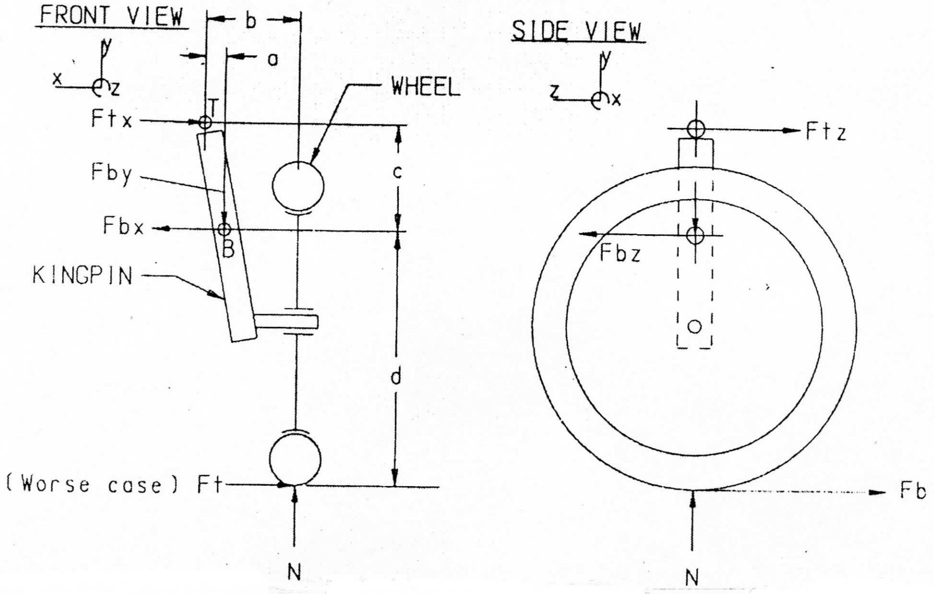
STATIC ANALYSIS - FRONT SUSPENSION - 4-WHEEL



For static conditions, with an equal weignт distribution on 4 wheels, $N = W/4$. If a 25% weight shift to the front wheels is assumed during braking, $N = 1.25*W/4$ on each front wheel.

For a static 2-G bump load, $N = 2*W/4$ on each wheel
For a 2-G bump load with a 25% weight shift, $N = 2.5*W/4$ on each front wheel

For a static 1-G turning load, $Ft = w/4$ on each front wheel.
For a worse case condition this load is outward on each front wheel.

For a 1-G braking assuming a 25% increase braking on front wheels, $Fb = 1.25*W/4$ on each front wheel for 4-wheel braking, and $Fb = W/2$ on each front wheel for front wheel braking only.

Front view

Sum of forces in y direction: $Fby = N$ ____ Eq(1)

Sum of the moments about $T = 0$

$N*b + Ft*(c+d) - Fby*a - Fbx*c = 0$ ____ Eq(2)

Sum of the moments about $B = 0$

$N*(b-a) + Ft*d - Ftx*c = 0 = 0$ ____ Eq(3)

Side view

Sum of the moments about $T = 0$

$Fb*(c+d) - Fbz*c = 0$ ____ Eq(4)

Sum of the moments about $B = 0$

$Fb*d - Ftz*c = 0$ ____ Eq(5)

For 2-1-1 loading, substitute chosen values for N, Ft, and Fb

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 $Fs = Ftz$