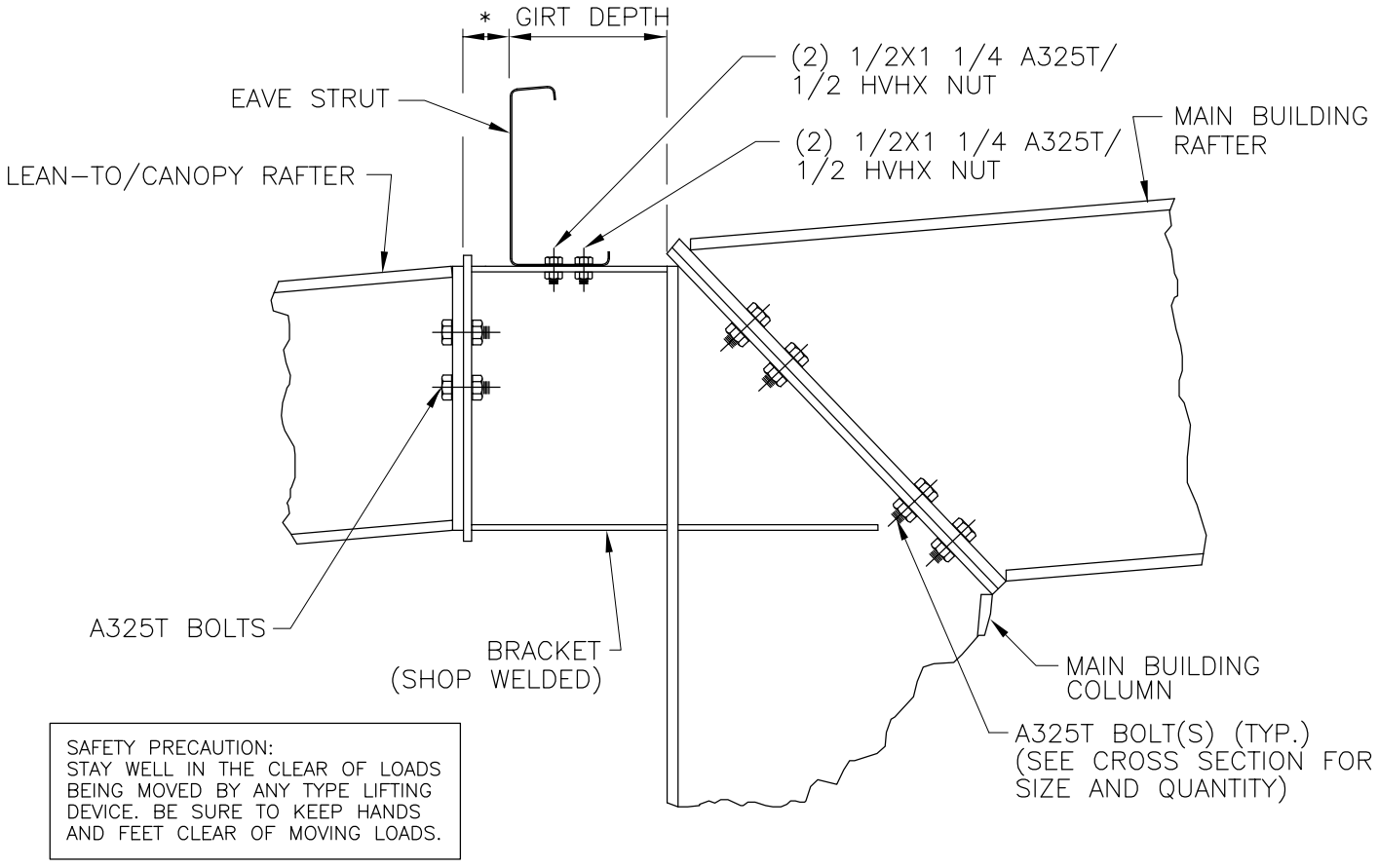
LEAN–TO/CANOPY CONNECTION TO MAIN BLDG. AT EAVE
INSET GIRTS

MF30Q
AA

Download the DWG file by clicking here.

To Section Index

Lean-To/Canopy Connection to Main Bldg. at Eave
By-Pass Girts
MF30R/AA



Download the DWG file by clicking here.

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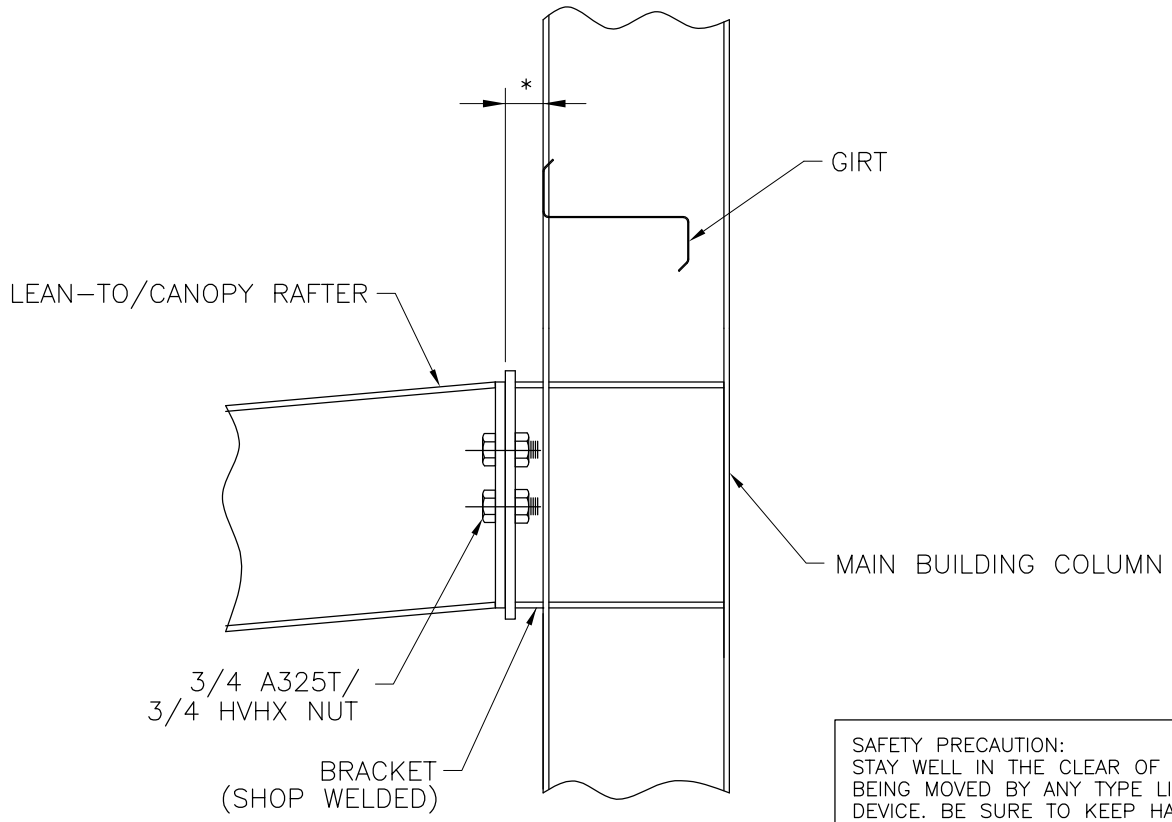
Lean-To/Canopy Connection to Main Bldg. Below Eave
Flush Girts
MF31P/AA



SAFETY PRECAUTION:
STAY WELL IN THE CLEAR OF LOADS BEING MOVED BY ANY TYPE LIFTING DEVICE. BE SURE TO KEEP HANDS AND FEET CLEAR OF MOVING LOADS.

* 1 1/4" FOR LONG SPAN III, ARCHITECTURAL III, & ARCHITECTURAL "V" RIB PANELS
* 3" FOR SHADOW PANELS

LEAN–TO/CANOPY CONNECTION TO MAIN BLDG. BELOW EAVE
FLUSH GIRTS

MF31P
AA

Download the DWG file by clicking here.

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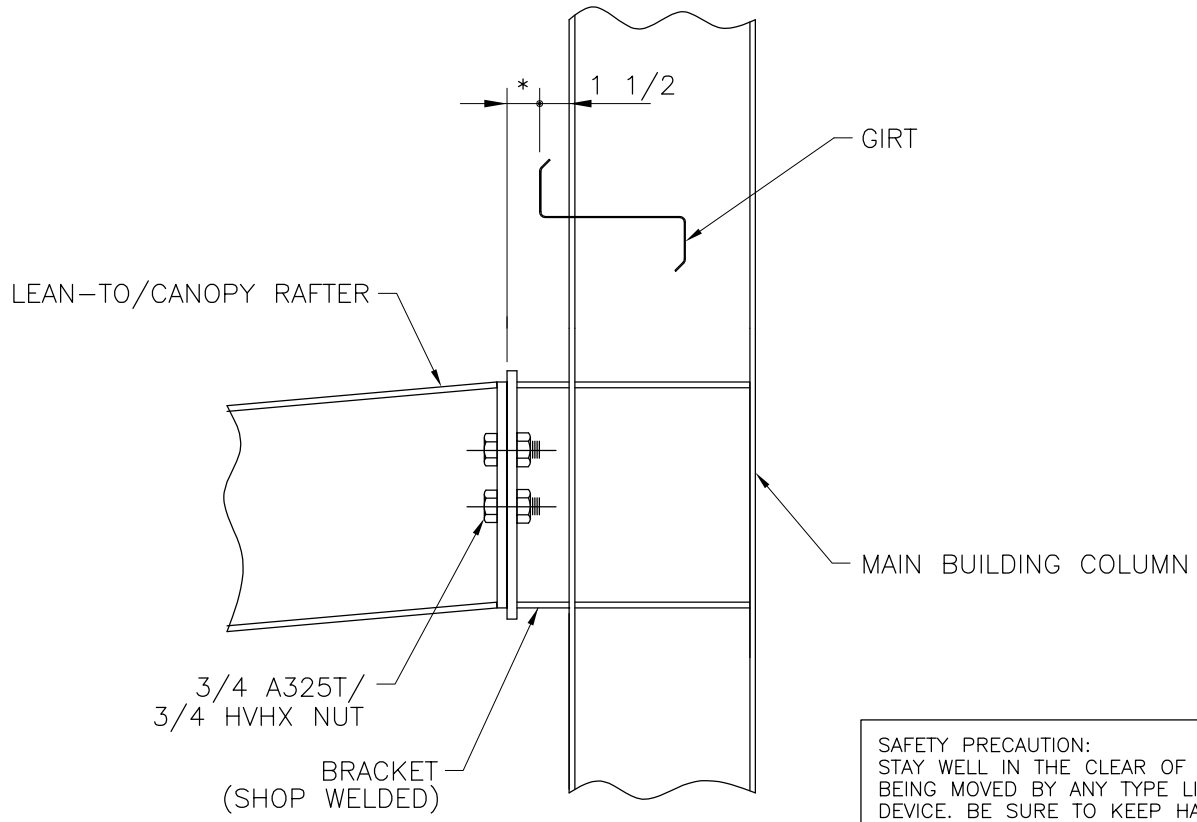
Lean-To/Canopy Connection to Main Bldg. Below Eave
Inset Girts
MF31Q/AA



SAFETY PRECAUTION:
STAY WELL IN THE CLEAR OF LOADS BEING MOVED BY ANY TYPE LIFTING DEVICE. BE SURE TO KEEP HANDS AND FEET CLEAR OF MOVING LOADS.

* 1 1/4" FOR LONG SPAN III, ARCHITECTURAL III, & ARCHITECTURAL "V" RIB PANELS
* 3" FOR SHADOW PANELS

LEAN–TO/CANOPY CONNECTION TO MAIN BLDG. BELOW EAVE
INSET GIRTS

MF31Q
AA

Download the DWG file by clicking here.

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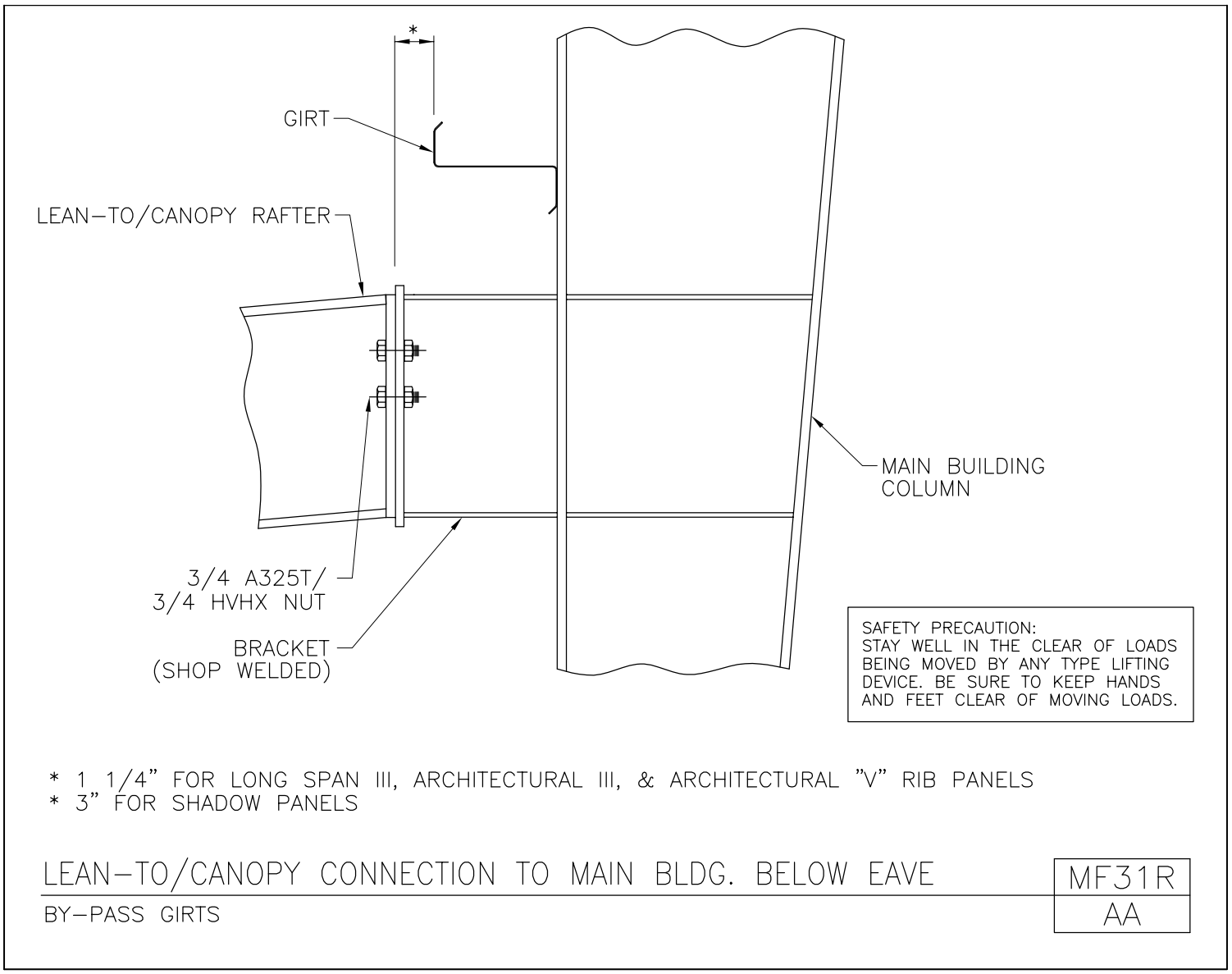
Lean-To/Canopy Connection to Main Bldg. Below Eave
By-Pass Girts
MF31R/AA



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Bolt Installation & Inspection Notes
1/2" Ø, 3/4" Ø, 7/8" Ø, & 1 1/4" Ø Structural Bolts (A325)
MF91/AA

BOLTED JOINTS
BOLTED JOINTS SHALL BE CONNECTED AND INSPECTED IN ACCORDANCE WITH THE "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DECEMBER 31, 2009. APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS COMMITTEE.

SNUG-TIGHT JOINTS
UNLESS NOTED OTHERWISE ON THE METAL BUILDING SUPPLIERS ERECTION DRAWINGS, ALL A325 BOLTS ARE USED IN CONNECTIONS DEFINED AS SNUG-TIGHT JOINTS (ST). FOR INSTALLATION IN SNUG-TIGHT JOINTS, ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT BOLT INSERTION WITHOUT UNDUE DAMAGE TO THE THREADS. BOLTS SHALL BE PLACED IN ALL HOLES WITH NUTS THREADED TO COMPLETE THE ASSEMBLY BEFORE COMPACTING THE JOINT TO THE SNUG-TIGHT POSITION, PROGESSING SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS IN THE JOINT AND ALL BOLTS IN THE JOINT HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. MORE THAN ONE CYCLE THROUGH THE BOLT PATTERN MAY BE REQUIRED.

PRETENSIONED AND SLIP-CRITICAL JOINTS
CONNECTIONS WHICH ARE DEFINED AS PRETENSIONED (PT) OR SLIP-CRITICAL (SC) JOINTS WILL BE AS NOTED ON THE ERECTION DRAWINGS BY THE METAL BUILDING MANUFACTURER OR BY THE ENGINEER OF RECORD. ALL CONNECTIONS WITH A490 BOLTS ARE EITHER PRETENSIONED (PT) OR SLIP-CRITICAL (SC) JOINTS. PRETENSIONED JOINTS ARE TYPICALLY REQUIRED WHEN THE JOINT IS SUBJECT TO SIGNIFICANT LOAD REVERSAL. THE JOINT IS SUBJECT TO FATIGUE LOAD WITH NO LOAD REVERSAL, THE BOLTS ARE SUBJECT TO TENSILE FATIGUE, THE BUILDING SUPPORTS A CRANE OF OVER 5-TON CAPACITY, OR THE CONNECTION IS PART OF THE SEISMIC LOAD RESISTING SYSTEM AND AISC SEISMIC PROVISIONS (AISC 341) ARE APPLICABLE. THE SEISMIC PROVISIONS ARE APPLICABLE WHEN THE SEISMIC RESPONSE MODIFICATION COEFFICIENT, R, IS TAKEN GREATER THAN 3. LOADINGS FROM WIND OR SNOW ARE NOT CONSIDERED SIGNIFICANT LOAD REVERSAL OR FATIGUE LOADINGS. SLIP CRITICAL JOINTS ARE REQUIRED WHEN SLIP IS DETERMINED TO BE DETRIMENTAL TO THE PERFORMANCE OF THE STRUCTURE. INSTALLATION METHODS PERMITTED FOR PRETENSIONED JOINTS INCLUDE TURN-OF-NUT PRETENSIONING, CALIBRATED WRENCH PRETENSIONING, TWIST-OFF-TYPE TENSION CONTROL BOLT PRETENSIONING, AND DIRECT-TENSION-INDICATOR PRETENSIONING. HOT DIP GALVANIZED CONNECTIONS MAY REQUIRE RE-PRETENSIONING AFTER 5 DAYS OF SETTLING.

TURN-OF-NUT PRETENSIONING
FIRST TIGHTEN ALL BOLTS IN ACCORDANCE WITH THE ABOVE SNUG-TIGHT PROCEDURE. THEN ROTATE THE NUT OR HEAD BY THE AMOUNT SPECIFIED IN THE BOLT PRETENSION SCHEDULE, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. THE PART NOT TURNED BY THE WRENCH SHALL BE PREVENTED FROM ROTATING DURING THIS OPERATION. IF THE NUT IS TURNED IN THE LOOSENING POSITION THE BOLT MUST BE REMOVED AND REPLACED. PRETENSION VALUES EQUAL TO OR GREATER THAN THE MINIMUM VALUES LISTED IN THE BOLT PRETENSION SCHEDULE ARE REQUIRED.

ASTM MINIMUM BOLT PRETENSION SCHEDULE

NOMINAL BOLT DIAMETER, d_b	SPECIFIED MINIMUM BOLT PRETENSION, T_m, KIPS		NUT OR HEAD ROTATION FROM SNUG-TIGHT CONDITION	
	ASTM A325 AND F1852	ASTM A490 AND F2280	$L_b \leq 4d_b$	$4d_b < L_b \leq 8d_b$
1/2"	13 KIPS	16 KIPS	1/3 TURN	1/2 TURN
3/4"	29 KIPS	37 KIPS		
7/8"	41 KIPS	51 KIPS		
1"	54 KIPS	67 KIPS		
1 1/4"	75 KIPS	107 KIPS		

(L_b = LENGTH OF BOLT)

INSPECTION REQUIREMENTS PRIOR TO START OF WORK:
VERIFY ALL FASTENER COMPONENTS CONFORM TO REQUIREMENTS.

INSPECTION REQUIREMENTS FOR SNUG-TIGHT JOINTS:
VERIFY THAT THE PROPER FASTENER COMPONENTS WERE USED AND THAT THE CONNECTED ELEMENTS WERE FABRICATED PROPERLY. AFTER ASSEMBLY, IT SHALL BE VISUALLY ENSURED THAT THE PLIES ARE SOLIDLY SEATED AGAINST EACH OTHER, BUT NOT NECESSARILY IN CONTINUOUS CONTACT, THAT WASHERS, IF REQUIRED, HAVE BEEN USED, AND THAT ALL BOLTS IN THE JOINT HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE TURNING OF THE NUTS WITHOUT THE USE OF A WRENCH. NO FURTHER EVIDENCE OF CONFORMITY IS REQUIRED.

INSPECTION REQUIREMENTS FOR TURN-OF-NUT PRETENSIONING:
FOR TURN-OF-NUT PRETENSIONING, IN ADDITION TO THE INSPECTION REQUIREMENTS FOR SNUG-TIGHT JOINTS, THE INSPECTOR SHALL OBSERVE THE PRE-INSTALLATION VERIFICATION TESTING AND MONITOR THE WORK IN PROGRESS TO ENSURE THAT THE BOLTING CREW PROPERLY ROTATES THE TURNED ELEMENT BY THE AMOUNT SPECIFIED IN THE SCHEDULE. ALTERNATIVELY, WHEN THE FASTENERS ARE MATCH-MARKED AFTER INITIAL FIT-UP (SNUG-TIGHT CONDITION), VISUAL INSPECTION IS PERMITTED. THE SIDE OF NUTS AND BOLTS THAT HAVE BEEN IMPACTED SUFFICIENTLY TO INDUCE THE MINIMUM PRETENSION LOADS WILL APPEAR SLIGHTLY PEENED. NO FURTHER EVIDENCE OF CONFORMITY IS REQUIRED.

BOLT INSTALLATION & INSPECTION NOTES — MF91 / AA
1/2"Ø, 3/4"Ø, 7/8"Ø, 1"Ø & 1 1/4"Ø STRUCTURAL BOLTS (A325)

Download the DWG file by clicking here.

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