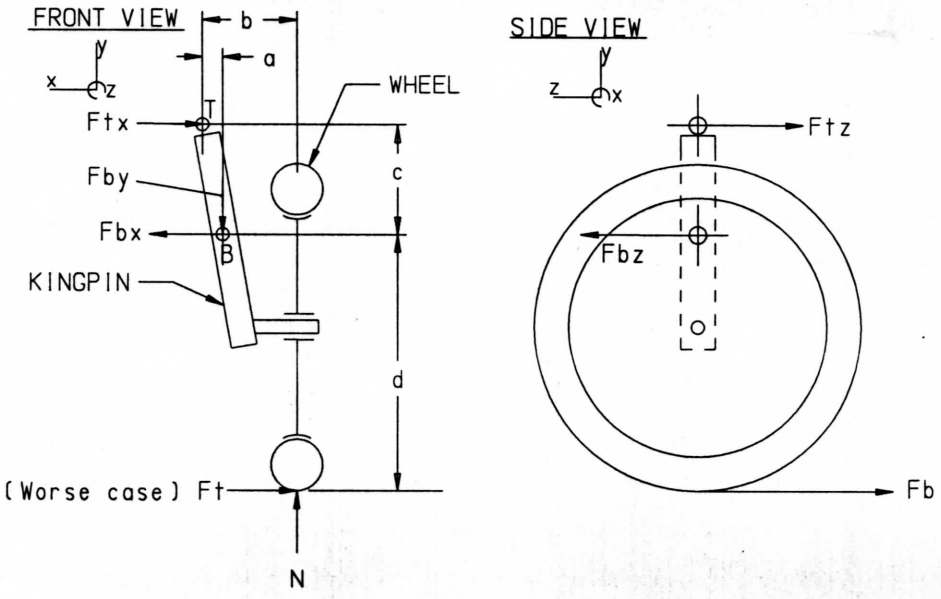
STATIC ANALYSIS - FRONT SUSPENSION



For static conditions, with equal distribution of weight on 3 wheels, N = W/3

For a 2-G bump load on the wheel, N = 2*W/3

For a 1-G turning load on the wheel, Ft = W/3

For a 1-G braking, assuming zero weight shift and all braking occurs on the front wheels only, Fb = W/2 on each front wheel.

Front view

Sum of the moments about T = 0

$N*b + Ft*(c+d) - Fby*a - Fbx*c = 0$ _____ Eq(1)

Sum of the moments about B = 0

$N*(b-a) + Ft*d - Ftx*c = 0 = 0$ _____ Eq(2)

Side view

Sum of the moments about T = 0

$Fb*(c+d) - Fbz*c = 0$ _____ Eq(3)

Sum of the moments about B = 0

$Fb*d - Ftz*c = 0$ _____ Eq(4)

For 2-1-1 G loading, substitute N = 2*W/3, and Ft = W/3, Fb = W/2

The axial load on the bottom rod end is Fa = Fbx (tensile) and the shear load is the vector sum of Fby and Fbz, therefore,

$$Fs = \sqrt{(Fby)^2 + (Fbz)^2}$$

The axial load on the top rod end is Fa = Ftx, (compressive) and the shear load is Fs = Ftz