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INTRODUCTION

The FAA charges you, the aircraft owner or pilot, with the responsibility of properly loading your aircraft for safe flight. Data presented in this document will enable you to carry out this responsibility and insure that your airplane is loaded to operate within the prescribed weight and center-of-gravity limitations.

FAA regulations also require that any change in the original equipment affecting the empty weight center of gravity be recorded in the Aircraft Log Book. A form for maintaining a permanent record of all such changes is provided on page 3–1. This form, if properly maintained, will enable you to determine the current weight-and-balance status of the airplane for load scheduling. The weight-and-balance data entered as your aircraft left the factory, plus the record you maintain on page 3–1, is all of the data needed to compute loading schedules.

The maximum certificated gross weight for the Model M20F under all operating conditions is 2740 pounds. Maximum useful load is determined by subtracting the corrected aircraft empty weight from its maximum gross weight. The aircraft must be operated strictly within the limits of the Center-of-Gravity Moment Envelope shown on page 2–3.

SECTION I. EQUIPMENT LIST AND CORRECTED EMPTY WEIGHT DATA

EQUIPMENT CHECKLIST

The equipment checked below was factory installed and is included in the original or basic empty weight of the aircraft.

FAA Registration No. _____

M20F Serial No. _____

DATE INSPECTED				
MO				
DAY				
YR.				

FED. A/C SPEC. 2A3 ITEM NO.	ITEM DESCRIPTION	WEIGHT	ARM	MARK ITEMS INSTALLED			
04	Constant-Speed Propeller, Hartzell						
	Hub (HC-C2YK-1) with (7666-2) Blades	53.75	-35.16	x			
	Hartzell Spinner (835-20)	3.25	-34.18	x			
	Edo Aire Governor	2.75	- 1.40	x			
101	Fuel Pumps:						
	Engine driven (AC)	1.60	- 3.80	x			
	Electric, Dukes	1.91	+ 7.50	x			
102	Oil Radiator, Stewart War.	2.40	-23.00	x			
103	Induction Air Filter	1.20	-24.50	x			
104	Starter, Prestolite	17.80	-23.00	x			
201	Main Wheel Brake Assys.	15.40					
202	Main Wheel Tires (6.00-6)	17.00					
205	Nose Wheel (5.00-5)	2.60					
206	Nose Wheel Tire & Tube	7.00					
301	Alternator, 60 AMP	10.30	-24.50	x			
302	Battery, 35 AMP HR	28.10	+110.80	x			
303	Voltage Regulator, Oeco	1.44	+ 2.00	x			
601	Stall Warning Indicator	.07	+50.00	x			
	Gear Warning Indicator	.12	+50.00	x			
602	Vacuum System	6.35	- 7.35	x			
	Instruments:						
	Horizon Gyro	2.00	+16.60				
	Directional Gyro	2.82	+16.70				
	Clock	.40	+19.75				
	Gage, OAT	.40	+19.5				
	Indicator, Rate-of-Climb	1.00	+16.00				
	Turn Coordinator	2.90	+16.50	x			

EQUIPMENT CHECKLIST (Continued)

FAA Registration No. _____

M20F Serial No. _____

	DATE INSPECTED			
MO				
DAY				
YR.				

EQUIP. ITEM NO.	ITEM DESCRIPTION	WEIGHT	ARM	MARK ITEMS INSTALLED			
1E	Heated Pitot Installation	.70	+ 38.00				
2E	Rotating Beacon Installation	1.70	+168.00				
3E	Exhaust Gas Temp. Ind.	1.10	+ 12.71				
4E	PC System, Brittain	7.10	+ 46.60				

EQUIPMENT INSTALLED OR REMOVED AFTER BASIC WEIGHT & BALANCE

The equipment listed below was factory installed or removed after basic weight and balance of the aircraft.

FAA Registration No. _____

M20F Serial No. _____

ITEM NO.	ITEM DESCRIPTION	WEIGHT	ARM	MOMENT
1	Oil (2 GAL)	-15.00	-11.50	+ 172.50
2	Fuel (Full)		48.43	
	Weight and Moment Added or Subtracted			

CORRECTED EMPTY WEIGHT AS DELIVERED

	WEIGHT	ARM	MOMENT	USEFUL LOAD
Aircraft Empty Weight as Weighed				
Weight Added or Subtracted				
Corrected Empty Weight and CG (Gear Extended) as Delivered From Factory Transfer these figures to page 3-1.				

SECTION II. PILOTS LOADING GUIDE

LOADING CALCULATION PROCEDURE

Proper loading of the aircraft is essential for maximum flight performance and safety. This section will assist you in determining whether the aircraft loading schedule is within the approved weight and center-of-gravity limits.

To figure an actual loading problem for your aircraft, proceed as follows:

Step 1. Refer to the latest entry on page 3–1 for the current empty weight and moment.
NOTE: Since the engine oil is normally kept at the full level, use the oil weight and moment figures shown in the sample problems as constants in calculating all loading problems.

Step 2. Note the pilot's weight and the position his seat will occupy in flight. Find this weight on the left scale of the Loading Computation Graph (page 2–3) and cross the graph horizontally to the point representing the pilot's seat position between the FWD and AFT position lines on the graph for #1 and #2 seats. When this point is located, drop down to the bottom scale to find the value of the moment/1000 due to the pilot's weight and seat position.

Repeat the procedure for the copilot and enter these weights and moment/1000 values in the proper subcolumns in the Problem Form on page 2–2.

Step 3. Proceed as in Step 2 to account for the passengers in seats 3 and 4. Enter the weight and value of moment/1000 in the proper columns.

Step 4. Again proceed as in Step 2 to account for the amount of fuel carried, and enter the weight and moment/1000 values in the proper columns.

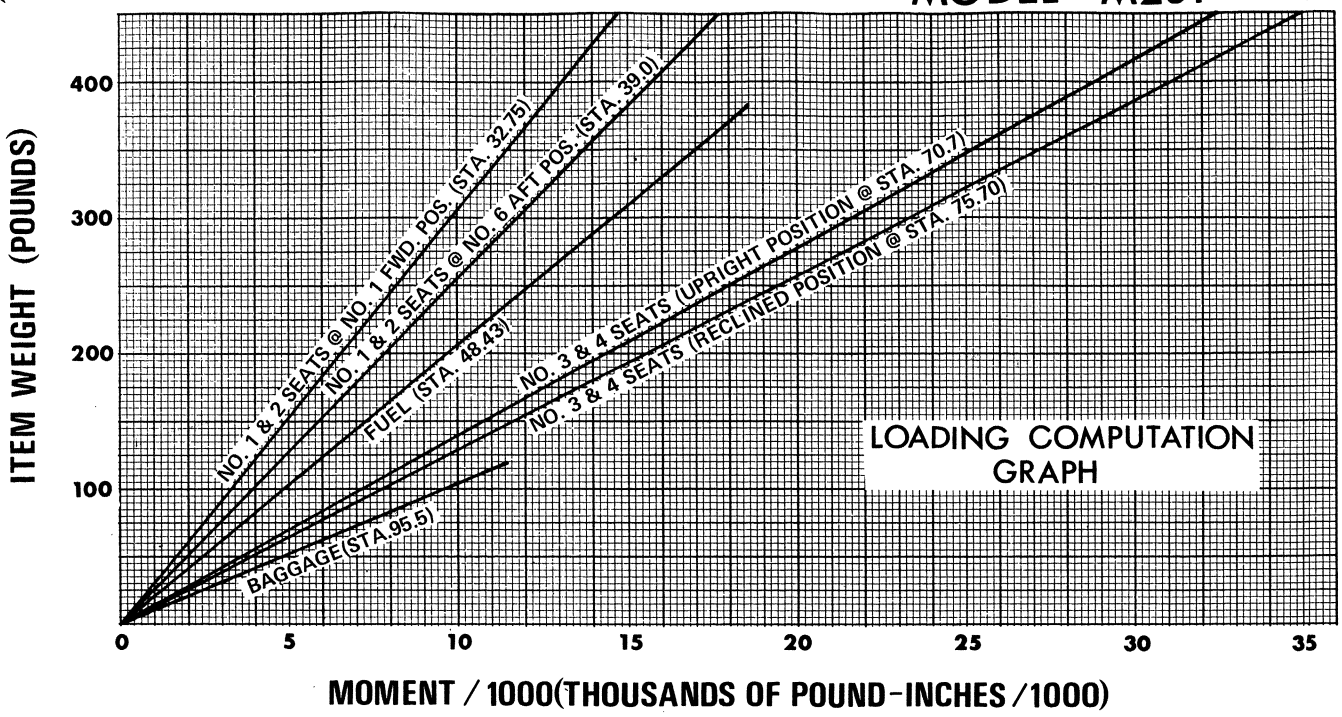
Step 5. Once more proceed as in Step 2 to account for the baggage to be carried and enter the figures in the proper columns.

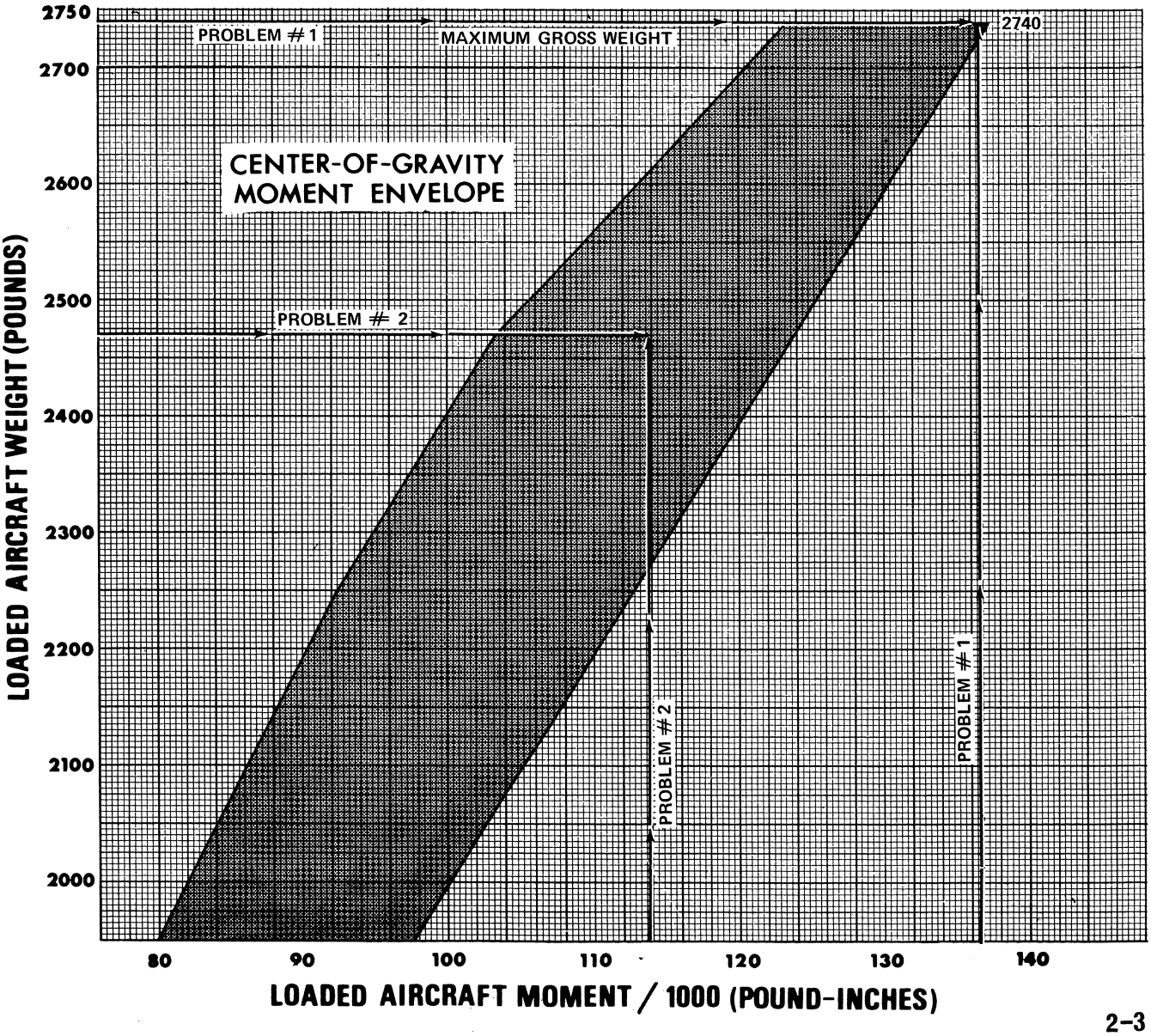
Step 6. Total the weight columns. This total must be 2740 pounds or less. Total the Moment/1000 column. Do not forget to subtract negative numbers.

Step 7. Refer to the Center-of-Gravity Moment Envelope (page 2–3). Locate the loaded weight of your airplane on the left scale of the graph and trace a line horizontally to the right. Locate the total moment/1000 value for your airplane on the bottom scale of the graph and trace a line vertically above this point until the horizontal line for weight is intersected. If the point of intersection is within the shaded area, your aircraft loading is acceptable. If the point of intersection falls outside the shaded area, you must rearrange the load before takeoff.

PROBLEM FORM FAA Registration No. _____ M20F Serial No. _____

STEP	ITEM	SAMPLE PROBLEM #1 PILOT & THREE PASS.		SAMPLE PROBLEM #2 PILOT & ONE PASS.		YOUR PROBLEM	
		WEIGHT (POUNDS)	MOMENT / 1000	WEIGHT (POUNDS)	MOMENT / 1000	WEIGHT (POUNDS)	MOMENT / 1000
1	Current Aircraft Empty Weight (From Page 3-1)	1645.0	72.48	1645.0	72.48		
	Oil--8 QT @ 1.875 LBS/QT (Sump assumed full for all flights)	15.0	-.17	15.0	-.17		
2	Pilot Seat (#1)*	160.0	6.34	160.0	6.34		
	Co-pilot Seat (#2)*	160.0	6.34	180.0	7.12		
3	Left Rear Seat (#3)*	165.0	12.49	--	--		
	Right Rear Seat (#4)*	145.0	10.98	--	--		
4	Fuel (No. GAL x 6 LBS GAL) (MAX 64 GAL 384 LBS)	320.0	15.50	360.0	17.43		
5	Baggage (MAX 120 LBS)	120.0	11.40	100.0	9.55		
	Hat Rack (MAX 10 LBS)	10.0	1.19	10.0	1.19		
6	Loaded Aircraft Weight	2740.0		2470.0			
	Total Moment/1000		136.61		113.94		
7	Refer to page 2-3, Center-of-Gravity Moment Envelope, to determine whether your aircraft loading is acceptable. (The hat rack arm station is 119.0; the fuel arm station is 48.43; and the oil arm station is -11.5.)						
	*Obtain the moment/1000 value for each position (FWD, MID, or AFT) from page 2-3.						


ITEM WEIGHT (POUNDS)
400
300
200
100
0
5
10
15
20
25
30
35
MOMENT / 1000(THOUSANDS OF POUND-INCHES /1000)
NO. 1 & 2 SEATS @ NO. 1 FWD. POS. (STA. 32.75)
NO. 1 & 2 SEATS @ NO. 6 AFT POS. (STA. 39.0)
FUEL (STA. 48.43)
NO. 3 & 4 SEATS (UPRIGHT POSITION @ STA. 70.7)
NO. 3 & 4 SEATS (RECLINED POSITION @ STA. 75.70)
BAGGAGE (STA.95.5)
LOADING COMPUTATION GRAPH


LOADED AIRCRAFT WEIGHT (POUNDS)
2750
2700
2600
2500
2400
2300
2200
2100
2000
80
90
100
110
120
130
140
LOADED AIRCRAFT MOMENT / 1000 (POUND-INCHES)
PROBLEM #1
MAXIMUM GROSS WEIGHT
2740
CENTER-OF-GRAVITY MOMENT ENVELOPE
PROBLEM # 2
PROBLEM # 2
PROBLEM #1

SECTION III. OWNERS WEIGHT & BALANCE RECORD

CORRECTED EMPTY WEIGHT & MOMENT (CG)

Enter below all weight change data from the Aircraft Log Book.

FAA Registration No. _____

M20F Serial No. _____

EMPTY WEIGHT	ARM	MOMENT / 1000	USEFUL LOAD	DATE AND SOURCE OF INFORMATION

MOONEY CORPORATION
Engineering Flight Test

WEIGHT AND BALANCE

_____

MODEL _____ SERIAL NUMBER _____ DATE _____

LOADED AS FOLLOWS

_____

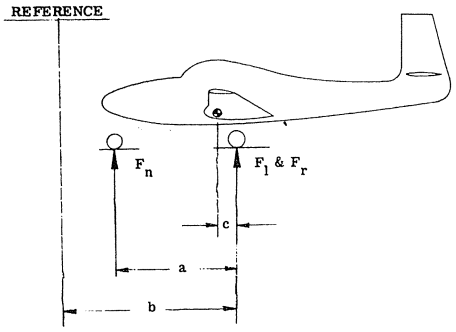
_____

_____

_____

_____

_____



(F_r) Weight - Right Main Wheel = _____ lbs.

(F_l) Weight - Left Main Wheel = _____ lbs.

(F_n) Weight - Nose Wheel = _____ lbs.

(F_t) Total Weight of Aircraft = [LBS]

(a) Distance - Nose Wheel C to Main Wheel C = _____ inches

(b) Distance - Reference to Main Wheel C = _____ inches

(c) C.G. Location $= \frac{(F_n)(a)}{(F_t)} = \frac{(\quad)(\quad)}{(\quad)}$

= _____ inches from main wheels

(d) Fuselage Station of Reference = _____ inches

Fuselage Station of C.G. = (b) - (c) + (d) = _____ inches

= [% MAC]