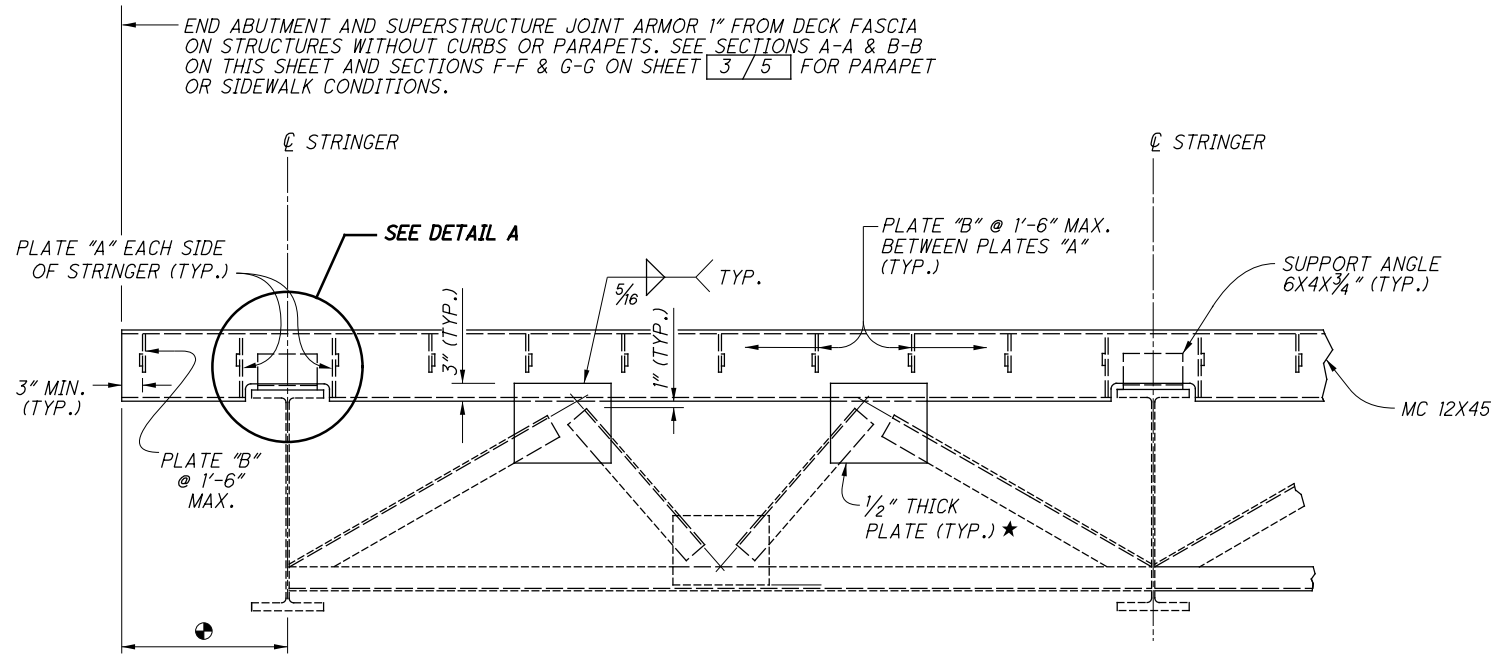


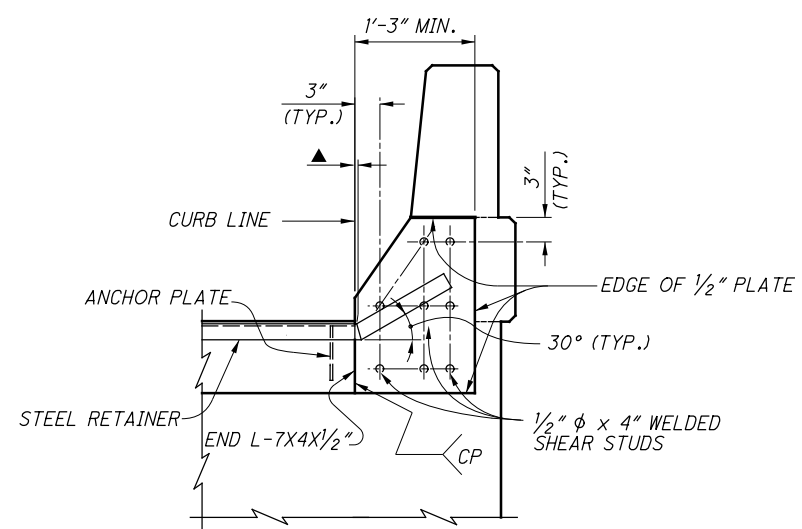
PART PLAN AT ABUTMENT
 FOR SQUARE OR LOW SKEWED (15° OR LESS)
 BRIDGES WITH DEFLECTOR PARAPET RAILING
 (BR-1 RAILING IS SHOWN, SBR-1-13 SHALL BE SIMILAR)



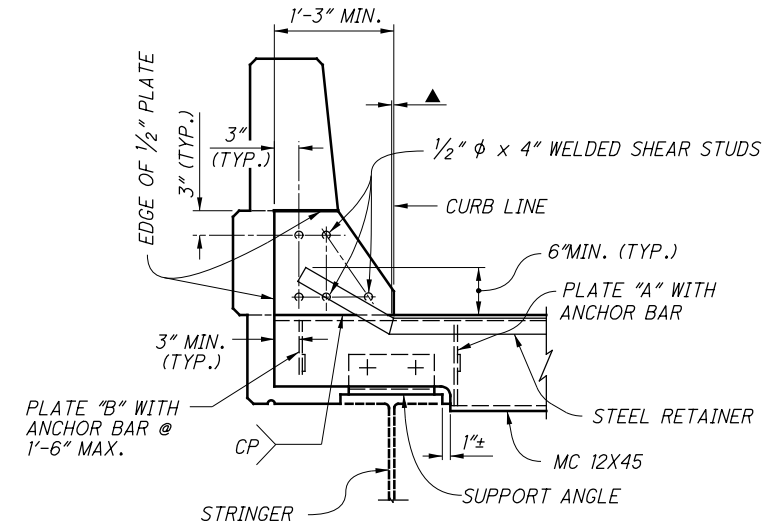
PART TRANSVERSE SECTION

SEE STD. BRIDGE DWG. GSD-1-96 FOR DETAILS OF END CROSSFRAMES AND GUSSET PLATES.

- ★ - INCLUDED WITH EXPANSION JOINT FOR COATING & PAYMENT.
- ⊕ - FOR CANTILEVERS LESS THAN 2'-6", PLATE "A" MAY BE OMITTED AND THE BOTTOM LEG OF THE CHANNEL MAY BE TRIMMED TO THE END AS SHOWN IN SECTION B-B.

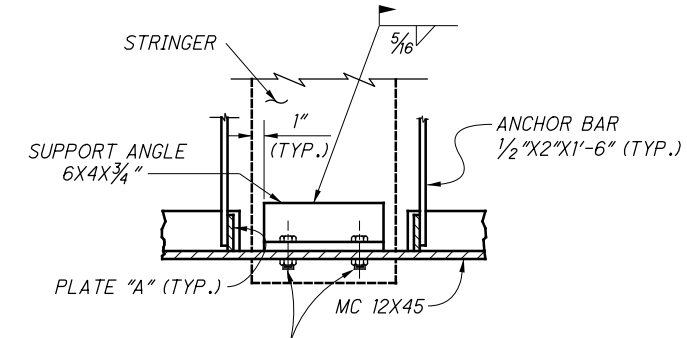


SECTION A-A



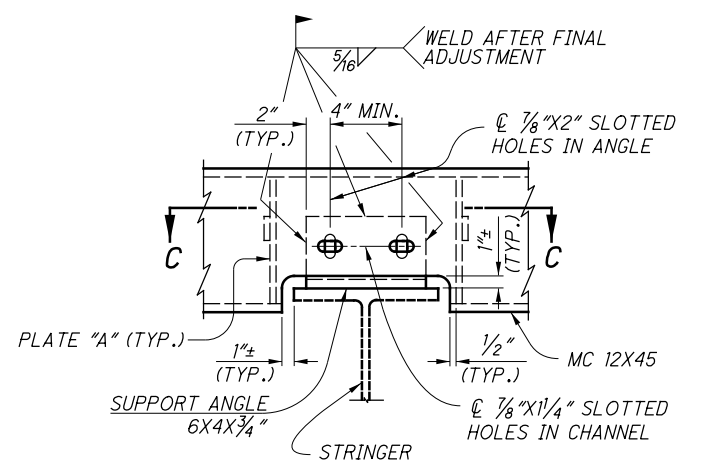
SECTION B-B

▲ - 0" MIN. TO 1/2" MAX. AT BREAKPOINT IN RETAINER FOR SQUARE BRIDGES. ON SKEWED BRIDGES THIS DIMENSION WILL ONLY APPLY TO THE SIDE OF JOINT ASSEMBLY WHICH IS NEAREST TO THE CURB LINE (SEE SHEET 2/5).



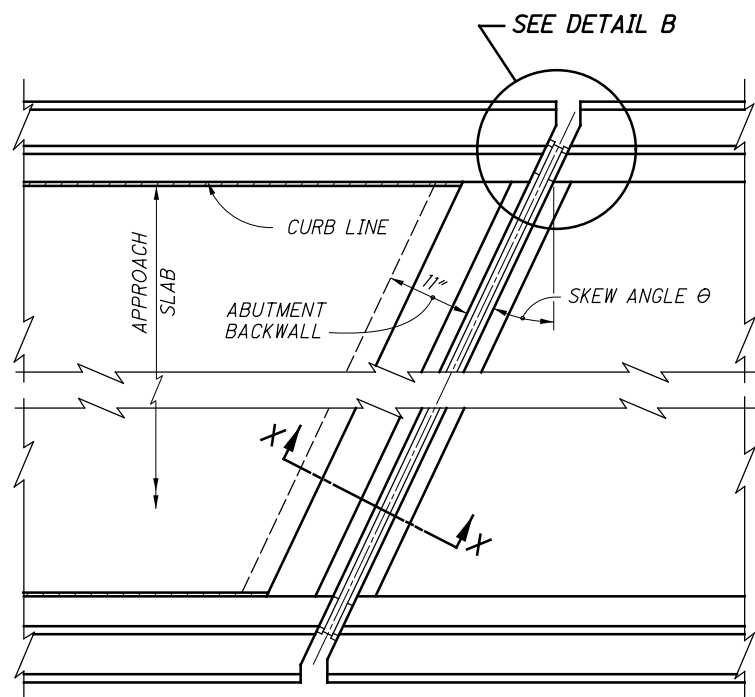
SECTION C-C

3/4" φ ASTM A325 TYPE 1 HEX HEAD BOLTS WITH HEX NUT



DETAIL A

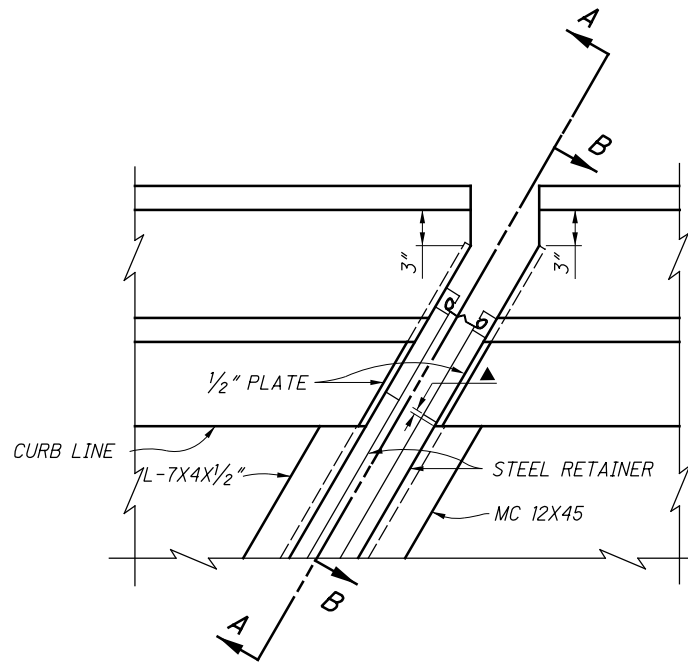
SEE SHEET 2/5 FOR SECTION X-X INCLUDING PLATE "A" DETAILS
 SEE SHEET 2/5 FOR SECTION Y-Y INCLUDING PLATE "B" DETAILS



PLAN AT ABUTMENT

**FOR SKEWED BRIDGES (OVER 15°)
WITH DEFLECTOR PARAPET RAILING**

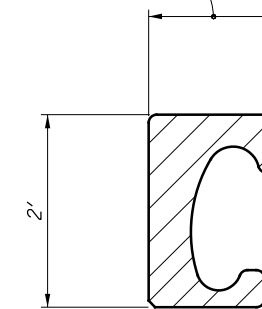
(BR-1 RAILING IS SHOWN, SBR-1-13 SHALL BE SIMILAR)



DETAIL B

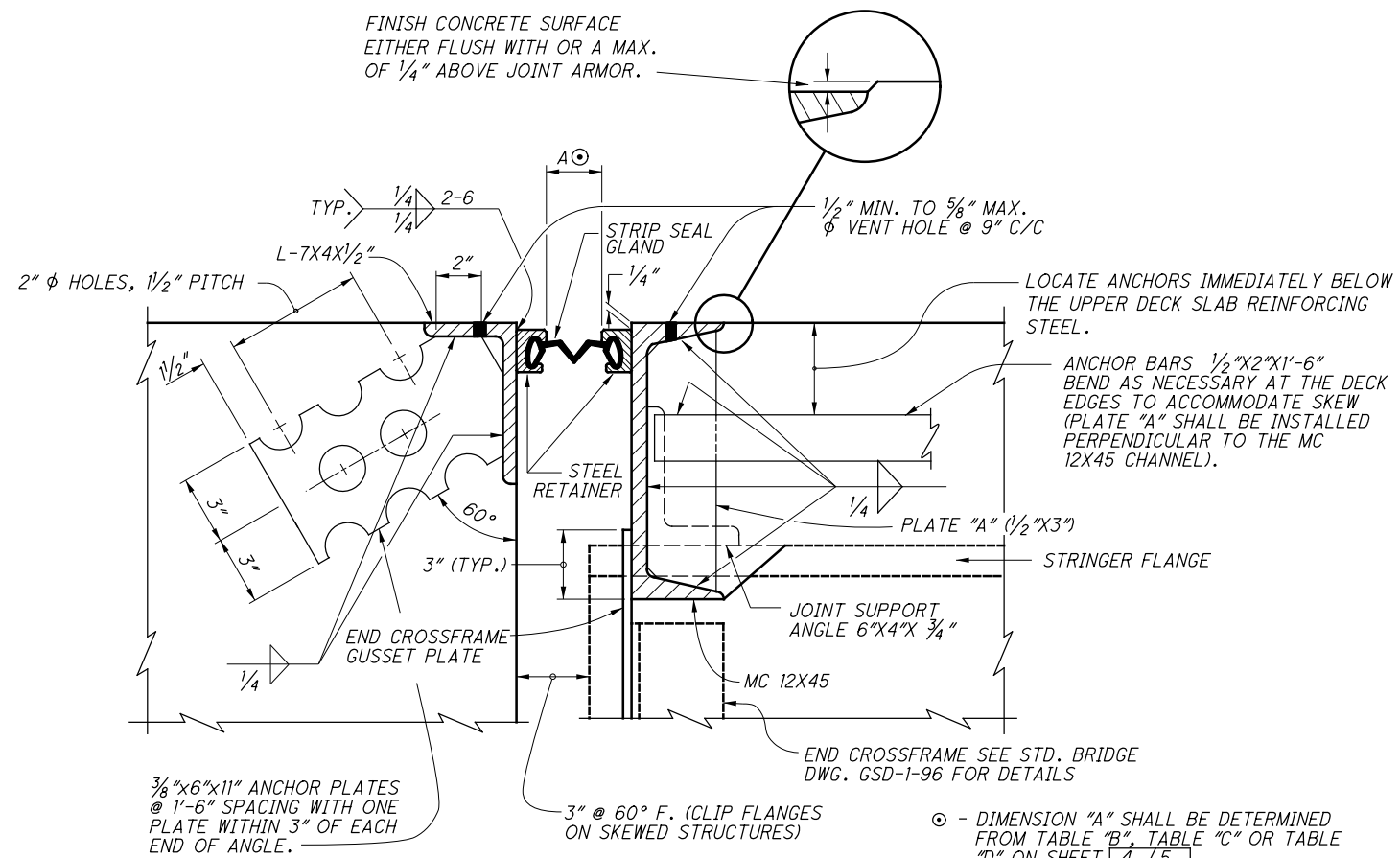
SEE SHEET [1/5] FOR DEFINITION OF "▲", SECTION A-A AND SECTION B-B. SECTION A-A AND SECTION B-B ARE SIMILAR FOR SQUARE AND SKEWED BRIDGES EXCEPT FOR THE CONCRETE FORMING AT THE EDGE OF THE PARAPET.

VARIES 1/4" TO 1/2"
BY MANUFACTURER



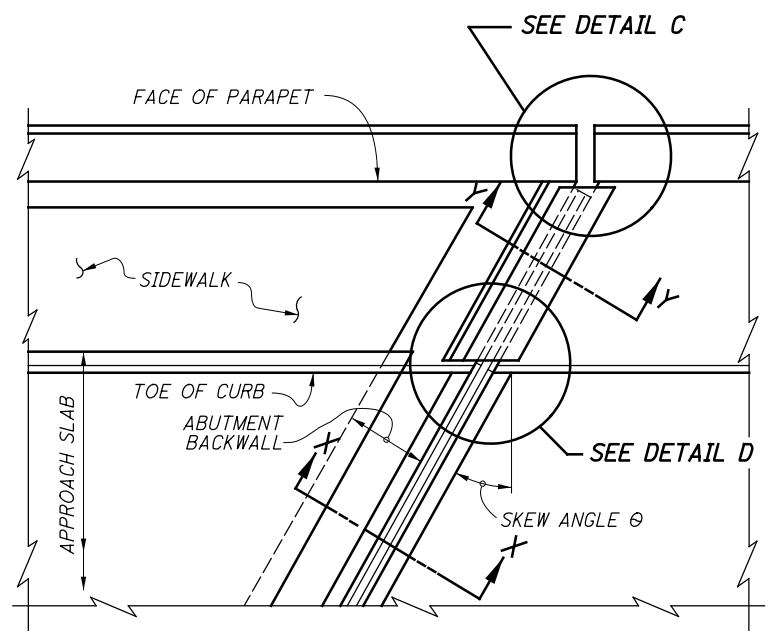
RETAINER DETAIL

FINISH CONCRETE SURFACE
EITHER FLUSH WITH OR A MAX.
OF 1/4" ABOVE JOINT ARMOR.

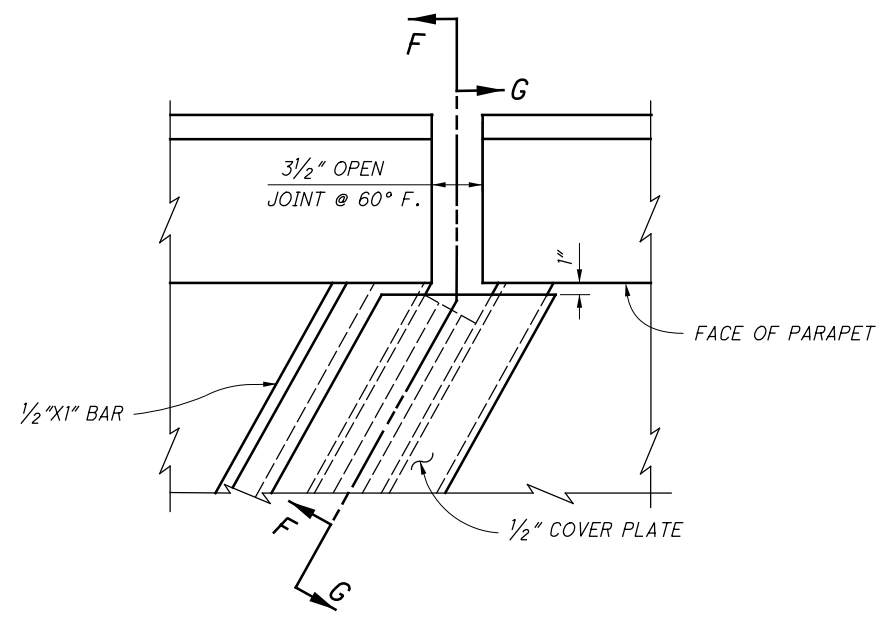


SECTION X-X

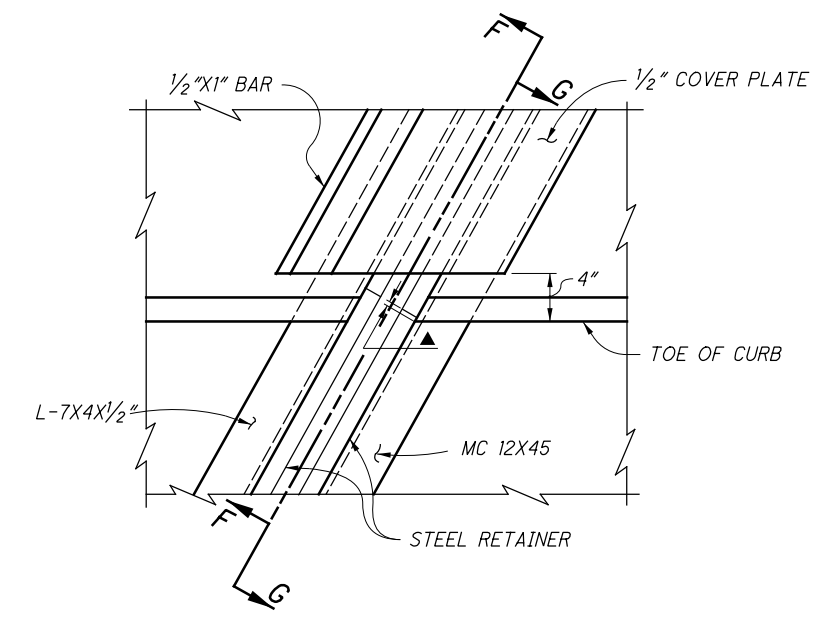
DESIGNED BY <i>GF/J/AJM</i>		REVISIONS	CHECKED JS	REVIEWED WTL/LMW	STATE OF OHIO DEPARTMENT OF TRANSPORTATION 01-20-94 <i>Bob P. [Signature]</i> ENGINEER OF BRIDGES	OFFICE OF STRUCTURAL ENGINEERING
DRAWN BY GF/J/AJM		01-14-97 04-20-01 07-19-02 01-19-18	EXJ-4-87			
STANDARD STRIP SEAL EXPANSION JOINTS STEEL STRINGER STRUCTURES						
2		5				



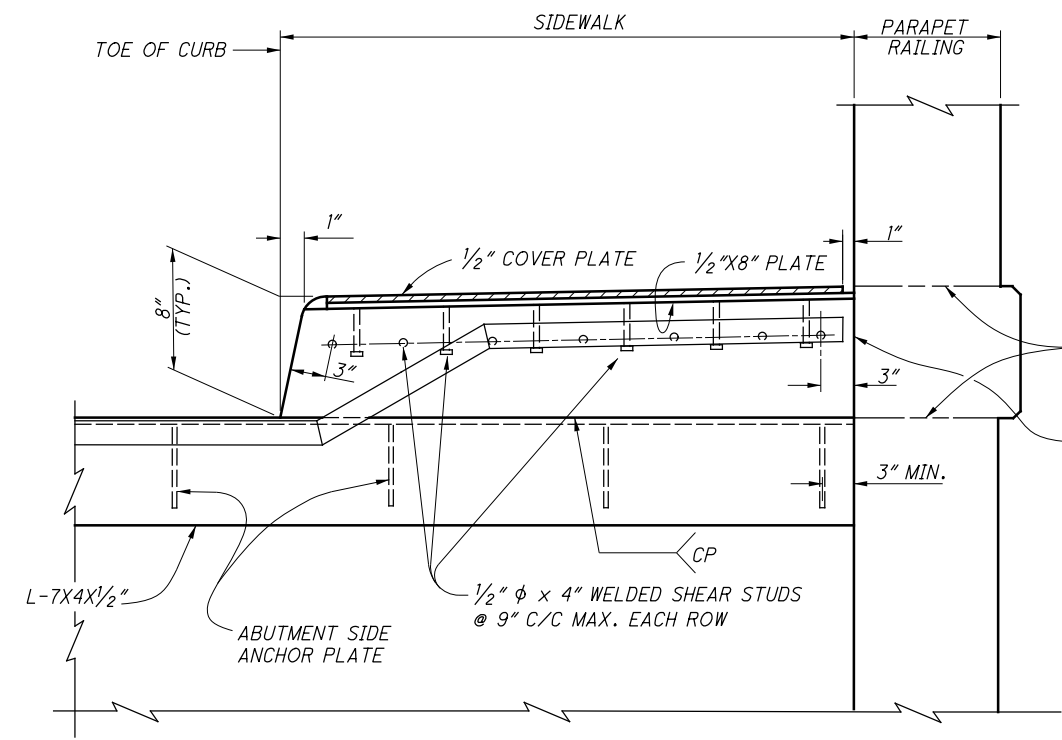
PART PLAN AT ABUTMENT
FOR BRIDGES WITH SIDEWALK
PARAPET RAILING



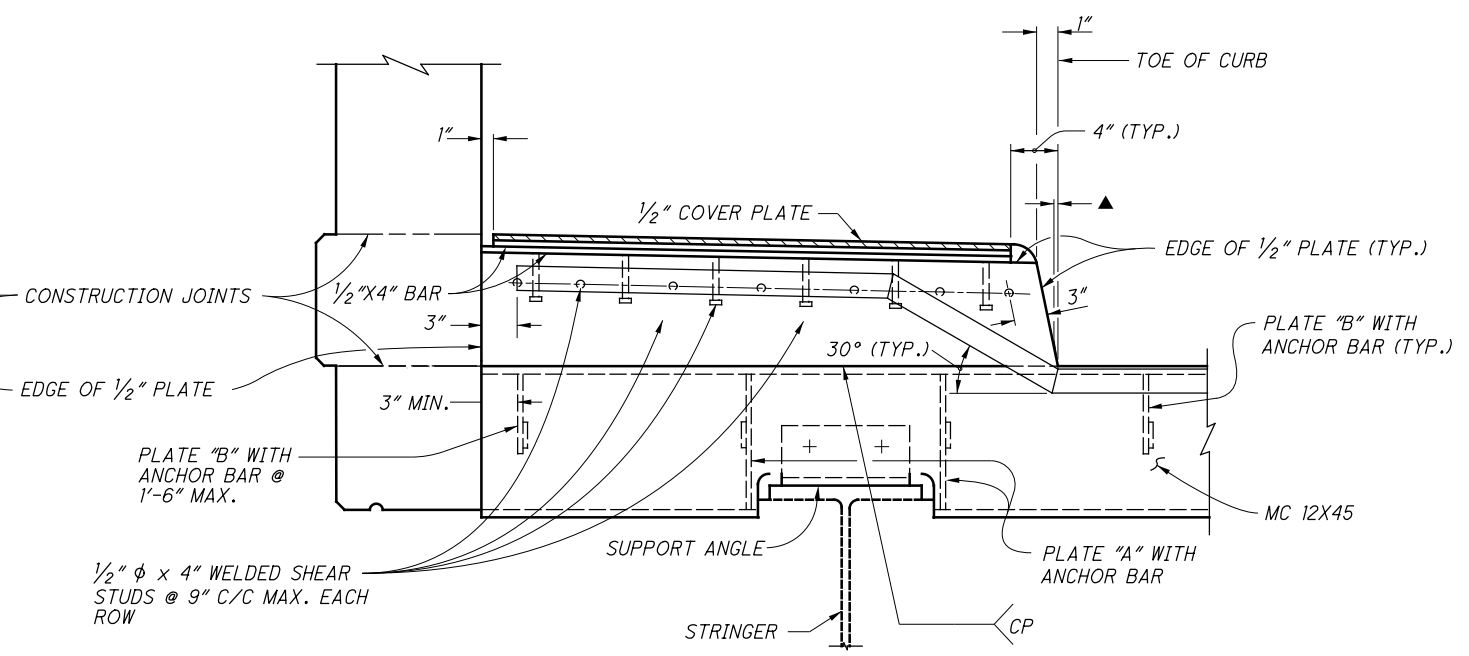
DETAIL C



DETAIL D



SECTION F-F



SECTION G-G

▲ - 0" MIN. TO 1/2" MAX. AT BREAKPOINT IN RETAINER FOR SQUARE BRIDGES. ON SKEWED BRIDGES THIS DIMENSION WILL ONLY APPLY TO THE SIDE OF JOINT ASSEMBLY WHICH IS NEAREST TO THE CURB LINE (SEE DETAIL "D" ABOVE).

FOR ADDITIONAL DETAILS, SEE DETAIL A ON SHEET 1 / 5.
FOR SECTION X-X SEE SHEET 2 / 5.
FOR SECTION Y-Y SEE SHEET 4 / 5.

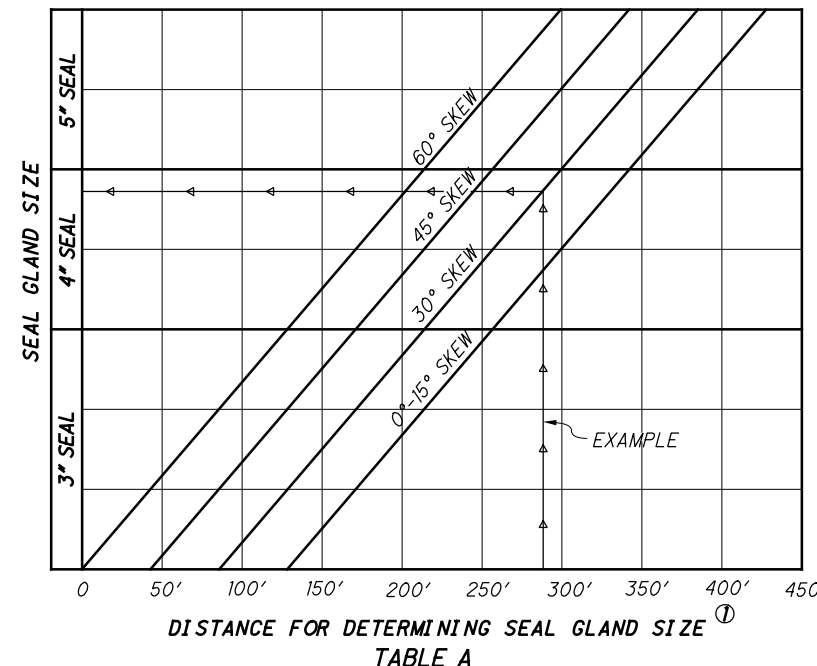


TABLE A
 DISTANCE FOR DETERMINING SEAL GLAND SIZE
 TABLE A

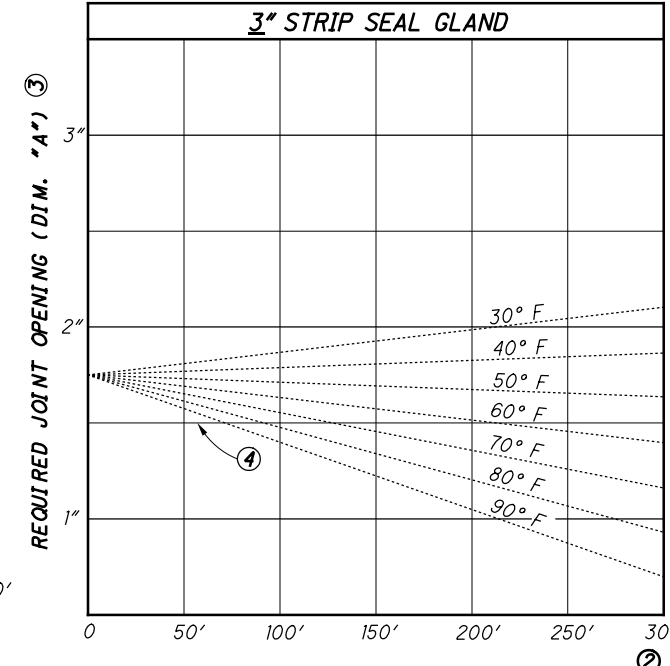


TABLE B
 DISTANCE FOR DETERMINING JOINT OPENING
 TABLE B

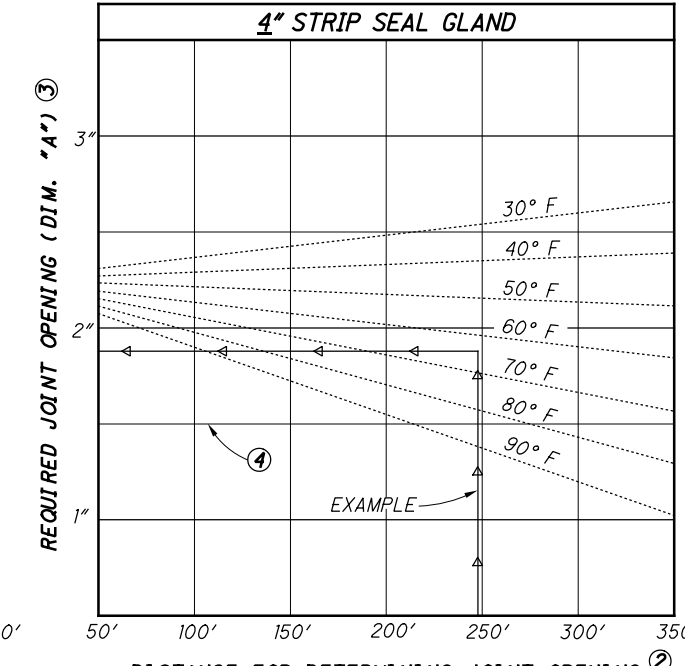


TABLE C
 DISTANCE FOR DETERMINING JOINT OPENING
 TABLE C

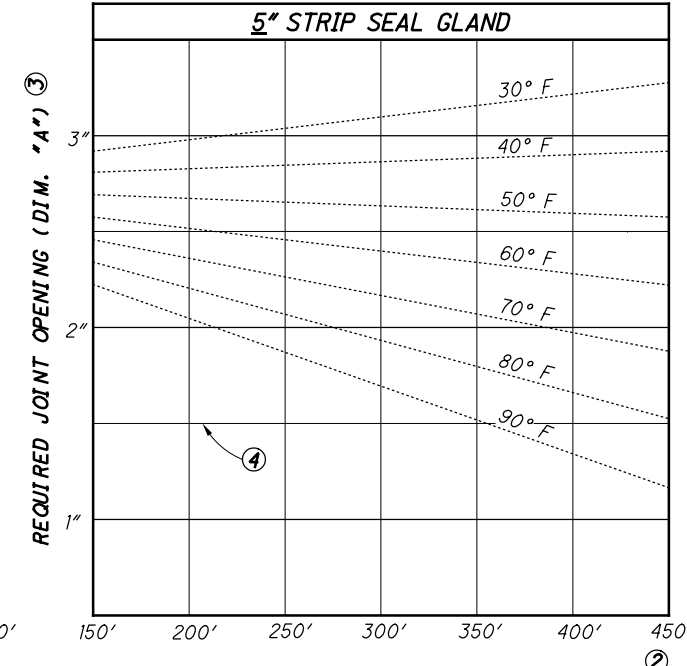


TABLE D
 DISTANCE FOR DETERMINING JOINT OPENING
 TABLE D

LEGEND

- ① - THIS IS THE ACTUAL DISTANCE FROM THE CENTERLINE OF JOINT TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE MEASURED ALONG THE CENTERLINE OF ROADWAY. THIS DIMENSION SHALL BE A MAXIMUM OF 299' FOR 60° SKEWS, 342' FOR 45° SKEWS, 385' FOR 30° SKEWS AND 427' FOR 0° THRU 15° SKEWS. THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE IS THAT POINT WHICH HAS ZERO HORIZONTAL MOVEMENT DURING TEMPERATURE CHANGES.
- ② - THIS DISTANCE FOR EXPANSION JOINTS HAVING SKEW ANGLES OF 15° OR LESS IS THE ACTUAL DISTANCE TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE ALONG THE CENTERLINE OF ROADWAY. THIS DISTANCE FOR EXPANSION JOINTS HAVING SKEW ANGLES OVER 15° BUT NOT GREATER THAN 60° IS ARRIVED AT BY MULTIPLYING THE ABOVE DEFINED DISTANCE ALONG THE CENTERLINE OF ROADWAY BY THE COSINE OF THE EXPANSION JOINT SKEW ANGLE.
- ③ - THIS IS THE JOINT OPENING (DIMENSION "A") REQUIRED AT THE TIME OF ABUTMENT BACKWALL CONCRETE PLACEMENT, BASED ON THE DAY'S ANTICIPATED PEAK AMBIENT TEMPERATURE.
- ④ - MINIMUM JOINT OPENING (DIMENSION "A") AT TIME OF SEAL GLAND INSTALLATION SHALL NOT BE LESS THAN 1/2". IF THE JOINT OPENING IS LESS, INSTALLATION SHALL BE POSTPONED UNTIL THE TEMPERATURE DROPS A SUFFICIENT AMOUNT TO ALLOW THE MINIMUM 1/2" OPENING.

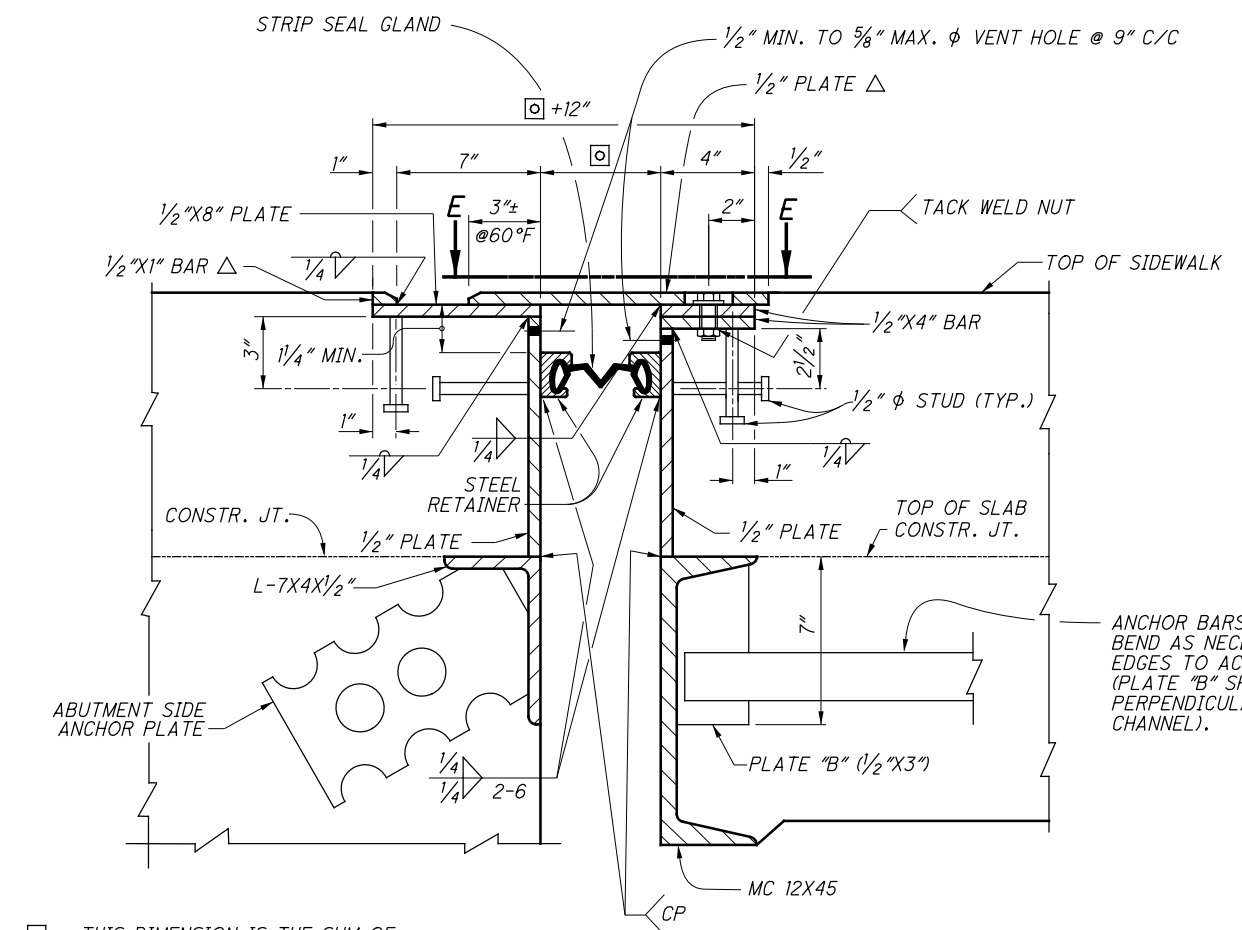
EXAMPLE

GIVEN - THE DISTANCE FROM THE CENTERLINE OF THE JOINT TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE ALONG THE CENTERLINE OF THE ROADWAY IS 287.5'. THE SKEW ANGLE OF THE EXPANSION JOINT IS 30° AND THE ANTICIPATED AMBIENT TEMPERATURE AT TIME OF JOINT INSTALLATION IS 65° F.

FIND - REQUIRED STRIP SEAL GLAND SIZE AND THE JOINT OPENING (DIMENSION "A") AT THE TIME OF JOINT ARMOR INSTALLATION.

SOLUTION -
 (A) ENTER TABLE "A" AT ① WITH 287.5' AND FIND THAT THE REQUIRED STRIP SEAL GLAND SIZE IS 4 INCHES.
 (B) ENTER TABLE "C" AT ② WITH 287.5' X COSINE OF 30° = 248.98' AND FIND REQUIRED JOINT OPENING AT 65°F IS 1.86".

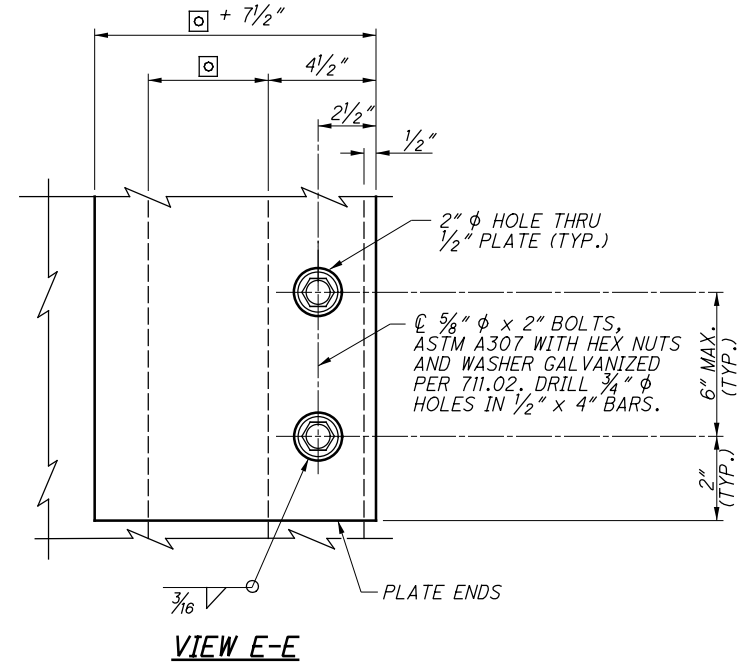
NOTE: STEP (B) REQUIRED ONLY AT TIME OF CONSTRUCTION.



⊠ - THIS DIMENSION IS THE SUM OF (2 X STEEL RETAINER WIDTH + DIM. "A").

Δ - PROVIDE A 1/2" HORIZONTAL X 1/4" VERTICAL BEVEL AT THE EXPOSED EDGE OF THE 1/2" COVER PLATE AND 1/2" X 1" BAR

SECTION Y-Y



REVISIONS	REVIEWED	DATE
01-14-97	WTL/LMW	
04-20-01	JS	
07-18-02	AJM	
01-19-18	GF/AJM	

STRIP SEAL EXPANSION JOINTS
 STEEL STRINGER STRUCTURES

GENERAL NOTES:

STRIP SEAL: FURNISH EXTRUDED POLYCHLOROPRENE MATERIAL CONFORMING TO ASTM D2628. DUE TO THE CONFIGURATION OF THE SEAL, THE RECOVERY TEST IS NOT APPLICABLE. THE PHYSICAL PROPERTIES OF THE STRIP SEAL SHALL CONFORM TO TABLE "E".

THE MANUFACTURER OR AN ACCREDITED LABORATORY SHALL TEST EACH LOT AS SPECIFIED AND SUBMIT TWO COPIES OF CERTIFIED TEST DATA SHOWING COMPLIANCE TO THE ODOT OFFICE OF MATERIALS MANAGEMENT. THE SEAL AND RETAINER ARE AN INTEGRAL SYSTEM DESIGNED AND SUPPLIED BY THE SAME MANUFACTURER. SEE "CONSTRUCTION PROCEDURE" FOR INSTALLATION.

ARMOR STEEL: ALL CHANNEL SHAPES, ANGLE SHAPES AND ALL CROSS FRAME CONNECTION GUSSET PLATES, SHALL BE ASTM 709, GRADE 50 OR 50W. ALL OTHER STEEL PARTS INCLUDING RETAINERS, SHALL BE ASTM A709, GRADE 36, 50 OR 50W.

JOINTS IN ARMOR STEEL: SHOP OR FIELD JOINTS IN THE ARMOR SHALL BE COMPLETE PENETRATION WELDS GROUND FLUSH WHERE IN CONTACT WITH THE RETAINER.

ARMOR COATING: COAT ALL STEEL PARTS OF THE JOINT ASSEMBLY ACCORDING TO 516.

DO NOT FIELD PAINT METALIZED SURFACES EXCEPT AS NOTED. CLEAN AND PAINT THE AREAS ON THE 1/2" GUSSET PLATES DAMAGED DURING CROSSFRAME INSTALLATION IN CONFORMANCE WITH THE STRUCTURE'S PAINT SYSTEM. PROTECT THE METALIZED COATING WHEN BLASTING OR COATING ADJACENT STEEL MEMBERS. OVERSPRAY NEED NOT BE REMOVED.

TEMPORARY SUPPORTS: THE FABRICATOR SHALL DESIGN AND INSTALL TEMPORARY SUPPORTS TO RESIST SHIPPING, ERECTION AND CONSTRUCTION FORCES WITHOUT DAMAGE TO THE STEEL ARMOR OR COATING. THESE SUPPORTS SHALL BE ADJUSTABLE IN THE FIELD TO ACCOUNT FOR VARIABLE TEMPERATURE SETTINGS. INSTALL THE SUPPORTS AFTER THE FABRICATION AND COATING IS COMPLETE.

CONSTRUCTION PROCEDURE:

ARMOR INSTALLATION:

1. PLACE JOINT ASSEMBLY SO THE CHANNEL AND ANGLE REMAIN PARALLEL TO EACH OTHER AND PERPENDICULAR TO THE ROADWAY GRADIENT.
2. PLACE ABUTMENT BACKWALL CONCRETE AFTER THE SUPER-STRUCTURE CONCRETE IS PLACED IN THE SPAN ADJACENT TO THE ABUTMENT.
3. SET ABUTMENT EXPANSION JOINT WIDTH TO DIMENSION "A" NO MORE THAN FOUR HOURS PRIOR TO THE DAY'S PEAK AMBIENT TEMPERATURE. SEE PROJECT PLANS FOR DIMENSION "A".
4. PLACE THE BACKWALL CONCRETE DURING STABLE OR RISING AMBIENT TEMPERATURES. CONCLUDE PLACEMENT AT OR IMMEDIATELY BEFORE THE DAY'S PEAK AMBIENT TEMPERATURE.
5. HAND PLACE AND VIBRATE CONCRETE UNDER JOINT ARMOR TO ACHIEVE COMPLETE CONSOLIDATION.
6. LOOSEN ANY TEMPORARY JOINT ARMOR SUPPORTS AFTER INITIAL SET OF THE CONCRETE, PREFERABLY NOT LATER THAN TWO HOURS AFTER CONCLUSION OF THE CONCRETE PLACEMENT.

SEAL INSTALLATION:

1. EXAMINE THE RETAINER FOR SOILAGE OR DEFECTS THAT CAN DAMAGE THE SEAL PRIOR TO SEAL INSTALLATION. REPAIR DEFECTS.
2. NOT MORE THAN 24 HOURS PRIOR TO SEAL INSTALLATION, BLAST THE RETAINER INTERIOR PER SSPC SP6 "COMMERCIAL BLAST CLEANING", WITHOUT DAMAGING ADJACENT COATINGS. REMOVE ALL BLASTING MEDIA FROM THE RETAINER.
3. CLEAN ALL SURFACES OF THE SEAL WITH METHYL ETHYL KETONE (MEK), TOLUENE (T) OR OTHER MANUFACTURER SPECIFIED SOLVENT USING CLEAN DISPOSABLE CLOTHS. MAINTAIN THE SURFACE CLEANLINESS UNTIL INSTALLATION.
4. IMMEDIATELY BEFORE APPLYING THE LUBRICANT-ADHESIVE, BONDING SURFACES MUST BE CLEAN, DRY AND WARMER THAN 45°F. BONDING SURFACES MUST BE MAINTAINED IN THIS CONDITION UNTIL THE SEAL IS INSTALLED. LIBERALLY APPLY THE LUBRICANT-ADHESIVE TO BOTH THE RETAINER AND THE SEAL USING THE MANUFACTURER'S SPECIFIED METHODS FOR COMPLETE AND UNIFORM COVERAGE.
5. INSTALL THE SEAL WITH EQUIPMENT AND PROCEDURE SPECIFIED BY THE MANUFACTURER. ELONGATION OF THE SEAL OR STRUCTURAL DAMAGE TO THE SEAL CAUSED BY INSTALLATION METHODS WILL BE CAUSE FOR REJECTION.
6. REMOVE EXCESS LUBRICANT-ADHESIVE AFTER INSTALLATION.

DESIGNER NOTES:

PROJECT PLANS SHALL LIST DIMENSION "A" FOR TEMPERATURES BETWEEN 30°F AND 90°F IN 10° INCREMENTS.

JOINT SEAL GLANDS AT FIXED BEARINGS SHALL BE THE SAME SIZE AS AT THE EXPANSION BEARINGS WITH A DIMENSION "A" OF 2" AT ANY AMBIENT TEMPERATURE.

LIMITATION: SKEW ANGLES SHALL NOT BE GREATER THAN 60°.

THE DESIGNER SHALL SUPPLY DETAILS FOR STRUCTURES WITH ROADWAY GRADES GREATER THAN 2%.

TABLE E
(PHYSICAL PROPERTIES OF SEAL ELEMENT)

PROPERTY	REQUIREMENT	ASTM METHOD
TENSILE STRENGTH, MIN. PSI	2000	D412
ELONGATION @ BREAK, MIN. (PERCENT)	250	D412
HARDNESS, TYPE A DUROMETER, POINTS	60 ± 5	MODIFIED D2240
OVEN AGING, 70 HR @ 212°F TENSILE STRENGTH, LOSS, MAX. ELONGATION, LOSS, MAX. HARDNESS, TYPE A DUROMETER, POINTS CHANGE	20 PERCENT 20 PERCENT 0 TO +10	D573 MODIFIED D2240
OIL SWELL, ASTM OIL 3 70 HR @ 212°F, WEIGHT CHANGE MAX	45 PERCENT	D471
OZONE RESISTANCE 20 PERCENT STRAIN, 300 PPHM IN AIR, 70 HR @ 104°F (WIPE WITH TOLUENE TO REMOVE SURFACE CONTAMINATION)	NO CRACKS	D1149
LOW TEMPERATURE STIFFENING 7 DAYS @ 14°F HARDNESS, TYPE A DUROMETER, POINTS CHANGE COMPRESSION SET, 70 HR @ 212°F MAX.	0 TO +15 40 PERCENT	D2240 MODIFIED D2240 D395 METHOD B

LUBRICANT-ADHESIVE: FURNISH A ONE PART MOISTURE CURING POLYURETHANE COMPOUND MEETING THE REQUIREMENTS OF ASTM D4070 AND AS SPECIFIED BY THE SEAL MANUFACTURER. SEE "CONSTRUCTION PROCEDURE" FOR APPLICATION.

JOINTS IN STRIP SEALS: FURNISH SEALS IN ONE CONTINUOUS PIECE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

SEAL RETAINERS: FURNISH SOLID SHAPE STEEL RETAINERS, AS DIMENSIONED ON SHEET 2 OF 5 "RETAINER DETAIL", THAT ARE EXTRUDED, HOT ROLLED OR MACHINED. RETAINERS MANUFACTURED FROM BENT PLATE OR BUILT UP PIECES ARE NOT ACCEPTABLE. THE MANUFACTURER SHALL SPECIFY THE INTERNAL DIMENSIONS OF THE RETAINER TO ACHIEVE A POSITIVE SEAL AND ANCHORAGE.

AT JOINT UPTURNS, ESPECIALLY ON SKEWED BRIDGE DECKS, THE USE OF SPLIT RETAINERS MAY BE NECESSARY TO ENSURE PROPER SEAL GLAND INSTALLATION. WHERE THE SPLIT RETAINERS ARE REQUIRED, THE MANUFACTURER SHALL OBTAIN THE ENGINEER'S APPROVAL FOR THE DESIGN.

BEFORE THE GLAND IS INSTALLED, CORRECT ANY DEFECTS IN THE STEEL RETAINER OR THE ACTUAL EXPANSION JOINT THAT COULD CAUSE DAMAGE TO THE GLAND.

JOINTS IN RETAINERS: WELDS SHALL BE WATER TIGHT, PARTIAL PENETRATION WELDS AROUND THE OUTER PERIPHERY OF THE ABUTTING SURFACES. GRIND FLUSH ALL WELDS IN CONTACT WITH

THE SEAL AND JOINT ARMOR. DO NOT USE SHORT PIECES OF RETAINERS LESS THAN 6'-0" LONG, UNLESS REQUIRED AT CURBS OR SIDEWALKS. DO NOT PROVIDE ADDITIONAL SPLICES IN RETAINERS AT CURB OR SIDEWALK SECTIONS OTHER THAN THOSE DETAILED IN THE STANDARD BRIDGE DRAWINGS.

DESIGN AGENCY
OFFICE OF
STRUCTURAL ENGINEERING

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
01-20-94
DATE
E.D. Shubert
ENGINEER OF BRIDGES

REVISIONS
01-14-97
04-20-01
07-19-02
01-19-18

DESIGNED
AJM
DRAWN
GF/J/AJM

CHECKED
JS

REVIEWED
WTL/LMW

EXJ-4-87

STANDARD
STRIP SEAL EXPANSION JOINTS
STEEL STRINGER STRUCTURES