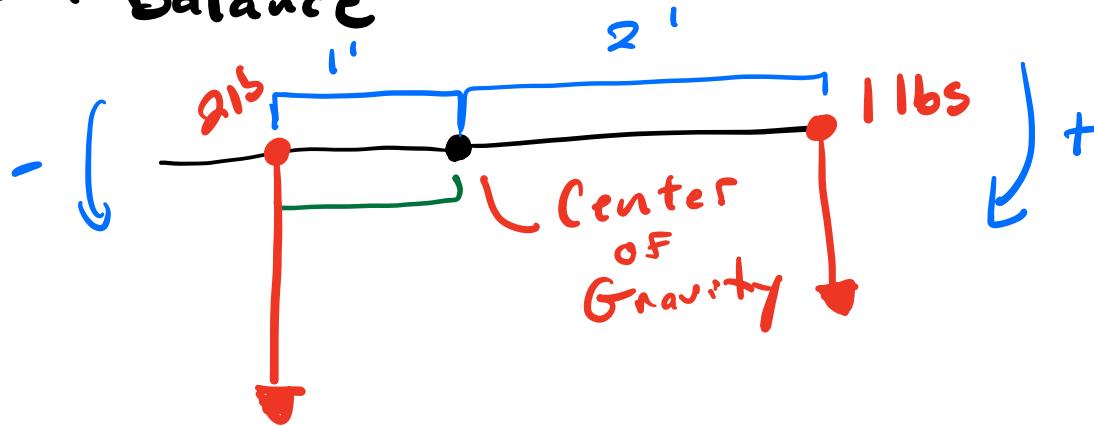


Weight + Balance



$$\text{Moments: } +2 + (-2) = 0$$

Terms:

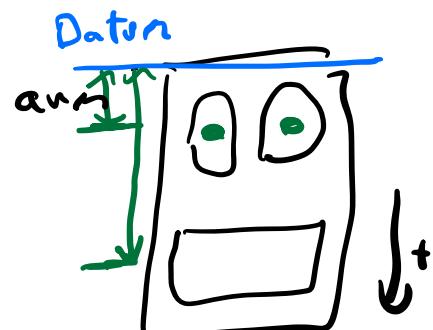
Datum : Line measure from
Station : Payload area

Arm : Distance from datum

Moment : Arm * weight

CoG : Total moments / Total weight

Envelope: Acceptable range weight/moment



Weights:

Basic empty weight ←

Standard empty weight : weight from factory

Licenced empty weight: Old term

Max ramp weight: taxi, not T/O

Fuel 100LL : 6 lbs/gallon

T182 50 gal 100LL

Pilot	160 lbs
Copilot	180 lbs
Pass.	120 lbs

Fuel burn: 40 gal

	<u>Old</u>	<u>New</u>
(37") Front	[Pilot 160 Copilot 180 Pass 120]	Front [160
(74") Back		Back [180 120]

Front: -180

Back: +180

2667.1 lbs

Old
105.3 in-lbs/lb

$$1000 \cdot 105.3 - 180 \cdot 37" + 180 \cdot 74"$$

$$1000 \cdot 105.3 + 180(74" - 37") = \boxed{111,960}$$

111.96 New

**SAMPLE
LOADING PROBLEM**

	SAMPLE AIRPLANE		YOUR AIRPLANE		Weight lbs	Moment lb.-in./ 1000
	Weight (lbs.)	Moment (lb.-ins. /1000)	Weight (lbs.)	Moment (lb.-ins. /1000)		
1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil)	1815	64.0	1914	70.4	1907.1	69.9(1)
2. Usable Fuel (At 6 Lbs./Gal) 46.5 Standard Tanks (88 Gal. Maximum)	528	24.6			300	14
Reduced Fuel (65 Gal.)	390	18.2	390	18.2	340	12.6
3. Pilot and Front Passenger (Station 32 to 50) 37"	340	12.6	400	15.0	120	8.8
4. Second Row Passengers 744	340	25.2	200	15.0		
Cargo Replacing Second Row Seats (Sta. 65 to 82)						
5. *Baggage (Area "A") or Passenger on Child's Seat (Sta. 82 to 109) 120 Lbs. Maximum	70	6.8	50	5.0		
6. *Baggage (Area "B") (Sta. 109 to 124) 80 Lbs. Maximum	19	2.2				
7. *Baggage (Area "C") (Sta. 124 to 134) 80 Lbs. Maximum			50	6.5		
8. RAMP WEIGHT AND MOMENT	3112	135.4			2667.1 lbs	<u>105.3</u>
9. Fuel allowance for engine start, taxi and runup.	-12	-.6				
10. TAKEOFF WEIGHT AND MOMENT (Subtract step 9 from step 8)	3100	134.8	3004	130.1		
11. Locate this point (3100 at 134.8) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable, provided that flight time is allowed for fuel burn-off to a maximum of 2950 pounds before landing.					4094 C6	
*The maximum allowable combined weight capacity for baggage in areas A, B, and C is 200 pounds.					-240 lbs	-11.6
*The maximum allowable combined weight capacity for baggage in areas B and C is 80 pounds.						

$$\frac{105.3 + 1000 \text{ in-lbs}}{2667.1 \text{ lbs}} = \boxed{39.48 \text{ in}}$$

2427.1 93.7



NORTHWEST AIRTECH

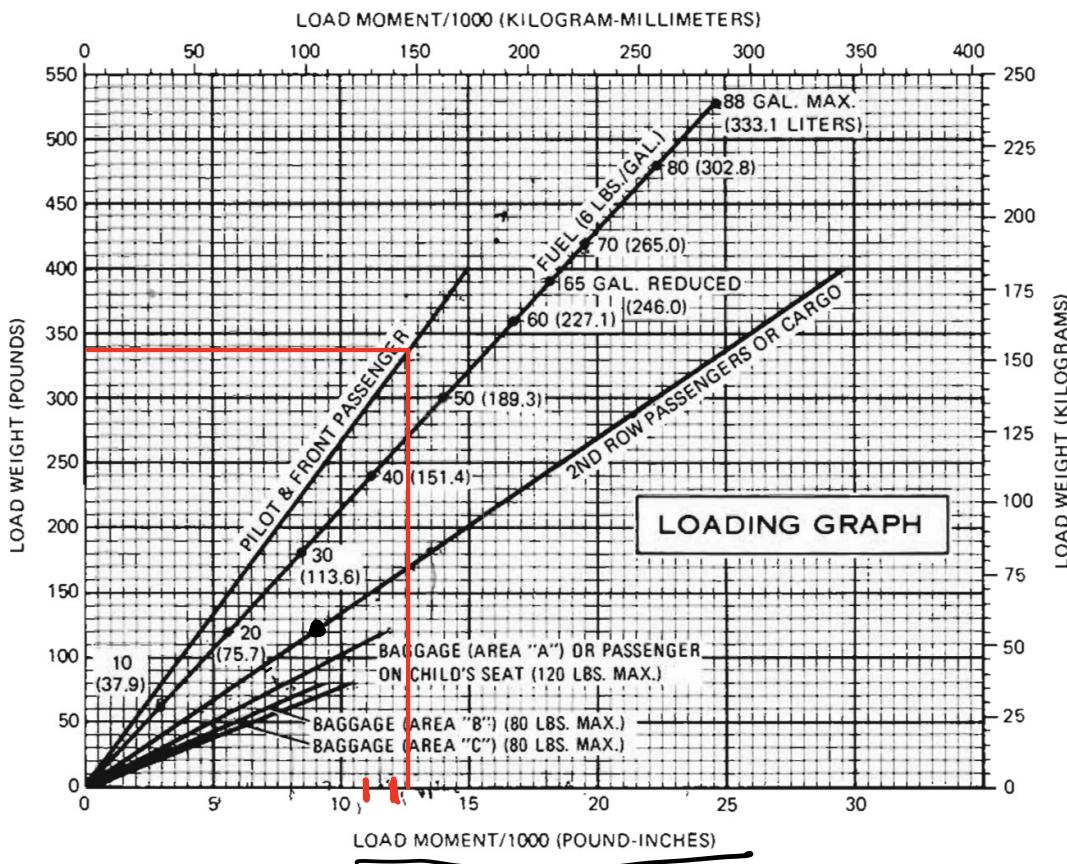


WEIGHT & BALANCE AND EQUIPMENT LIST AMENDMENT

DATE	WO #	OWNER	REG. #	MAKE & MODEL	SERIAL #
4/1/2024	4626	Plane Fun	N2017E	Cessna T182	18268183

ITEM	WEIGHT	ARM	MOMENT
Previous empty weight as of 4/10/2020	1911.0		69891.300
Remove Nose Wheel Pant:	-3.9	-6.00	23.400 0.000 0.000 0.000 0.000 0.000 0.000
Totals	1907.1	36.66	69914.700
NEW EMPTY WEIGHT	1907.1		
E.W.C.G.	36.66		
MOMENT	69914.700		
MAX TAKE-OFF WEIGHT	3100		
USEFUL LOAD	1192.9		

Robert L Reinecke
Robert L Reinecke AP3455579IA



NOTE: 1. Line representing adjustable seats shows pilot and front seat passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements diagram for forward and aft limits of occupant C.G. range.

Figure 6-6. Loading Graph

CESSNA
MODEL T182

SECTION 6
WEIGHT & BALANCE/
EQUIPMENT LIST

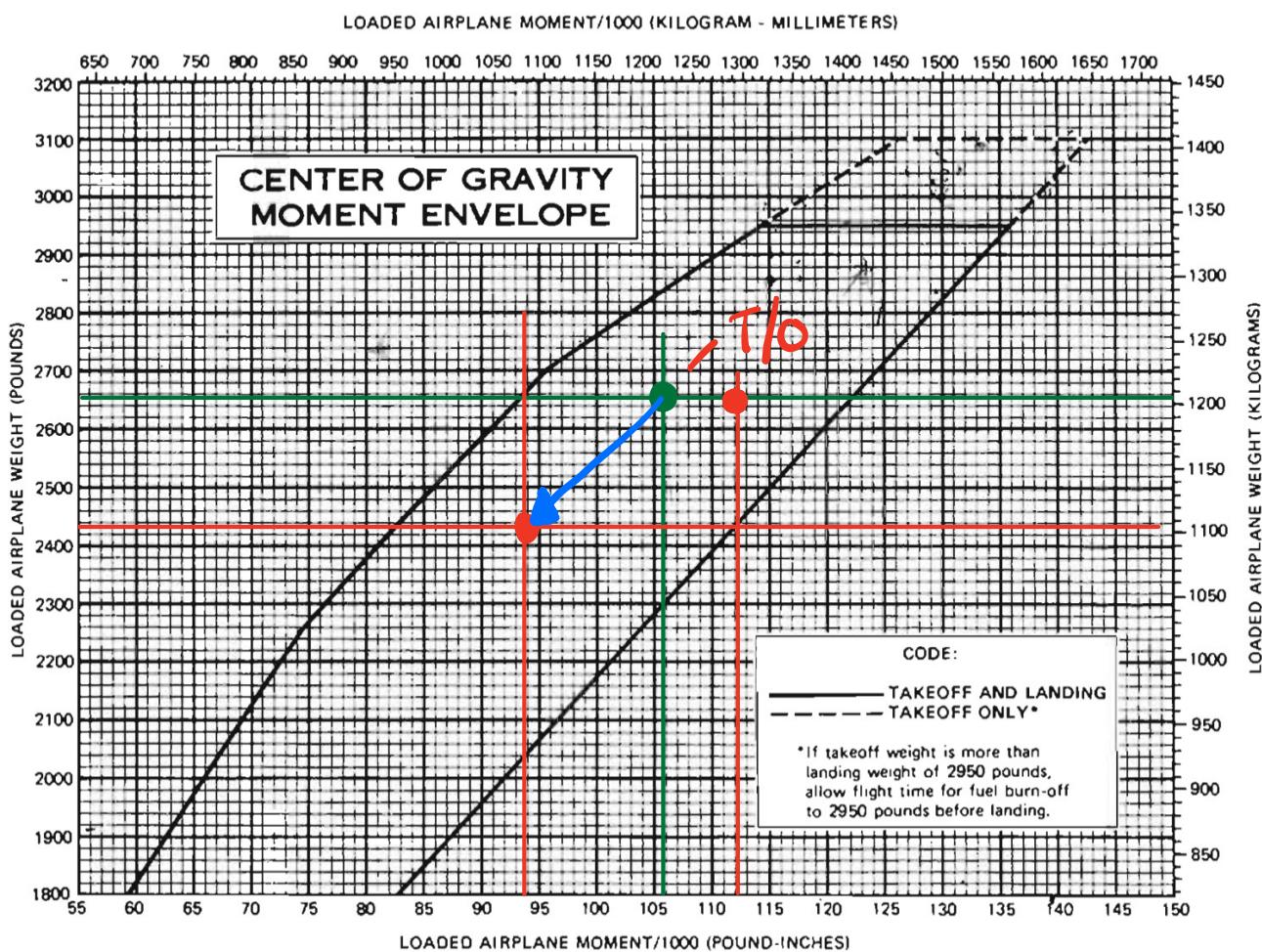


Figure 6-7. Center of Gravity Moment Envelope

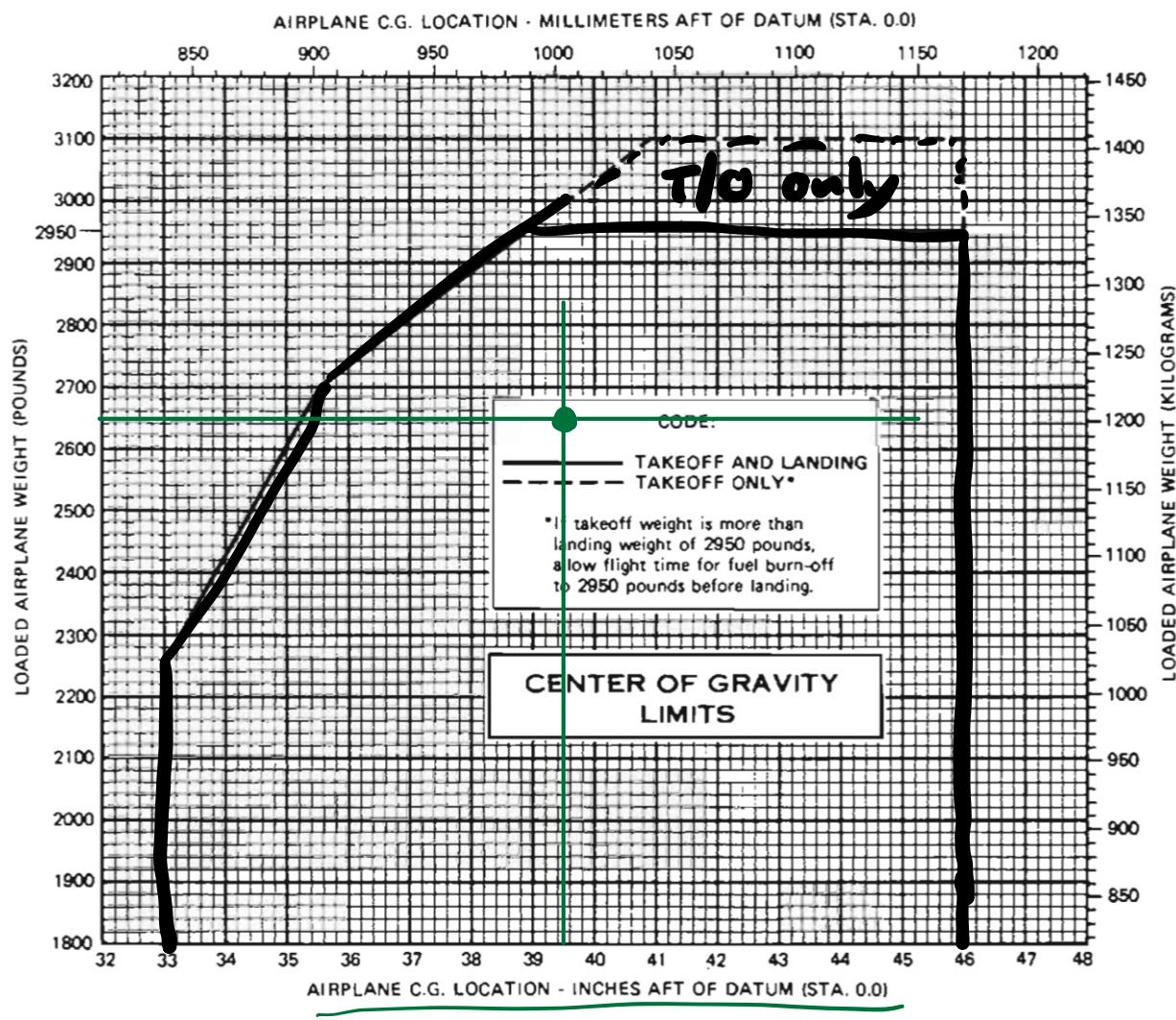


Figure 6-8 Center of Gravity Limits

Overweight

- Longer T/O roll
- Slover climb
- Long landing roll
- Structural damage

Aft CG

Less stable, faster cruise speed

Limited forward elevator, stall

Forward CG

More stable, slower cruise speed

Limited rear elevator, landing