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BRIDGE SUPPORT STRUCTUAL CALCULATIONS

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PROGRAM - PROJECT - JOB

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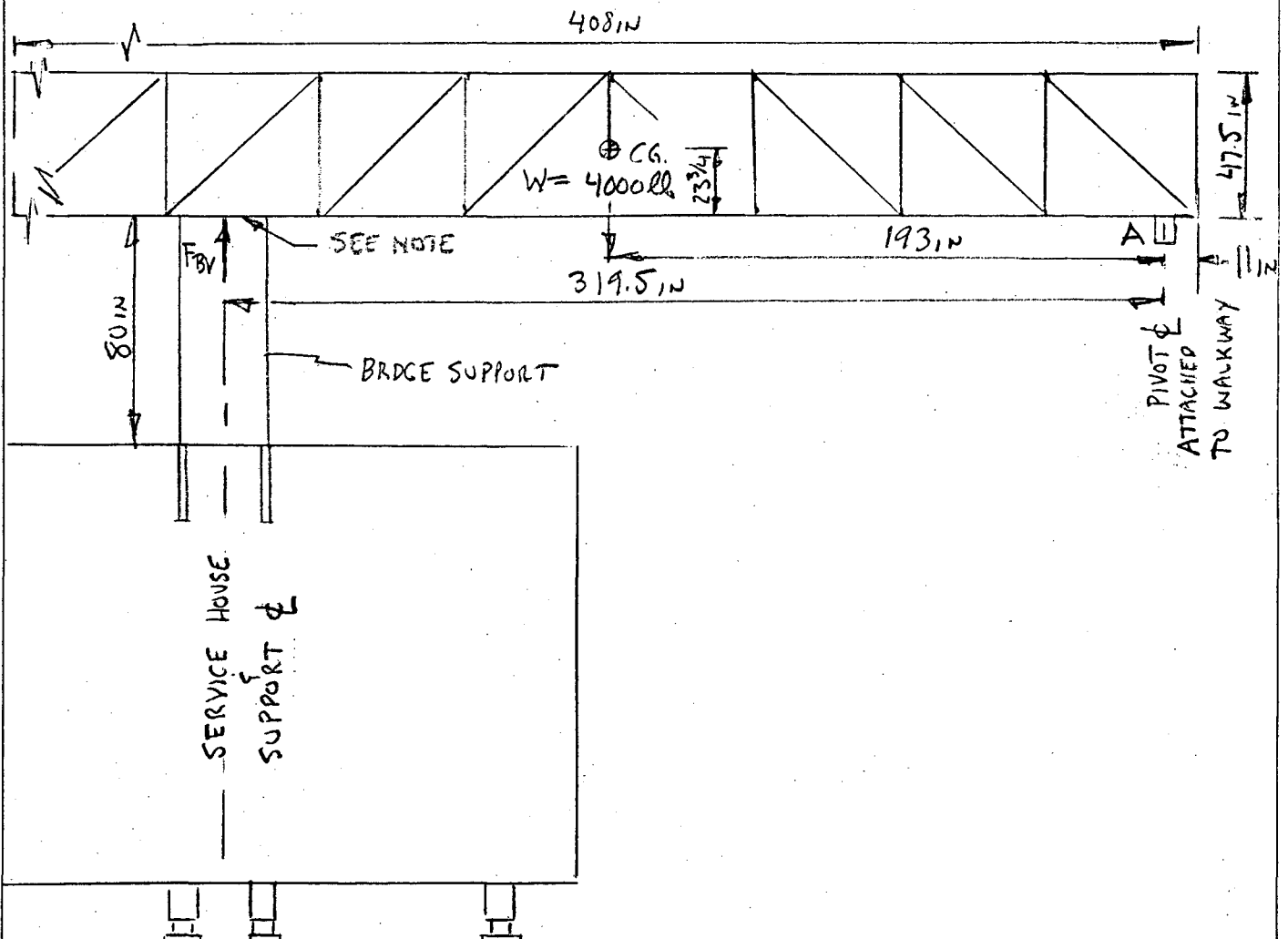
SERVICE HOUSE

P. Purgalis

TITLE
BRIDGE SUPPORT STRUCTURAL CALCULATIONS

6-11-81

STRUCTURAL CALCULATIONS ARE SHOWN FOR THE SERVICE HOUSE BRIDGE SUPPORT. THE SUPPORT AND THE WELDS ATTACHING IT TO THE SERVICE HOUSE ARE STRESSED WITHIN ALLOWABLE LIMITS FOR DEAD WEIGHT AND .7g SEISMIC LOADS.

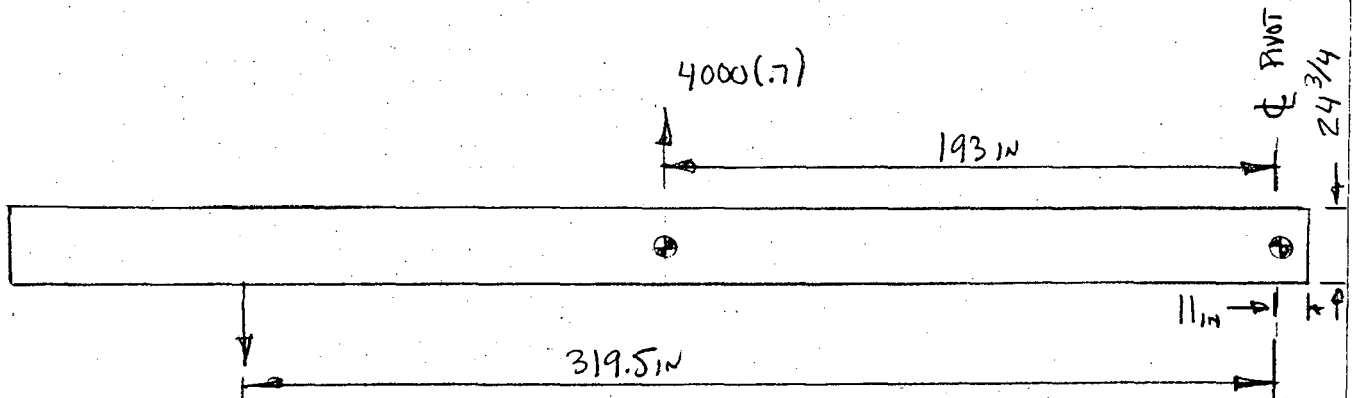


NOTE BRIDGE SHOULD BE ATTACHED TO BRIDGE SUPPORT SO IT DOES NOT SLIDE AROUND AND APPLY IMPACT LOAD TO BRIDGE SUPPORT DURING EARTHQUAKE

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BRIDGE - SLAC DWG SA-205-024-58-R0 PIPING SUPPORT BRIDGE
 " " GP-205-024-20-R6 EQ. & PIPING OVERALL LAYOUT



PLAN VIEW

ΣM AROUND A IN VERTICAL PLANE

$$4000(193) = F_{BV}(319.5)$$

$$F_{BV} = \frac{4000(193)}{319.5} = 2416 \text{ lb}$$

ΣM AROUND A IN HORIZONTAL PLANE

$$4000(.7)(193) = F_{BH}(319.5)$$

$$F_{BH} = \frac{4000(.7)(193)}{319.5} = 1692 \text{ lb}$$

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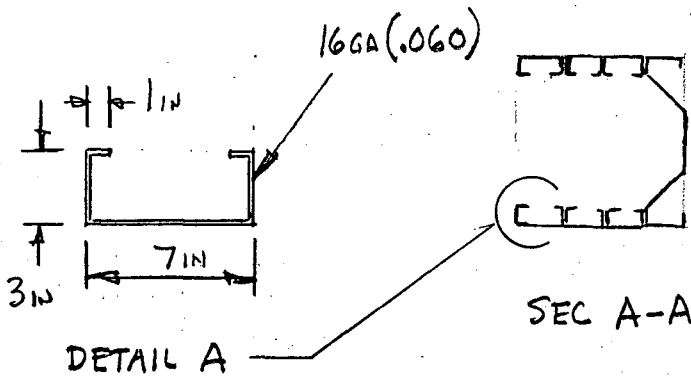
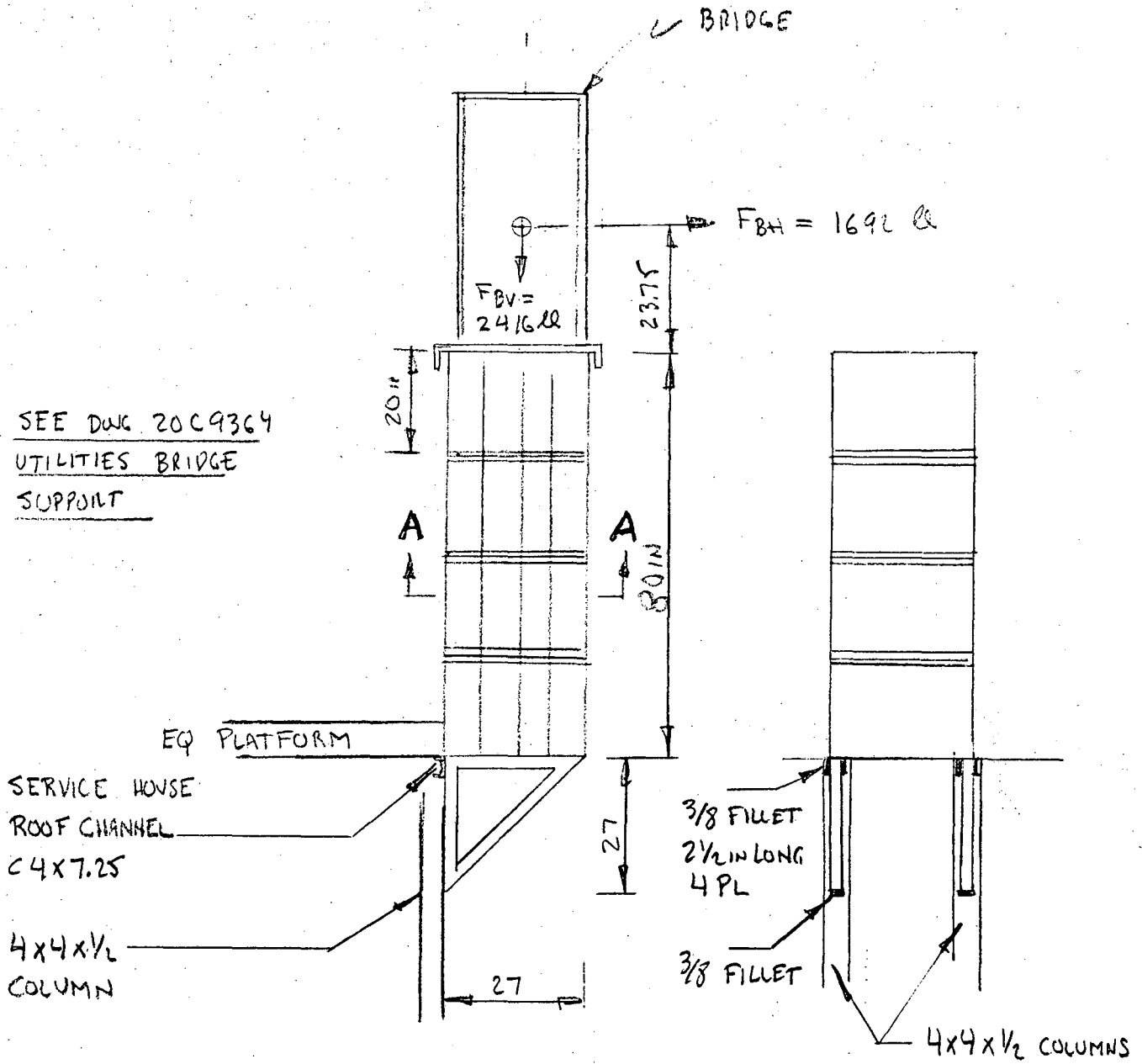
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SEE DWG 20C9364
UTILITIES BRIDGE
SUPPORT



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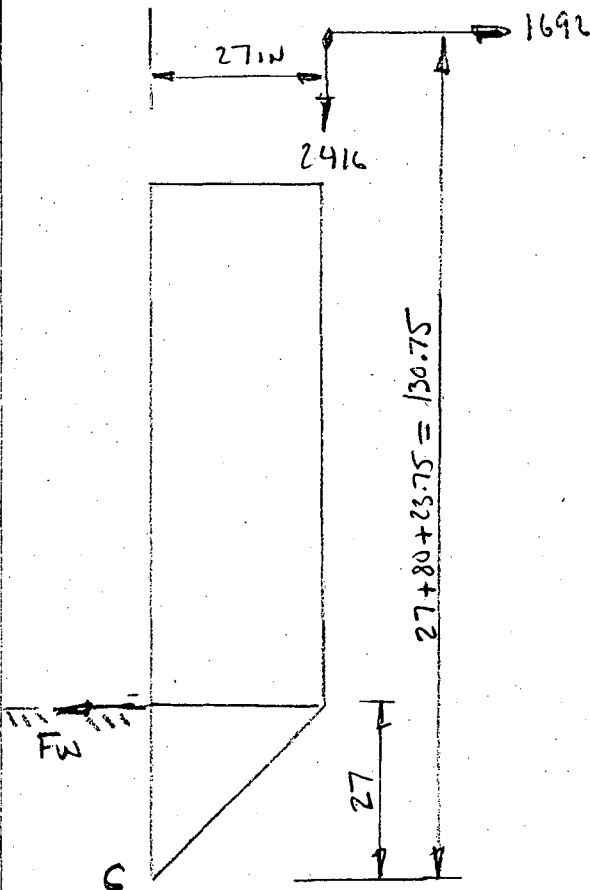
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CHECK ATTACHMENT WELD TO SERVICE HOUSE

ΣM AROUND C

$$F_w(27) = 2416(27) + 1692(130.75)$$

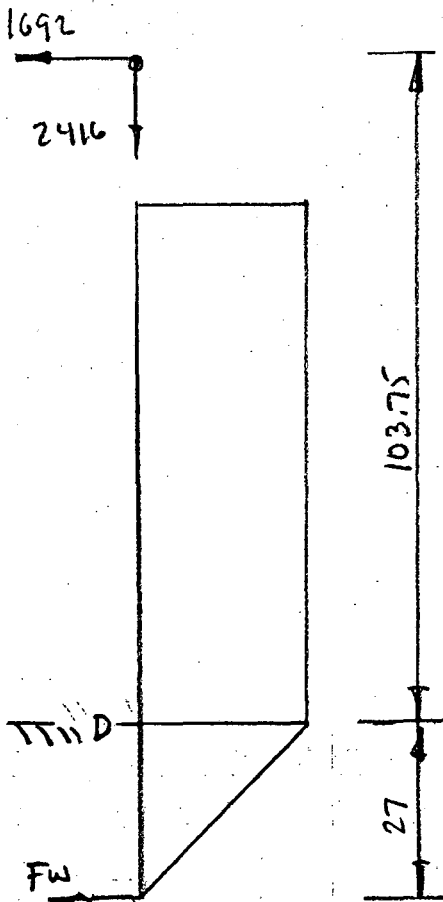
$$F_w = \frac{2416(27) + 1692(130.75)}{27}$$

$$= \boxed{10,610 \text{ lb}}$$

O.K.

ALLOWABLE WELD STRENGTH FOR 3/8 FILLET 3750 lb/in

$$2.5 \text{ IN} \times 4 \text{ PLACES} \times 3750 \text{ lb/in} = \boxed{37,500 \text{ lb}}$$



ΣM AROUND D

$$F_w(27) = 1692(103.75)$$

$$F_w = \frac{1692(103.75)}{27} = \boxed{6500 \text{ lb}}$$

O.K.

ALLOWABLE

$$4 \text{ IN} \times 2 \text{ PLACES} \times 3750 \text{ lb/in} = \boxed{30,000 \text{ lb}}$$

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CHECK BUCKLING STRENGTH OF BRIDGE SUPPORT

$$A = (1 \text{ IN} + 1 \text{ IN} + 3 \text{ IN}) \times .06 \text{ IN}$$

$$= .3 \text{ IN}^2$$

$$I_{yy} = .026 \text{ IN}^4$$

$$r_{yy} = \sqrt{\frac{I}{A}} = \sqrt{\frac{.026}{.3}} = .29 \text{ IN}$$

$$I_{xx} = .4 \text{ IN}^4$$

$$r_{xx} = \sqrt{\frac{.4}{.3}} = 1.16 \text{ IN}$$

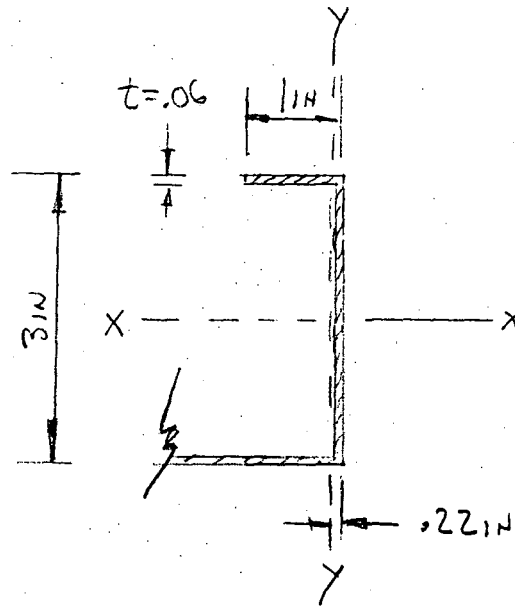
$$\frac{L}{r_{yy}} = \frac{20 \text{ IN}}{.29 \text{ IN}} = 69 \quad \text{WEAKEST AXIS}$$

FROM "AISC" ALLOWABLE COMPRESSIVE STRESS = 13 KSI
SEE BLODGETT "DESIGN OF WELDMENTS" PAGE 2-5-9

$$\text{ALLOWABLE LOAD} = .3 \text{ IN}^2 \times 13 \text{ KSI} = \boxed{3.9 \text{ K}}$$

$$\text{LOAD} = \boxed{2.4 \text{ K}} \quad \text{O.K.}$$

SO WEAKEST PART OF ONE SECTION CAN CARRY THE ENTIRE LOAD



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