Mooney Aircraft, Inc. Kerrville, Texas

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

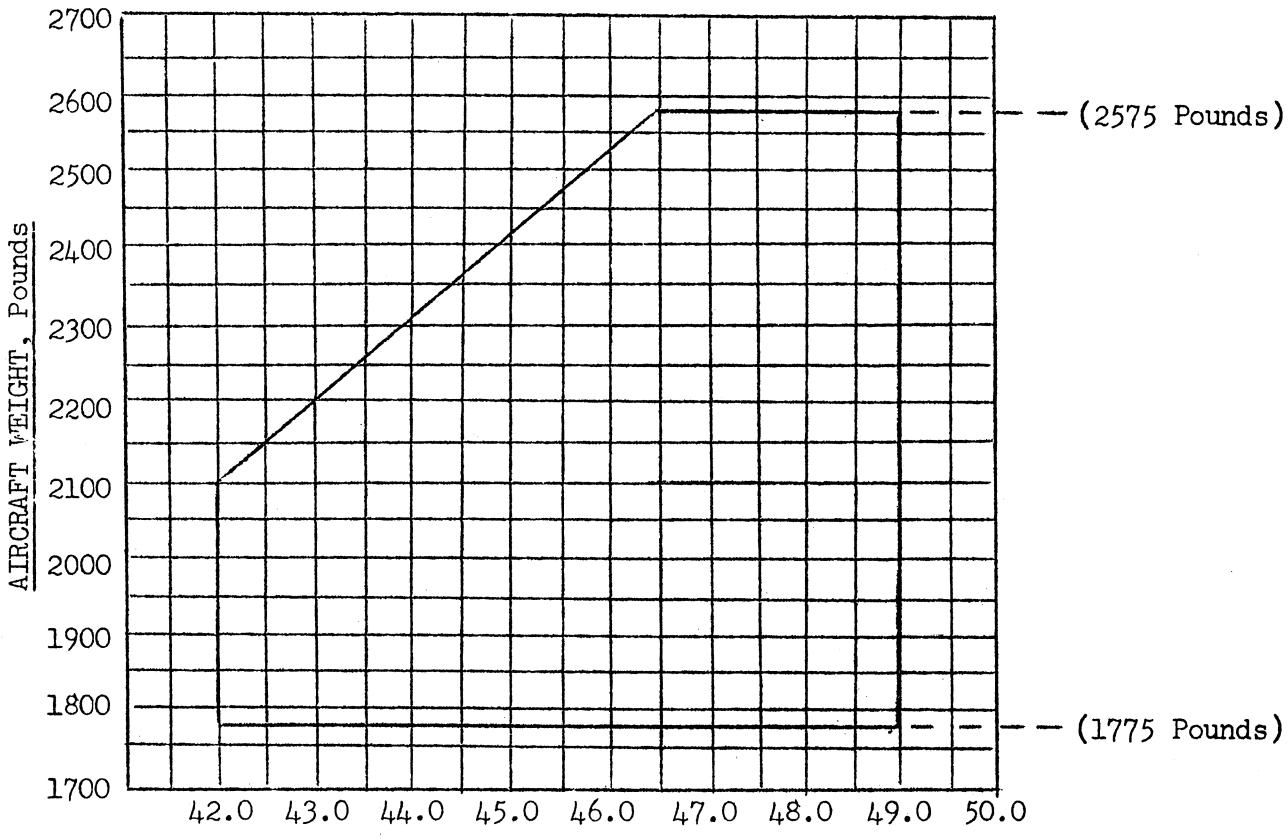
F.A.A. Registration No._____ Date_____
Serial No._____

1. WEIGHT AND CENTER OF GRAVITY LIMITS:

Maximum certificated aircraft weight for all operating conditions is 2575 pounds.

It is the responsibility of the airplane owner and of the pilot to insure that the aircraft is properly loaded. The empty weight, empty weight C.G., and useful load are noted below for this airplane as delivered from the factory. If the airplane or equipment have been altered, refer to the latest Approved Repair & Alteration FORM (FAA-337) for this information.

The figure shown below is a plot of aircraft weight versus center of gravity (C.G.). The fore and aft location of the C.G. is plotted in terms of distance from the Horizontal Datum, which is the Centerline of the Nose Gear Support Bolts (Fuselage Sta. 0). The aircraft must be operated strictly within the limits of the envelope defined by the dark lines on this figure. The loading envelope is based on the gear extended configuration.



The points marked 'A', 'B', and 'C' on the above figure are the plotted results of the sample Weight and Balance calculations shown on Page 2. The pilot should make a similar check of his specific loading as part of his Pre-Flight Check.

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

F.A.A. Registration No._____ Date_____

2. USEFUL LOAD:

Maximum Useful Load is 2575 - _____ = _____ lbs.
Useful load items are:

Item	Weight	Arm
Oil, 2 Gallons	15	-7.4
Pilots, (2) each	170	36.5 to 44.0
Fuel, 52 Gallons maximum	312	48.4
Rear Passengers, (2) each	170	70.7
Baggage maximum	120	93.0
Hatrack maximum	10	114.0

The Empty Weight C.G. location is with the landing gear extended and with both front seats in the forward position (40.0"). Each seat weighs 17 pounds. Maximum seat travel is 7.5" in 6 equal adjustments. Therefore, seat positions are 1.25" apart.

3. SAMPLE WEIGHT & BALANCE COMPUTATIONS, GEAR EXTENDED:

A. Most Forward at any Weight

Item	Weight	Arm	Moment
Weight Empty			
Oil (2 Gals.)	15	-7.4	-111
Front Seats Moved Aft_____" Each (Compute Moment Only, Empty Wt. Includes Seats)	--		
Pilot (_____Position of Seat)	170		
Front Passenger (_____Position of Seat)	170		
Fuel (15.0 Gals. Minimum in Tanks)	90	48.4	4356
Weight & C.G.			

B. Most Forward Loading with Full Tanks

Item	Weight	Arm	Moment
Weight Empty			
Oil (2 Gals.)	15	-7.4	-111
Front Seats Moved Aft _____" Each (Compute Moment Only, Empty Wt. Includes Seats)	--		
Pilot (_____Position of Seat)	170		
Front Passenger (_____Position of Seat)	170		
Fuel (52 Gals. Maximum in Tanks)	312	48.4	15,101
Weight & C.G.			

C. Most Rearward Loading at Gross Weight

Item	Weight	Arm	Moment
Weight Empty			
Oil (2 Gals.)	15	-7.4	-111
Front Seats Moved Aft_____" Each (Compute Moment Only, Empty Wt. Includes Seats)	--		
Pilot (_____Position of Seat)	170		
Front Passenger (_____Position of Seat)	170		
Fuel (_____Maximum)		48.4	
Rear Passengers (2)	340	70.7	24,038
Baggage (Maximum)		93.0	
Weight & C.G.			

The above loadings are presented as examples only. Loadings other than the above must be substantiated by additional calculations. Two persons in the rear seat with only one pilot is not normally an acceptable loading.

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

F.A.A. Registration No. _____ Date_____

4. EQUIPMENT LIST:

The following equipment was installed in this airplane as delivered from the factory and is included in the Empty Weight:

Check Items Installed

	NO.		WT.	ARM
	4.	Hartzell Constant Speed Propeller		
(x)		(a) Hartzell HC-C2YK Hub with 1/7666-2 Blades	53.75	(-30.16)
(x)		(b) Hartzell Spinner Assembly 835-20	3.25	(-29.18)
(x)		(c) Hartzell Governor H-1	4.5	(+ 3.6)
	101.	Fuel Pumps		
(x)		(b) One Electric Pump, Dukes Part No. 4140-00-21A	1.9	(- 1.5)
(x)		(c) One Engine-Driven Pump, AC Part No. 6440295	1.5	(+ 1.2)
	102.	Oil Radiator		
( )		(b) Harrison 8526250	2.0	(-18.0)
( )		(d) Stewart-Warner Model 8406E1	2.8	(-18.0)
(x)	103.	Carburetor Air Filter, Air-Maze 13219	1.0	(-17.0)
(x)	104.	Starter		
		(d) Prestolite MZ 4206	17.8	(-18.0)
(x)	201.	Two Main Wheel-Brake Assemblies, 6.00-6		
		(c) Cleveland Model DHB-3 Wheel Assembly No. 40-24 Brake Assembly No. 30-5	19.1	***
(x)	202.	(a) Two Main Wheel 6-Ply Rating Tires, 6.00-6 Type III, with Regular Tubes	17.0	***
(x)	205.	One Nose Wheel, 5.00-5, Type III		
		(b) Cleveland Model 40-33	4	***
(x)	206.	(a) One Nose Wheel 4-Ply Rating Tire, 5.00-5 Type III, with Regular Tube	7	***
(x)	301.	Electric Generator		
		(c) 50 AMP, Delco-Remy 1101915	16.6	(-19.5)
(x)	302.	(c) Prestolite R-35 Battery	28.0	(+ 2.5)
(x)	303.	Voltage Regulator		
		(c) 50 AMP, Delco-Remy 1119224C	2.0	(+ 7.0)
(x)	601.	Stall Warning Indicator, Safe-Flight Model 164R	1.0	(+28.0)
	602.	Vacuum System		
(x)		(a) In accordance with Mooney Dwg. 860026	6.35	(+ 2.65)
	603.	Instruments		
(x)		(a) Horizon Gyro	1.8	(+19.0)
(x)		(b) Directional Gyro	2.0	(+20.0)
(x)		(c) Clock	.4	(+30.5)
(x)		(d) Outside Air Temperature Gage	.2	(+33.0)
(x)		(e) Rate of Climb Indicator	1.0	(+22.3)
(x)		(f) Electric Turn & Bank Indicator	1.25	(+21.50)

Mooney Aircraft, Inc. Kerrville, Texas

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

F.A.A. Registration No. _____ Date _____

4. EQUIPMENT LIST (Con't)

	No.		Wt.	Arm
(x)	604.	Cigarette Lighter	.2	(+21.0)
( )	605.	Rotating Beacon, Grimes, In Accordance with Mooney Dwg. 950018 (8234)	2.0	(+163.0)
(x)	606.	Dual Controls	3.5	(+ 14.0)
(x)	607.	Brittian LSA-2 Flight Control I/A/W Mooney Dwg. 830075	7.1	(+ 46.6)
***(x)	608.	Full Fuel at _____°F.	_____	(+ 48.4)
***(x)	609.	Oil (2 Gals.)	15	(- 7.4)
( )	610.	_____	_____	_____
( )	611.	_____	_____	_____
( )	612.	_____	_____	_____
( )	613.	_____	_____	_____
( )	614.	_____	_____	_____
( )	615.	_____	_____	_____
( )	616.	_____	_____	_____
( )	617.	_____	_____	_____

5. EMPTY WEIGHT AFTER INSTALLATION OF OPTIONAL EQUIPMENT:

Item	Weight	Arm	Moment
Weight Empty as Weighed, Gear Extended	_____	_____	_____
Item 608, Full Fuel	- _____	(+48.4)	- _____
Item 609, Oil	-15	(-7.4)	(+111)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Computed Empty Weight & C.G., Gear Extended

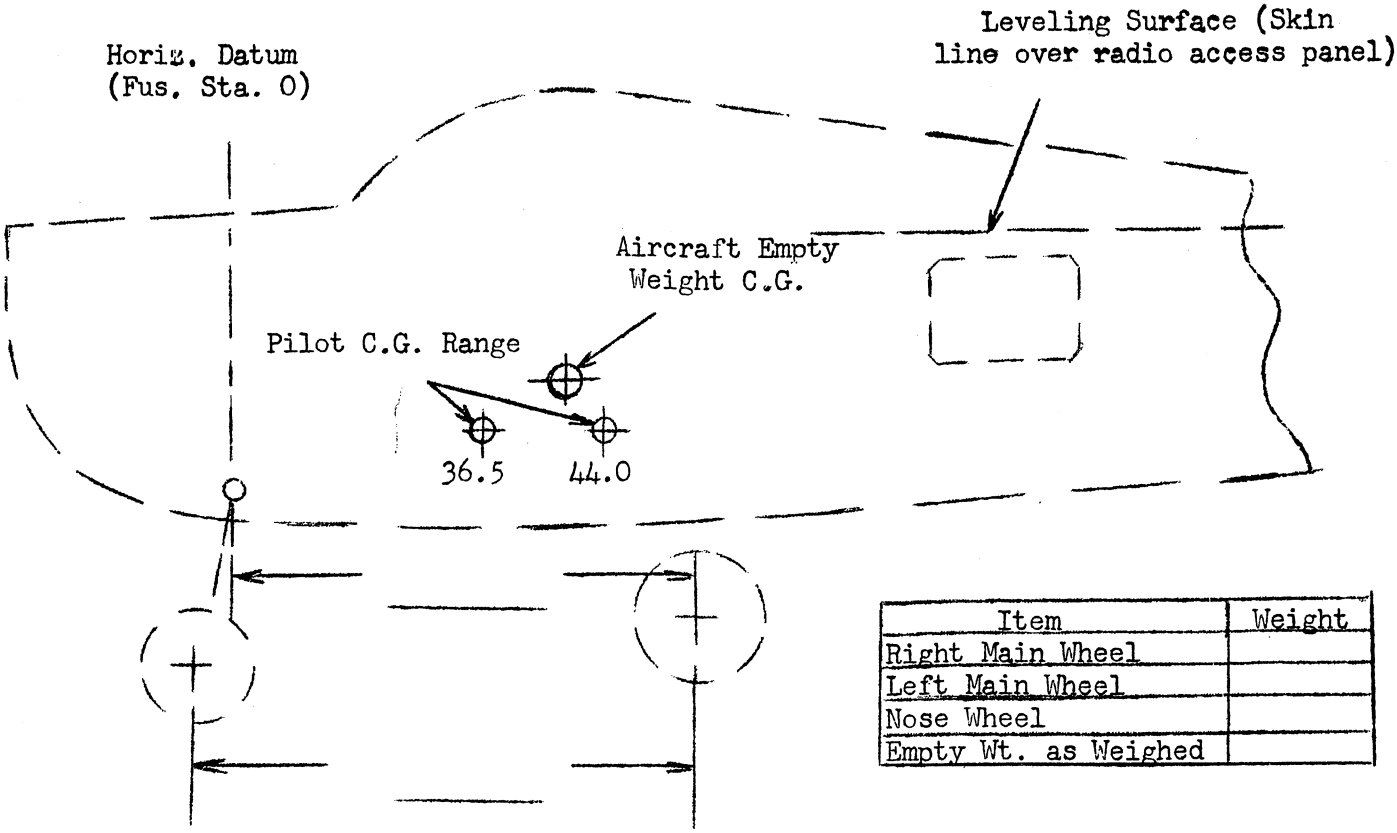
*Added After Production Weight & Balance
**Rebuilt Instruments
***Removed After Production Weight & Balance
****See Weight & Balance Data of Aircraft for Wheel and Tire Locations

Mooney Aircraft, Inc. Kerrville, Texas

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

F.A.A. Registration No. _____ Date _____

6. EMPTY WEIGHT & C.G. COMPUTATIONS:



Item	Weight
Right Main Wheel	
Left Main Wheel	
Nose Wheel	
Empty Wt. as Weighed	

Horizontal Datum is Centerline of Nose Gear Support Bolts (Sta. 0) and is 33.0" forward of Wing L.E. at Wing Sta. 59.25 (Inboard edge of stall strip). MAC is 59.2". L.E. of MAC is 33.1" aft Datum. Leveling means: Edge of skin splice over aft fuselage radio access panel. (Spirit level is used to level.)

Computations:

C.G. Forward of Main Wheels = _____ x _____/ _____ = _____";

C.G. Aft Datum = _____ - _____ = _____";

C.G. % MAC = (_____ - 33.1)/59.2 = _____/59.2 = _____% MAC

The Empty Weight C.G. location is with the landing gear extended and with both front seats in the forward location (40.0"). Each seat weighs 17.0 pounds. Maximum seat travel is 7.5" in 6 equal adjustments. Moment change per seat in aft position (47.5") is 128 inch-pounds.

MOONEY MODEL M20C (1966)
ACTUAL WEIGHT & BALANCE DATA

F.A.A. Registration No. _____ Date _____

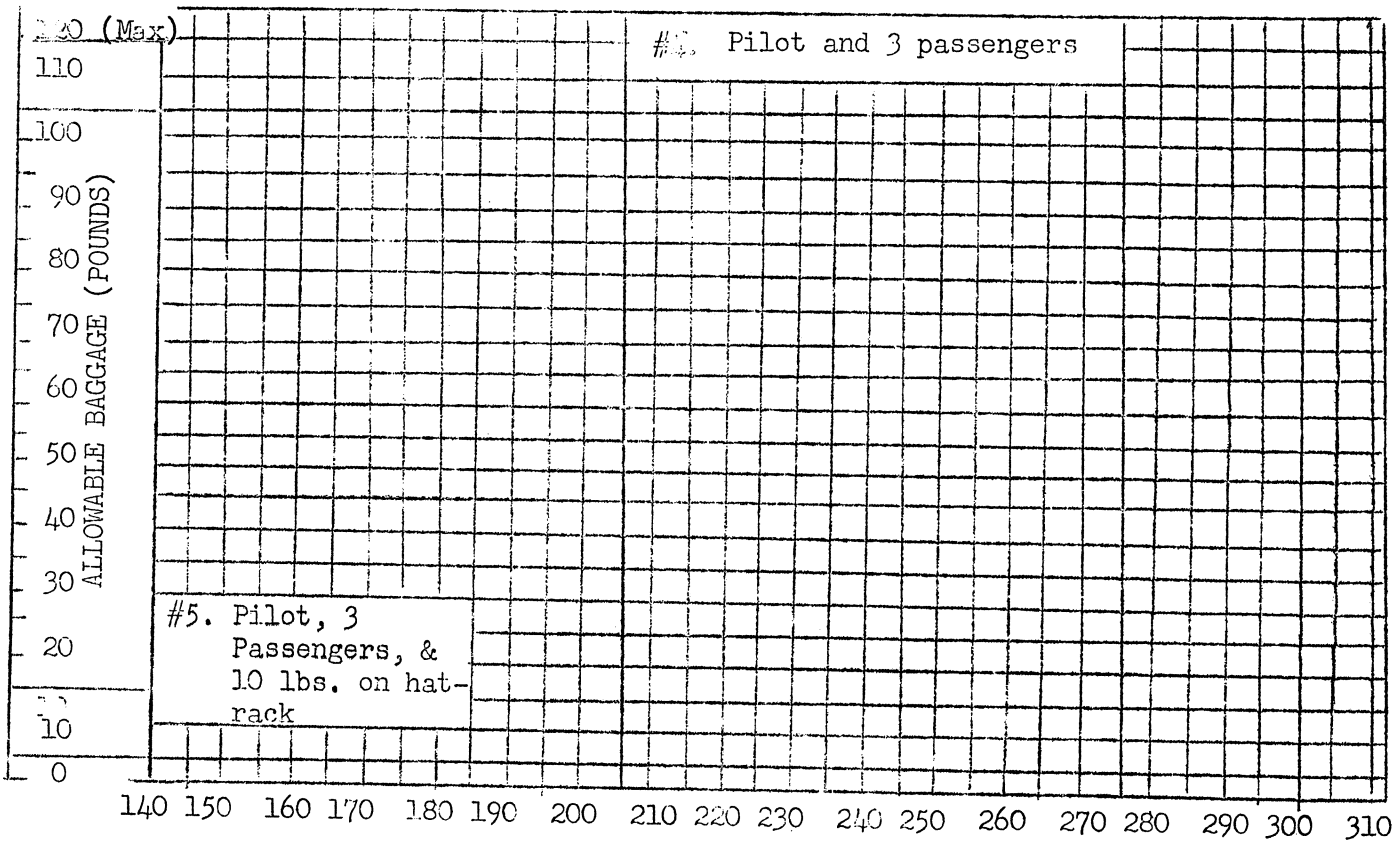
7. LOADING SCHEDULE:

The following information is offered as an aid in checking loadings without having to perform the computations shown on Page 2. These loadings are all based on an average passenger or pilot weight of 170 pounds and it is assumed that the forward seats are in the second position aft. If the actual loading does not correspond to one of the basic loading conditions, then a detailed check should be made according to the procedure shown on Page 2.

For normal usage, there are five basic loadings for this airplane. They are:

Loading #1 Pilot alone
Loading #2 Pilot and front passenger
Loading #3 Pilot, front passenger and one rear passenger
Loading #4 Pilot and 3 passengers
Loading #5 Pilot, 3 passengers and 10 lbs. in hatrack

Loadings #1 and #2 are not limited in any way. The maximum fuel, baggage, and hatrack loads can be carried without exceeding either gross weight or C.G. limits. Loading #3 is not limited as far as C.G. is concerned. However, it is possible to exceed the gross weight if the empty, equipped weight of the airplane exceeds 1608 pounds. Loadings #4 and #5 are limited as shown in the graph below.



Loading #4: take-off fuel with ____# baggage = 1830 - _____ - empty wt. = ____ Lbs. (max.)
fuel with no baggage = 1880 - empty wt. = _____ lbs. (Max.)
Loading #5: take-off fuel with ____# baggage* = 1870 - _____ - empty wt. = ___lbs. (Max.)
fuel with no baggage = 1870 - empty weight = _____ lbs. (Max.)
*Note: Max. baggage for Loading #5 is 15 lbs. less than max. baggage for Loading #4.

WEIGHT & BALANCE RECORD

MODEL M20C

1966 & ON

TABLE OF CONTENTS

	INTRODUCTION	i
SECTION I.	EQUIPMENT LIST AND CORRECTED EMPTY WEIGHT DATA	1-1
	EQUIPMENT CHECKLIST	1-1
	EQUIPMENT INSTALLED OR REMOVED AFTER BASIC WEIGHT & BALANCE	1-3
	CORRECTED EMPTY WEIGHT AS DELIVERED	1-3
SECTION II.	PILOTS LOADING GUIDE	2-1
	LOADING CALCULATION PROCEDURE . .	2-1
	PROBLEM FORM	2-2
	LOADING COMPUTATION GRAPH	2-3
	CENTER-OF-GRAVITY MOMENT ENVELOPE	2-3
SECTION III.	OWNERS WEIGHT & BALANCE RECORD	3-1
	CORRECTED EMPTY WEIGHT & MOMENT (CG)	3-1

REVISED 10/78

EQUIPMENT CHECKLIST (Continued)

FAA Registration No. _____

M20C Serial No. _____

FED. A/C SPEC 2A3 ITEM NO.	ITEM DESCRIPTION	WEIGHT	ARM	DATE INSPECTED MO / DAY / YR. — MARK ITEMS INSTALLED			
	Anticollision Light	1.70	+163.00				
	Controls, Dual	4.25	15.0	x			
	P.C. System, Brittain	7.10	+ 46.40	x			
	Heated Pitot Inst.	.70	+ 38.00				
	Exhaust Gas Temp. Ind.	1.10	+ 17.71				

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. _____

M20C Serial No. _____

ITEM NO.	ITEM DESCRIPTION	WEIGHT	ARM	MOMENT
1	Oil (2 GAL)	- 15.00	- 7.40	+111.00
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.

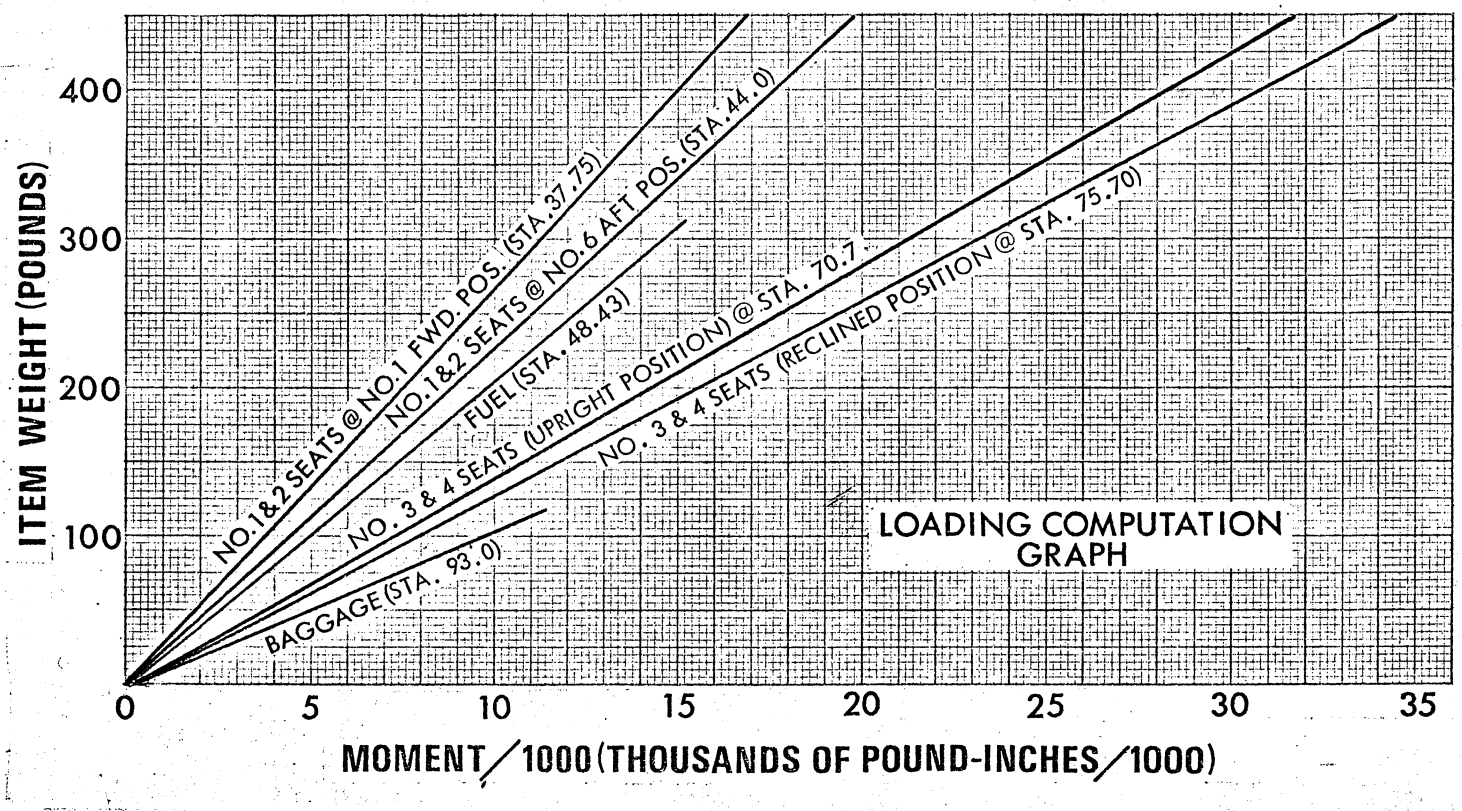
Step 6. Total the weight columns. This total must be 2575 pounds or less. Total the Moment/1000 column. Do not forget to subtract negative numbers.

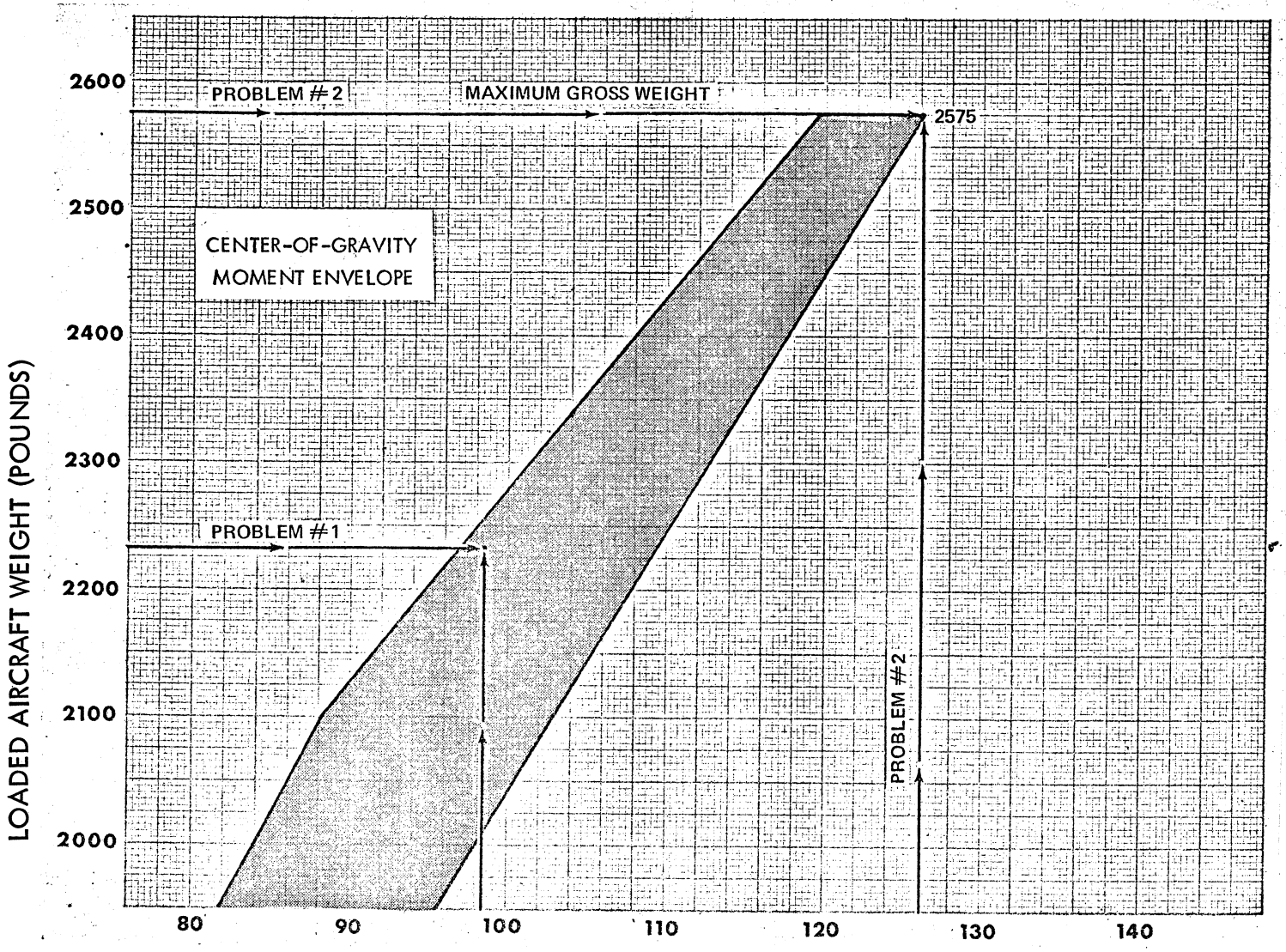
Step 7. Refer to the Center-of-Gravity Moment Envelope (page 2-3). Locate the loaded weight of your airplane on the left scale of the graph and trace a line horizontally to the right. Locate the total moment/1000 value for your airplane on the bottom scale of the graph and trace a line vertically above 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. _____ M20C Serial No. _____

STEP	ITEM	SAMPLE PROBLEM #1 PILOT & ONE PASS. (Seats Fwd. Position)		SAMPLE PROBLEM #2 PILOT & THREE PASS.		YOUR PROBLEM	
		WEIGHT (POUNDS)	MOMENT 1000	WEIGHT (POUNDS)	MOMENT 1000	WEIGHT (POUNDS)	MOMENT 1000
1	Current Aircraft Empty Weight (From Pg. 3-1)	1566.0	70.63	1566.0	70.63		
	Oil--8 QT @ 1.875 LBS/QT (Sump assumed full for all flights)	15.0	-.11	15.0	-.11		
2	Pilot Seat (#1)*	170.0	6.42 (Fwd. Pos.)	170.0	6.42 (Fwd. Pos.)		
	Co-pilot Seat (#2)*	170.0	6.63 (2nd Pos.)	170.0	6.42 (Fwd. Pos.)		
3	Left Rear Seat (#3)*	---	---	170.0	12.02 (Unreclined)		
	Right Rear Seat (#4)*	---	---	170.0	12.02 (Unreclined)		
4	Fuel (No. GAL x 6 LBS GAL) (MAX 52 GAL 312 LBS)	312.0	15.11	234.0	11.33		
5	Baggage (MAX 120 LBS)			80.0	7.44		
6	Loaded Aircraft Weight	2233.0		2575.0			
	Total Moment/1000		98.68		126.17		
7	Refer to page 2-3, Center-of-Gravity Moment Envelope, to determine whether your aircraft loading is acceptable. (The fuel arm station is 48.43, the oil arm station is -7.4 and the hatrack station is 114.0 Max. 10 lbs.)						

*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. 37.75)
NO. 1&2 SEATS @ NO. 6 AFT POS. (STA. 44.0)
FUEL (STA. 48.43)
NO. 3 & 4 SEATS (UPRIGHT POSITION) @ STA. 70.7
NO. 3 & 4 SEATS (RECLINED POSITION @ STA. 75.70)
BAGGAGE (STA. 93.0)
LOADING COMPUTATION GRAPH


LOADED AIRCRAFT WEIGHT (POUNDS)
2600
2500
2400
2300
2200
2100
2000
PROBLEM #2
MAXIMUM GROSS WEIGHT
2575
CENTER-OF-GRAVITY MOMENT ENVELOPE
PROBLEM #1
PROBLEM #2
80
90
100
110
120
130
140
LOADED AIRCRAFT MOMENT/1000 (POUND-INCHES)

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. _____

M20C 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

_____

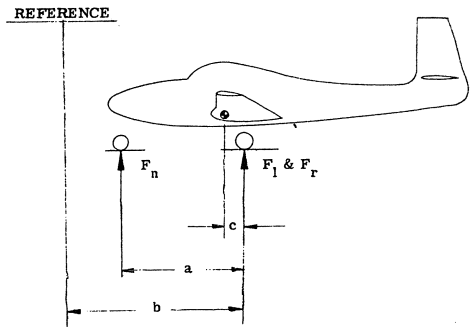
_____

_____

_____

_____

_____



(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]