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job no 61-20533 sheet 1/4
made by TVB date 3/4/2020
checked WER date 3/5/20
office YOUNGSTOWN
project POLAND CEMETERY BRIDGE

PAINTING - ITEM 513 - FIELD PAINTING OF STRUCTURAL STEEL

STRINGERS - W10X12

PERIMETER: $3.96 + 2(9.87) + 4(3.96 - 0.190) = 38.78$ in

AREA = $38.78\text{ in}\left(\frac{\text{ft}}{12\text{ in}}\right) \times (49.5' \times 2 + 27.67') \times 6$ STRINGERS = 2456 FT^2

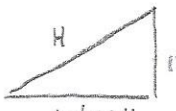
FLOOR BEAMS

UNKNOWN SIZE, ASSUME 3' PERIMETER

AREA = $3' \times (20.17') \times 13$ BEAMS = 789 FT^2

ARCH - TOP CHORD
- 3/8" THICK SEMI-OVAL SECTION - ASSUME 6" DIA. CIRCULAR CROSS-SECTION

PERIMETER = $\pi(6") = 6\pi"$
LENGTH = 130'

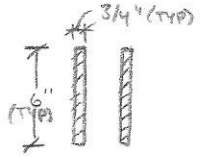


$H = \sqrt{62.79^2 + 12^2} \approx 64'$

AREA = $130' \times 6\pi"\left(\frac{\text{ft}}{12\text{ in}}\right) \times 2$ SIDES = 408 FT^2

"BOW STRING" - BOT. CHORD
- 2 PL 6 x 3/4"

PERIMETER = $4(6") + 4(3/4") = \cancel{28"}\ 27" \approx 28"$
LENGTH = 125.58'



AREA = $125.58' \times 28"\left(\frac{\text{ft}}{12\text{ in}}\right) \times 2$ SIDES = 586 FT^2

PIPE RAILING - 2" ϕ
- LENGTH APPROX. = 115' AVG (4 (PER SIDE) PIPES TOTAL)
PERIMETER = $2\pi"$

AREA = $115' \times 2\pi"\left(\frac{\text{ft}}{12\text{ in}}\right) \times 4$ PIPE PER SIDE $\times$ 2 SIDES = 482 FT^2

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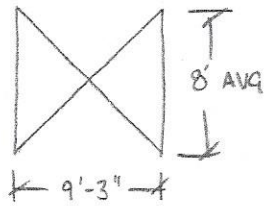
ITEM 513 - FIELD PAINTING OF STRUCTURAL STEEL

VERTICAL HANGERS

- AVG. LENGTH = 8' (ASSUMED)
- ASSUME 8" PERIMETER FOR HANGER

AREA = $8' \times 8'' \left(\frac{ft}{12in}\right) \times 13$ HANGERS $\times$ 2 SIDES = 139 FT^2

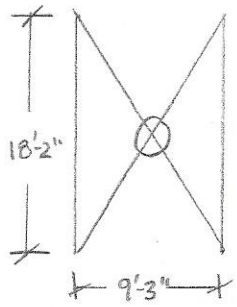
DIAGONALS BETWEEN VERTICAL HANGERS (1" ϕ ROD)



- PERIMETER = 1π"
- L = $\sqrt{8'^2 + 9.25'^2}$ = 12.23' AVG DIAG. LENGTH
- 2 PER SPACE

AREA = 12.23' $\times$ π" $\left(\frac{ft}{12in}\right) \times (2 \times 12\,SPA) \times 2$ SIDES = 154 FT^2

LATERAL BRACING (BELOW DECK) (1" ϕ ROD)

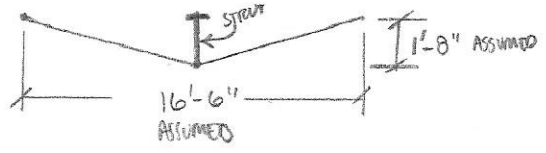


- PERIMETER = π"
- L = $\sqrt{9.25'^2 + 18.17'^2}$ = 20.39' PER 1" ϕ ROD $\times$ 2 RODS/FLOOR BM BAY = 40.78'/BAY

AREA = 40.78'/BAY $\times$ 14 BAYS $\times$ π" $\left(\frac{ft}{12in}\right)$ = 150 FT^2

KING POSTS (1" ϕ ROD)

- 2 PER FLOOR BEAM
- L = $2\sqrt{1.67'^2 + 8.25'^2}$ = 16.83'
- PERIM. = π"



AREA = 16.83' $\times$ π" $\left(\frac{ft}{12in}\right) \times 2 \times 13$ FLOOR BM = 115 FT^2

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ITEM 513 - FIELD PAINTING OF STRUCTURAL STEEL

TOP LATERAL BRACING SUPPORT POSTS

- 6 TOTAL
- HT: 2 @ 1'-4½" + 4 @ 2'-2½"
  ↑ 4 7/16" O.D. ↑ 4 5/8" O.D.

$$\text{AREA} = 2\left(1.38' \times \pi(4.44'')\left(\tfrac{\text{FT}}{12\text{IN}}\right)\right) + 4\left(2.21' \times \pi(4.63')\left(\tfrac{\text{FT}}{12\text{IN}}\right)\right) = 14\ \text{FT}^2$$

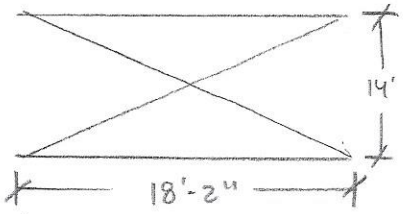
TOP LATERAL BRACING

- ASSUME 2 - 4" PLATES SPANNING BETWEEN EA. SET OF SUPPORTS (3/8" THICK?)
- LENGTH = 18'-2" (ASSUMED)
- 3 LOCATIONS

$$\text{AREA} = \left(4(4'') + 4(3/8'')\right)\left(\tfrac{\text{FT}}{12\text{IN}}\right) \times 18.17' = 27\ \text{FT}^2$$

TOP DIAGONALS (1" Ø RND, ASSUMED)

- ASSUME 14' TOP LAT. SUPPORT SPACING - 2 BAYS - PERIMETER = π"



$$\text{TOTAL } L = 2\sqrt{18.17'^2 + 14^2} = 45.88'\ \text{PER BAY}$$

$$\text{AREA} = 2\ \text{BAYS} \times 45.88'/\text{BAY} \times \pi'\left(\tfrac{\text{FT}}{12\text{IN}}\right) = 24\ \text{FT}^2$$

MODIFIED SWAY BRACING BRACKETS

- W8 → ASSUME 4' LENGTH & 2'-6" PERIMETER ; 3 x 4' x 2.5' = 30 FT²
- EXIST. L3x3 → ASSUME 2'-6" LENGTH & 12½" PERIM. ; 3 x 2.5' x 1.04' = 8 FT²
- L2x2x¼" → ASSUME 6'+3' = 9' OVERALL LENGTH, 8" PERIM ; 3 x 9' x 0.67' = 18 FT²
- C4x5.45 → L = 55.29', PERIMETER = 1.18' ; 55.29' x 1.18' = 66 FT²

TOTAL = 122 FT²

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ITEM 513 - FIELD PAINTING OF STRUCTURAL STEEL.

2" ϕ PIPE RAIL & BRACKETS (OUTSIDE OF ARCH)

2ϕ PIPE : - AVG. LENGTH = [(12'-6") + (8'-4")] / 2 = 10'-5" - PERIM. = 2π"
- 4 PER SIDE x 2 SIDES = 8 TOTAL
AREA = 8 x 10.42' x (2π" x $\frac{ft}{12in}$) = 44 FT²

W6x15 RAIL POSTS : - AVG. LENGTH = [(4'-6") + (2'-3")] / 2 = 3.38 FT - PERIM. = 29.5"
- 4 PER SIDE x 2 SIDES = 8 TOTAL
AREA = 8 x 3.38' x (29.5" x $\frac{ft}{12in}$) = 67 FT²

TOTAL = 111 FT²

TOTAL CALCULATED AREA

= 2456 + 789 + 408 + 586 + 482 + 139 + 154 + 150 + 115 + 14 + 27 + 24 + 122 + 111 = 5577 FT²

ADD 15% FOR BOLTS, RODS & MISC. ITEMS : (5577 FT²)(1.15) = 6414SF

USE 6500 SF