

ERA22FA384 Weight and Balance

Max Acrobatic Weight: 1,850 lbs

FWD CG limit: 81.62

REAR CG limit: 88.65

Per the medical examiner, the rear passenger weighed 267 pounds and the front passenger weighed 180 pounds. The parachutes weighed 14 pounds each.

Weight and Balance calculations with 10 gallons of fuel in the wing tanks (consistent with recovery personnel statements that 10-15 gallons of fuel was drained from the wing tanks at recovery):

Item	Weight	Arm	Moment
Basic Empty Weight	1311.16	78.42	102,817.18 in-lb.
Main Fuel Tank - 17 gal	0	73	
RH Wing Fuel Tank	31.76	96	3,048.96
LH Wing Fuel Tank	31.76	96	3,048.96
Front pax + chute	194	98	19,012
Pilot + chute	281	128	35,968
Totals:	1,849.68 lbs gross weight		163,895.1 in-lb. total moment
CG: 88.61			

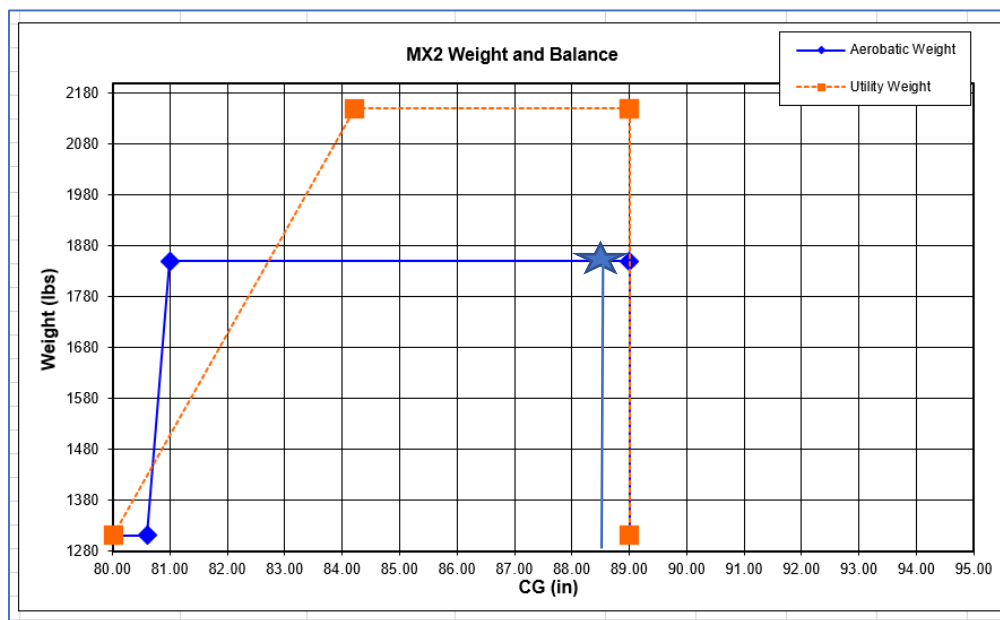


Figure 1 – Plot of accident flight weight and balance (blue star)

Weight and Balance Computerized Form															
MXR MX2 N263MX S/N 003															
Item	Weight	Arm	Moment												
Basic Empty Weight	1318.00 Lbs.	78.01 In.	102817.18 In-Lbs												
Main Fuel Tank	17.00 Gals.	73.00 In.	7446.00 In-Lbs												
RH Wing Fuel Tank	Gals.	96.00 In.	0.00 In-Lbs												
LH Wing Fuel Tank	Gals.	96.00 In.	0.00 In-Lbs												
Smoke Oil	Gals.	73.00 In.	0.00 In-Lbs												
Front Seat + Chute	Lbs.	98.00 In.	0.00 In-Lbs												
Pilot Seat + Chute	280.00 Lbs.	128.00 In.	35840.00 In-Lbs												
Seat Luggage	Lbs.	128.00 In.	0.00 In-Lbs												
Turtle Deck Cargo	Lbs.	135.00 In.	0.00 In-Lbs												
Total	1700.00 Lbs.	85.94 In.	146103.18 In-Lbs												
Aerobatic Weight															
OK to Fly Aerobatics															
Max. Take Off Weigh Acrobatic Category	1850.00 Lbs.														
Forward CG	81.62														
Max. Aft CG	88.65														
MGTOW															
OK to Fly															
Max. Take Off Weight Normal Category	2150.00 Lbs.														
Forward CG	81.62														
Max. Aft CG	88.65														
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%;">Smoke Oil @ 7.5 lbs/Gal. Max QTY 6 Gall.</td> <td style="width: 20%; text-align: right;">60 Lbs.</td> <td style="width: 40%;"></td> </tr> <tr> <td>Main Tank Full Qty 20 Gall @ 6 lbs/Gal</td> <td style="text-align: right;">120 Lbs.</td> <td></td> </tr> <tr> <td>RH Wing Tank Qty 17 Gall @ 6 lbs/Gal</td> <td style="text-align: right;">102 Lbs.</td> <td></td> </tr> <tr> <td>LH Wing Tank Qty 17 Gall @ 6 lbs/Gal</td> <td style="text-align: right;">102 Lbs.</td> <td></td> </tr> </table>				Smoke Oil @ 7.5 lbs/Gal. Max QTY 6 Gall.	60 Lbs.		Main Tank Full Qty 20 Gall @ 6 lbs/Gal	120 Lbs.		RH Wing Tank Qty 17 Gall @ 6 lbs/Gal	102 Lbs.		LH Wing Tank Qty 17 Gall @ 6 lbs/Gal	102 Lbs.	
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Figure 2 – Photo of weight and balance from pilot's aerobatic binder



6.1.2 Typical Aerobatic Weight and Balance

Weight and Balance Spreadsheet

Left Main	610 lb	FS Position	12.4	7625
Right Main	610 lb	12.5	7625	
Tail Wheel	80 lb	88.1	9119	
Empty Weight	1264 lb		23069	
Empty CG	18.49 FS			
MAC Wing	52.47 in	Values shown here are from the PDR. Neutral point takes into account wing, tail, fuselage, thrust, and prop location.		
1/4 Chord MAC	86.34 FS			
NP Power Off	96.88			
NP Power On	97.67			

Flying Weights

Pilot	200 lb	FS Position	59	13800
PAX 1	0 lb	38	0	
Fuel (Header)	100 lb	10.0	1134	
Fuel (Wing)	0 lb	38	0	
Ballast	0 lb	184.0	0	
			14934	
Flying Weight	1572 lb			
Flying CG	24.37 FS			
CG position on %MAC	93.11 %			
Static Margin Power Off	74.51 in	Distance between NP and CG		
Static Margin Power On	73.30 in			
SM as % MAC Power Off	112.61 %			
SM as % MAC Power On	109.71 %			

Maneuverability is inversely proportional to the SM.
The smaller the static margin, the more maneuverable the airplane will feel. Up to where the SM approaches 0, then the plane becomes unstable.

Figure 3 – Photo of “Typical Aerobatic Weight and Balance” in Pilot’s Operating Handbook showing no fuel in wing tanks