BY G. OHANIAN
DATE 5-29-2025
SUBJECT

RACK DESIGN & ENGINEERING CO.
412 WEST BROADWAY, SUITE #204
GLENDALE, CA. 91204
E-MAIL: rackdesign1@gmail.com

SHEET NO. 1
JOB NO. RD-21700

STRUCTURAL CALCULATIONS OF STORAGE RACKS FOR:

PUGET SOUND ENERGY

325 TODD ROAD NORTHWEST

PUYALLUP, WA 98371

PER IBC 2021, ASCE 7-16

RMI/ANSI/MH16.1:2021 AND

RMI/ANSI/MH16.3:2016

GARNIK OHANIAN
STATE OF WASHINGTON
33562
REGISTERED
PROFESSIONAL ENGINEER

Digitally signed by Garnik Ohanian
Date: 2025.05.30 11:07:54 -07'00'

EXPIRES 12-26-25

STORAGE RACKS CAPACITY:

2000 #/ LEVEL AT PALLET RACKS

1000 #/ ARM AT CANTILEVER RACKS

200 #/ LEVELS AT SHELVING

CALCS. 1 THRU 16

PRCTI20250781

DRAWINGS: RD-21700

Calculations required to be provided by the Permittee on site for all Inspections

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
SKinnear
06/20/2025
2:19:27 PM

CITY OF PUYALLUP
STATE OF WASHINGTON

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

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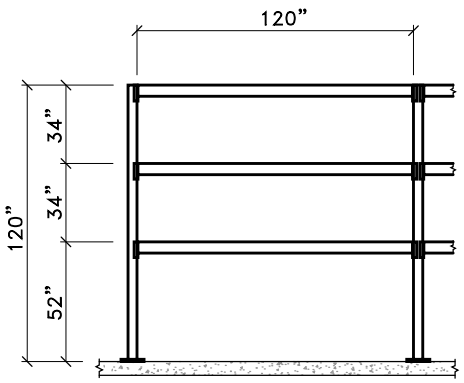
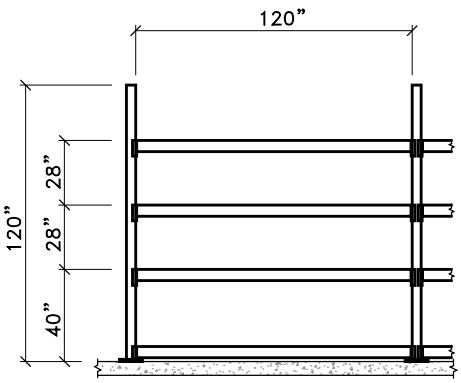
SHEET NO. 2
JOB NO. RD-21700



TYPE-B



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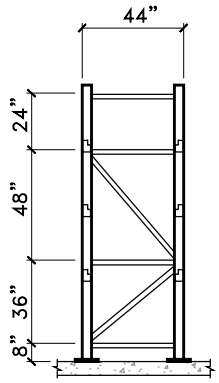
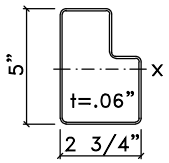


SIDE VIEW

BEAM DESIGN



$I_x = 2.86$
$S_x = 1.09$
$F_Y = 55^{KSI.}$

LOAD PER BEAM + 25% IMPACT LOAD

$(2.0^K x.88)+(1.0^K x.25) = \frac{2.0}{2_{BEAMS}} = 1.0^K$

$M = \frac{wL^2}{8} = 15\ ^{"K}$

$S_R = .46 < 1.09$

$\Delta = \frac{5xwL^4}{384.I_x.E} = .27" < \frac{L}{180} = .67"$

SEISMIC DESIGN

$V = \frac{S_{DS}\,xI}{Rx1.4_{(ASD)}} xW$ IBC 2021, ASCE 7-16
RMI/ANSI/MH16.1:2021

$S_{DS} = 1.00$ SITE CLASS D (RISK CATEGORY II)

I=1 NO PUBLIC ACCESS RMI 7.4.2.2

R=6 MOM. CONN. (LONG. SEISMIC) RMI 7.4.6

R=4 BRACED CONN. (TRANSV. SEISMIC)

W= D.L.+(.67xPRODUCT LOAD)
D.L.+(1.0xTOP SHELF MAX. LOAD)

LOAD PER COL. $= \frac{3x2.0^K}{2_{COL.}} = 3.0^K$

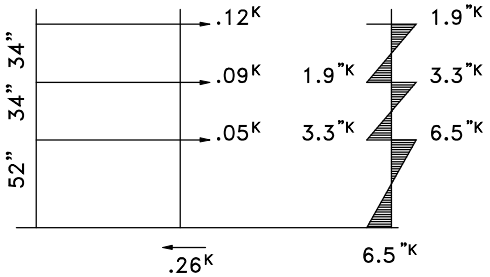
$P = .2_{DL} + (3.0^K x 0.75) = 2.4^K$

$W = .2_{DL} + (3.0^K_{PL} x 0.67) = 2.2^K$

$V_{LONGIT.} = .26^K$

$V_{TRANS.} = .39^K$

LONGIT. SEISMIC



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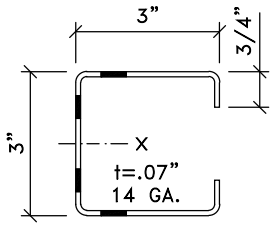
SHEET NO. 3
JOB NO. RD-21700

COLUMN DESIGN



$F_Y = 55$ KSI
$A_e = .62$
$I_x = .95$
$S_e = .6$
$r_x = 1.2$
$r_y = 1.1$

$\frac{KL}{r_x} = \frac{52 \times 1.0}{1.2} = 42$

$\frac{KL}{r_y} = \frac{36}{1.1} = 33$

$M_n = S_e \cdot F_y = 35$

$Fe = \frac{\pi^2 x E}{(\frac{KL}{r_x})^2} = 166$

$F_n = F_y(.658^{\lambda_c^2}) = 48$ KSI

$P_n = F_n \cdot A_e = 30.0$ K

$\lambda_c = \sqrt{F_y / Fe} = 0.58$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E \cdot Ix}{(KL)^2} = 102.0$

$ax = 1 - \frac{\Omega c P}{Pex} = .96$

$\Omega c = 1.8$
$\Omega b = 1.67$
$Cmx = .85$

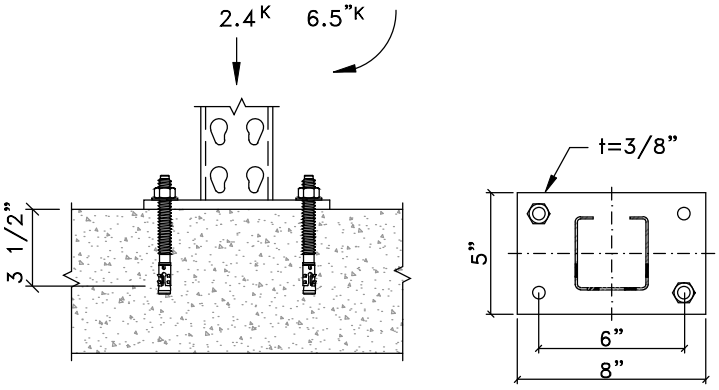
$\frac{\Omega c \cdot P}{P_n} + \frac{\Omega b \cdot Cmx \cdot M}{M_n \cdot ax} = .43 < 1$

BASE PLATE

ANCH. TENSION = 0

ANCHOR SHEAR = .13 K

(2)-1/2"ø ANCHORS PER BASE PL., 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

.5x.07x1x65=2.3 K BEARING CAPACITY OF COL. HOLE

7/16"ø RIVET

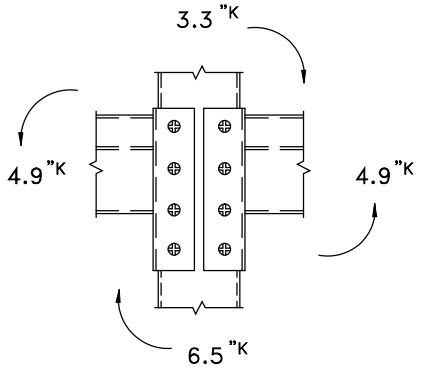
A = .1 Fy = 79 KSI

Pa = .1x79x.4 = 3 K

$M_{a\ CONN.} = (2.3^K x 6") + (1.5^K x 4") = 19.8\ "K$ 4 PIN CONN.

$M_{END} = .01 x w l^2 = 1.2\ "K$

M = 4.9 "K SEISMIC M = 6.1 "K TOTAL



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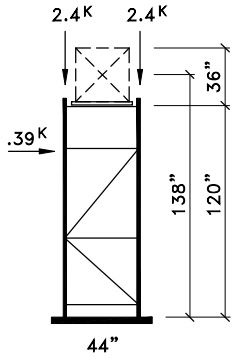
OVERTURNING 67% LOADING

$M_{OT} = .39^{K} \times 2_{COL.} \times 138" \times 0.66 = 72^{"K}$

$M_R = 2.4^{K} \times 44" = 108^{"K}$

NO UPLIFT



TOP LEVEL 100% LOADING

$W = 0.2_{DL} + 1.0_{LL} = 1.2^{K}$ LOAD PER COL.

$V = .22^{K}$

$M_{OT} = .22^{K} \times 2_{COL.} \times 120" = 52^{"K}$

$M_R = 1.2^{K} \times 44" = 53^{"K}$

NO UPLIFT

LOAD TO DIAGONAL

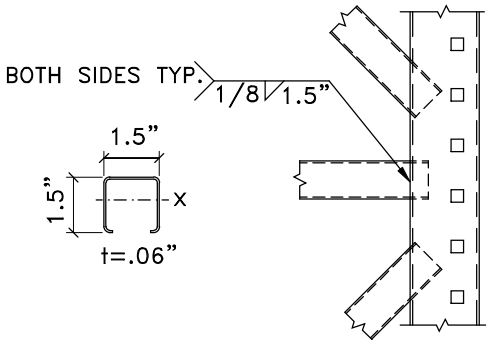
$P = .39^{K} \times 2_{COL.} \times \frac{52}{44} = .92^{K}$

$F_Y = 55^{KSI}$

$Ae = .26$

$r_x = .48$

$L = 52"$ $P_a = 3.1^{K}$



CHECK WELDS

$P_n = L.t.F_u = .06 \times 1.5" \times 65 = 5.9^{K}$

$\Omega = 2.35$

$\frac{P_n}{\Omega} = \frac{5.9^{K}}{2.35} = 2.5 \times 2_{SIDES} = 5.0^{K}$

CHECK SLAB

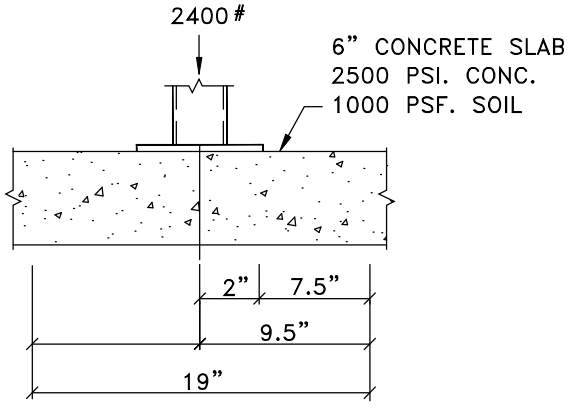
$\frac{2400}{1000} = 2.4^{\square'}$ $2.4 \times 144 = 345^{\square"}$

$\sqrt{345} = 19"$

$M = \left(\frac{7.5}{12}\right)^2 \times 1000 \times \frac{1}{2} \times 12 = 2344^{"\#}$

$S = \frac{12 \times 6^2}{6} = 72$

$\frac{2344}{72} = 33 < 1.6\sqrt{2500} = 80$



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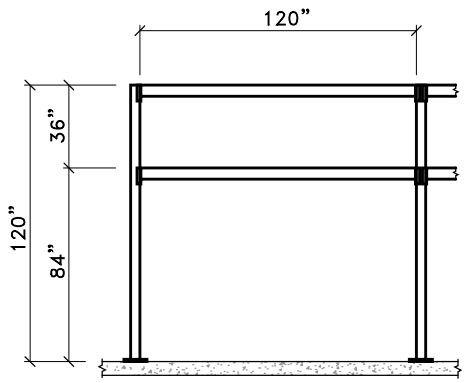
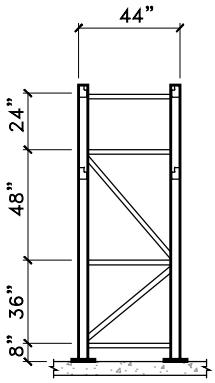
SHEET NO. 5
JOB NO. RD-21700



TYPE-A



SIDE VIEW

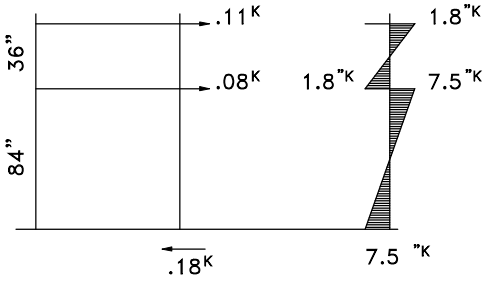
LOAD PER COL. $= \frac{2 \times 2.0^{K}}{2\ COL.} = 2.0^{K}$

$P = .2_{DL} + (2.0^{K} \times 0.75) = 1.7^{K}$

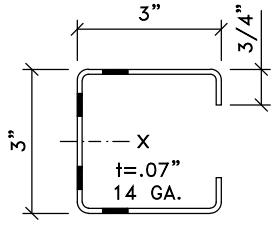
$W = .2_{DL} + (2.0^{K}_{PL} \times 0.67) = 1.5^{K}$

$V_{LONGIT.} = .18^{K}$

$V_{TRANS.} = .28^{K}$



COLUMN DESIGN



$F_Y = 55^{KSI}$
$A_e = .62$
$I_x = .95$
$S_e = .6$
$r_x = 1.2$
$r_y = 1.1$

$\frac{KL}{r_x} = \frac{84 \times 1.0}{1.2} = 68$

$\frac{KL}{r_y} = \frac{36}{1.1} = 33$

$M_n = S_e . F_y = 35$

$Fe = \frac{\pi^2 x E}{(\frac{KL}{r_x})^2} = 63$

$F_n = F_y(.658^{\lambda_c^2}) = 38^{KSI}$

$P_n = F_n . A_e = 24.0^{K}$

$\lambda_c = \sqrt{F_y / Fe} = 0.93$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E . Ix}{(KL)^2} = 39.0$

$ax = 1 - \frac{\Omega c P}{Pex} = .92$

$\Omega c = 1.8$
$\Omega b = 1.67$
$Cmx = .85$

$\frac{\Omega c . P}{P_n} + \frac{\Omega b . Cmx . M}{M_n . ax} = .46 < 1$

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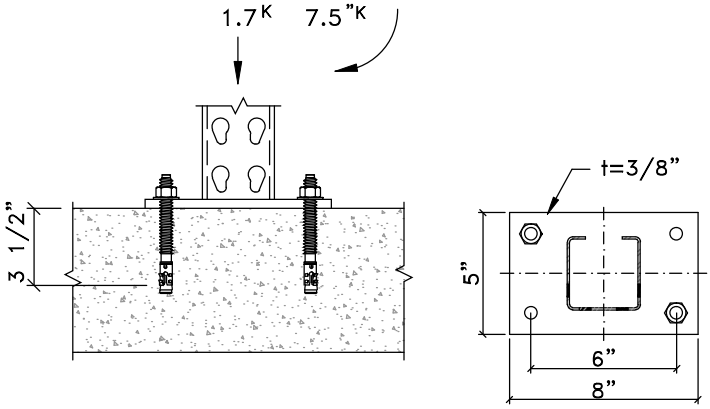
BASE PLATE

ANCH. TENSION = .40 K

ANCHOR SHEAR = .09 K

(2)-1/2"ø ANCHORS PER BASE PL., 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

.5x.07x1x65=2.3 K BEARING CAPACITY OF COL. HOLE

7/16"ø RIVET

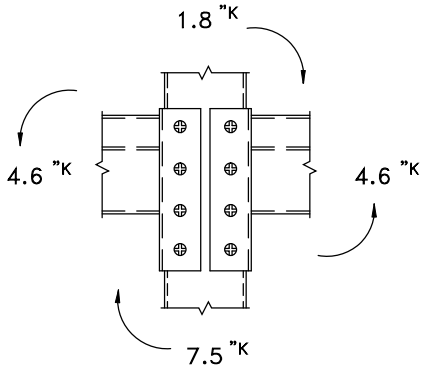
A = .1 Fy = 79 KSI

Pa = .1x79x.4 = 3 K

$M_{a\ CONN.}$ = (2.3 Kx6")+(1.5 Kx4") = 19.8 "K 4 PIN CONN.

M_{END} = .01xwl^2 = 1.2 "K

M = 4.6"K SEISMIC M = 5.8"K TOTAL

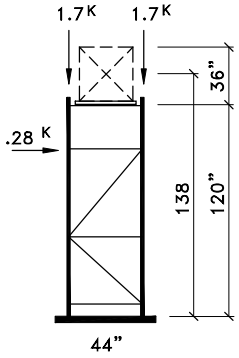


OVERTURNING 67% LOADING

M_{OT} = .28 Kx2 COL. x138"x0.66 = 50 "K

M_R = 1.7 Kx44" = 75 "K

NO UPLIFT



TOP LEVEL 100% LOADING

W= 0.2_{DL}+1.0_{LL}=1.2 K LOAD PER COL.

V= .22 K

M_{OT} = .22 Kx2 COL. x120" = 52"K

M_R = 1.2 Kx44" = 53 "K

NO UPLIFT

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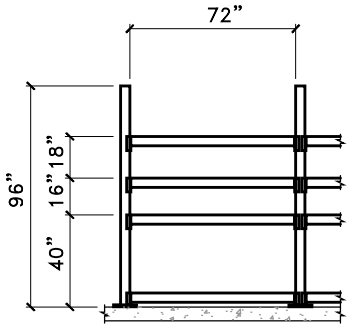
SHEET NO. 7
JOB NO. RD-21700



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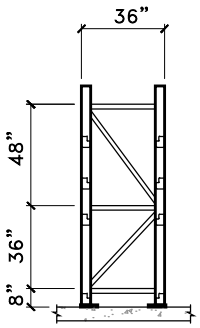
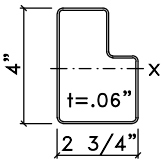


SIDE VIEW

BEAM DESIGN



$I_x = 1.63$
$S_x = .77$
$F_Y = 55^{KSI.}$

LOAD PER BEAM + 25% IMPACT LOAD

$(2.0^K x .88)+(1.0^K x .25) = \frac{2.0}{2_{BEAMS}} = 1.0^K$

$M = \frac{wL^2}{8} = 9\ ^{"K}$

$S_R = .27 < .77$

$\Delta = \frac{5xwL^4}{384.I_x.E} = .10" < \frac{L}{180} = .40"$

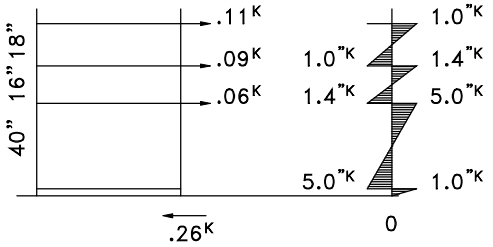
LOAD PER COL. $= \frac{3x2.0^K}{2_{COL.}} = 3.0^K$

$P = .2_{DL} + (3.0^K x 0.75) = 2.4^K$

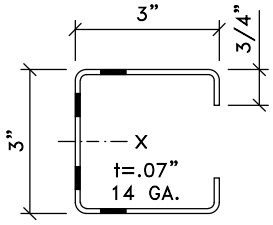
$W = .2_{DL} + (3.0^K_{PL} x 0.67) = 2.2^K$

$V_{LONGIT.} = .26^K$

$V_{TRANS.} = .39^K$



COLUMN DESIGN



$F_Y = 55^{KSI}$
$A_e = .62$
$I_x = .95$
$S_e = .6$
$r_x = 1.2$
$r_y = 1.1$

$\frac{KL}{r_x} = \frac{40x1.0}{1.2} = 32$

$\frac{KL}{r_y} = \frac{36}{1.1} = 33$

$M_n = S_e.F_y = 35$

$Fe = \frac{\pi^2 xE}{(\frac{KL}{r_y})^2} = 272$

$F_n = F_y(.658^{\lambda_c^2}) = 51^{KSI}$

$P_n = F_n.A_e = 31.0^K$

$\lambda_c = \sqrt{F_y/Fe} = 0.45$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E.Ix}{(KL)^2} = 173.0$

$ax = 1 - \frac{\Omega_c P}{Pex} = .97$

$\Omega_c = 1.8$
$\Omega_b = 1.67$
$Cmx = .85$

$\frac{\Omega_c.P}{P_n} + \frac{\Omega_b.Cmx.M}{M_n.ax} = .35 < 1$

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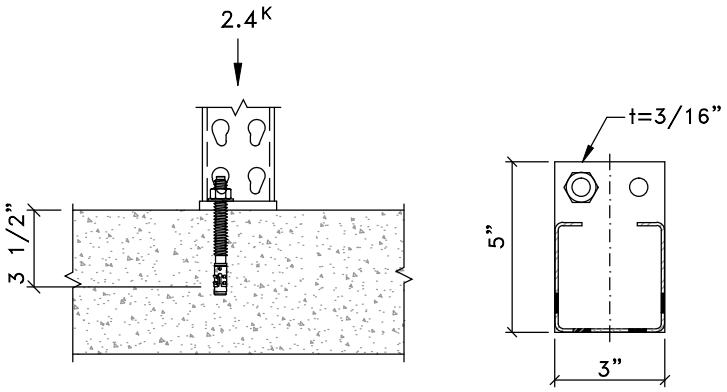
BASE PLATE

ANCH. TENSION = 0

ANCHOR SHEAR = .26 K

(1)-1/2"ø ANCHOR PER BASE PL., 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

.5x.07x1x65=2.3 K BEARING CAPACITY OF COL. HOLE

7/16"ø RIVET

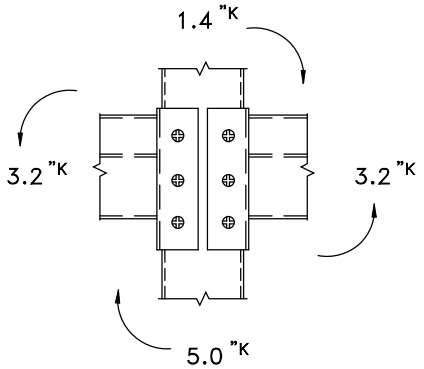
A = .1 Fy = 79 KSI

Pa = .1x79x.4 = 3 K

$M_{a\ CONN.}$ = (2.3 Kx4")+(1.1 Kx2") = 11.4 "K 3 PIN CONN.

M_{END} = .01xwl^2 = 1.2 "K

$M_{SEISMIC}$ = 3.2 "K M_{TOTAL} = 4.4 "K

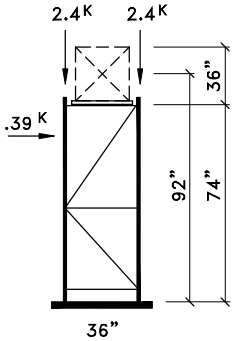


OVERTURNING 67% LOADING

M_{OT} = .39 Kx2$_{COL.}$x92"x0.66 = 48 "K

M_R = 2.4 Kx36" = 88 "K

NO UPLIFT



TOP LEVEL 100% LOADING

W= 0.2_{DL}+1.0_{LL}=1.2 K LOAD PER COL.

V= .22 K

M_{OT} = .22 Kx2$_{COL.}$x74" = 32"K

M_R = 1.2 Kx36" = 43 "K

NO UPLIFT

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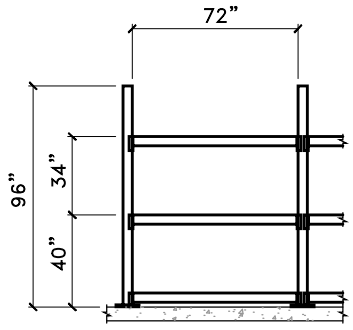
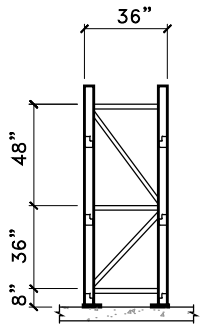


TYPE-B



SIDE VIEW

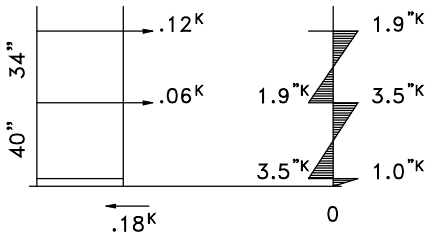
LOAD PER COL. $= \frac{2 \times 2.0^{K}}{2\ \text{COL.}} = 2.0^{K}$

$P = .2_{DL} + (2.0^{K} \times 0.75) = 1.7^{K}$

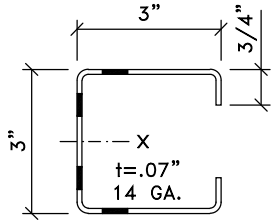
$W = .2_{DL} + (2.0^{K}_{PL} \times 0.67) = 1.5^{K}$

$V_{LONGIT.} = .18^{K}$

$V_{TRANS.} = .28^{K}$



COLUMN DESIGN



$F_Y = 55^{KSI}$
$Ae = .62$
$I_x = .95$
$S_e = .6$
$r_x = 1.2$
$r_y = 1.1$

$\frac{KL}{r_x} = \frac{40 \times 1.0}{1.2} = 32$

$\frac{KL}{r_y} = \frac{36}{1.1} = 33$

$M_n = S_e . F_y = 35$

$Fe = \frac{\pi^2 x E}{(\frac{KL}{r_y})^2} = 272$

$F_n = F_y(.658^{\lambda_c^2}) = 51^{KSI}$

$P_n = F_n . Ae = 31.0^{K}$

$\lambda_c = \sqrt{F_y / Fe} = 0.45$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E . Ix}{(KL)^2} = 173.0$

$ax = 1 - \frac{\Omega c P}{Pex} = .98$

$\Omega c = 1.8$
$\Omega b = 1.67$
$Cmx = .85$

$\frac{\Omega c . P}{P_n} + \frac{\Omega b . Cmx . M}{M_n . ax} = .24 < 1$

BY G. OHANIAN
DATE 5-29-2025
SUBJECT

RACK DESIGN & ENGINEERING CO.
412 WEST BROADWAY, SUITE #204
GLENDALE, CA. 91204
E-MAIL: rackdesign1@gmail.com

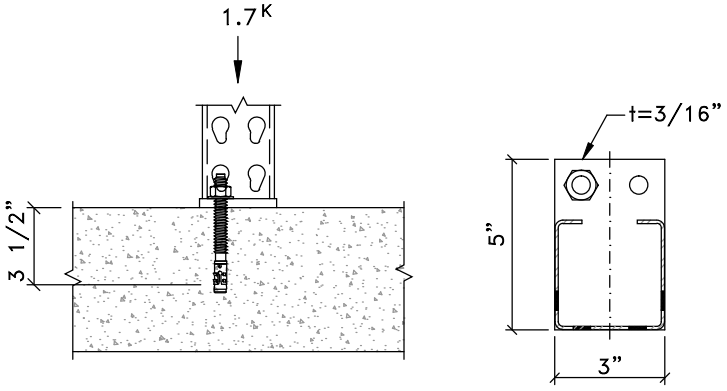
SHEET NO. 10
JOB NO. RD-21700

BASE PLATE

ANCH. TENSION = 0

ANCHOR SHEAR = .18 K

(1)-1/2"ø ANCHOR PER BASE PL., 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

.5x.07x1x65=2.3 K BEARING CAPACITY OF COL. HOLE

7/16"ø RIVET

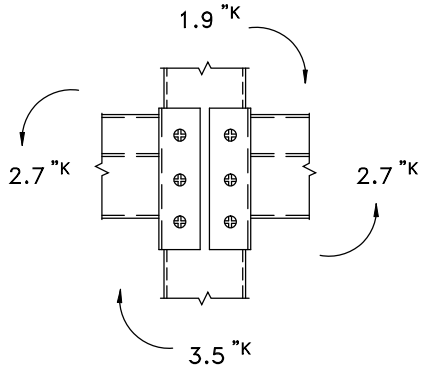
A = .1 Fy = 79 KSI

Pa = .1x79x.4 = 3 K

$Ma_{CONN.}$ = (2.3 Kx4")+(1.1 Kx2") = 11.4 "K 3 PIN CONN.

M_{END} = .01xwl^2 = .7 "K

M = 2.7 "K SEISMIC M = 3.4 "K TOTAL

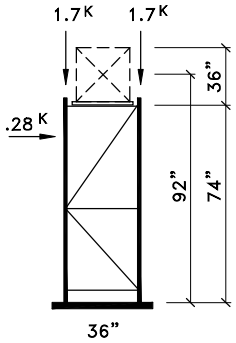


OVERTURNING 67% LOADING

M_{OT} = .28 Kx2 COL. x92"x0.66 = 33

M_R = 1.7 Kx36" = 61 "K

NO UPLIFT



TOP LEVEL 100% LOADING

W= 0.2_{DL}+1.0_{LL}=1.2 K LOAD PER COL.

V= .22 K

M_{OT} = .22 Kx2 COL. x74" = 32 "K

M_R = 1.2 Kx36" = 43 "K

NO UPLIFT

BY G. OHANIAN
DATE 5-29-2025
SUBJECT

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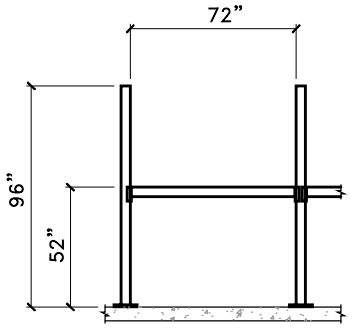
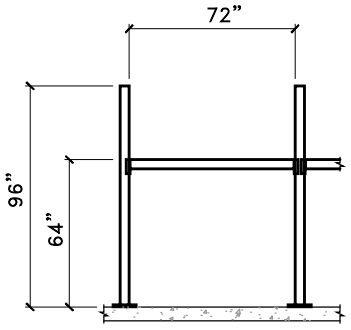
412 WEST BROADWAY, SUITE #204
GLENDALE, CA. 91204
E-MAIL: rackdesign1@gmail.com

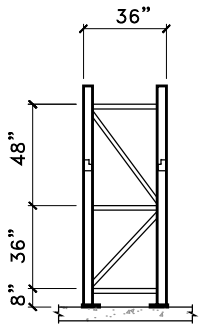
SHEET NO. 11
JOB NO. RD-21700



TYPE-D



TYPE-E



SIDE VIEW

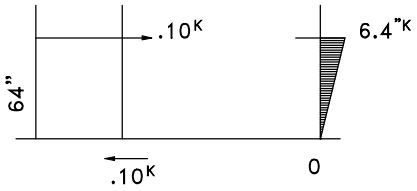
LOAD PER COL. $= \frac{2.0^K}{2\ \text{COL.}} = 1.0^K$

$P = .2_{DL} + (1.0^K \times 0.75) = 1.0^K$

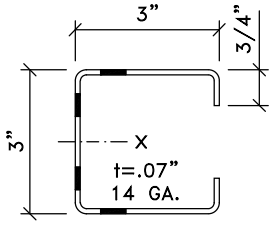
$W = .2_{DL} + (1.0^K_{PL} \times 0.67) = 0.9^K$

$V_{LONGIT.} = .10^K$

$V_{TRANS.} = .16^K$



COLUMN DESIGN



$F_Y = 55^{KSI}$
$A_e = .62$
$I_x = .95$
$S_e = .6$
$r_x = 1.2$
$r_y = 1.1$

$\frac{KL}{r_x} = \frac{64 \times 1.7}{1.2} = 88$

$\frac{KL}{r_y} = \frac{36}{1.1} = 33$

$M_n = S_e . F_y = 35$

$Fe = \frac{\pi^2 x E}{(\frac{KL}{r_x})^2} = 38$

$F_n = F_y(.658^{\lambda_c^2}) = 30^{KSI}$

$P_n = F_n . A_e = 19.0^K$

$\lambda_c = \sqrt{F_y / Fe} = 1.21$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E . Ix}{(KL)^2} = 23.0$

$ax = 1 - \frac{\Omega c P}{Pex} = .93$

$\Omega c = 1.8$
$\Omega b = 1.67$
$Cmx = .85$

$\frac{\Omega c . P}{P_n} + \frac{\Omega b . Cmx . M}{M_n . ax} = .37 < 1$

BY G. OHANIAN
DATE 5-29-2025
SUBJECT

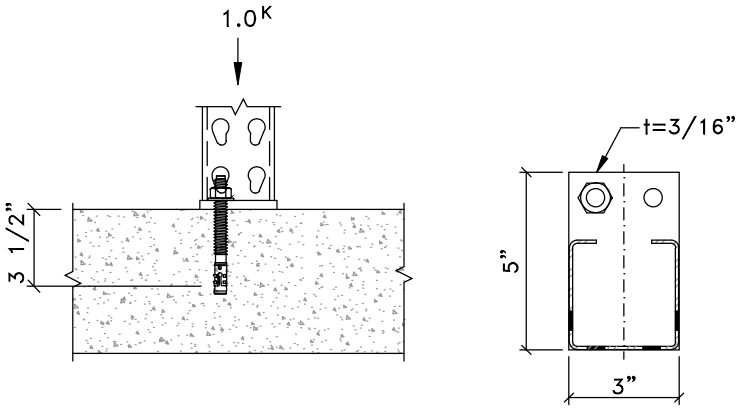
RACK DESIGN & ENGINEERING CO.
412 WEST BROADWAY, SUITE #204
GLENDALE, CA. 91204
E-MAIL: rackdesign1@gmail.com

BASE PLATE

ANCH. TENSION = 0

ANCHOR SHEAR = .10 K

(1)-1/2"ø ANCHOR PER BASE PL., 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

.5x.07x1x65=2.3 K BEARING CAPACITY OF COL. HOLE

7/16"ø RIVET

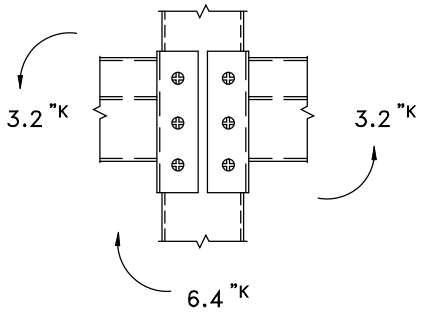
A = .1 Fy = 79 KSI

Pa = .1x79x.4 = 3 K

$M_{a\ CONN.}$ = (2.3 Kx4")+(1.1 Kx2") = 11.4 "K 3 PIN CONN.

M_{END} = .01xwl^2 = .7 "K

$M_{SEISMIC}$ = 3.2 "K M_{TOTAL} = 3.9 "K

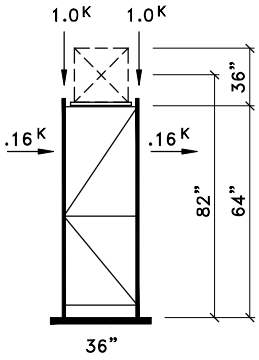


OVERTURNING 67% LOADING

M_{OT} = .16 Kx2$_{COL.}$x82" = 26 "K

M_R = 1.0 Kx36" = 34 "K

NO UPLIFT



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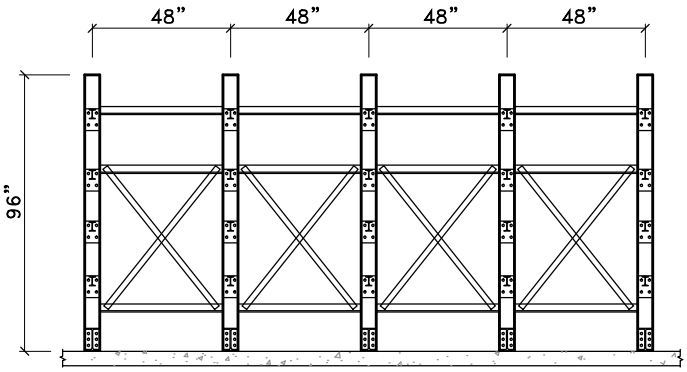
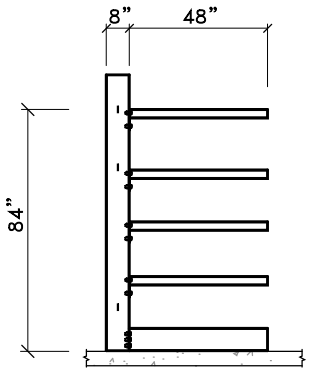
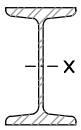


CANTILEVER RACK



SIDE VIEW

S3x5.7 ARM



$I_x = 2.5$

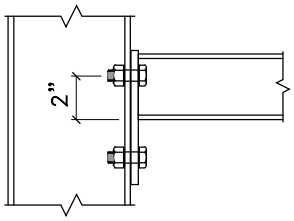
$S_x = 1.67$

$F_Y = 50^{KSI.}$

1000 #/ ARM

$M = 1.0^K \times 24" = 24"^K$

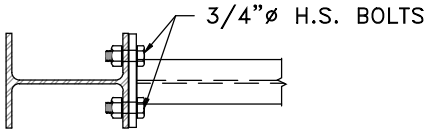
$S_R = \frac{24"^K}{30} = 0.8 < 1.67$



$Pa = 19.4^K$ 3/4"ø H.S. BOLTS

$19.4 \times 2 = 38.8^K$ 2 BOLTS

$Ma_{CONN.} = 38.8^K \times 2" = 78 > 24"^K$



SEISMIC DESIGN

$V = \frac{S_{D1} \times I}{T \times R \times 1.4} \times W$ IBC 2021
ANSI MH16.3-2016

$S_{D1} = .47$	SITE CLASS D
I=1	NO PUBLIC ACCESS
R=2.5	CROSS AISLE
R=3.25	DOWN AISLE
T=0.5	SECONDS
W=	D.L.+(.67xPRODUCT LOAD)

LOAD PER COL. $= 4 \times 1.0^K = 4.0^K$

$W = .5_{DL} + (4.0^K_{PL} \times 0.67) = 3.2^K$

$V_{CROSS} = .85^K$

$V_{DOWN} = .66^K$

$M_e = 3.2^K \times (24" + 4") = 89"^K$

$M_s = .85^K \times 84" \times .66 = 47"^K$

$136"^K$

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W8x18 COLUMN

$F_Y = 50^{KSI}$

$A_g = 5.26$ $\Omega_b = 1.67$

$Z_x = 17$ $\Omega_c = 1.67$

$r_x = 3.43$

$\frac{Kl}{r_x} = \frac{2x84}{3.43} = 49$

$M_n = Z_x . F_y = 850^{"K}$

$M_c = \frac{M_n}{\Omega_b} = 508^{"K}$

$Fe = \frac{\pi^2 xE}{(\frac{Kl}{r})^2} = 121$

$Fe > .44Fy = 22$

$F_{cr} = F_y (.658^{Fy/Fe}) = 42^{KSI}$

$P_n = F_{cr} . A_g = 221^K$

$P_c = \frac{P_n}{\Omega_c} = \frac{221}{1.67} = 132$

COMBINED STRESS RATIO

$\frac{P}{P_c} = \frac{4.0}{78} = .03 < .2$

$\frac{Pr}{2P_c} + \frac{M}{M_c} = \frac{4.0}{2x132} + \frac{136}{508} = .28 < 1.0$

OVERTURNING

$M_{OT} = 47^{"K}$

$M_R = 3.2^K x 28" = 89^{"K}$ NO UPLIFT

(2)-5/8"ø ANCHORS PER BASE 3 1/2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266

PERIODIC SPECIAL INSPECTION IS REQUIRED

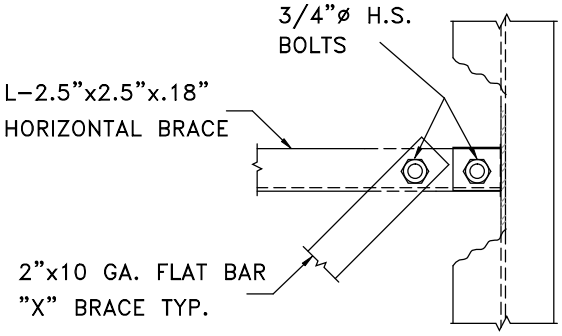
"X" BRACING

$P = .66x \frac{5^{COL.}}{4_{"X" BRACE}} x \frac{62"}{48"_{SPAN}} = 1.0^K$ (62" = LENGTH OF BAR)

2"x10 GA. FLAT BAR

$Pa = 2"x.13"x36x.6 = 5.6^K$

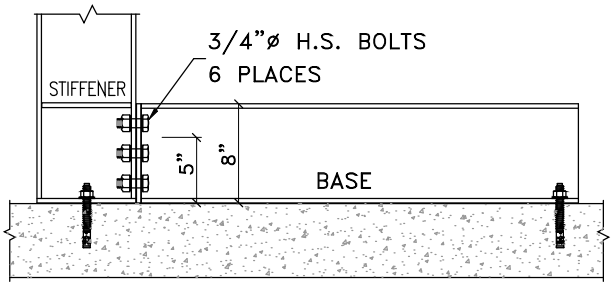
3/4"ø H.S. BOLT $Pa = 9.3 > 1.0^K$



BASE CONNECTION

$M_{BASE} = 136^{"K}$

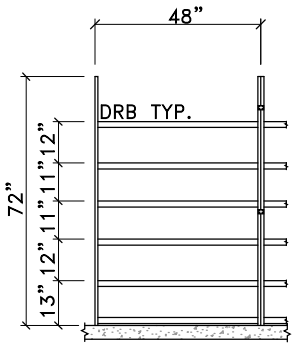
$M_{a\ BASE} = 19.4^K$ (3/4"ø H.S. BOLT) $x4x5" = 388 < 136^{"K}$



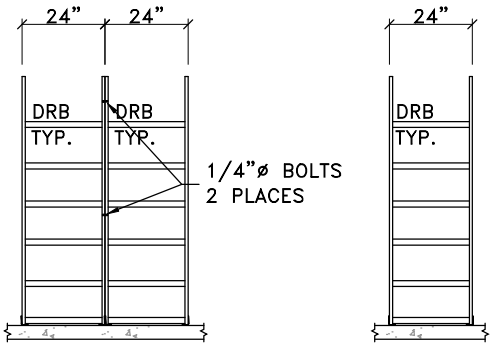
BY G. OHANIAN
DATE 5-29-2025
SUBJECT

RACK DESIGN & ENGINEERING CO.
412 WEST BROADWAY, SUITE #204
GLENDALE, CA. 91204
E-MAIL: rackdesign1@gmail.com

SHEET NO. 15
JOB NO. RD-21700

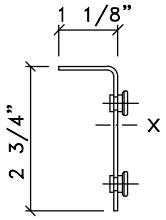


FRONT VIEW



SIDE VIEW

DOUBLE RIVET BEAM



$I_x = 0.18$
$S_x = .11$
$F_Y = 36^{KSI}$
t=16 GA.

200 #/ LEVEL

$M = \frac{48" \times .10^K}{8} = 0.6"^K$

$S_R = \frac{0.6"^K}{22} = .03 < .11$

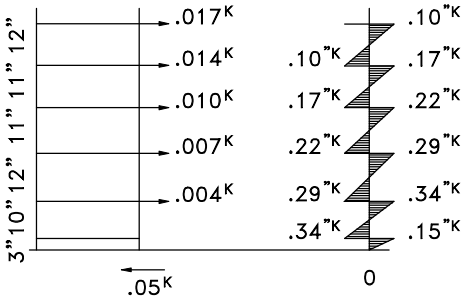
$\Delta = \frac{5 \times w \times L^4}{384 . I_x . E} = .03" < \frac{L}{180} = .26"$

LOAD PER COL. $= \frac{5 \times .20^K}{2\ COL.} = .50^K$

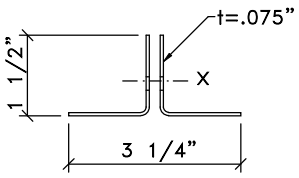
$P = .1_{DL} + (.50^K \times 0.75) = .48^K$

$W = .1_{DL} + (.60^K_{PL} \times 0.67) = .44^K$

$V = .05^K$



COLUMN DESIGN



$F_Y = 36^{KSI}$
Ae=.28
I_x=.07
S_{min}=.07
r_{min}=.51

$\frac{KL}{r_{min}} = \frac{10 \times 1.0}{.51} = 20$

$M_n = S_e . F_y = 2.5$

$Fe = \frac{\pi^2 \times E}{(\frac{KL}{r_x})^2} = 757$

$F_n = F_y(.658^{\lambda_c^2}) = 35^{KSI}$

$P_n = F_n . Ae = 9.9^K$

$\lambda_c = \sqrt{F_y / Fe} = .22$

$\lambda_c < 1.5$

COMBINED STRESS RATIO

$Pex = \frac{\pi^2 E . Ix}{(KL)^2} = 204$

$ax = 1 - \frac{\Omega c P}{Pex} = .99$

$\Omega c = 1.8$
$\Omega b = 1.67$
$Cmx = .85$

$\frac{\Omega c . P}{P_n} + \frac{\Omega b . Cmx . M}{M_n . ax} = .23 < 1$

BY G. OHANIAN
DATE 5-29-2025
SUBJECT

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412 WEST BROADWAY, SUITE #204
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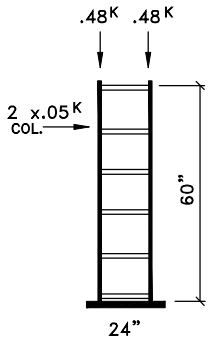
OVERTURNING

$M_{OT} = .05^K \times 2 \times 60" \times .66 = 3.9^{"K}$

$M_R = .48^K \times 24" = 11.5^{"K}$

NO UPLIFT

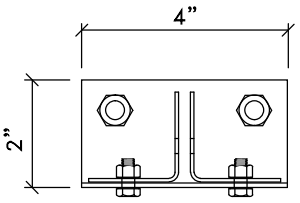


BASE PLATE

ANCHOR TENSION = 0

ANCHOR SHEAR = $.04^K$

(2)-3/8"ø ANCHORS PER BASE PL., 2" EMB.
HILTI KWIK BOLT-TZ2 ESR-4266
PERIODIC SPECIAL INSPECTION IS REQUIRED



MOMENT AT BEAM CONNECTION

$M_{CONN.} = \frac{.34+.29}{2} = .32^{"K}$

$V_{a\ RIVET} = \frac{.25^2 \times 3.14}{4} \times 80 \times .4 = 1.5^K$

$M_{a\ CONN} = 1.5^K \times 1.5" = 2.3^{"K}$