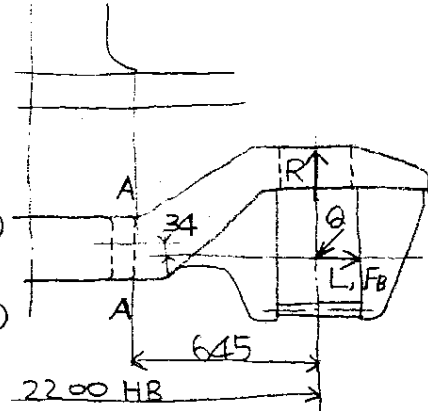


	7-1) TKK 8000 Mc1	
57-4-22	側バリ強度	9 /

車両重量 62.9t (2.9倍定員)

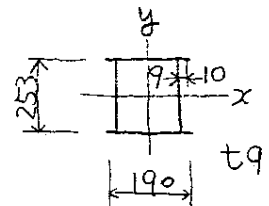
1) 荷重

$$\begin{aligned}
 R &= \text{軸バネ反力} = 7060 \text{ Kg} \\
 L &= \text{前後力} = 0.3 R = 2120 \text{ Kg} \\
 Q &= \text{左右力} = 0.3 R = 2120 \text{ Kg} \text{ (片振)} \\
 F_B &= \text{制輪子押付力} = 2500 \text{ Kg} \\
 &\quad \text{(片振, 2倍定員, 非常)} \\
 R' &= 0.3 R = 2120 \text{ Kg}
 \end{aligned}$$



2) A断面

$$\begin{aligned}
 Z_x &= 556 \text{ cm}^3, & A_x &= 42.3 \text{ cm}^2 \\
 Z_y &= 397 \text{ cm}^3, & A_y &= 34.2 \text{ cm}^2 \\
 A &= 76.5 \text{ cm}^2, & A_m &= 393 \text{ cm}^2
 \end{aligned}$$



3) 応力

$$\begin{aligned}
 \text{i) } R \text{ による曲} & \quad \sigma_R = M/Z_x = 7060 \times 645 / 556 = 819 \text{ Kg/cm}^2 \\
 \text{ii) } R' \text{ " " " } & \quad \sigma_{R'} = 0.3 \sigma_R = 246 \text{ Kg/cm}^2 \\
 \text{iii) } L \text{ による曲} & \quad \sigma_L = M/Z_x = 2120 \times 3.4 / 556 = 13.0 \\
 \text{iv) } Q \text{ による曲} & \quad \sigma_Q = M/Z_y = 2120 \times 645 / 397 = 344 \\
 \text{v) } F_B \text{ による曲} & \quad \sigma_B = M/Z_x = 2500 \times 3.4 / 556 = 15.3 \\
 \text{vi) } R \text{ によるせん断} & \quad \tau_R = R/A_x = 7060 / 42.3 = 167 \\
 \text{vii) } R' \text{ " " " } & \quad \tau_{R'} = 0.3 \tau_R = 50.1 \\
 \text{viii) } L \text{ による引張} & \quad \sigma_{L_t} = L/A = 2120 / 76.5 = 27.7 \\
 \text{ix) } Q \text{ によるせん断} & \quad \tau_Q = Q/A_y = 2120 / 34.2 = 62.0 \\
 \text{x) " 接り} & \quad \tau_{tg} = M_t / 2tA_m = 2120 \times 3.4 / 2 \times 0.9 \times 393 = 10.2 \\
 \text{xi) } F_B \text{ による引張} & \quad \sigma_{B_t} = F_B / A = 2500 / 76.5 = 32.7 \text{ Kg/cm}^2
 \end{aligned}$$

4) 合成応力

σ_L, σ_B は偏心少いのので省略してよい

$$\begin{aligned}
 \text{平均応力} \quad \sigma_m &= \sqrt{\sigma_R^2 + (\sigma_Q/2)^2 + (\sigma_B/2 + \sigma_{B_t}/2)^2 + 3[\tau_R^2 + (\tau_Q/2 + \tau_{tg}/2)^2]} \\
 &= 888 \text{ Kg/cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{変動応力} \quad \sigma_{dy} &= \sqrt{\sigma_{R'}^2 + (\sigma_L + \sigma_{L_t})^2 + (\sigma_Q/2)^2 + (\sigma_B/2 + \sigma_{B_t}/2)^2} \\
 &\quad + 3[\tau_{R'}^2 + (\tau_Q/2 + \tau_{tg}/2)^2] \\
 &= 322 \text{ Kg/cm}^2
 \end{aligned}$$

$$\text{最大応力} \quad \sigma_{max} = \sigma_m + \sigma_{dy} = 1210 \text{ Kg/cm}^2$$

$$\text{許容応力} \quad \sigma_a = 1330 \times 1.125 = 1496 \text{ Kg/cm}^2 \quad DS \Rightarrow$$

$$\text{安全率} \quad SF = \sigma_a / \sigma_{max} = 1.24$$

(山陽)

7-3) 485系 Tc

57-5-

側バリ強度

1) 荷重

車両重量 52,600 kg
 乗客+水 9,600+1,000 kg
 2.5倍定員

$W = \text{車輪重} = 6575 \text{ kg}$

$R = \text{車軸バネ反力}$

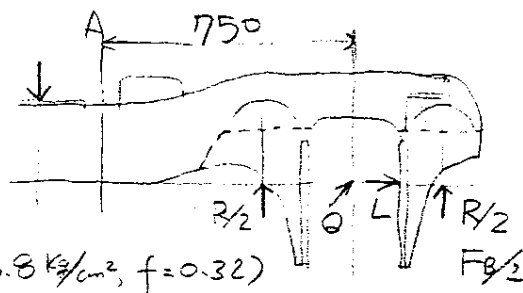
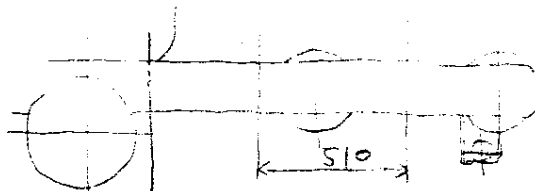
$= 5775 \text{ kg}$

$R' = 0.3 R = 1733 \text{ kg}$

$Q = 0.3 R = 1733 \text{ kg}$

$L = 0.3 R = 1733 \text{ kg}$

$F_B = 7L\text{-キ力} = 1264 \text{ kg}$ ($P_{bc} = 6.8 \text{ kg/cm}^2, f = 0.32$)

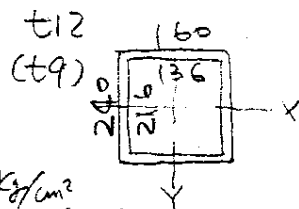


2) A断面

(457)

$Z_x = 584 \text{ cm}^3, Z_y = 458 \text{ cm}^3$

$A_x = 51.84 \text{ cm}^2, A_y = 32.64 \text{ cm}^2$



3) 応力

i) R による曲 $\sigma_R = M/Z_x = 5775 \times 75 / 584 = 742 \text{ kg/cm}^2$

ii) R' " $\sigma_{R'} = " = 1.3 \sigma_R = 964 \text{ kg/cm}^2$ (948) (1232)

iii) R せん断 $\tau_R = R/A_x = 5775 / 51.84 = 111 \text{ kg/cm}^2$ (145)

iv) R' " $\tau_{R'} = 1.3 \tau_R = 145 \text{ kg/cm}^2$ (188)

v) L 曲げ $\sigma_L = M/Z_x = 1733 \times 12 / 584 = 40.5 \text{ kg/cm}^2$ (51.9)

4) 合成応力
平均

$\sigma_m = \sqrt{\sigma_R^2 + 3\tau_R^2} = 767 \text{ kg/cm}^2$ (981)

$\sigma_{max} = \sqrt{\sigma_{R'}^2 + \sigma_L^2 + 3\tau_{R'}^2} = 997 \text{ kg/cm}^2$ (1275)

$\sigma_a = 1220 \times 1.125 = 1372 \text{ kg/cm}^2$ (1575)

$SF = \sigma_a / \sigma_{max} = 1.38$ (1.24)

参考1) F_B による曲げ $\sigma_B = 162 \text{ kg/cm}^2$

$\sigma_{max} = 1010 "$

$SF = 1.36$