

ELEVATION

LIST OF CONTRACTS

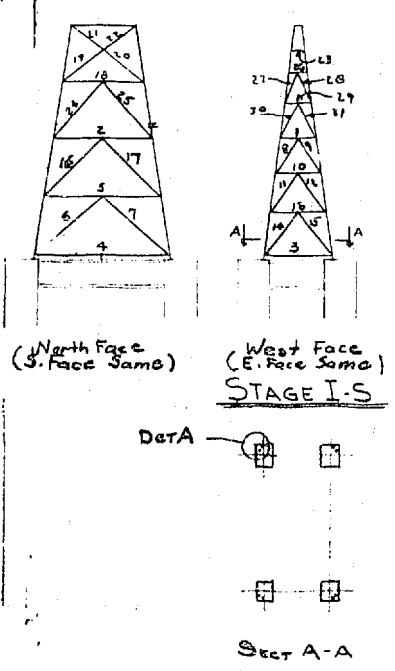
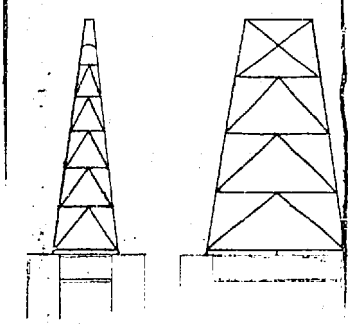
- V-8562 - 7 Thru Truss Spans
- V-8563 - 12 Deck Plate Girder Spans
- V-8564 - 5 Deck Truss Spans
- V-8565 - One Cantilever Truss Span
- V-8565-X1 - 2 Towers for Cantilever Span
- V-8566 - Class A Concrete
- V-8566-X1 - Rebars
- V-8567 - Parapet Railing
- V-8568 - Timber for Inspection Walk
- V-8569 - Navigation and Obstacle Lighting
- V-8570 - Engineering and Erection Material

ERECTING PROCEDURE - GENERAL

1. Equipment to be used at site for erecting steel will be that shown in the various stages.
  - a. Derrick boat to have 240' S1 tower, 130' boom with 25' jib
  - b. 3500 crawler crane
  - c. Derrick boat with 95' - S2 tower, 105' boom with 20' jib
2. Construction Dept. to furnish material and equipment for erecting purposes as noted on these drawings; this includes standard falsework bent, pile cages piles, derrick boat, crawler crane, and jacks. Construction Dept. to design pile foundations for FW2 (towers) and FW3.
3. Erecting sequences to be: (a) Stages IS thru IVS, (b) Stages IN thru IVN, (c) Stages VS thru VIS & VN thru VIN, (d) Final closure to be made at Panel Point U28 and L27.
4. Truss members are to be erected in the order of numerical sequence shown on the individual stages. Sway frames, portals, fl. beams, stringers, top & bottom lateral systems to be erected as limited in Stages I thru IV.
5. All joints are to be 50 per cent minimum connected using 60 per cent traffic pins and 40 per cent H.T. bolts; however, all truss joints are to be completely filled using 50 per cent H.T. bolts (completely torqued) and 50 per cent traffic pins (firmly driven) within 6 panels of members being erected. Joints for fixing the span for continuity are also to be completely filled using 50 per cent H.T. bolts and 50 per cent traffic pins as soon after drilling of holes as possible or else riveted. Joints in the anchor span shall be completely filled before removal of FW2. Final riveting of all construction thru Stage IVS shall be complete before leaving South end of bridge to start erection of Stage IIN.
6. Field riveting is to follow erection as close as conditions & facilities permit except that top chords U21 thru U35 shall not be riveted until the span has been swung. When replacing erection bolts and pins with final rivets, no more than 10 per cent of the total connections in a joint shall be replaced at a time.
7. Restriction to balanced erection:
  - a. Erection of Stages IIN & S must be as shown to prevent overstressing of FW1.
  - b. Erection of Stages III & IV must be as shown to prevent overstressing of FW2.

ERECTING PROCEDURE - STAGES - STAGES IS & IN

1. Check base plate areas for level within each of 4 base plates & between the 4 areas. If areas are not in proper level, shim all bases to match highest point found within any of the four areas. State will grout all bases with an epoxy grout after tower is erected. Scribe center lines on piers and measure distance c/c of piers. Report this measurement to Chicago District Engineer.
2. Erect lvr. halves of the 4 tower cols. Hold cols. in position by placing Howlett Grip Nuts on two anchor rods on each col. as per Det. A and Sect. B-B. DO NOT STRESS ANY ANCHOR RODS AT THIS TIME.
3. Erect trans. brg. (N.S. Faces) & long. (E.W. Faces) in numbered sequence. (Nos. for S. Face same as for N. Face - Nos. for E. Face same as for W. Face.) NOTE: Cols. are cambered, but brg. - except Members 18 thru 23 - is not. This will cause horizontals to be bowed downward slightly when diagonals are connected at ctrs. Make conn. of horiz. to cols. with 60% pins & 40% bolts before making conns. of diagonals to center of horizontals.
4. Erect upper halves of cols. Make aplices complete with permanent H.S. bolts.
5. Erect brg. in numbered sequence - 18 thru 23. The plates are cambered. Make all conns. of these members full with 60% pins & 40% bolts except for unreamed holes near tops of mem. 23. At night, when all tower steel is at a uniform temperature, check tower for plumbness.
6. Make field welds at top of tower (See E Sheet).
7. Erect brg. in numbered sequence - 23 thru 31 (See Note under Step 3 above).
8. At night, when all tower steel is at a uniform temp., transfer c/l line of conn. of bott. chord to top of tower down to top of concrete pier. After this has been done for second tower, measure distance between marks for Towers 169 & 170 with utmost accuracy & report same to Chgo. Dist. Engr. at once. This information is vital to proper closure in Stage VI, & to proper conversion of span from cantilever to continuous.
9. Stress anchor rods to 137 per rod. Jack bars symmetrically about c/l line of each leg.
10. Weld col. base plates to setting plates (See E Sheet).
11. Brg. connections may be riveted at this time at discretion of Construction Dept. Riveting of tower must be complete before commencing Stage III.



LIST OF ERECTING PROCEDURE DRAWINGS

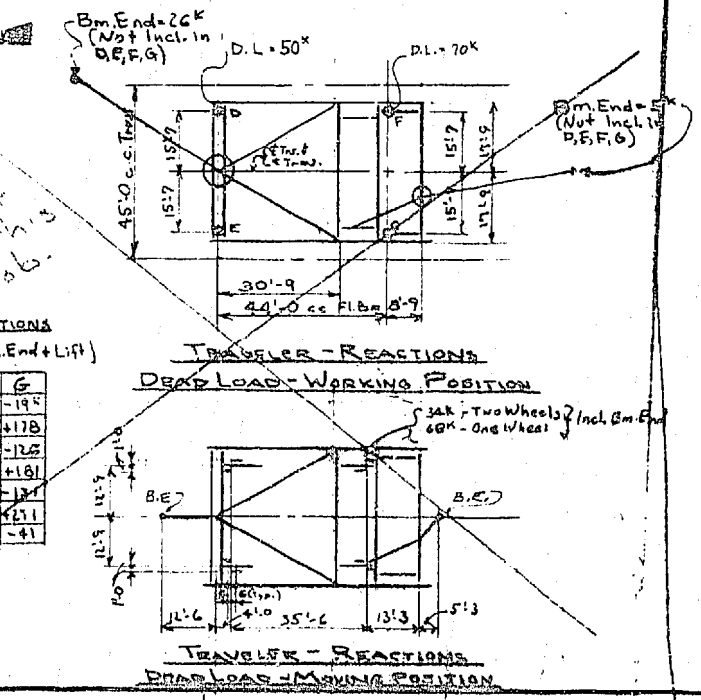
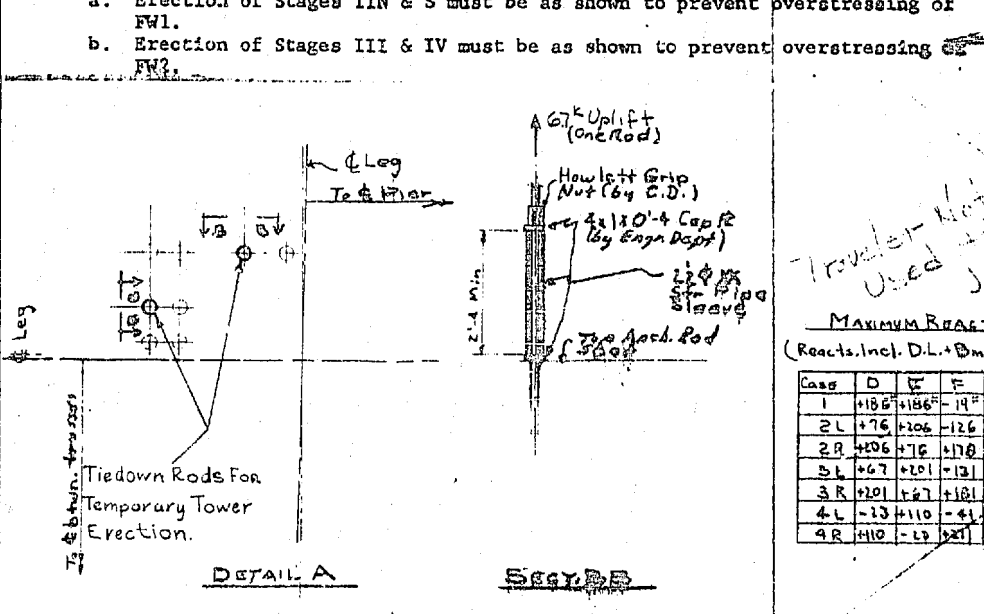
- EP1 - Elevation Cantilever Span - General Notes - Stage I
- EP2 - Stage II - Design of FW1 (Batter Bent)
- EP3 - Stages III and IV
- EP4 - Stages V & VI
- EP5 - Jacking Members
- EP6 - Erection Stresses
- EP7 - Design of FW2 (Tower)
- EP8 - Traveler Runway - Details - FW2 Jacking Heads
- EP9 - Closure, Swinging Span and Fixing Span to make into three-span continuous bridge.
- EP10 - Unassigned
- EP11 - 303' Deck Truss Erecting Procedure
- EP12 - 303' Deck Truss Erecting Procedure Continued
- EP13 - 351' Deck Truss Erecting Procedure
- EP14 - Unassigned
- EP15 - 351' Thru Truss Erecting Procedure

General Notes

All erecting material shall be A36 unless noted. All erecting material to have one coat of U.S.S.D. Formula LA564 (Red Lead from Oxide) Applied at Gary Plant.

Erection Wind:  
 Highest Wind Recorded at Astoria Weather Station = 96 mph @ El + 46 Elev. Both Chord + 189  
 $V_{46} = 100$  (assumed)  $V_{189} = V_{46} \left(\frac{100}{189}\right)^{.1} = 122.4$  mph  
 $P_{189} = 0.00256 V_{189}^2 C = 0.00256 \times (122.4)^2 \times 1.5 = 89.16$  psf  
 $G =$  Gust factor = 1.246  $C =$  Shape factor = 1.5 (Truss I3-ridge)  
 Use 90 psf as a moving load. When part of structure is loaded with 90 psf, remainder of structure assumed to be loaded with 30 psf.

All holes in permanent material left open after removal of erecting mat. shall be filled with properly driven rivets.



ABD- Allowable Unit Stresses for Erecting in ksi

Mechanical Properties - In kips/sq-in	T1E22 T1A14	A441E22 A440E22 A242E22	A441E22 A440E22 A242E22	A36 8" thick and under	A36 All thick	A441E22 A440E22
F <sub>y</sub> Yield Point	100	50	46	36	33	42
F <sub>t</sub> Allowable Tension	67	33	30	24	22	28
F <sub>v</sub> Allowable Bearing 5/16" dia	37/200	33/400	30/440	24/550	22/600	28/476
F <sub>v</sub> Allowable Shear	44	22	20	16	14.5	18.7
F <sub>a</sub> Allowable Comp.	See Formulas Noted Below					
F <sub>p</sub> All Brg. Milled Stiffs	100	50	46	36	33	42
C <sub>50</sub> 2" x 1/2" Fy	75.6	107	111.6	126.1	131.7	116.7
n = Basic Factor Safety = F <sub>y</sub> /F <sub>t</sub>	1.5	1.5	1.5	1.5	1.5	1.5

\*F<sub>y</sub> = 13200 + 8d/bt or 0.66 F<sub>y</sub> whichever is less  
 When  $\frac{h}{L} < C_c$ ,  $F_a = \left[ \frac{1}{2} \left( \frac{F_y}{F_s} \right) + \frac{1}{4} \left( \frac{F_y}{F_s} \right)^2 \right] F_y / F_s$ , when  $\frac{h}{L} \geq C_c$ ,  $F_a = \frac{177000}{(L/r)^2}$ ; (L = KL)  
 $F_s = n + 0.725n \left( \frac{h}{L} \right) - 0.075n \left( \frac{h}{L} \right)^3$ , when  $(L/r) < C_c$ ;  $F_s = 1.725n$ , when  $(L/r) \geq C_c$

Note: Allowable stresses, except F<sub>y</sub> may be increased 20% when wind is included.  
 \*\* Where H.S. bolts are used in combination with pins to transmit stress, the bolts must be fully tightened.

Bearing on Expansion Rollers or Rockers (kip per lin. in.) for diameters (D) from 2 1/2 in. to 1 1/2 in. @ (F <sub>y</sub> = 13200) (20000) where F <sub>y</sub> is of Rocker or Base whichever is less.	Unit Working Values for Fasteners				Filler Weld Allow. Load (kip/lin.)
	Rvs. A141	A307	A325	A548	
Allow. Tens. on Nom. Body Dia.	29.0	14.0	40.0	50.0	E60xx 1800
Allow. Shear on Nom. Body Dia.	15.0	15.0	24.0	15.0	E70xx 2100
A325 & A354 BC - Threads Included			22.0	24.0	2400
A325 & A354 BC - Threads Excluded			20.0	20.0	3000
Allow. Shear Used with Pins		7.5	15.0	18.0	3600
Allow. Brg. Used with Pins		15.0	15.0	15.0	4800
Allow. Brg. without Pin on Carbs. St.	44.0	44.0	44.0	44.0	5600
Allow. Brg. without Pin on T1, A332, A440, A441					7200

Filler Weld Allow. Load (kip/lin.)  
 E60xx 1800  
 E70xx 2100  
 2400  
 3000  
 3600  
 4800  
 5600  
 7200  
 8400

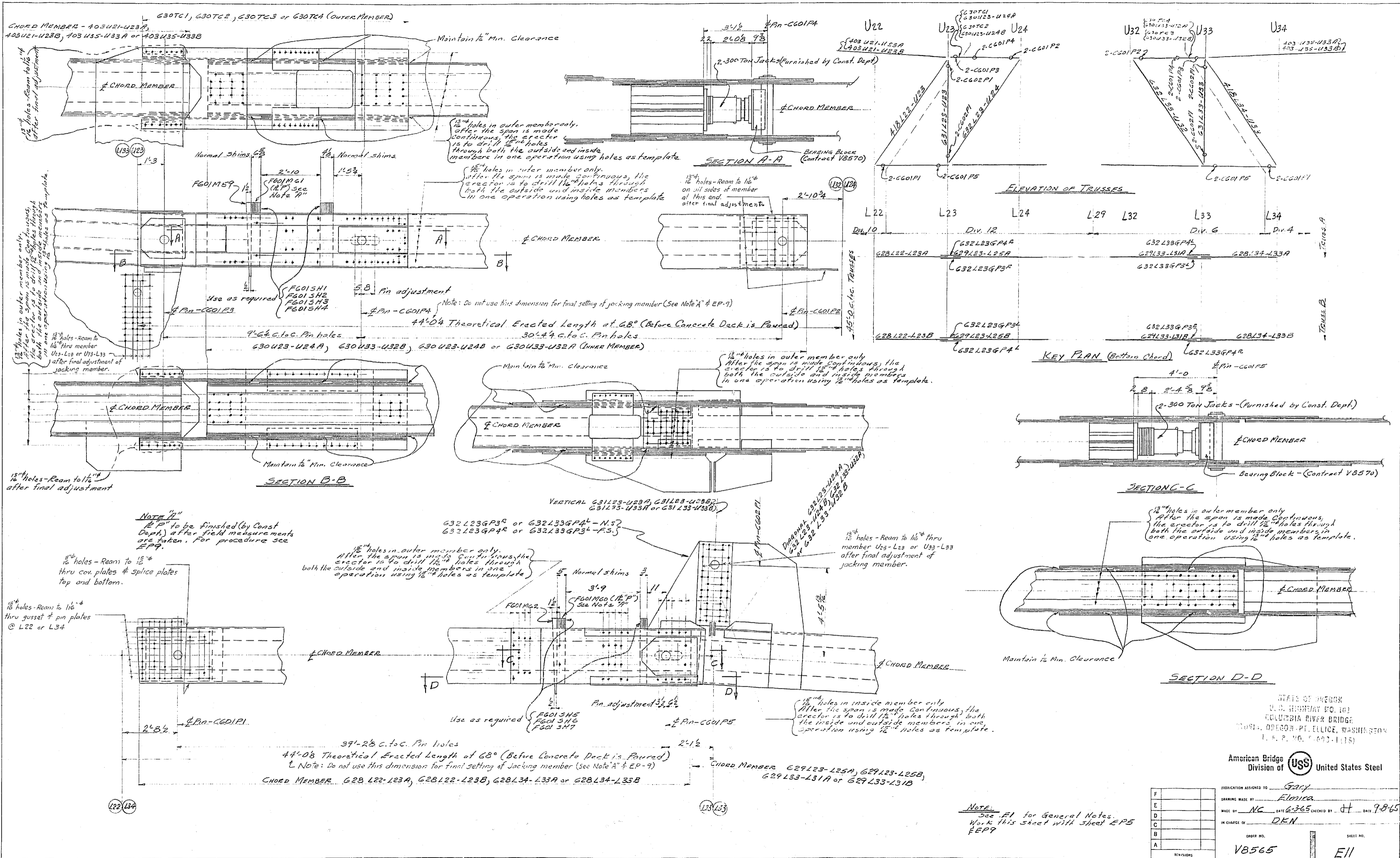
COLUMBIA RIVER BRIDGE  
 ASTORIA, OREGON - POINT ELICE, WASHINGTON  
 ERECTING PROCEDURE  
 CANTILEVER SPAN

AMERICAN BRIDGE

ENGINEERING DEPARTMENT  
 CHICAGO OFFICE

DATE JANUARY 20, 1964  
 MADE BY J. NEWCOMB  
 CHECKED BY G. P. WRIGHT  
 IN CHARGE O. L. N. BISHOP

CUSTOMER'S ORDER  
 A. B. INQUIRY W-4384  
 A. B. ORDER V-8561-70 (V-8570)  
 DRAWING NO. EP-1 OF



STATE OF OREGON  
 U.S. HIGHWAY NO. 101  
 COLUMBIA RIVER BRIDGE  
 TONGUE POINT, CLATSOP COUNTY, OREGON  
 U.S. P. NO. 1-602-1(15)

American Bridge Company  
 Division of USS United States Steel

F			
E			
D			
C			
B			
A			

FABRICATION ASSIGNED TO: Gary  
 DRAWING MADE BY: Elmira  
 MADE BY: NC DATE: 6-3-65 CHECKED BY: JT DATE: 9-8-65  
 IN CHARGE OF: DEN  
 ORDER NO. V8565 SHEET NO. E11