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

MAULE AIRCRAFT CORPORATION  
JACKSON, MICHIGAN

Model M-4 - 210 Series

④  
(Includes Models M-4-210, M-4-210S, M-4-210C and M-4-210T)

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

FAA Ident. Number \_\_\_\_\_

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

APPROVED

*John W. Husley*

FOR

JOHN A. CARRAN, Chief  
Engineering & Manufacturing Br.  
Central Region

DATE: March 15, 1966

MAULE MODEL M-4-210 SERIES

AIRPLANE FLIGHT MANUAL

LOG OF REVISIONS

Rev. No.	Page Number (s)	Description	Date of Revision	Approved By
1	3 & 4	Install header tank and fuel system modifications	11/18/64	J.W. Husley
2	All	Include approval of Models M-4-210, M-4-210S, M-4-210C and M-4-210T airplanes.	3/15/66	J.W. Husley
3	2, 3 & 4	Increased gross weight to 2300 pounds and revised center of gravity limits.	10/15/68	J.W. Husley
4	1 & 4	Added IO-360-D Model Engine and Corresponding Engine Limit, Manifold Pressure Limit, and Oil Temperature Limit. Added cyl. head temp note.  Revision No. 4 applies to M-4-210 airplane serial numbers 1086C and up.		<p><i>John F. Vogel</i>                      Chief, Engineering and Manufacturing Branch                      Southern Region, FAA                      Date: June 20, 1973</p>

\* For Chief, Engineering & Manufacturing Branch, Central Region

MAULE AIRCRAFT CORPORATION  
AIRPLANE FLIGHT MANUAL

**MAULE M-4-210/C**

**LOG OF SUPPLEMENTS**

(2)  
(3)  
(4)

SUPP. NO.	NO. OF PAGES	DESCRIPTION	APPROVAL DATE
1	1	Flight operation with <b>Right Rear Door removed</b> - STC SA258CE. (M-4-210)	09/24/64
2	3	Installation of <b>Fli-Lite 3000 MK IIIA Skis</b> - Maule drawing <b>9079A</b> . Revised	10/07/65
3	1	Installation of Federal Model <b>A2000A Skis</b> . (09/28/64) Revised	10/07/65
-	1	Installation of <b>Landes-Airglas L-2500A Main Skis</b> . (STC SA222AL)	12/05/66
4	2	Installation of Federal Model <b>C3000H Skis</b> .	09/20/67
5	2	Installation of Federal Model <b>C2200H Skis</b> .	02/09/68
6	1	Installation of <b>Fleet Model 2500 Floats</b> . *	07/23/68
-	7	Installation of <b>CAP Model 62-2000 Floats</b> . (Requires Page 3 of Spec. S-14)	11/21/66
7	1	Installation of <b>EDO Model 248A2440 or 248B2440 Floats</b> - Maule STC SA609CE. * (11/29/68) Revised	09/19/69
8	2	Operation of aircraft with <b>Wing Tip Auxiliary Fuel Tanks installed</b> .	06/04/75
9	1	Installation of Continental IO-360- <b>D</b> engine - <b>Maule SL#42</b> . (Applicable to s/n's 1001-1045, 1001C-1085C)	01/15/80
10	2	<b>Preflight Inspection</b> added for Airplane Flight Manuals dated 9/24/64 and 3/15/66.	05/01/84
11	2	Flight operation with <b>Right Rear Passenger Door removed</b> . (M-4-210C)	09/13/96
12	2	Flight operation with <b>either one (not both) of the Front Doors removed</b> . (M-4-210C)	09/13/96
13	4	Operation of aircraft when existing Wing Assemblies, Ailerons, Flaps and Flap Ratchet are <b>replaced with M-5 Wing Assemblies 2110X-L/R or 2110X-30, Ailerons, Flaps and 20°/40° Flap Ratchet</b> in accordance with Maule <b>Modification Kit No. 41</b> .	08/23/01
-	5	Installation of <b>Apollo MX20 Multi-Function Display</b> - Maule Drawing 7265A.	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

\*For s/n's 1001-1035 with Maule SL#7 and #15 complied with; 1036-1045, 1001C-1074C, 1079C, 1080C with SL#15 complied with and 1075C-1078C, 1081C-1117C.

MAULE MODEL M-4 - 210 SERIES  
AIRPLANE FLIGHT MANUAL

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## MAULE MODEL M-4-210 SERIES

## AIRPLANE FLIGHT MANUAL

## I. LIMITATIONS

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

- |                             |   |
|-----------------------------|---|
| A. Engine                   | Continental Model IO-360-D.   |
| B. Engine Limits            | 210 H.P. @ 2800 RPM<br>All operations   |
| C. Fuel                     | 100-130 Minimum Grade Aviation Gasoline.  |
| D. Propellers               | McCauley D2A34C67N/S76C-2   |
| E. Power Plant Instruments: |   |
| Cylinder Head Temp          | Green Arc: 100°F - 460°F<br>(Normal Operating Range)<br>Red Radial: 460°F   |
| Manifold Pressure           | No required markings  |
| Oil Temperature             | Green Arc: 75- 240°F<br>(Normal Operating Range)<br>Red Radial: 240°F   |
| Oil Pressure                | Green Arc: 30-60 psi<br>(Normal Operating Range)<br>Yellow Arc (Caution), 10-30 psi<br>Red Radials: 10 and 60 psi |
| Tachometer                  | Green Arc: 1800-2800 RPM<br>(Normal Operating Range)<br>Red Radial: 2800 RPM                                      |

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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)	
Max. Flap Extension Speed ( $V_F$ )	90 mph (82K)	
Flap Operating Range	56-90 mph (49-82K)	(White Arc)

**NOTE 1. 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.
- (d) WHITE arc denotes speed range in which flaps may be safely lowered.

**G. Maneuvers:** Normal Category maneuvers only are approved.

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

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

**WARNING:** Use controls with caution above 125 mph (109K) CAS.

**I. Maximum Weight** 2300 lbs.

**J. Center of Gravity Limits**

	(+16.0) to (+19.6)	at 2300 lbs.
	(+15.0) to (+23.0)	at 2100 lbs.
	(+11.0) to (+23.0)	at 1400 lbs.

or less

Straight Line variation between points given  
Datum: Wing Leading Edge

**NOTE 2.** 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.

**K. Placards:**

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

"NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED."

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

"TAKE OFF WITH 15° FLAPS"

**Types of Operation Authorized:**

One of the following placards is required depending on equipment installed. (See FAR 91).

"THIS AIRCRAFT APPROVED FOR DAY VFR FLIGHT ONLY" or,

"THIS AIRCRAFT APPROVED FOR DAY OR NIGHT VFR FLIGHT" or,

"THIS AIRCRAFT APPROVED FOR DAY OR NIGHT VFR OR IFR FLIGHT".

**L. Warning:** Flight into icing conditions not approved.

**M. Fuel System Operation**

"TAKE OFF AND LAND ON FULLEST MAIN TANK."

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

**II. PROCEDURES**

**A. Normal Procedures**

**1. Wing Flap Settings:**

Takeoff	15°	(First Notch)
Cruise	0°	(Full Up-Retracted)
Landing	35°	(Second Notch)

**2. Best rate of climb speed:** 90 MPH (CAS) at sea level.

**3. Stall Warning Indicator:**

The required 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.

**4. Altitude loss during stall recovery may be as much as 200 feet.**

5. Maximum 90° crosswind velocity demonstrated: 20 mph
  6. Right Rudder Trim:  
Use of right rudder trim is recommended during takeoff, climb and high speed flight to reduce the amount of right rudder force required. During level flight at moderate speeds and for glides the trim control should be in the off position.
  7. Anti-Collision Beacon  
WARNING: Turn anti-collision lights "off" when encountering adverse atmospheric conditions such as haze, fog or clouds.
  8. When climbing at altitude observe cylinder head temperature guage to prevent engine overheating.
- B. Emergency Procedures:
1. Air Restart  
Use primer pump for engine restart.
  2. Engine Failure  
Use 15° flap setting (first notch), maintain 85 mph (78K) CAS. If air restart is not possible, cut ignition and master switches. Execute forced landing.
  3. Engine Fire  
Turn fuel valve OFF.  
Open throttle to full ON position  
Turn ignition switch OFF.

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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.

3

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**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:**

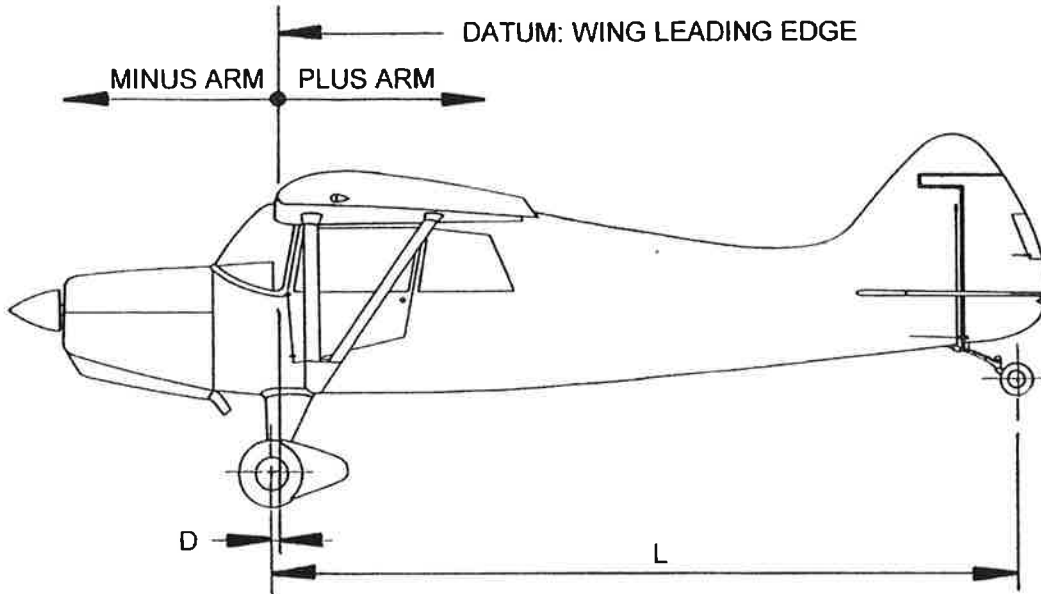
<u>Center of Gravity Range</u>	<u>At Weight of</u>
+16.0 to +19.6 inches	2300 lbs.
+15.0 to +23.0 inches	2100 lbs.
+11.0 to +23.0 inches	1400 lbs. or less

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

Skiplane Center of Gravity Range with Fli-Lite 3000 MK IIIA or Federal A2000A skis is same as landplane except gross weight is limited to 2100 lbs.. Skiplane empty weight and center of gravity will be done with the skis in the wheel position.

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

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



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**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**.....=                      Lbs.
  - b. **Left Main Wheel**.....=                      Lbs.
  - c. **Tailwheel**, with tare =                      Lbs., minus tare of                      Lbs.  
 = net Tailwheel wt. (T) of                      Lbs.

Total Weight as Weighted (W) =                      Lbs.

The above empty weight includes unusable fuel of 18 lbs. at 24 inches and 10 quarts of oil at minus 37 inches, plus all items of equipment as marked on the accompanying Equipment Lists. The certificated empty weight is the above weight less 12.5 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.

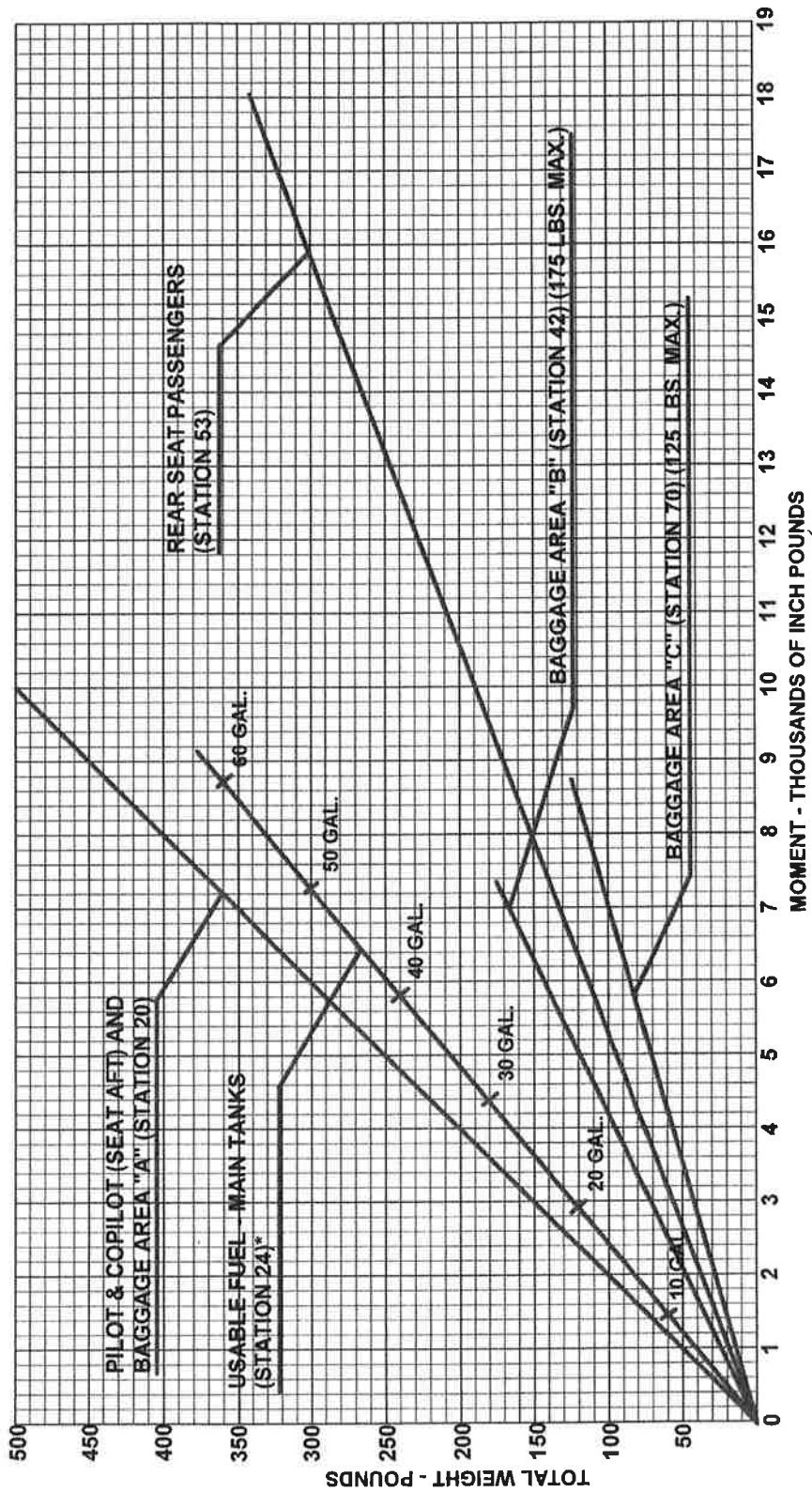
EXAMPLE OF WEIGHT AND BALANCE CALCULATION FOR LOADED AIRCRAFT:

An airplane with an empty weight of 1147 lbs. and empty weight C.G. location of 11.2 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)	1147	11.2	12,846
Pilot and Front Passenger	340	*	6,800
Fuel - 40 gal. in Mains	240	*	5,760
Baggage (Area "B")	50	*	3,500
	<u>1777</u>	16.3	<u>28,906</u>

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

By locating the point corresponding to 1777 lb. aircraft weight and a C.G. Location of 16.3 inches on the Center of Gravity Envelope graph, you can see that this point falls within the envelope, signifying the loading is acceptable.



**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.

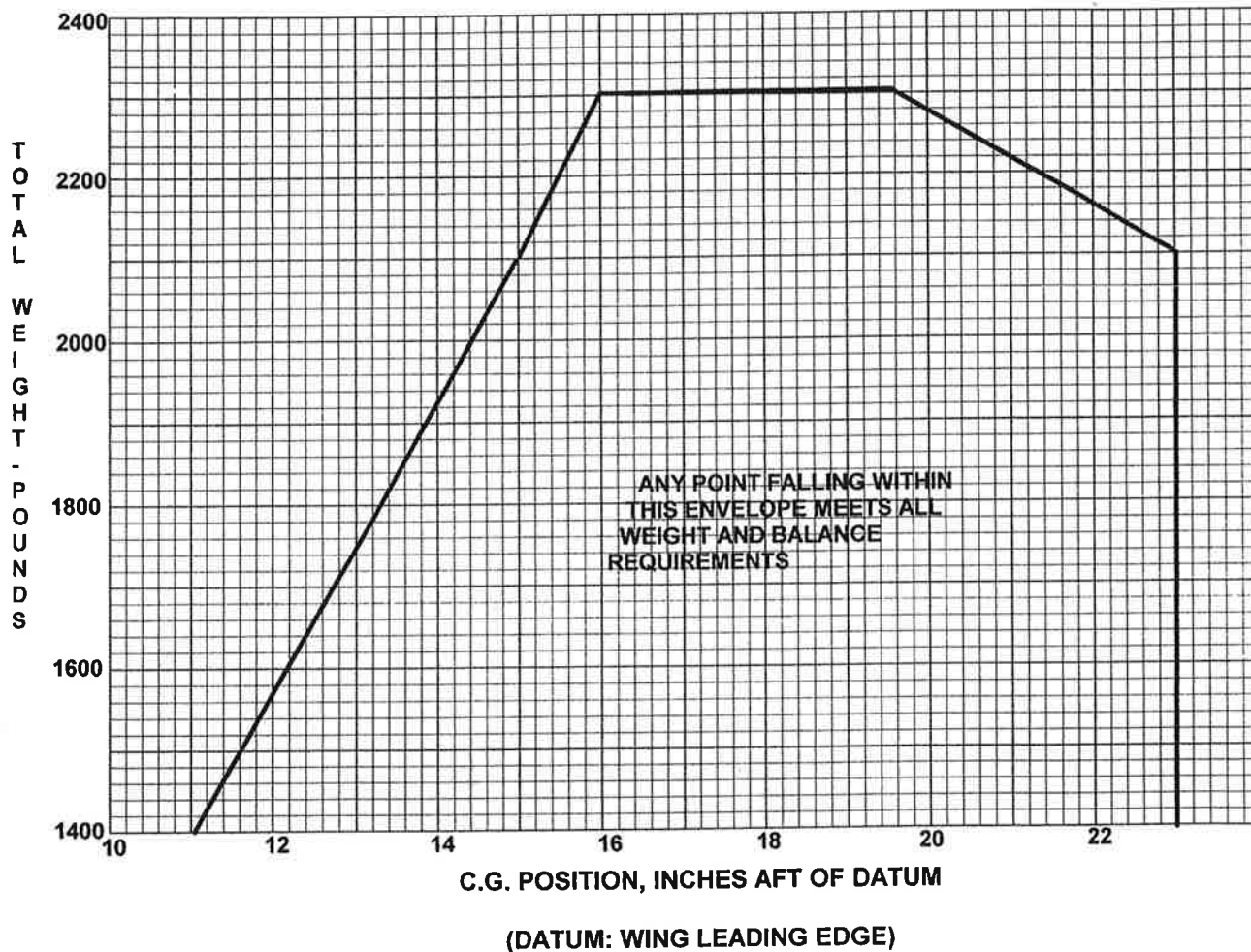
**LOADING CHART**

\*USE (STATION 22.2) FOR FINDING AUX TANK USABLE FUEL MOMENT

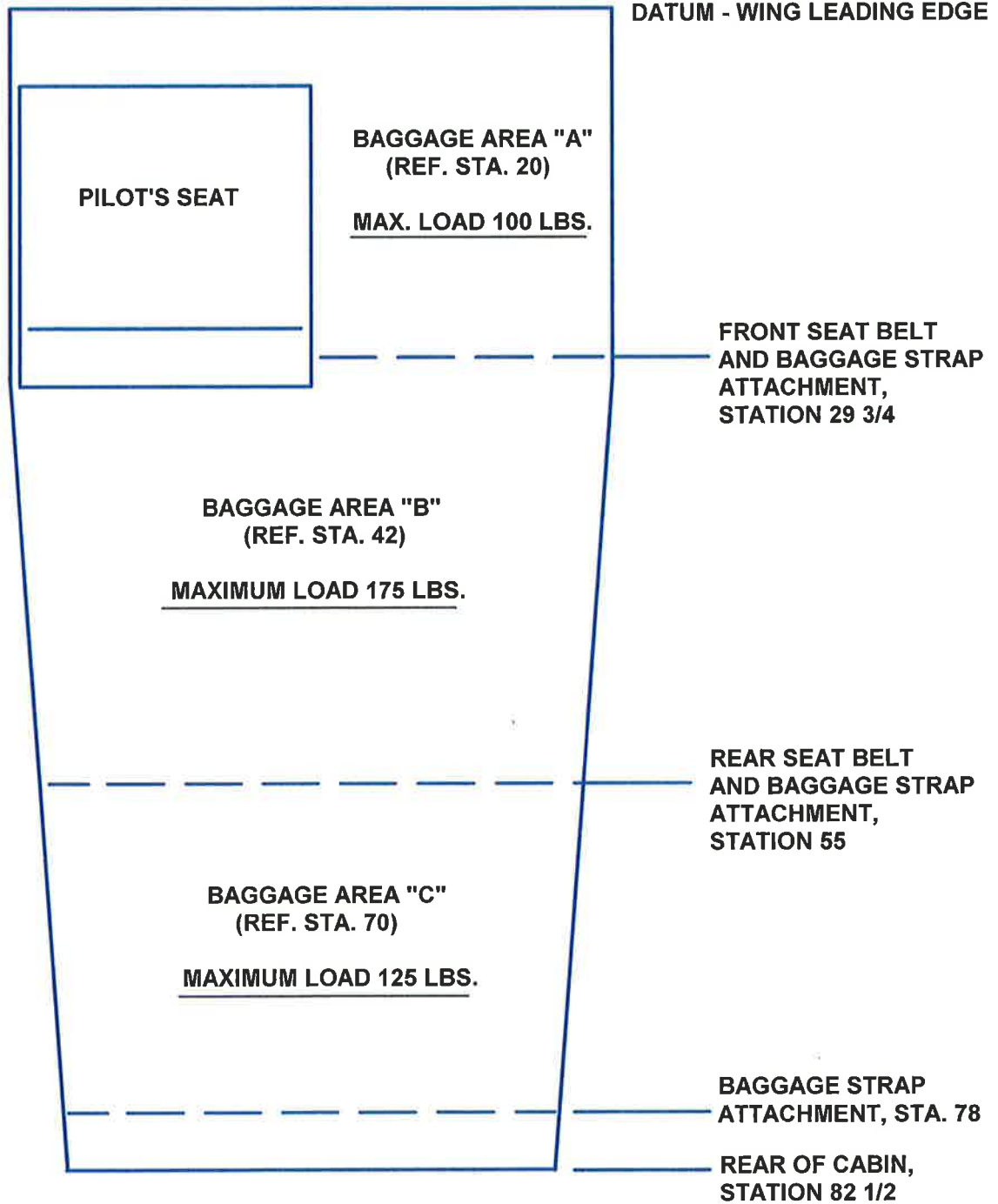
**WEIGHT AND BALANCE ENVELOPE**

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STRUCTURAL CAPACITY CHART



**MAULE AIRCRAFT CORPORATION  
 AIRPLANE FLIGHT MANUAL  
 MAULE M-4-210IC**

**WEIGHT AND  
 BALANCE**

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

**EQUIPMENT CHANGE - WEIGHT AND BALANCE**

**ITEM'S (MAKE & MODEL)      WEIGHT                      ARM                      MOMENTS**

**3**

**4**

ITEM'S (MAKE & MODEL)	WEIGHT	ARM	MOMENTS
Previous Aircraft Empty			

- 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 \_\_\_\_\_