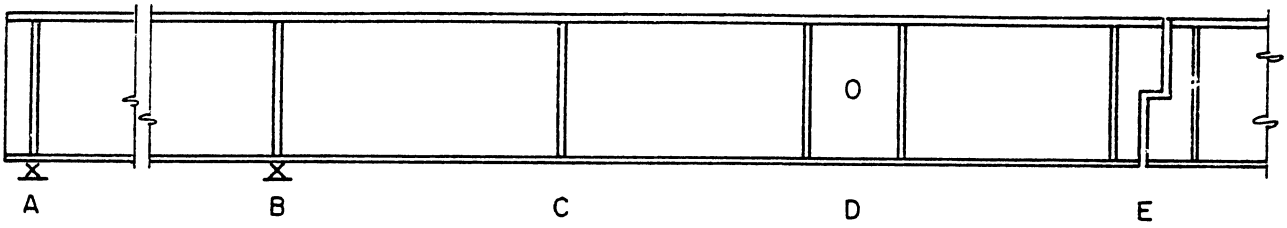
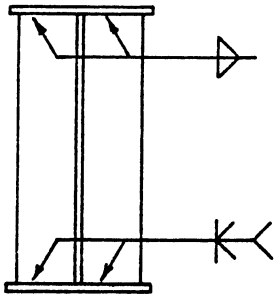
TRANSVERSE WEB STIFFENERS ON WELDED PLATE GIRDERS

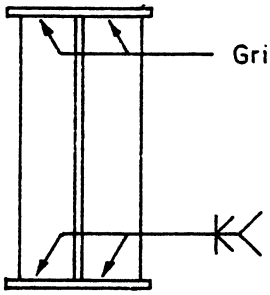


Case A : Girder supported on a bearing , free end.



Note A : If crossframe is not connected to the bearing stiffeners add "Alternative : grind to bear."

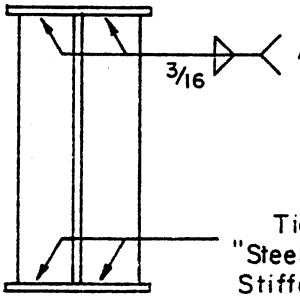
Case B : Girder supported on a bearing , continuous .



Case C : Intermediate or crossframe , one or both sides.

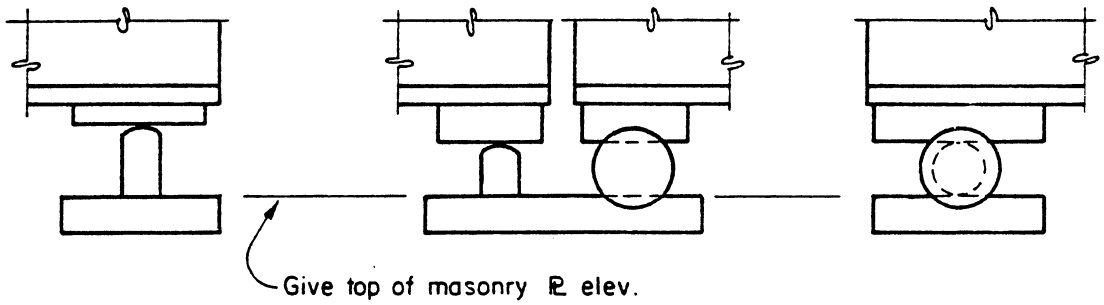
Case D : Girder supported on a pin , continuous .

Case E : Girder at a hinge , cantilever or suspended.

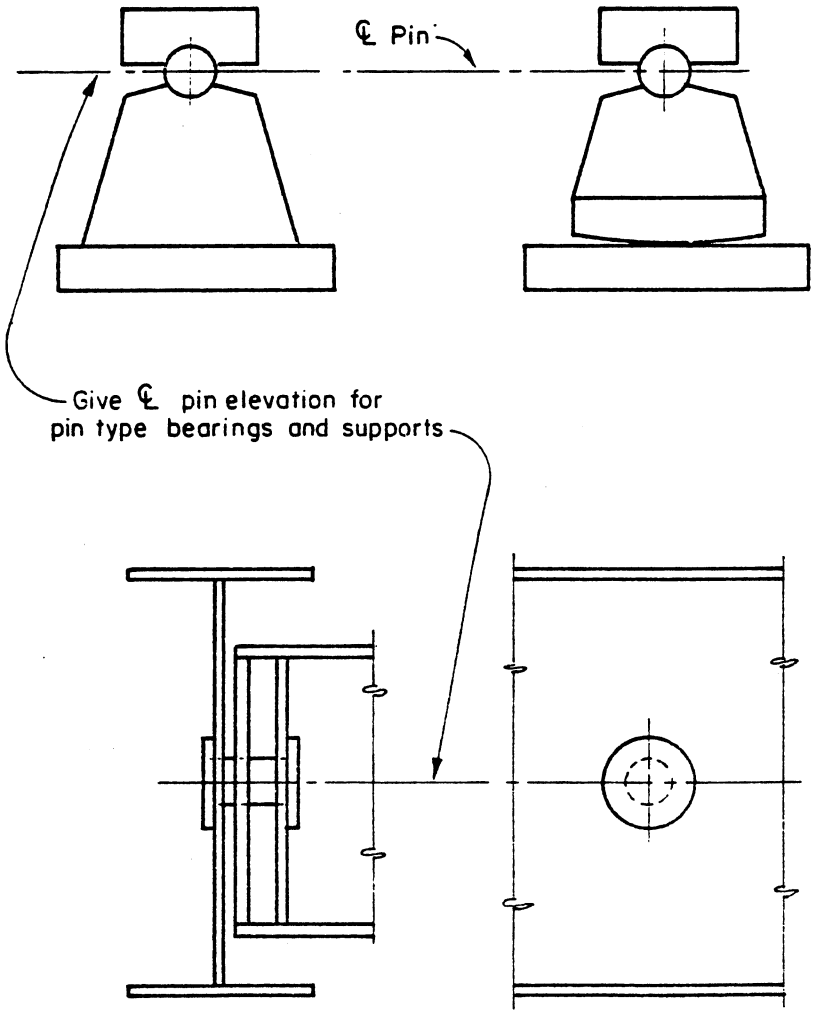


Tight fit at tension flange. See Standard Plan B 9-1 "Steel Girder Details" for cope and Alternative Stiffener Detail.

LOCATION OF BEARING ELEVATION



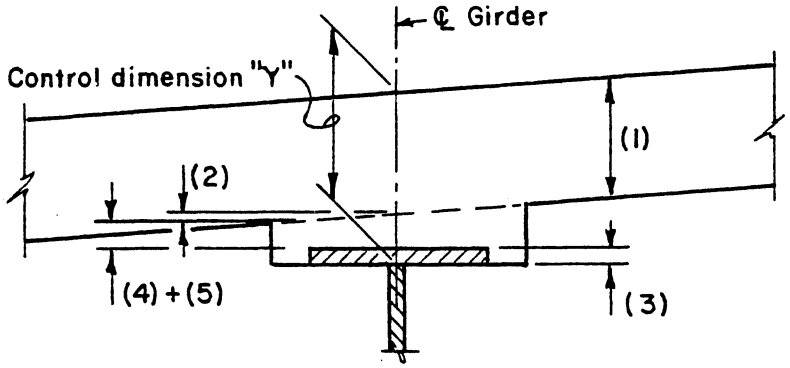
Give top of masonry ℄ elevations for all structures using bearing bars, bearing bar and roller combinations, or roller bearings.



Give ℄ pin elevations for all the heavier type bearings using pins and pin type supports on continuous girders.

Do not give pin elevations on hinges.

CRITERIA FOR CONTROL DIMENSION "Y" ON STEEL GIRDERS

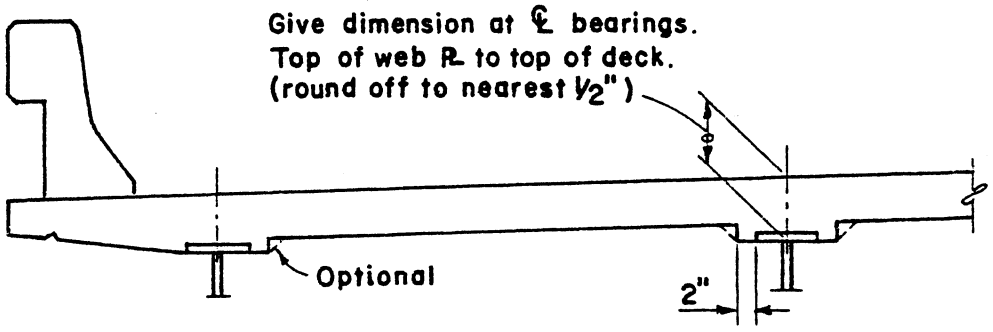


To calculate dimension "Y", add together the following 6 factors:

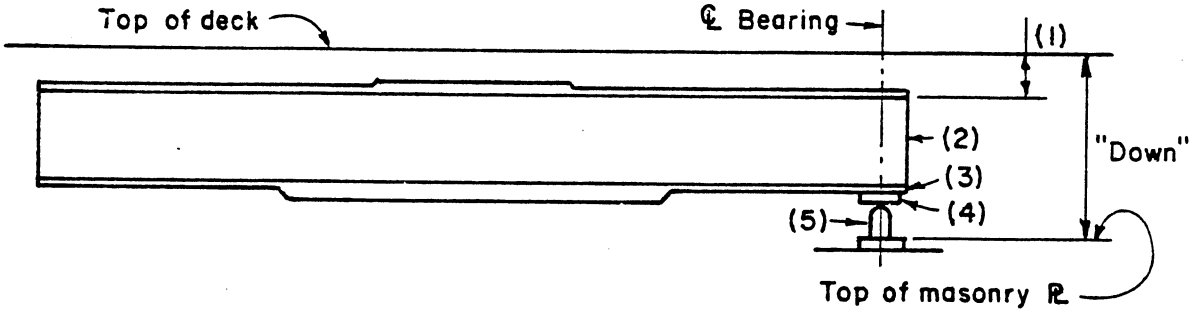
(1) Deck thickness
(2) Correction for roadway slope; = 1/2 max. flange width times roadway cross slope in % times 1/100.
(3) Maximum top flange thickness
(4) Additional camber, if used; see Memo 16-3 & 16-4.
(5) Excess fillet to allow for fabricating tolerance in girder camber; allow 1" for spans 40' or less. Allow 1 1/2" minimum for spans over 40'.

In multiple span structures dimension "Y" should be constant if possible. Item (5) may be increased from its minimum value as necessary to achieve this end. Dimension "Y" should be shown on the "Typical Section" sheet and designated as the distance from the top of deck to the top of web ℞ at the ℄ bearings.

Proper embedment of shear connectors on composite girders may require special attention. See Article 5-98, Vol. I.



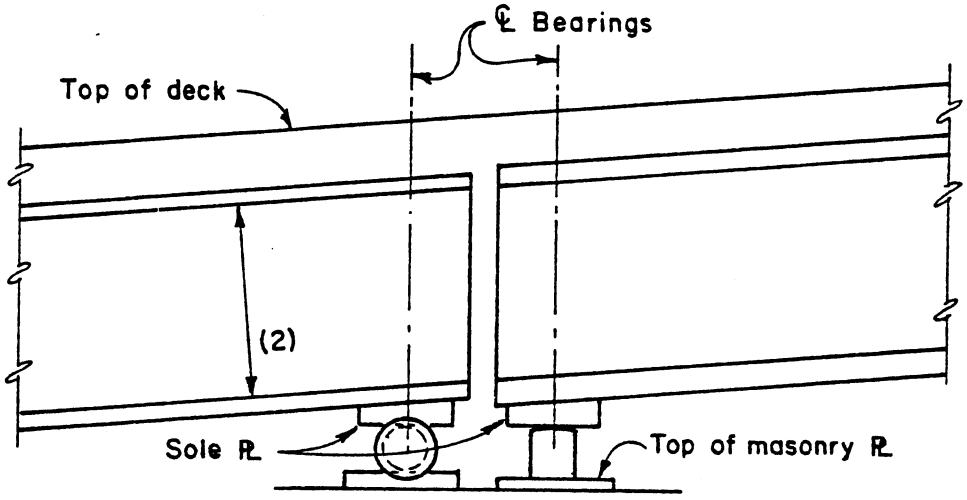
"DOWN" DISTANCE FOR MASONRY ℄ GRADES



To calculate the "Down" distance, add together the following 5 factors:

(1) Control dimension "Y"
(2) Web ℄ depth
(3) Bottom flange ℄ thickness @ ℄ bearing
(4) Sole ℄ thickness at ℄ bearing
(5) Bearing bar height

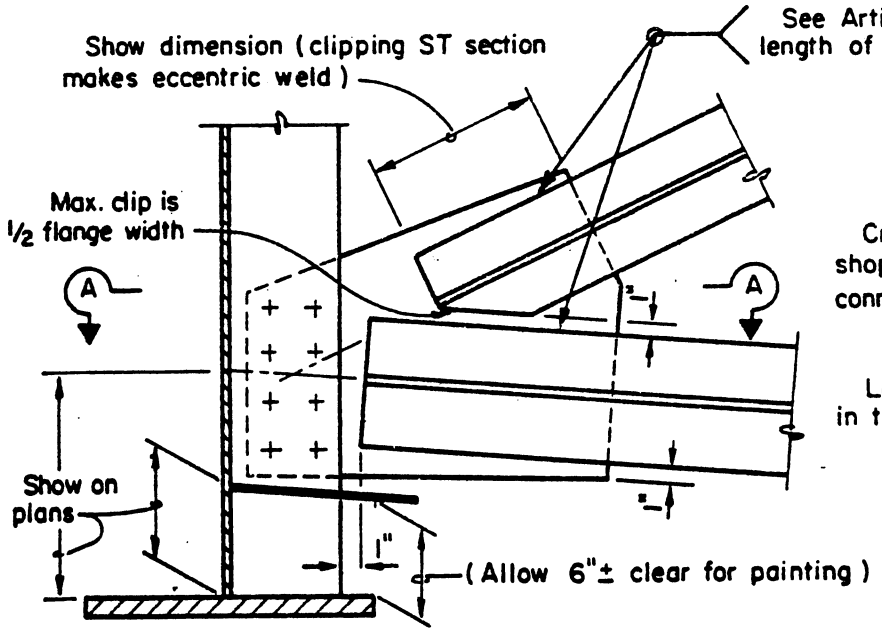
The same method may be used to find ℄ pin elevations by substituting sole ℄ to ℄ pin distance for bearing bar height in Item (5).



On bearings set on fabric bearing pads where adjacent girders have bottom flanges of different thickness, or, where there is difference of .01' or more in grade between ℄ bearings, the sole ℄ thickness on the high side should be increased to compensate for the difference in elevations.

Web depth (2) should be corrected for slope on all grades of 6% or more.

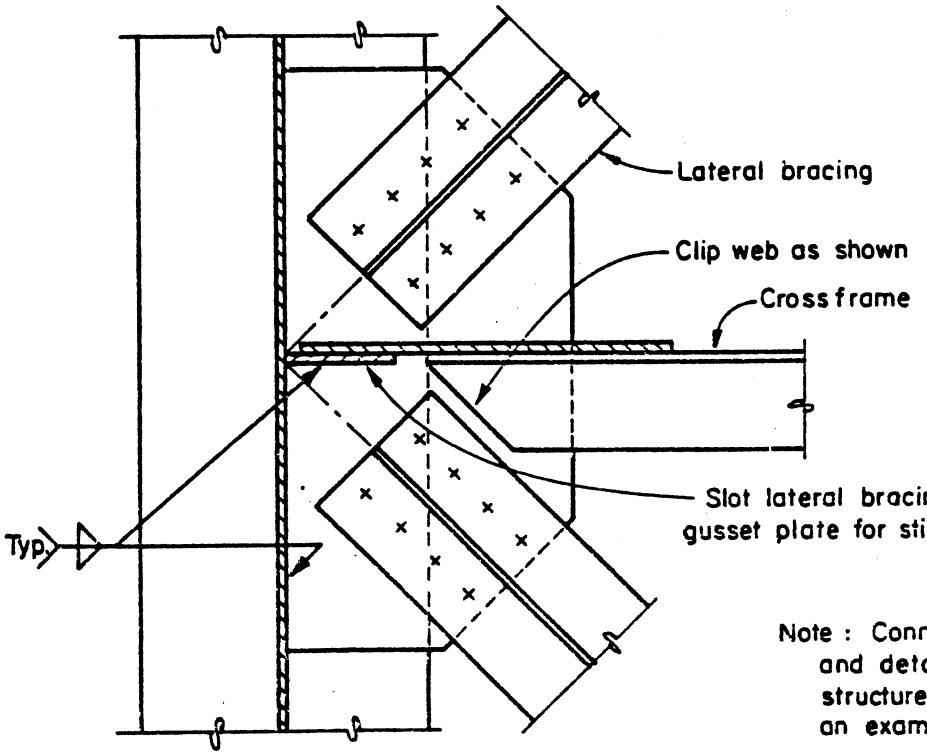
CROSSFRAMES WITH LATERAL BRACING



Cross frames are usually shop welded except for field connections which are bolted.

Lateral bracing not shown in this view.

ELEVATION



Note : Connections shall be designed and detailed to fit the individual structure. The connection shown is an example only.

SECTION A-A

WELDING SYMBOLS

Basic Welding Symbols and Their Location Significance

Location Significance	Fillet	Plug or Slot	Spot or Projection	Seam	Back or Backing	Surfacing	Scarf for Brazed Joint	Flange Edge
Arrow Side					Groove weld symbol			
Other Side					Groove weld symbol	Not used		
Both Sides		Not used	Not used	Not used	Not used	Not used		Not used
No Arrow Side or Other Side Significance	Not used	Not used			Not used	Not used	Not used	Not used

Supplementary Symbols Used with Welding Symbols

Convex Contour Symbol

Convex contour symbol indicates face of weld to be finished to convex contour

Finish symbol (user's standard) indicates method of obtaining specified contour but not degree of finish

Weld-All-Around Symbol

Weld-all-around symbol indicates that weld extends completely around the joint

Joint with Backing

With groove weld symbol

Note: Material and dimensions of backing as specified

Joint with Spacer

With modified groove weld symbol

Double bevel groove

Note: Material and dimensions of spacer as specified

Melt-Thru Symbol

Any applicable weld symbol

Melt-thru symbol is not dimensioned (except height)

Flush Contour Symbol

Flush contour symbol indicates face of weld to be made flush. When used without a finish symbol, indicates weld without subsequent finishing

Finish symbol (user's standard) indicates method of obtaining specified contour but not degree of finish

Multiple Reference Lines

First operation shown on reference line nearest arrow

Second operation or supplementary data

Third operation, or test information

Field Weld Symbol

Field Weld symbol indicates that weld is to be made at a place other than that of initial construction

Complete Penetration

Indicates complete penetration regardless of type of weld or joint preparation

Supplementary Symbols

Weld-All-Around	Field Weld	Melt-Thru	Backing, Spacer	Contour		
				Flush	Convex	Concave

Location of Elements of a Welding Symbol

Finish symbol
Contour symbol
Root opening, depth of filling for plug and slot welds
Effective throat
Depth of preparation, size or strength for certain welds
Specification, process, or other reference
Tail (Tail omitted when reference is not used)
Basic weld symbol or detail reference
Groove angle, included angle of countersink for plug welds
Length of weld
Pitch (center-to-center spacing) of welds
Field weld symbol
Arrow connecting reference line to arrow side member of joint
Weld-all-around symbol
Reference line
Elements in this area remain as shown when tail and arrow are reversed
(N) Number of spot or projection welds

F A R S E (BOTH SIDES) (OTHER SIDE) (ARROW SIDE) L P T N

Basic Joints—Identification of Arrow Side and Other Side of Joint

Butt Joint

Arrow of welding symbol
Arrow side of joint
Other side of joint

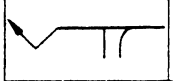
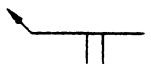
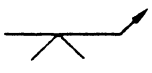
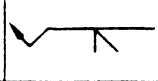
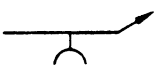
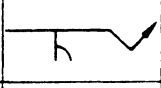
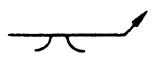
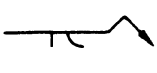
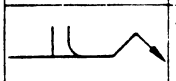
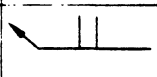
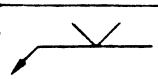
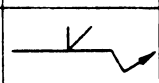
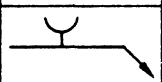
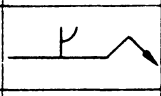
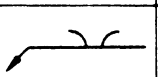
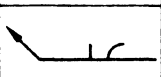
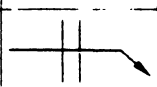
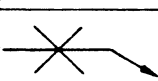
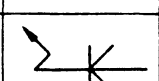
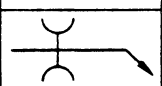
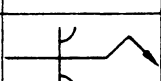
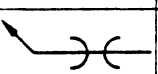
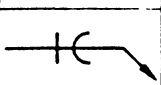
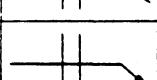
Corner Joint

Arrow side of joint
Arrow of welding symbol
Other side of joint

T-Joint

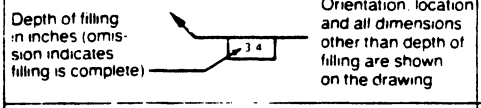
Arrow of welding symbol
Arrow side of joint
Other side of joint

Basic Welding Symbols and Their Location Significance

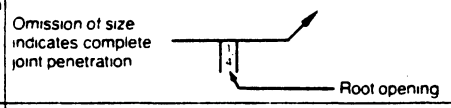
Flange	Groove							Location Significance
Corner	Square	V	Bevel	U	J	Flare-V	Flare-Bevel	
								Arrow Side
								Other Side
Not used								Both Sides
Not used		Not used	Not used	Not used	Not used	Not used	Not used	No Arrow Side or Other Side Significance

Typical Welding Symbols

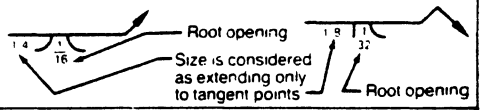
Slot Welding Symbol



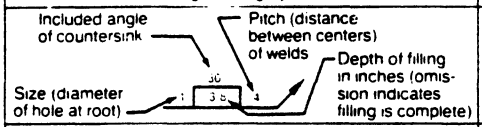
Square-Groove Welding Symbol



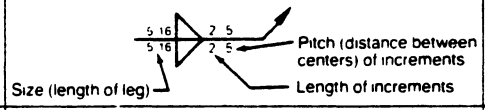
Flare-V and Flare-Bevel-Groove Welding Symbols



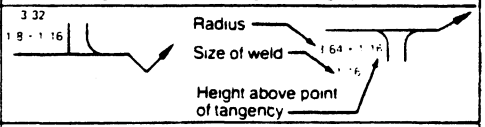
Plug Welding Symbol



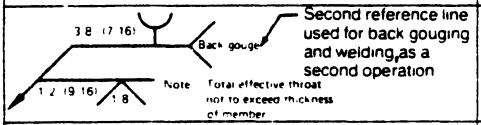
Chain Intermittent Fillet Welding Symbol



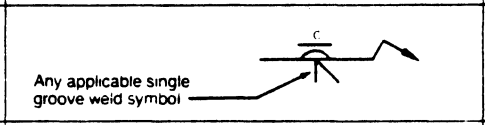
Edge- and Corner- Flange Welding Symbols



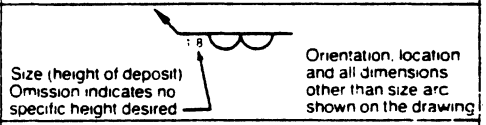
Backgouging Welding Symbol



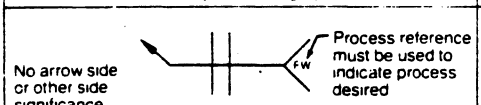
Back or Backing Welding Symbol



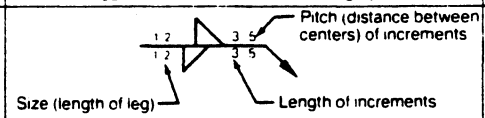
Surfacing Welding Symbol Indicating Built-up Surface



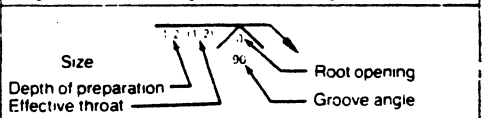
Flash or Upset Welding Symbol



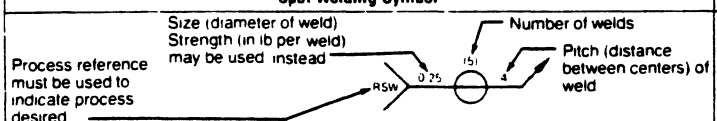
Staggered Intermittent Fillet Welding Symbol



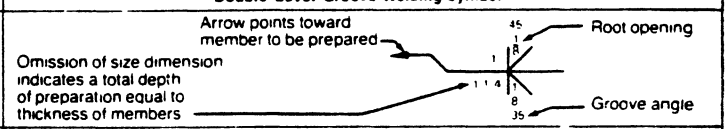
Single-V Groove Welding Symbol Indicating Root Penetration



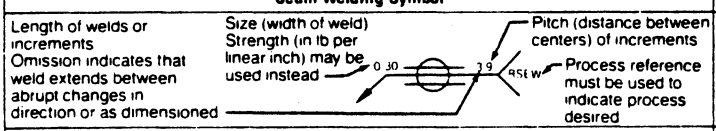
Spot Welding Symbol



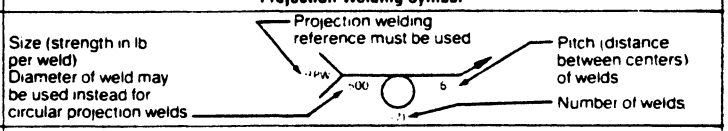
Double-Bevel-Groove Welding Symbol



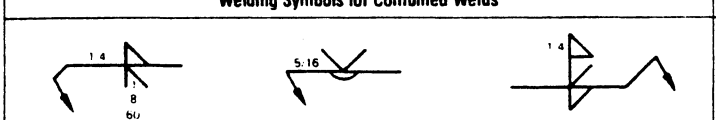
Seam Welding Symbol



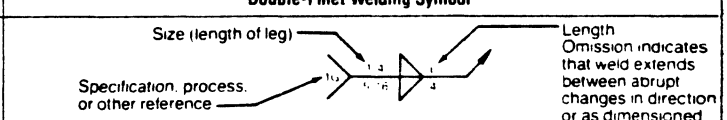
Projection Welding Symbol



Welding Symbols for Combined Welds

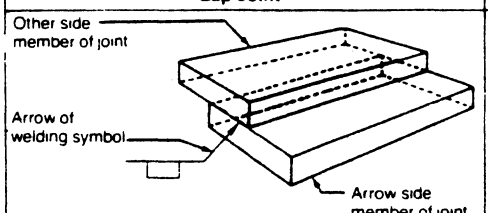


Double-Fillet Welding Symbol

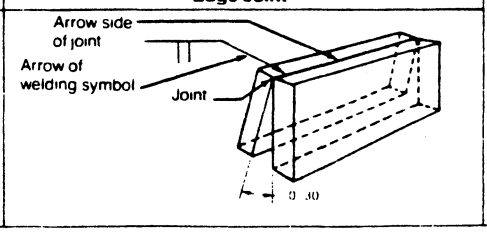


Basic Joints—Identification of Arrow Side and Other Side of Joint

Lap Joint



Edge Joint



Process Abbreviations

Where process abbreviations are to be included in the tail of the welding symbol, reference is made to Table A, Designation of Welding and Allied Processes by Letters, of AWS 2.4-79, 71

AMERICAN WELDING SOCIETY, INC.
2501 N.W. 7th Street, Miami, Florida 33125

STRUCTURAL STEEL SHAPE DESIGNATIONS

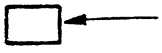
TYPE OF SHAPE	Symbol	New Designation	Old Designation
Wide Flange shapes	W	W 36 × 300	36WF 300
Wide Flange shapes	W	W 14 × 26	14 B 26
American Standard Beams	S	S 24 × 120	24 I 120
Miscellaneous shapes	M	M 8 × 18.5	8 M 18.5
Miscellaneous shapes	M	M 10 × 9	10 JR 9.0
Miscellaneous shapes	M	M 8 × 34.3	8×8 M 34.3
American Standard Channels	C	C 12 × 20.7	12 C 20.7
Miscellaneous Channels	MC	MC 12 × 45	12 × 4 C 45.0
Miscellaneous Channels	MC	MC 12 × 10.6	12 JR C 10.6
Bearing Piles	HP	HP 14 × 73	14 BP 73
Equal Leg Angle	L	L 6 × 6 × ¾	∠ 6 × 6 × ¾
Unequal Leg Angle	L	L 8 × 4 × ½	∠ 8 × 4 × ½
Structural Tee – Cut from W shape	WT	WT 12 × 38	ST 12WF 38
Structural Tee– Cut from W shape	WT	WT 7 × 13	ST 7 B 13
Structural Tee – Cut from S shape	ST	ST 12 × 50	ST 12 I 50
Structural Tee – Cut from M shape	MT	MT 4 × 9.25	ST 4 M 9.25
Structural Tee– Cut from M shape	MT	MT 5 × 4.5	ST 5 JR 4.5
Structural Tee– Cut from M shape	MT	MT 4 × 17.15	ST 4 M 17.15
Plates	PL or PL	PL ½ × 18	PL 18 × ½
Square Bar	Bar □	Bar 1 □	Bar 1 □
Round Bar	Bar ○	Bar 1¼ ○	Bar 1¼ ○
Flat Bar	Bar	Bar 2½ × ½	Bar 2½ × ½
Square Structural Tubing	TS	TS 4×4× .375	Tube 4×4×.375
Rectangular Structural Tubing	TS	TS 5×3×.375	Tube 5×3×.375
Circular Structural Tubing	TS	TS 3 OD×.250	Tube 3 OD× .250
Pipe – Standard		Pipe 4 Std	4" ○ Std. Pipe
Pipe – Extra Strong		Pipe 4 × - Strong	4" ○ Extra Strong Pipe
Pipe – Double Extra Strong		Pipe 4 ×× - Strong	4" ○ Dble. Ex. Strong Pipe

STEEL SHEET THICKNESS DESIGNATIONS

Conversion of steel sheet thickness from gage number to decimals of an inch.
Column 1 is for use by the designer in his calculations.
Column 2 is for use by the detailer in dimensioning uncoated material or material to be galvanized after fabrication.
Column 3 is for use by the detailer in dimensioning pregalvanized material.

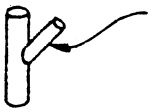
Gage	Column 1 Uncoated Min. Thick	Column 2 Uncoated Nominal Thick	Column 3 Galvanized Nominal Thick
7	0.171	0.179	0.183
8	.156	.164	.168
9	.142	.150	.153
10	.127	.135	.138
11	.112	.120	.123
12	.097	.105	.108
13	.083	.090	.093
14	.068	.075	.079
16	.055	.060	.064
18	.044	.048	.052
20	.033	.036	.040
22	.027	.030	.034
24	.021	.024	.028
26	.016	.018	.022
28	.013	.015	.019

Example note for pre-galvanized materials (10 gage):



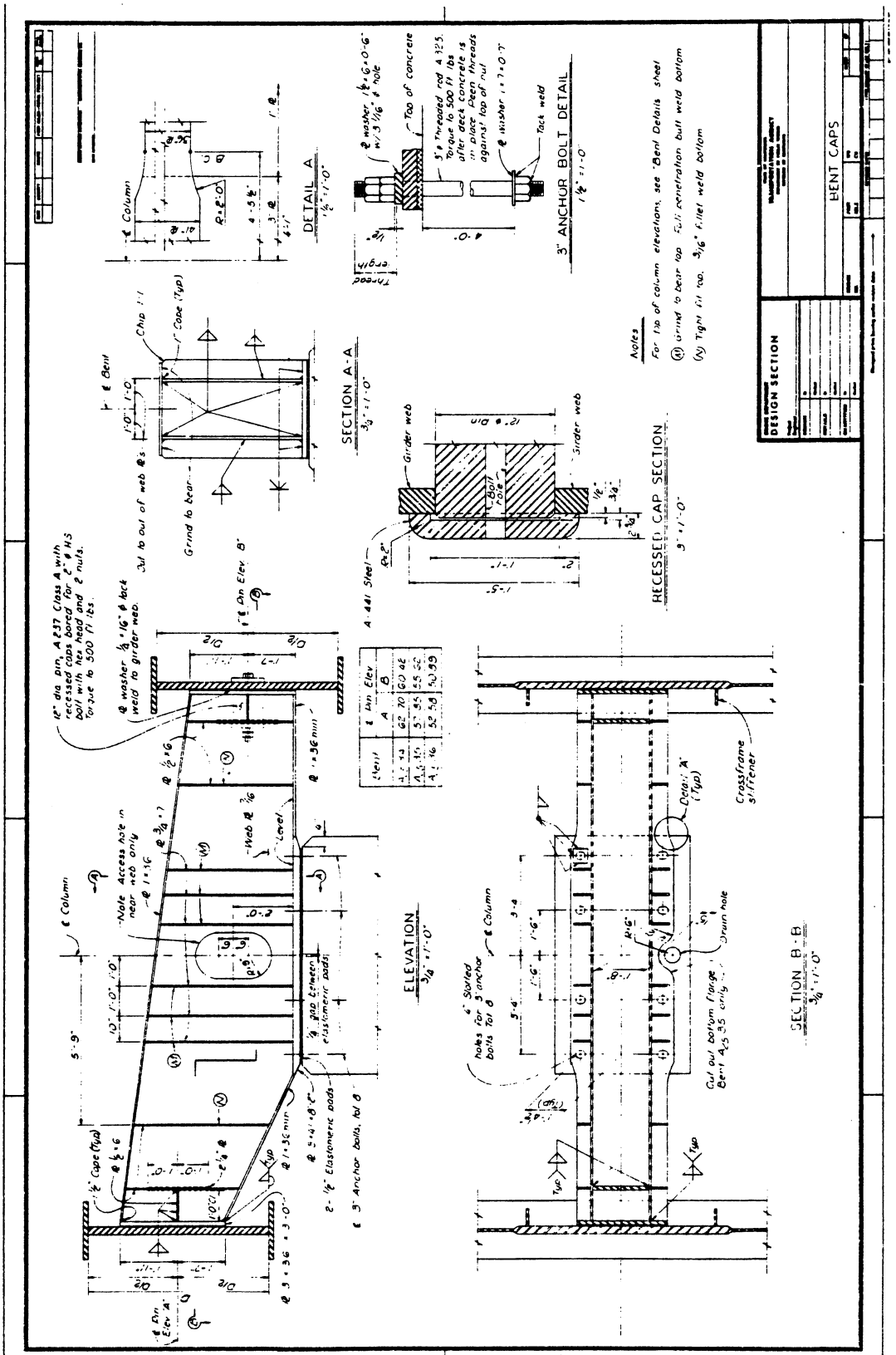
2'-0" x 3'-0" x 0.138" galv. sheet metal.

Example note for material galvanized after fabrication:



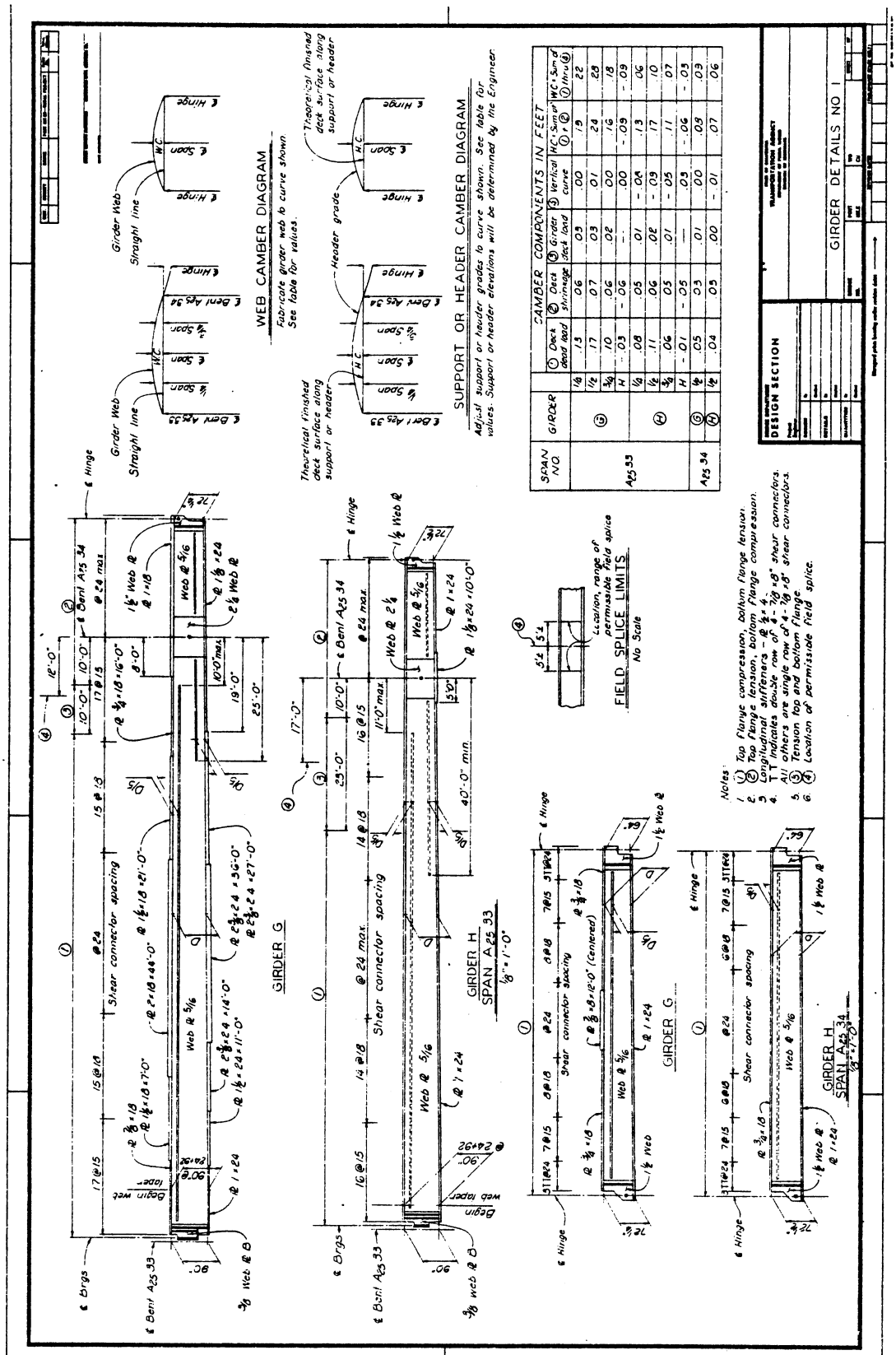
6" Ø x 0.135" drain pipe. Galv. after fabrication

DETAILING EXAMPLE



DETAILS SHOWN ARE FOR EXAMPLE ONLY
NOT TO BE USED FOR DESIGN PURPOSES

DETAILING EXAMPLE



DETAILS SHOWN ARE FOR EXAMPLE ONLY
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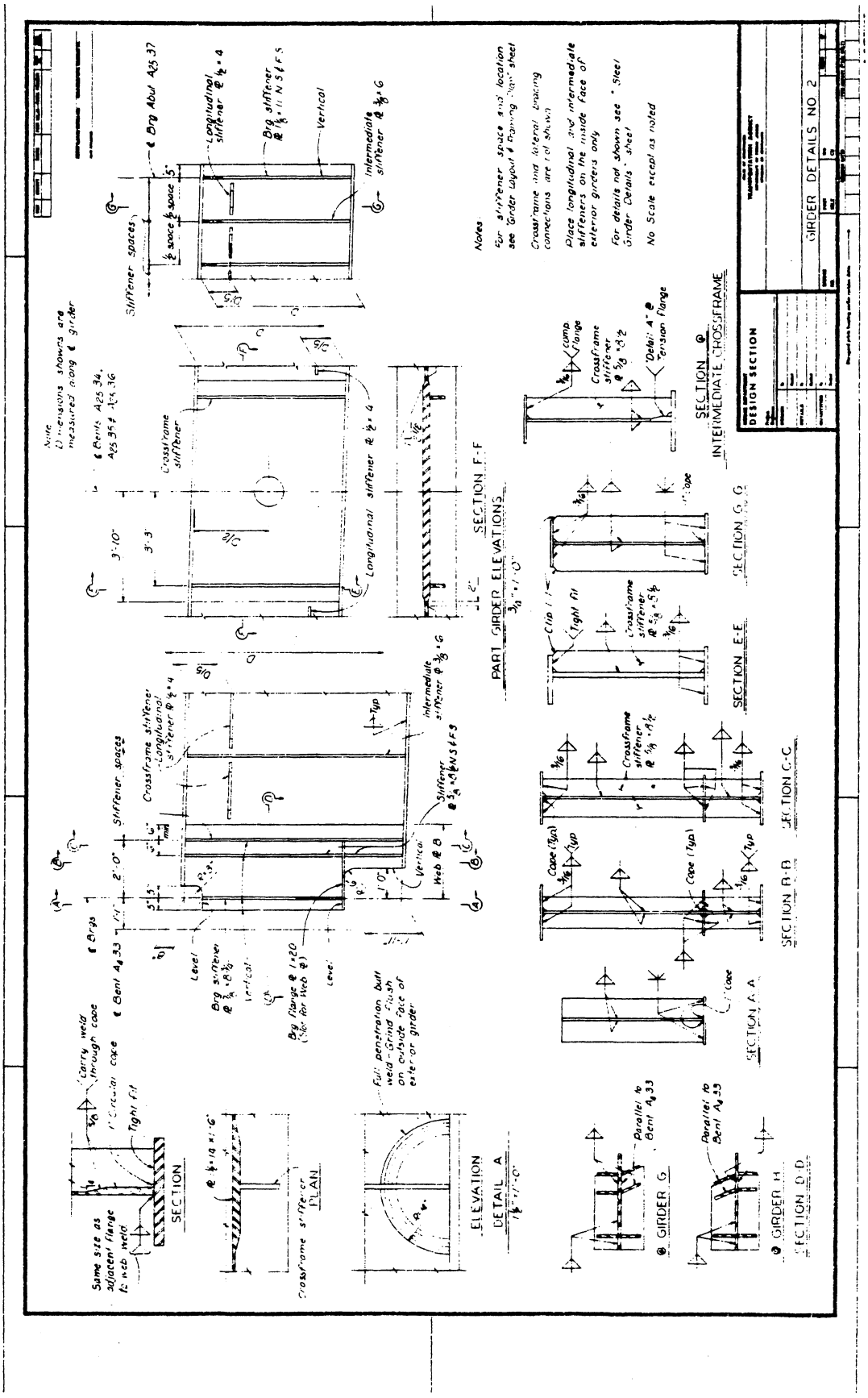
DETAILING EXAMPLE



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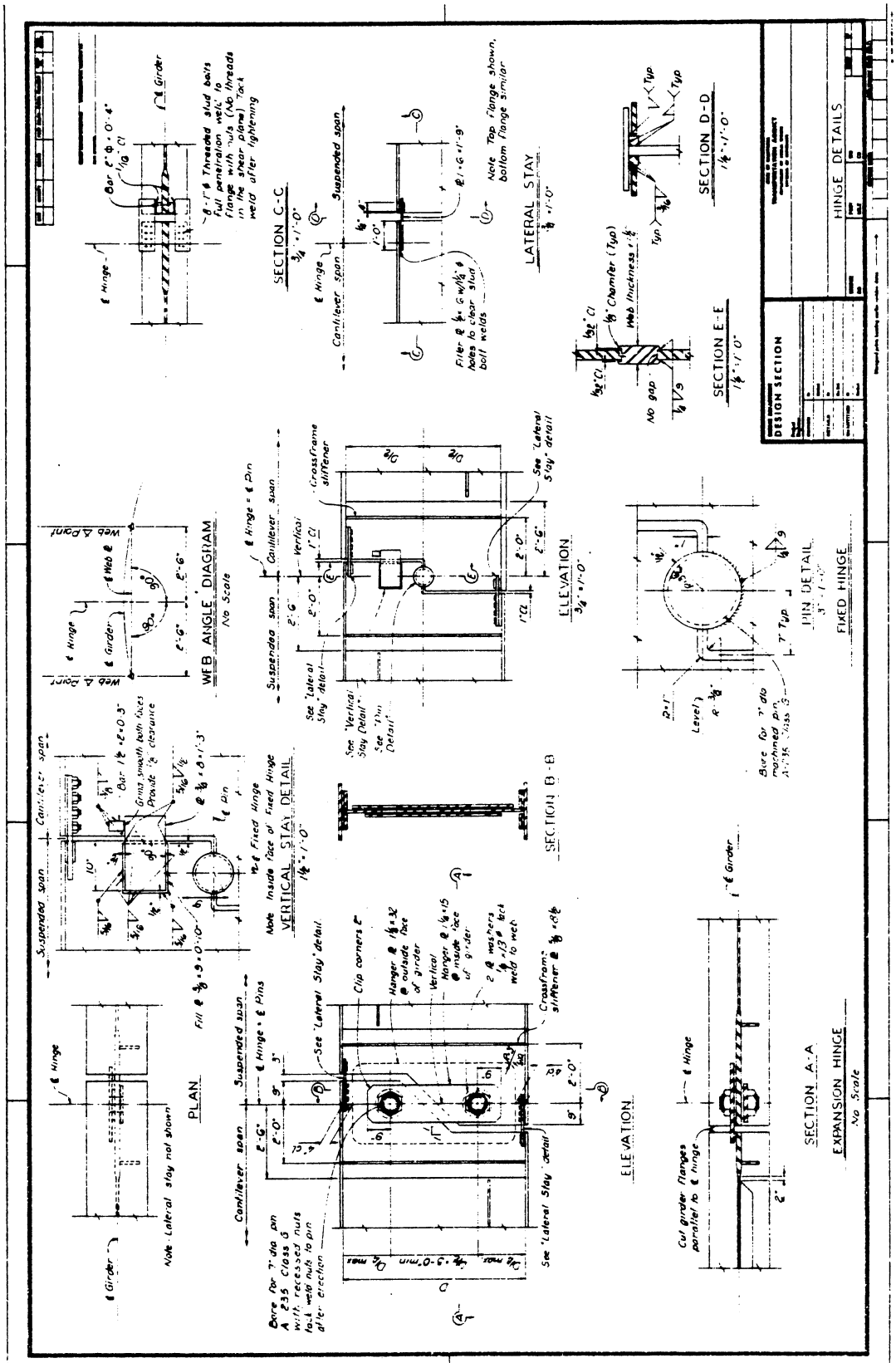
DETAILING EXAMPLE



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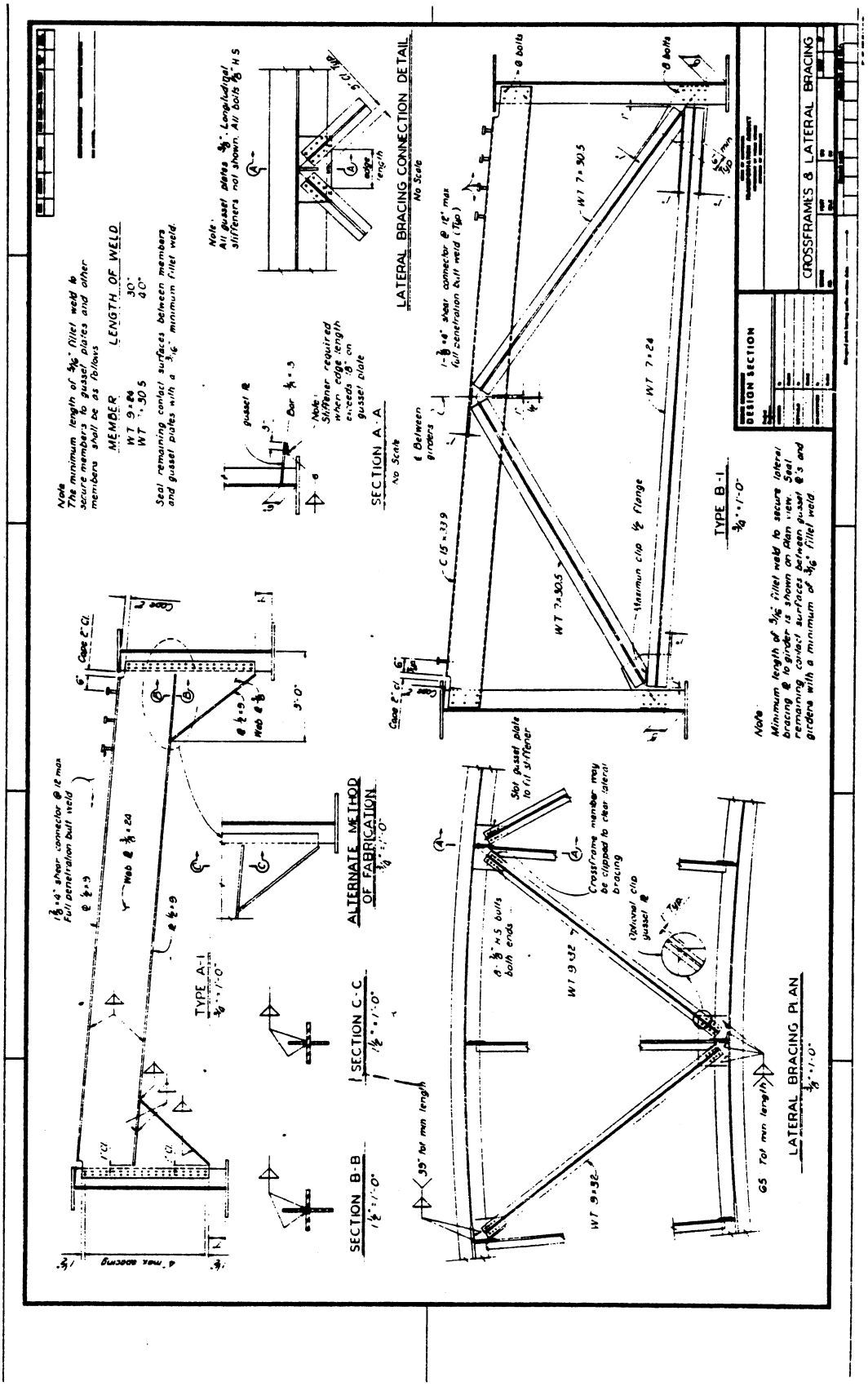
DETAILING EXAMPLE



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