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# Doubly Symmetric I Shape Wale Design
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316000

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# Input Geometry
begin

    # Material & Total Geometry

    E=29000 # ksi Elastic Modulus
    G=11200 # ksi Shear Modulus
    F_y=50 # ksi Yield Strength
    L_cx=18*12 # in
    L_cy=18*12 # in
    L_cz=18*12 # in

    # Cross Section Geometry

    A=72.5 # in^2 Area
    d=36.7 # in Total Depth

    t_w=0.8 # in Web Thickness

    b_f=16.5 # in Flange Width
    t_f=1.35 # in Flange Thickness

    k=2.3 # in Corner, h=d-2*k for web depth

    γ=247/100 # klf Unit Weight over Length

    λ_f= 6.11 # Flange Ratio
    λ_w=40.1 # Web Ratio, can also be determined as (d-2*k)/t_w

    I_x=16700
    I_y=1010

    S_x=913
    S_y=123

    r_x=15.2
    r_y=3.74

    Z_x=1030
    Z_y=190

    r_ts=4.42
    h_0=35.4

    J=34.7
    C_w=316000
end
```

```
# Compact Check
begin

    λ_c_rf = 0.56*sqrt(E/F_y) # B4.1(a)

    λ_c_rw = 1.49*sqrt(E/F_y) # B4.1(a)

    λ_lr = max(L_cx/r_x, L_cy/r_y) # E3-2, E3-3

    # Determine F_e (Flexural Buckling / Tortional Buckling)

    # C_w = I_y*h_0^2/4 # E4(c)
    F_e = min(pi^2*E/(λ_lr)^2, (pi^2*E*C_w/L_cz^2+G*J)/(I_x+I_y)) #  E3-4, E4-2

    # Determine F_cr (From F_e)

    if λ_lr <= 4.71*sqrt(E/F_y) # E3(a)
            F_cr = 0.658^(F_y/F_e)*F_y # E3-2
    else # E3(b)
            F_cr = 0.877*F_e # E3-3
    end

    # Determine A_ge (Non-Slender / Slender)

    if λ_f <= λ_c_rf && λ_w <= λ_c_rw # E3, E4, E7
        A_ge = A
    else

        h = λ_w*t_w

        A_flange = 2*b_f*t_f
        A_web = h*t_w
        A_res = A - A_flange - A_web # Area except Web and Flange

        # Flange

        if λ_f <= λ_c_rf*sqrt(F_y/F_cr) # E7(a)
            A_flange = A_flange # E7-2
        else # E7(b)
            c_1_f = 0.22 # E7.1
            c_2_f = (1-sqrt(1-4*c_1_f))/2/c_1_f # E7-4
            F_el_f = (c_2_f*λ_c_rf/λ_f)^2*F_y # E7-5

            A_flange = A_flange * (1-c_1_f*sqrt(F_el_f/F_cr))*sqrt(F_el_f/F_cr) # E7-
            3
        end

        # Web

        if λ_w <= λ_c_rw*sqrt(F_y/F_cr) # E7(a)
            A_web = A_web # E7-2
        else
            c_1_w = 0.18 # E7.1
            c_2_w = (1-sqrt(1-4*c_1_w))/2/c_1_w # E7-4
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            F_el_w = (c_2_w*λ_c_rw/λ_w)^2*F_y # E7-5

            A_web = A_web * (1-c_1_w*sqrt(F_el_w/F_cr))*sqrt(F_el_w/F_cr) # E7-3
        end

        A_ge = A_res + A_flange + A_web

    end

    P_n = F_cr*A_ge # E3-1, E4-1, E7-1
    print(A_ge)
```

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72.5
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```
begin
    a=1
    b=2
    if a<=1 && b<=1
        print(1)
    else
        print(0)
    end
end
```

```
0
```

3

```
begin
    c=2
    c=c+1
end
```