

FAA APPROVED  
A I R P L A N E F L I G H T M A N U A L

MAULE AIRCRAFT CORPORATION  
MOULTREE, GEORGIA

Model M-5-220C

Airplane Serial No. \_\_\_\_\_

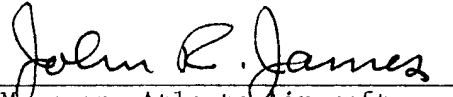
FAA Registration No. \_\_\_\_\_

(THIS DOCUMENT MUST BE KEPT IN THE AIRPLANE AT ALL TIMES)

FAA APPROVED: John F. Vogel  
Chief, Engineering and  
Manufacturing Branch  
Southern Region, FAA

DATE: December 28, 1973

MAULE MODEL M-5-220C  
AIRPLANE FLIGHT MANUAL  
LOG OF REVISIONS

Rev. No.	Page(s)	Description	Approval and Date
A	3a	Add " <u>PREFLIGHT INSPECTION</u> " to "II PROCEDURES".	 Manager, Atlanta Aircraft Certification Office FAA, Central Region Date: <u>May 1, 1984</u>

MAULE AIRCRAFT CORPORATION

AIRPLANE FLIGHT MANUAL

**MAULE M-5-220C**

LOG OF SUPPLEMENTS

SUPP. NO.	NO. OF PAGES	DESCRIPTION	APPROVAL DATE
1	2	Inst. of <b>EDO 248A2440</b> or <b>248B2440 Floats</b> - Maule Dwg <b>9080A</b> .	06/27/74
2	3	Installation of <b>FluiDyne C2200H Skis</b> - Maule Drawing <b>9021X</b> .	04/02/75
3	2	Flight operation with <b>either one</b> (not both) of the <b>Front doors removed</b> .	08/20/02
-	3	Installation of <b>Pee Kay 2300 Floats</b> .	03/02/77
-	3	Installation of <b>Aqua 2400 Floats</b> .	07/20/77
4	2	Installation of <b>20°/40° Flap Ratchet</b> Maule p/n 3207B.	04/01/83
5	2	Inst. of <b>20°/40° Flap Ratchet</b> <u>and</u> <b>2500#</b> Upgross modification.	03/21/84
-	2	Operation of aircraft when <b>M-5 Wing Assemblies 2110X-30</b> (with 2167X Main Fuel Tanks) are installed - Maule <b>Mod Kit No. 15</b> .	10/08/96
-	3	Operation of aircraft when a <b>5<sup>th</sup> passenger Seat</b> is installed in rear cabin - Maule <b>Mod Kit No. 8</b> .	09/02/97
-	4	Installation of <b>Aqua 2200 Floats @2300#</b> - - STC SA00758CH.	09/18/97
7	8	Inst. of <b>EDO 248B2440 Floats @ 2500#</b> GW - Maule Dwg <b>9173A</b> .	12/08/98
8	6	Installation of <b>S-TEC System 55 Two Axis Autopilot Model ST-620</b> (14v) per Maule Drawing <b>9196A</b> , Rev. A or later. (Land)	04/04/00
9	6	Installation of <b>S-TEC System 55 Two Axis Autopilot Model ST-620</b> (14v) - Maule Drawing <b>9196A</b> , Rev. A or later. (Sea)	04/04/00
10	9	Installation of <b>S-TEC System 20 Single Axis Autopilot Model ST-810-20</b> (14v) - Maule Drawing <b>9197A</b> , Rev. B or later. (Land)	03/20/00
11	9	Installation of <b>S-TEC System 20 Single Axis Autopilot Model ST-810-20</b> (14v) - Maule Drawing <b>9197A</b> , Rev. B or later. (Sea)	03/20/00
12	7	Installation of <b>S-TEC System 40 Single Axis Autopilot Model ST-418-40</b> (14v) - Maule Drawing <b>9193A</b> , Rev. C or later.	10/29/01
-	5	Installation of <b>Apollo MX20 Multi-Function Display</b> - Maule Drawing <b>7265A</b> .	08/15/02
-	8	Installation of <b>GARMIN GNC-420 (GPS/COMM) System</b> - Maule Drawing <b>7251A</b> .	06/30/03
-	9	Installation of <b>GARMIN GNS-530 (GPS/NAV/COMM) System</b> - Maule Drawing <b>7253A</b> .	06/30/03
-	4	Installation of <b>GARMIN GTX-330 Mode S Transponder Traffic Information System (TIS)</b> - Maule Drawing <b>7255A</b> .	06/30/03
-	3	Operation of aircraft when Micro AeroDynamics <b>Vortex Generator System</b> is installed per Maule Drawing <b>9177A</b> .	12/16/05

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## I. LIMITATIONS

The following limitations must be observed in the operation of this airplane:

- |                             |   |
|-----------------------------|---|
| A. Engine                   | Franklin 6A-350-C1  |
| B. Engine Limits            | 220 H.P. @ 2800 rpm, all operations   |
| C. Fuel                     | 100-130 Minimum Grade<br>Aviation Gasoline  |
| D. Propellers               | McCauley 2A34C22-N/S84SF-6<br>McCauley 2A34C22-N/S84SF-8  |
| E. Power Plant Instruments: |   |
| Cylinder Head Temp          | Green Arc: 200-390° F.<br>(Normal Operating Range)<br>Red Radial: 390° F.                                 |
| Manifold Pressure           | No required markings  |
| Oil Temperature             | Green Arc: 100-235° F.<br>(Normal Operating Range)<br>Red Radial: 235° F.                                 |
| Oil Pressure                | Green Arc: 55-80 psi<br>(Normal Operating Range)<br>Yellow Arc: (Caution) 0-55 psi<br>Red Radials: 80 psi |
| Tachometer                  | Green Arc: 1800-2800 rpm<br>(Normal Operating Range)<br>Red Radial: 2800 rpm                              |
| Fuel Pressure               | Green Arc: .5-9 psi<br>Red Radials: .5 and 9 psi  |

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F. Airspeed Limits: (Calibrated Airspeed)

Never Exceed ( $V_{NE}$ )	180 mph (156K) (Red Radial)
Caution Range	145-180 mph (126-156K) (Yellow Arc)
Design Cruising Speed ( $V_C$ )	145 mph (126K)
Normal Operating Range	62-145 mph (54-126K) (Green Arc)
Max. Design Maneuvering Speed ( $V_P$ )	125 mph (109K) (Maximum safe speed for application of full aerodynamic controls)
Max. Flap Extension Speed ( $V_F$ )	94 mph (82K)
Flap Operating Range	56-94 mph (49-82K) (White Arc)

NOTE: Airspeed Instrument Markings and their significance:

- (a) Radial RED line marks the never exceed speed, which is the maximum safe airspeed.
- (b) YELLOW arc on indicator denotes range of speeds in which operations should be conducted with caution and only in smooth air.
- (c) GREEN arc denotes normal operating speed range; 62 mph (54K) CAS is stall speed with flaps up, power off at 2300 lbs.
- (d) WHITE arc denotes speed range in which flaps may be safely lowered; 56 mph (49K) CAS is stall speed with flaps 35°, power off at 2300 lbs.

G. Maneuvers: Normal category maneuvers only are approved.

H. Flight Load Factors: (At max. gross weight of 2300 lbs.)

Maneuver: Positive Flaps Up	3.8g	Negative: 1.5g
Flaps Extended:	1.9g	

I. Maximum Weight 2300 lbs.

J. Center of Gravity Limits

	(+16.0) to (+20.5)	at 2300 lbs.
	(+15.0) to (+20.5)	at 2100 lbs.
	(+12.0) to (+20.5)	at 1600 lbs. or less

Straight Line variation between points given  
Datum: Wing Leading Edge

NOTE: It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. Refer to Weight and Balance data for baggage/cargo loading.

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K. Placards:

"THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUAL."

"NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED."

"ROUGH AIR OR MANEUVERING SPEED: 125 MPH (109K)"

"SEE LOADING INSTRUCTIONS IN WEIGHT AND BALANCE SECTION OF AIRPLANE FLIGHT MANUAL."

Type of Operation Authorized:

"THIS AIRPLANE APPROVED FOR DAY OR NIGHT IFR NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 OR FAR 135"

Fuel System Operation:

"FUEL REMAINING IN TANK WHEN INDICATOR READS ZERO CANNOT BE USED SAFELY IN FLIGHT."

Next to fuel filler caps:

MAIN (inboard) TANKS:

"FUEL - 100/130 OCTANE - 21.5 GAL" (20 gal useable each tank)

AUXILIARY (outboard) TANKS IF INSTALLED

"FUEL - 100/130 OCTANE - 11.5 GAL" (11.5 gal. useable each tank if transferred in level flight).

On face of each auxiliary tank fuel quantity gauge, if installed: "CAP 11.5 GAL".

"DO NOT TURN OFF ALTERNATOR IN FLIGHT EXCEPT IN CASE OF EMERGENCY"

L. Door off operation (rear passenger door or rear passenger door and baggage compartment door off):

1. Maximum speed with door removed - 125 MPH IAS
2. Maximum angle of bank - 30°
3. Maximum angle of yaw - 10°
4. No smoking permitted
5. Flight limited to VFR conditions.

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## AIRPLANE FLIGHT MANUAL

## II PROCEDURES

PREFLIGHT INSPECTION:

## A. INTERIOR:

1. BAT. Switch.....ON
2. Fuel gauges.....CHECK INDICATIONS
3. All Electrical Switches.....OFF
4. BAT. Switch.....OFF
5. Flaps.....FULL DOWN

## B. EXTERIOR: Begin at the left front door, proceed around the left wing to the nose area, then around the right wing and back to the fuselage, then around the tail section.

1. Fuel drains behind step.....DRAIN (2)
2. Left Flap.....CHECK HINGES & CONTROL ATTACHMENT
3. Aileron.....CHECK HINGES & CONTROL ATTACHMENT
4. Wing Top.....CHECK FOR WRINKLES AS INDICATION OF INTERNAL DAMAGE
5. Wing Main & Aux Fuel Tank Drains.....DRAIN (2)
6. Wing tip and nav. light.....CHECK FOR DAMAGE
7. Auxiliary fuel tank.....VISUALLY CHECK QUANTITY
8. Landing light.....CHECK FOR DAMAGE
9. Wing Tiedown.....REMOVE
10. Pitot tube.....REMOVE COVER
11. Stall Warning Switch.....CHECK FOR FREEDOM OF MOVEMENT
12. Main Fuel Tank.....VISUALLY CHECK QUANTITY
13. Left Landing Gear.....CHECK TIRE INFLATION AND BRAKE LINE SECURITY
14. Bottom left side of cowl.....DRAIN GASCOLATOR (1)
15. Top Cowl; Oil access door.....CHECK OIL QUANTITY
16. Propeller.....CHECK LEADING EDGE FOR DAMAGE
17. Air inlets.....CHECK FOR FOREIGN OBJECTS, INSPECT VISIBLE CONNECTIONS AND COMPONENTS
18. Right landing gear.....CHECK TIRE INFLATION AND BRAKE LINE SECURITY
19. Right wing and controls.....INSPECT SAME AS LEFT WING
20. Wing Main & Aux Fuel Tank Drains.....DRAIN (2)
21. Right fuselage side and top.....INSPECT FOR WRINKLES AS INDICATION OF INTERNAL DAMAGE
22. Static port.....CLEAR
23. Right Stabilizer.....CHECK ATTACHMENT POINTS AND STRUT
24. Right Elevator.....CHECK HINGE POINTS
25. Rudder.....CHECK HINGE POINTS, CONTROL ATTACHMENTS AND NAV. LIGHT
26. Tailwheel.....CHECK INFLATION, ATTACHMENTS, REMOVE TIEDOWNS
27. Left Elevator.....CHECK TAB CONTROLS AND ALL HINGE POINTS
28. Left Stabilizer.....CHECK ATTACHMENT AND STRUT
29. Left Fuselage side and bottom.....CHECK FOR WRINKLES AS INDICATION OF INTERNAL DAMAGE
30. Left side Static port.....CLEAR

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REV. A dated: 5/1/84



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## II. PROCEDURES

## A. Normal Procedures

## 1. Wing Flap Settings:

Takeoff - Normal 15° (First Notch) (0° permissible)  
- Shortfield 35° until safely airborne, then retract to 15°

Normal Climb and Cruise 0°

Landing 35° (Second Notch) (0° or 15° permissible)

2. Caution: Take off and land on fullest main tank.
3. Best Rate of Climb Speed: 90 MPH (CAS) at sea level, 0° flaps.  
Best Angle of Climb Speed: 75 MPH (CAS) at sea level, 15° flaps.
4. Right Rudder Trim: Use of right rudder trim is recommended during takeoff and climb to reduce the amount of right rudder force required. During level flight at moderate speeds and glide, the trim control should be in the OFF position, or as required to counteract any fuel unbalance.
5. Stall Warning Indicator: The electric stall warning system will light a red light on the instrument panel at approximately seven mph above the stalling speed. It will be inoperative when the master switch is off.
6. Loss of altitude prior to recovery from a stall may be as much as 200 feet.
7. Maximum 90° crosswind velocity demonstrated: 14 MPH
8. Anti-Collision Light:  
WARNING: Anti-Collision light may cause adverse effect on pilot when flying in overcast or haze. It is recommended that it be turned off under these conditions.
9. Auxiliary Gas Tank Operation (if installed):
  - a. The auxiliary fuel tank switches activate transfer pumps which will transfer the contents of the selected auxiliary tank into its respective main tank at a rate of 0.4 gallons per minute (approximately 30 minutes for a full auxiliary tank). Over filling a main tank from an auxiliary tank will force the excess fuel overboard through the tank vent system.

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- b. Recommended fuel use sequence:
  1. Use each main tank to one-half (1/2).
  2. With the left main to engine selected, transfer one-half of the left auxiliary tank to the left main tank.
  3. With the right main to engine selected, transfer the entire right auxiliary tank to the right main tank.
  4. With the left main to engine selected, transfer remaining left auxiliary fuel to the left main tank.
  5. Use either main tank as necessary to maintain lateral trim.

## B. Emergency Procedures

## 1. Engine failure.

## a. Air Restart:

Check mixture rich (over 8,000 feet a leaner mixture may be required), fuel on proper tank.  
Maintain 85 mph (74K) IAS (engine will not windmill below 80 mph).  
Use Boost Pump for engine restart.

## b. Forced Landing:

Maximum glide range under zero wind condition is obtained with prop stopped, 80 MPH, 0° flap setting. Turn fuel selector "OFF". Cut ignition and master switches just prior to landing. Use flaps as necessary.

## 2. Engine Fire:

Turn fuel selector OFF  
Open throttle to full ON position  
Turn ignition switch OFF  
Push OFF air vent and cabin heat

## 3. Spin Recovery:

Intentional spins are prohibited. If aircraft inadvertently enters a spin, immediately use opposite rudder followed by forward elevator for recovery. Adding power assists recovery.

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**WEIGHT AND BALANCE**

Serial Number \_\_\_\_\_ Registration Number \_\_\_\_\_

It is the responsibility of the airplane owner and the pilot to insure that the airplane is loaded properly. The empty weight, empty weight center of gravity and useful load are listed below for this airplane as delivered from the factory. If the airplane has been altered, refer to the aircraft log and/or aircraft records for this information.

**WEIGHT AND BALANCE DATA SUMMARY AS DELIVERED FROM THE FACTORY:**

Basic Empty Weight (including engine oil)..... \_\_\_\_\_ Lbs.  
Gross Weight..... 2300 Lbs.  
Useful Load..... \_\_\_\_\_ Lbs.  
Empty Center of Gravity..... \_\_\_\_\_ Inches  
Empty Weight Moment..... \_\_\_\_\_ Inch Lbs.

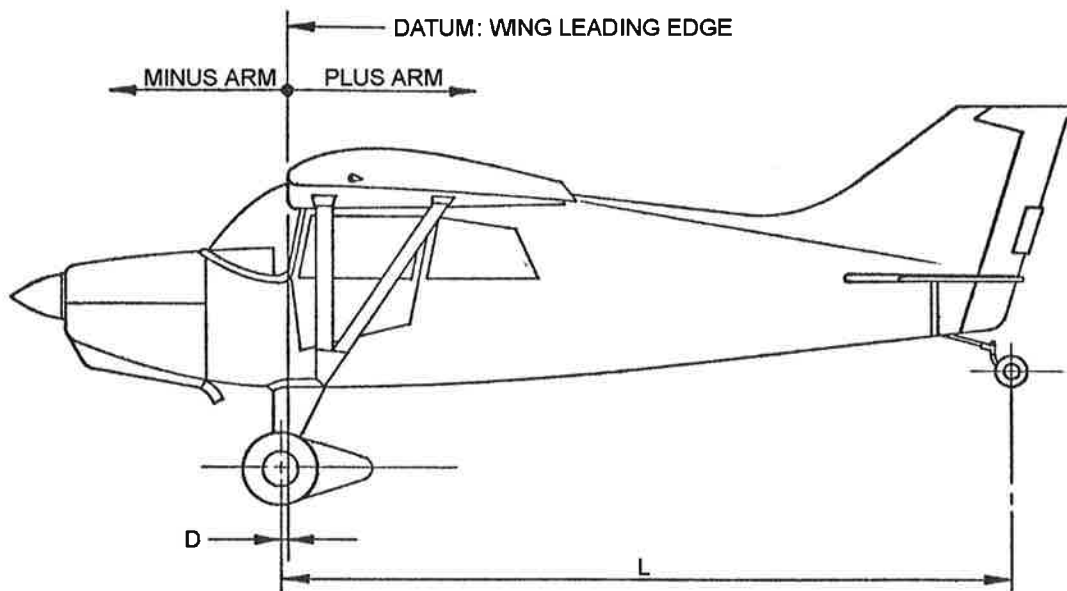
**CENTER OF GRAVITY RANGE:**

<u>Center of Gravity Range</u>	<u>At Weight of</u>
+16.0 to +20.5 inches	2300 lbs.
+15.0 to +20.5 inches	2100 lbs.
+12.0 to +20.5 inches	1600 lbs. or less

NOTE: Straight line variation between given points  
DATUM: Wing leading edge

CERTIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_

DETAILED CALCULATIONS OF EMPTY WEIGHT AND EMPTY WEIGHT CENTER OF GRAVITY AS DELIVERED FROM FACTORY:



PROCEDURE:

1. Place each of the wheels on a scale with the tailwheel elevated to place the airplane in approximately the flight attitude.
2. Place a level on the leveling mark and leveling lug on the bottom of the right wing near the root. Adjust the height of the tailwheel until the aircraft is level.
3. Measure the following distances:
  - a. Wheel base (**L**) - the horizontal distance from the tailwheel weight point (center of axle) to the main wheel weight point (center of axle).  
 $L = \underline{\hspace{2cm}}$  Inches
  - b. Main Wheel Station (**D**) - the horizontal distance from the main wheel weight point (center of axle) to the datum line.  
 $D = \underline{\hspace{2cm}}$  Inches
4. Measure the weights at the following points:
  - a. **Right Main Wheel**..... =  $\underline{\hspace{2cm}}$  Lbs.
  - b. **Left Main Wheel**..... =  $\underline{\hspace{2cm}}$  Lbs.
  - c. **Tailwheel**, with tare =  $\underline{\hspace{2cm}}$  Lbs., minus tare of  $\underline{\hspace{2cm}}$  Lbs.  
 = net Tailwheel wt. (**T**) of  $\underline{\hspace{2cm}}$  Lbs.  
 Total Weight as Weighted (**W**) =  $\underline{\hspace{2cm}}$  Lbs.

The above empty weight includes unusable fuel of 18 lbs. at 24 inches and 5 quarts of oil at minus 37.0 inches plus all items of equipment as marked on the accompanying Equipment Lists. The certificated empty weight is the above weight less 10 lbs. drainable oil at a minus arm of 37 inches and for this airplane is \_\_\_\_\_ lbs. The corresponding empty weight center of gravity is \_\_\_\_\_ inches.

5. Calculations for determining weight, C.G. and moment:

a. Center of Gravity (inches) =  $\frac{L \times T}{W} - D$

i.e., C.G. = \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_ inches.

b. Moment (inch pounds) =  $W \times C.G.$

i.e., Moment = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_ inch lbs.

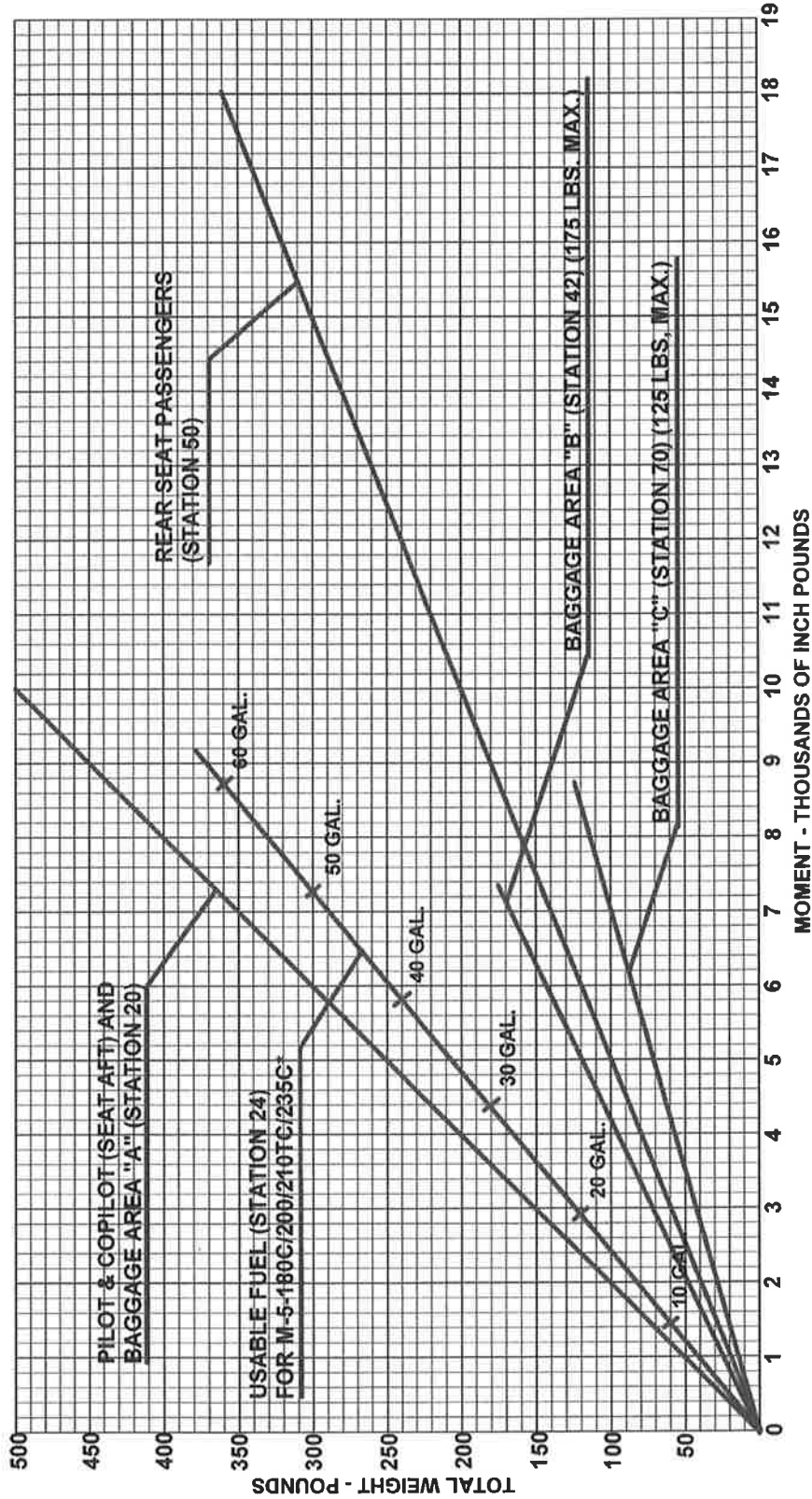
**EXAMPLE OF WEIGHT AND BALANCE CALCULATION FOR LOADED AIRCRAFT:**

An airplane with an empty weight of 1360 lbs. and empty weight C.G. location of 13.7 inches is loaded with a pilot and front seat passenger, fuel and baggage.

Item	Weight, lbs.	C.G. Location	Moment, In.lbs.
Empty Weight (including engine oil)	1360	13.7	18,632
Pilot and Front Passenger	340	*	6,800
Fuel - 40 gal. in Mains	240	*	5,760
Baggage (Area "C")	<u>125</u>	*	<u>8,750</u>
	2065	19.3	39,942

\*Moments can be read directly from the loading graph.

By locating the point corresponding to 2065 lb. aircraft weight and a C.G. Location of 19.3 inches on the Center of Gravity Envelope graph, you can see that this point falls within the envelope, signifying the loading is acceptable.



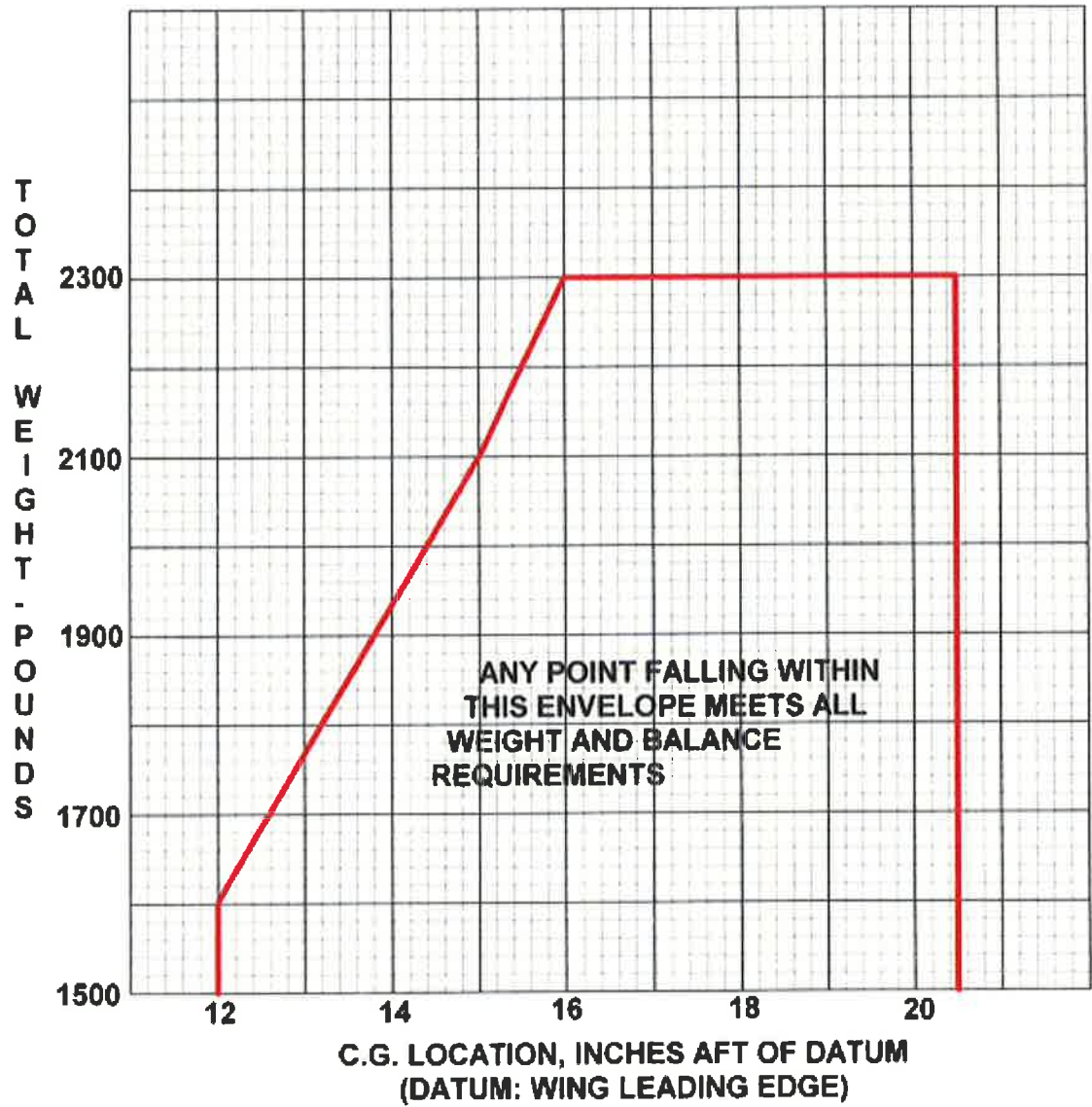
**LOADING CHART**

**PROCEDURE FOR DETERMINING WEIGHT & CENTER OF GRAVITY:**

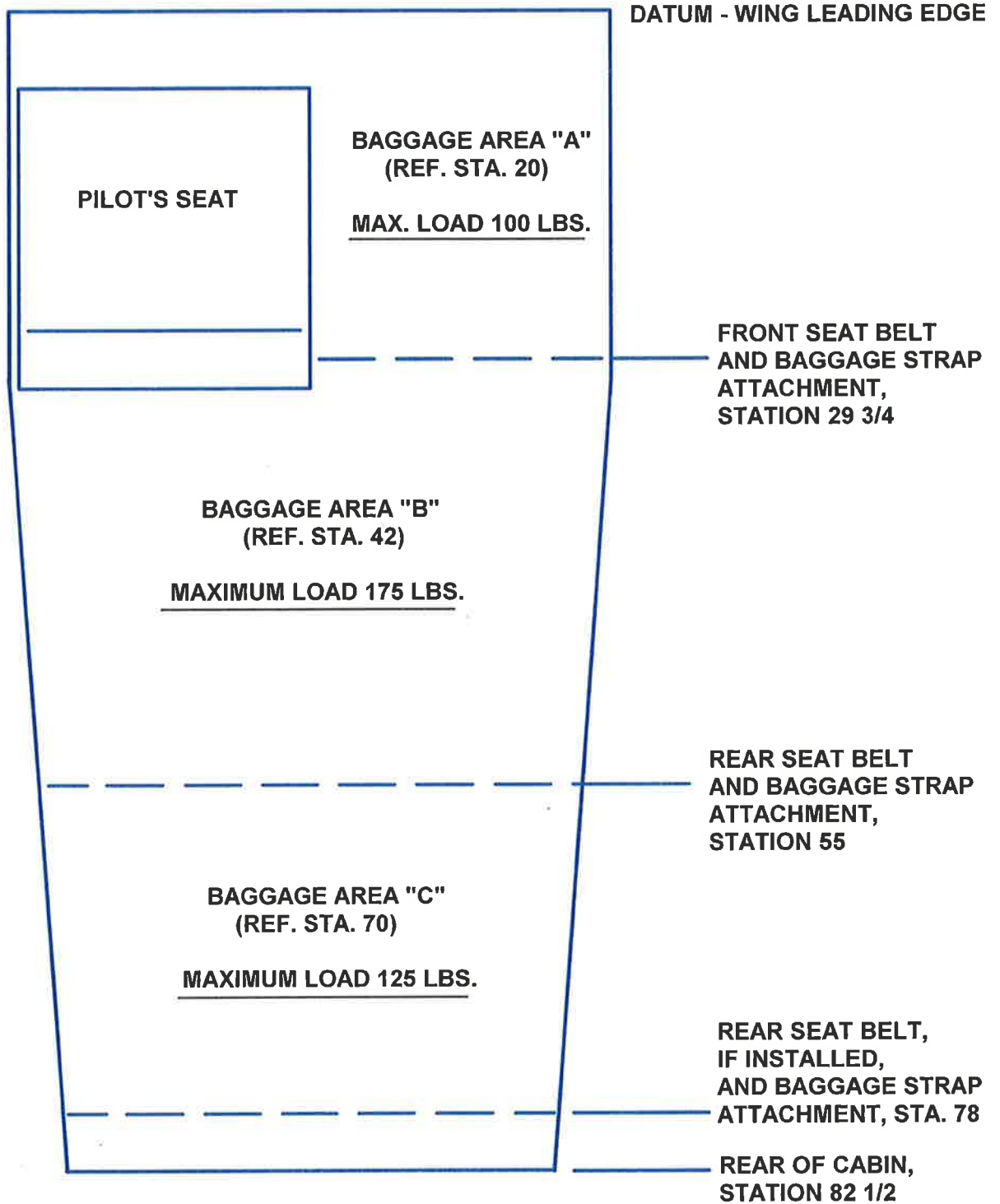
1. Add weight of items to be carried to the basic empty weight of the aircraft.
2. Find moments of items to be carried by using the above loading graph and add these moments to the empty moment of the aircraft. Divide total moment by total weight for aircraft C.G. location.
3. Using the C.G. location from Step 2, find the point on the Weight and Balance Envelope.

\*FOR M-5-210C/220C, USE (STATION 23.3) FOR FINDING USABLE MAIN TANK FUEL MOMENT AND (STATION 22.2) FOR FINDING AUX FUEL TANK MOMENT

**WEIGHT AND BALANCE ENVELOPE**



STRUCTURAL CAPACITY CHART





SERIAL NO. \_\_\_\_\_ REG. NO. \_\_\_\_\_ MODEL \_\_\_\_\_

EQUIPMENT CHANGE - WEIGHT AND BALANCE

ITEM'S (MAKE & MODEL)                      WEIGHT                      ARM                      MOMENTS

Previous Aircraft Empty	WEIGHT	ARM	MOMENTS

- A. New Empty Weight \_\_\_\_\_ lbs.
- B. New Empty Center of Gravity \_\_\_\_\_ ins.
- C. New Empty Weight C.G. Moment \_\_\_\_\_ in. lbs.
- D. New Useful Load \_\_\_\_\_ lbs.

Supersedes all previous weight and balance data. For aircraft loading see instructions in original weight and balance forms.

BY \_\_\_\_\_ DATE \_\_\_\_\_