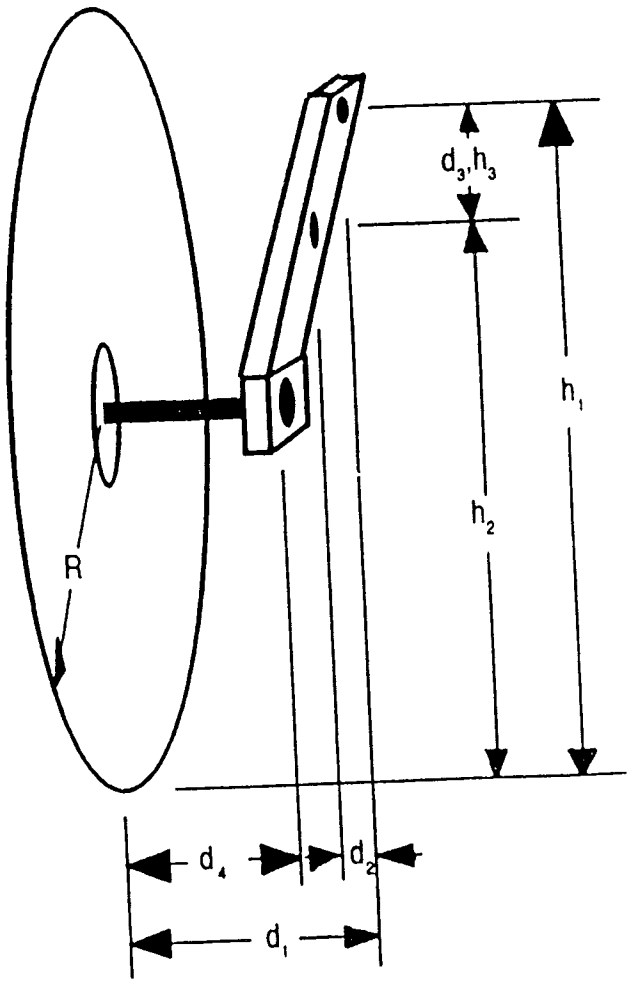
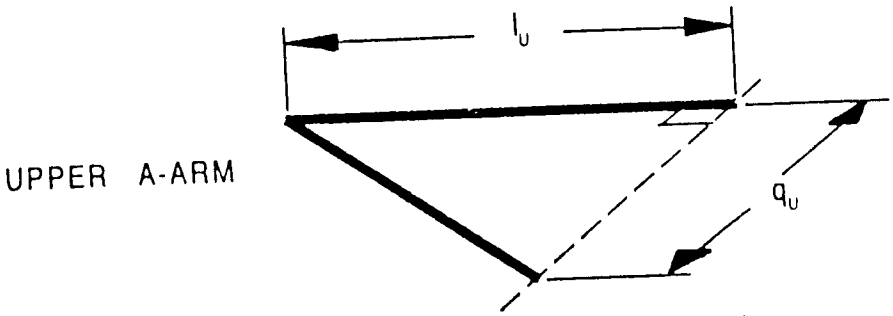
HANDOUT 4. SOLAACAR FRONT SUSP. FORCES

[FROM A SR. DESIGN REPORT ON AURORA II]

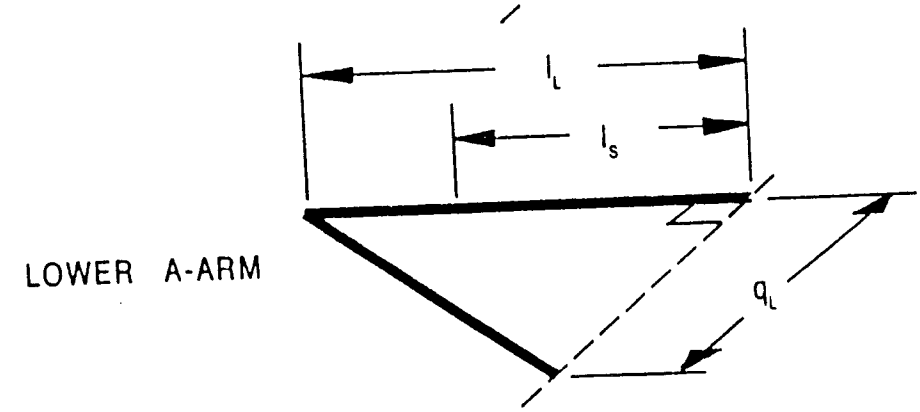


WHEEL/AXLE

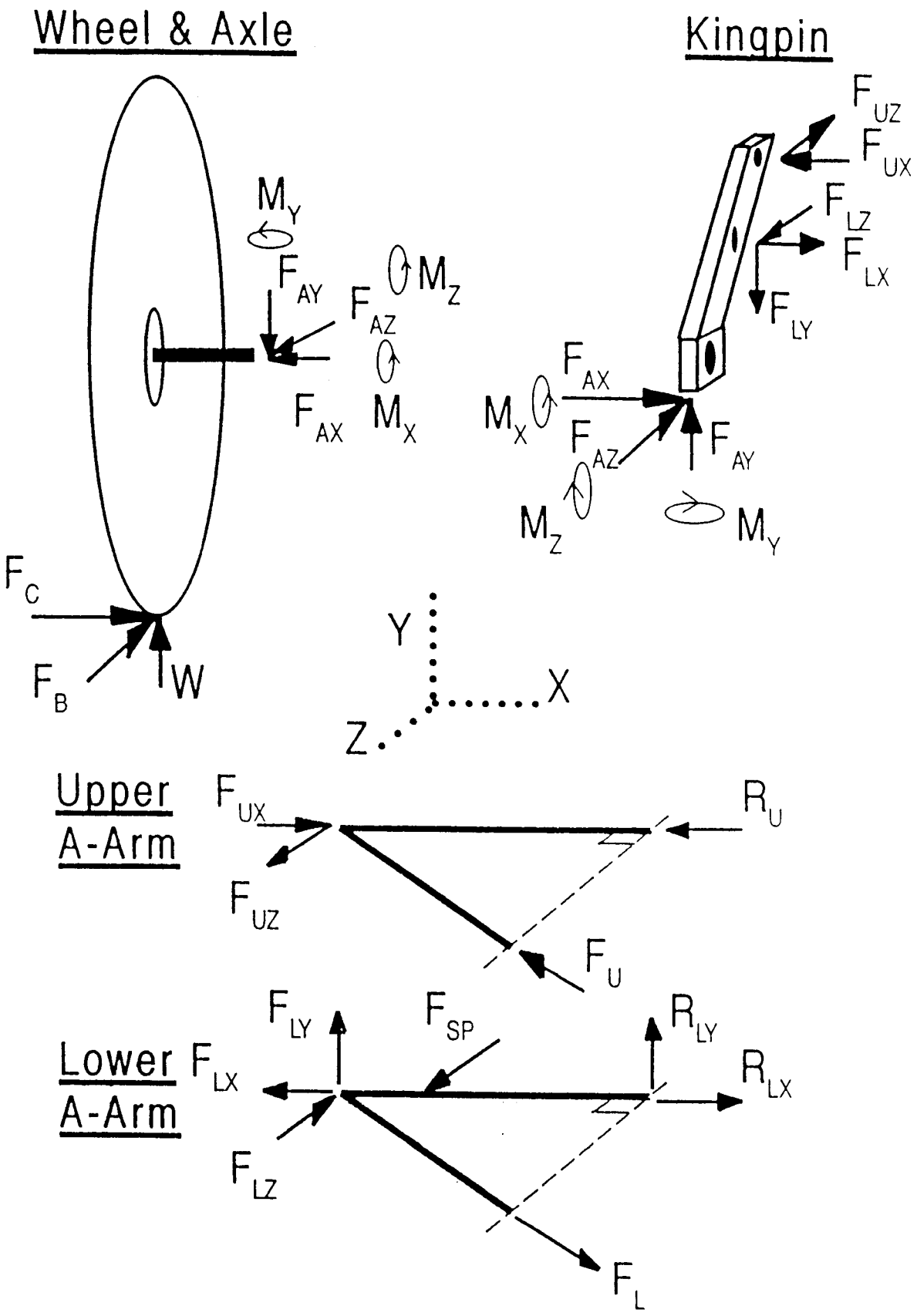
NOTE A-ARM DESIGN — ONE LEG is PARALLEL to AXLE LINE — (AURORA style)



UPPER A-ARM



LOWER A-ARM


Wheel & Axle
Kingpin
F_{UZ}
F_{UX}
F_{LZ}
F_{LX}
F_{LY}
M_Y
F_{AY}
M_Z
F_{AZ}
F_{AX}
M_X
F_C
F_B
W
Y
X
Z
Upper A-Arm
R_U
F_U
Lower A-Arm
F_{SP}
R_{LY}
R_{LX}
F_L

Front Suspension Force Equations

At Upper Kingpin Connection:

$F_{UX} = [W (d_1 - d_2) / d_3] + (h_2 / h_3) F_C$ inside wheel
$= [W (d_1 - d_2) / d_3] - (h_2 / h_3) F_C$ outside wheel

$F_{UY} = 0.000$ both wheels

$F_{UZ} = (h_2 / h_3) F_B$ both wheels

At Lower Kingpin Connection:

$F_{LX} = [W (d_1 - d_2) / d_3] + (h_1 / h_3) F_C$ inside wheel
$= [W (d_1 - d_2) / d_3] - (h_1 / h_3) F_C$ outside wheel

$F_{LY} = W$ both wheels

$F_{LZ} = (h1 / h3) F_B$ both wheels

At Axle Connection:

$F_{AX} = F_C$ inside wheel
$F_{AX} = - F_C$ outside wheel

$F_{AY} = W$ both wheels

$F_{AZ} = F_B$ both wheels

$M_X = (R) F_B$ both wheels

$M_Y = (d_4) F_B$ both wheels

$M_Z = (d_4) W + (F_C) R$ inside wheel
$= (d_4) W - (F_C) R$ outside wheel

At Frame Connections:

$R_U = [W (d_1 - d_2) / d_3] + (h_2 / h_3) F_C - [(h_2 / h_3) (l_U / q_U) F_B]$ inside wheel

$= [W (d_1 - d_2) / d_3] - (h_2 / h_3) F_C - [(h_2 / h_3) (l_U / q_U) F_B]$ outside wheel

$F_U = F_B (h_2 / h_3) [(q_U^2 + l_U^2)^{1/2} / q_U]$ both wheels

$R_{LX} = W[[(d-d_2)/d_3] + [(l_L/l_S)\cot(\theta)]] + [(h_1/h_3)F_C] - [(h_1/h_3)(l_L/q_L)F_B]$ inner wheel

$= W[[(d-d_2)/d_3] + [(l_L/l_S)\cot(\theta)]] - [(h_1/h_3)F_C] - [(h_1/h_3)(l_L/q_L)F_B]$ outer wheel

$R_{LY} = W [(l_L - l_S) / l_S]$ both wheels