REXCONN DESIGN
STRUCTURAL ENGINEERING

JOB _____ NO. _____
SHEET NO. 2 OF H
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
DESCRIPTION HSS6.625X0.25 T <=50 kips

Hanger: HSS6.625x0.25

A_g = 4.68 in^2

F_y = 42 ksi

F_u = 58 ksi

t = 0.233 in

T = 50 kips

HSS Check

-HSS to WF web weld

Try 1/4 fillet weld (4 side)

Try L = 6.75" Min

D_{eff} = 1/4-1/16 = 3/16

$ØR_n = 1.392*D_{eff}*4*L = 1.392*3*6.75*4 = 112.8$ kips > T Okay

-Tension Yielding HSS

$ØR_n = 0.9F_yA_g = 0.9*42*4.68 = 176.9$ kips >= T Okay

-Tension Rupture HSS

A_g = 4.68 in^2

$A_n = A_g - 2*(t_w+0.125)t = 4.68-2(0.375+0.125)*0.233 = 4.45in^2$

X = D/pi = 6.625/3.14 = 2.1088

U = 1-(X/L) = 1-(2.1088/6.75) = 0.6875

If L > 1.3*D then U = 1

$A_e = UA_n = 3.06in^2$

$ØR_n = 0.75*F_u*A_e = 0.75*58*3.06 = 133.1$ kips > T Okay

Web

Beam F_y = 50 ksi; Beam F_u = 65 ksi

-Shear Yielding of WF Web

Web thicknes t_w = 0.375 in X 8

$ØR_n = 1*0.6*F_y*t_w*L*2 = 1*0.6*50*0.375*6.75*2 = 151.9$ kips

-Tension Yielding

$ØR_n = 0.9*A_g*F_y = 135$ kips > T Okay

-Tension Rupture

$ØR_n = 0.75*0.85*A_g*F_u = 124.3$ kips > T Okay

Flange

Flange width b_f = 8in

Flange thickness t_f = 0.375in

Try 3/4" A325-N-STD (row x column)2x2

$Ør_n$ = 15.9 k/bolt

$ØR_n = Ør_n*row*column = 15.9*2*2 = 63.6$ kips > T/2 Okay

-Tension Yielding

$\emptyset R_n = 0.9*F_y*b_f*t_f$ = 135 kips > T/2 Okay

-Tension Rupture

$\emptyset R_n = 0.75*F_u*(b_f-(2*(0.75+0.125)))t_f$= 114.3 kips > T/2 Okay

-Block shear rupture

$\emptyset R_n$ = 94.1 kips > T/2 Okay

Flange Plate

Plate thickness t_p = 0.5 in

Plate width b_p = 8 in

Plate F_y = 36 ksi

Plate F_u = 58 ksi

-Tension Yielding

$\emptyset R_n = 0.9*F_y*b_p*t_p$ = 129.6 kips > T/2 Okay

-Tension Rupture

$\emptyset R_n = 0.75*F_u*(b_p-(2*(0.75+0.125)))t_p$ > 135.9 kips > T/2 Okay

-Block shear rupture

$\emptyset R_n$ = 104.2 kips > T/2 Okay

-WT Check

e = 8" Max

T/2 = 25 kips

M = T*e/2 = 200 kips-in

Try 3/8 WT stem

D_{eff} = 3.94#16's

L_w = 15" $S_w = L_w^2/3$ = 75 in^2

$f_{req} = M/S_w + (T/2)/(2*L_w)$ = 3.5 k/in

$F_{allow} = 1.392*D_{eff}$ = 5.48 k/in > f_{req} Okay

$\emptyset M_n = L_w^2*0.375*.25*50*0.9$ = 949.2 kips-in > M Okay