



PEDESTRIAL GUARDRAIL BARRIER
WEST BRIDGE
PARAGON STAR SPORTS COMPLEX
LEE'S SUMMIT, MISSOURI
PROJECT NO. 2120521

NOVEMBER 19, 2021
STRUCTURAL CALCULATIONS



MICHAEL LANCEY, P.E.
ENGINEER OF RECORD

Wallace Engineering
Structural Consultants, Inc.
1741 McGee Street
Kansas City, Missouri 64108
816.421.8282, Fax 816.421.8338
www.wallacesc.com

Date 9/13/21

Sheet No.

of

Job EAST BRIDGE

Subject FENCE ANCHORAGE

DESIGN BASE CONNECTION FOR GUARDRAIL:

HSS 4x4x1/4 TOST @ 8'-0" o.c.

$$\therefore \text{LATERAL LL} = 8'(50\#/\text{ft}) = 400\# @ h = 42''$$

$$\text{DL} = 8'(121\#) = 970\#$$

$$\text{FACTORED LATERAL: } V_u = 400(1.6) = 640\#$$

$$M_u = 400(3.5')(1.6) = 2.3\text{K-ft} = 27\text{K-in}$$

RE: HILTI TROFIS ANALYSIS

USE 10"x10" BASE PLATE w/ 3" EDGE DISTANCE

(4) 3/4" DIA HILTI HASTE RODS w/ H-T-#/200, EMBED = 6"

$$\therefore \text{CURB WIDTH} = 12''$$

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Company:
Address:
Phone | Fax: |
Design: 2021-09-13 Guardrail Base
Fastening point:

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Specifier:
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Specifier's comments:

1 Input data

Anchor type and diameter:

HIT-HY 200 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

Item number:

2198029 HAS-V-36 3/4"x8" (element) / 2022793 HIT-HY 200-R (adhesive)

Effective embedment depth:

$h_{ef,act} = 6.000$ in. ($h_{ef,limit} = -$ in.)

Material:

ASTM A 1554 Grade 36

Evaluation Service Report:

ESR-3187

Issued | Valid:

5/1/2021 | 3/1/2022

Proof:

Design Method ACI 318-14 / Chem

Stand-off installation:

$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.

Anchor plate^R:

$l_x \times l_y \times t = 9.000$ in. \times 10.000 in. \times 0.500 in.; (Recommended plate thickness: not calculated)

Profile:

Square HSS (AISC), HSS4X4X.25; (L x W x T) = 4.000 in. \times 4.000 in. \times 0.250 in.

Base material:

cracked concrete, 2500 , $f'_c = 2,500$ psi; $h = 8.500$ in., Temp. short/long: 32/32 °F

Installation:

hammer drilled hole, Installation condition: Dry

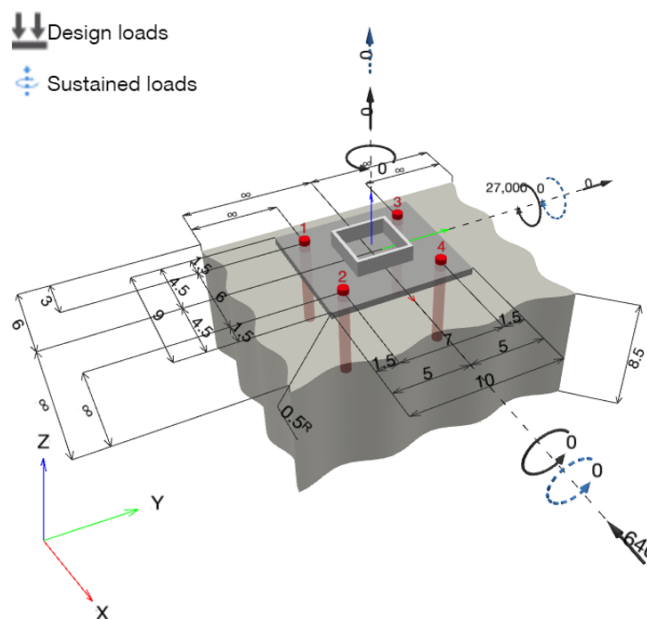
Reinforcement:

tension: condition B, shear: condition B; no supplemental splitting reinforcement present
edge reinforcement: none or $< \text{No. 4 bar}$



^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]





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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V _x = -640; V _y = 0; M _x = 0; M _y = 27,000; M _z = 0; N _{sus} = 0; M _{x,sus} = 0; M _{y,sus} = 0;	no	67

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2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	Status
Loading	Proof	Load	Capacity	β_N / β_V [%]	
Tension	Concrete Breakout Failure	3,986	6,015	67 / -	OK
Shear	Concrete edge failure in direction x-	640	2,910	- / 22	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.663	0.220	5/3	59	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!



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4 Remarks; Your Cooperation Duties

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