

INTRODUCTION

This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided. For additional information regarding Weight and Balance procedures, refer to the Aircraft Weight and Balance Handbook (FAA-H-8083-1). A comprehensive list of Cessna equipment available for this airplane is included at the back of this section.

Specific information regarding the weight, arm, moment and installed equipment for this airplane as delivered from the factory can be found in the plastic envelope in the back of this POH.

WARNING

IT IS THE RESPONSIBILITY OF THE PILOT TO MAKE SURE THE AIRPLANE IS LOADED PROPERLY. OPERATION OUTSIDE OF PRESCRIBED WEIGHT AND BALANCE LIMITATIONS COULD RESULT IN AN ACCIDENT AND SERIOUS OR FATAL INJURY.

AIRPLANE WEIGHING PROCEDURES

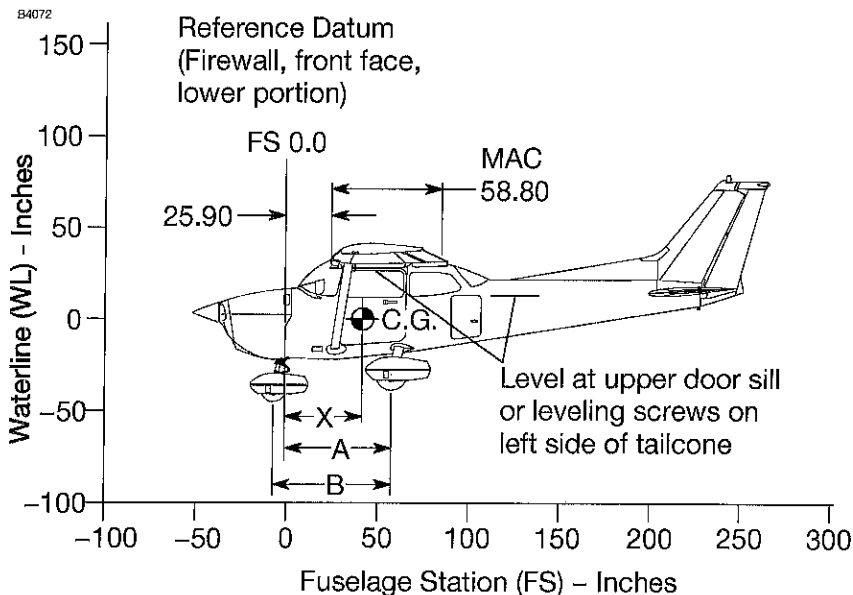
1. Preparation:
 - a. Inflate tires to recommended operating pressures.
 - b. Defuel airplane. Refer to the Maintenance Manual.
 - c. Service engine oil as required to obtain a normal full indication (approximately 7 quarts on dipstick).
 - d. Move sliding seats to the most forward position.
 - e. Raise flaps to the fully retracted position.
 - f. Place all control surfaces in neutral position.
 - g. Remove all non-required items from airplane.

(Continued Next Page)

AIRPLANE WEIGHING PROCEDURES (Continued)

2. Level:
 - a. Place scales under each wheel (minimum scale capacity, 1000 pounds).
 - b. Deflate the nose tire and/or lower or raise the nose strut to properly center the bubble in the level (Refer to Figure 6-1 Sheet 1).
3. Weigh:
 - a. Weigh airplane in a closed hangar to avoid errors caused by air currents.
 - b. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.
4. Measure:
 - a. Obtain measurement A by measuring horizontally (along the airplane centerline) from a line stretched between the main wheel centers to a plumb bob dropped from the firewall.
 - b. Obtain measurement B by measuring horizontally and parallel to the airplane centerline, from center of nosewheel axle, left side, to a plumb bob dropped from the line between the main wheel centers. Repeat on right side and average the measurements.
5. Using weights from step 3 and measurements from step 4, the Basic Empty Weight and C.G. can be determined by completing Figure 6-1 (Sheet 2).
6. Changes to the Airplane Weight and Balance due to alteration or repair must be documented in a permanent record within the POH similar to that shown in Figure 6-2.
7. A new Basic Empty Weight and CG Arm based on actual airplane weight (as weighed) is required after a major repair or alteration. It is recommended that the airplane be weighed to verify Basic Empty Weight and CG Arm at intervals not to exceed 5 years.

AIRPLANE WEIGHING FORM



NOTE

It is the responsibility of the pilot to make sure that the airplane is loaded properly.

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Figure 6-1 (Sheet 1 of 2)

AIRPLANE WEIGHING FORM

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Locating CG with Airplane on Landing Gear

$$X \text{ (Inches Aft of Datum)} = A - \left[\frac{\text{Nosewheel Weight} \times B}{\text{Total Weight}^*} \right]$$

*(Nose + L + R Wheel Weights)

Locating Percent MAC

$$\text{CG Percent MAC} = \frac{(\text{CG Arm of Airplane}) - 25.90}{0.5880}$$

Leveling Provisions

Longitudinal – Left side of tailcone
at FS 108.00 and 142.00

Measuring A and B

Measure A and B per pilot's
operating handbook
instructions to assist in locating
CG with airplane weighed on
landing gear.

Airplane as Weighed Table

Position	Scale reading	Scale drift	Tare	Net weight
Left Wheel				
Right Wheel				
Nose Wheel				
Airplane total as weighed				

Basic Empty Weight and Center-of-Gravity Table

Item	Weight Pounds	CG Arm (Inches)	Moment (Inch-Pounds /1000)
Airplane (calculated or as weighed) (includes all undrainable fluids and full oil)			
Drainable unusable fuel at 6.0 pounds per gallon – (3 gallons)	18.0	46.00	0.83
Basic Empty Weight			

Figure 6-1 (Sheet 2)

SAMPLE WEIGHT AND BALANCE RECORD

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SAMPLE WEIGHT AND BALANCE RECORD

(Continuous history of changes in structure or equipment affecting weight and balance)

Date		Item no.		Airplane model		Description of article or modification		Serial number				Page number	
								Weight change				Running basic empty weight	
								Added (+)		Removed (-)		WT. Moment /1000	
Arm (in.)		Arm (in.)		WT. (lb.)		WT. (lb.)							
						As delivered							

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Figure 6-2

WEIGHT AND BALANCE

The following information will enable you to operate your Cessna within the prescribed weight and center of gravity limitations. To determine weight and balance, use the Sample Loading Problem (Figure 6-3), Loading Graph (Figure 6-4), and Center of Gravity Moment Envelope (Figure 6-7) as follows:

Enter the appropriate basic empty weight and moment/1000 from the weight and balance records for your airplane in the YOUR AIRPLANE column of the Sample Loading Problem.

NOTE

In addition to the basic empty weight and moment noted on these records, the C.G. arm (FS) is also shown, but need not be used on the Sample Loading Problem. The moment which is shown must be divided by 1000 and this value used as the moment/1000 on the loading problem.

Use the Loading Graph to determine the moment/1000 for each additional item to be carried; then list these on the loading problem.

NOTE

Loading Graph information for the pilot, passengers and baggage is based on seats positioned for average occupants and baggage loaded in the center of the baggage areas as shown on the Loading Arrangements diagram. For loadings which may differ from these, the Sample Loading Problem lists fuselage stations (FS) for these items to indicate their forward and aft C.G. range limitations (seat travel and baggage area limitation). Refer to Figures 6-5 and 6-6 for additional loading information. Additional moment calculations, based on the actual weight and C.G. arm (FS) of the item being loaded, must be made if the position of the load is different from that shown on the Loading Graph.

Total the weights and moments/1000 and plot these values on the Center of Gravity Moment Envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

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WEIGHT AND BALANCE (Continued)

BAGGAGE TIEDOWN

A nylon baggage net having four tiedown straps is provided as standard equipment to secure baggage on the cabin floor aft of the rear seat (baggage area A) and in the aft baggage area (baggage area B). Six eyebolts serve as attaching points for the net. Two eyebolts for the forward tiedown straps are mounted on the cabin floor near each sidewall just forward of the baggage door approximately at station FS 90; two eyebolts are installed on the cabin floor slightly inboard of each sidewall approximately at FS 107; and two eyebolts are located below the aft window near each sidewall approximately at FS 107. A placard on the baggage door defines the weight limitations in the baggage areas.

When baggage area A is utilized for baggage only, the two forward floor mounted eyebolts and the two aft floor mounted eyebolts (or the two eyebolts below the aft window) may be used, depending on the height of the baggage. When baggage is carried in the baggage area B only, the aft floor mounted eyebolts and the eyebolts below the aft window should be used. When baggage is loaded in both areas, all six eyebolts should be utilized.

SAMPLE LOADING PROBLEM

ITEM DESCRIPTION	WEIGHT AND MOMENT TABULATION			
	SAMPLE AIRPLANE		YOUR AIRPLANE	
	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)	1642	62.6		
2 - Usable Fuel (At 6 Lbs./Gal.)				
- Standard Fuel - 53 Gallons Maximum				
- Reduced Fuel - 35 Gallons	210	10.1		
3 - Pilot and Front Passenger (FS 34 to 46)	340	12.6		
4 - Rear Passengers (FS 73)	310	22.6		
5 - *Baggage "A" (FS 82 to 108) 120 Pounds Maximum	56	5.3		
6 - *Baggage "B" (FS 108 to 142) 50 Pounds Maximum				
7 - RAMP WEIGHT AND MOMENT	2558	113.2		
8 - Fuel allowance for engine start, taxi and runup	-8.0	-0.4		
9 - TAKEOFF WEIGHT AND MOMENT (Subtract Step 8 from Step 7)	2550	112.8		

10 - Locate this point (2550 at 112.8) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.

*The maximum allowable combined weight capacity for baggage in areas "A" and "B" is 120 pounds.

Figure 6-3 (Sheet 1 of 2)

SAMPLE LOADING PROBLEM

YOUR AIRPLANE		YOUR AIRPLANE		YOUR AIRPLANE	
Weight (lbs.)	Moment (Lb-ins, /1000)	Weight (lbs.)	Moment (Lb-ins, /1000)	Weight (lbs.)	Moment (Lb-ins, /1000)

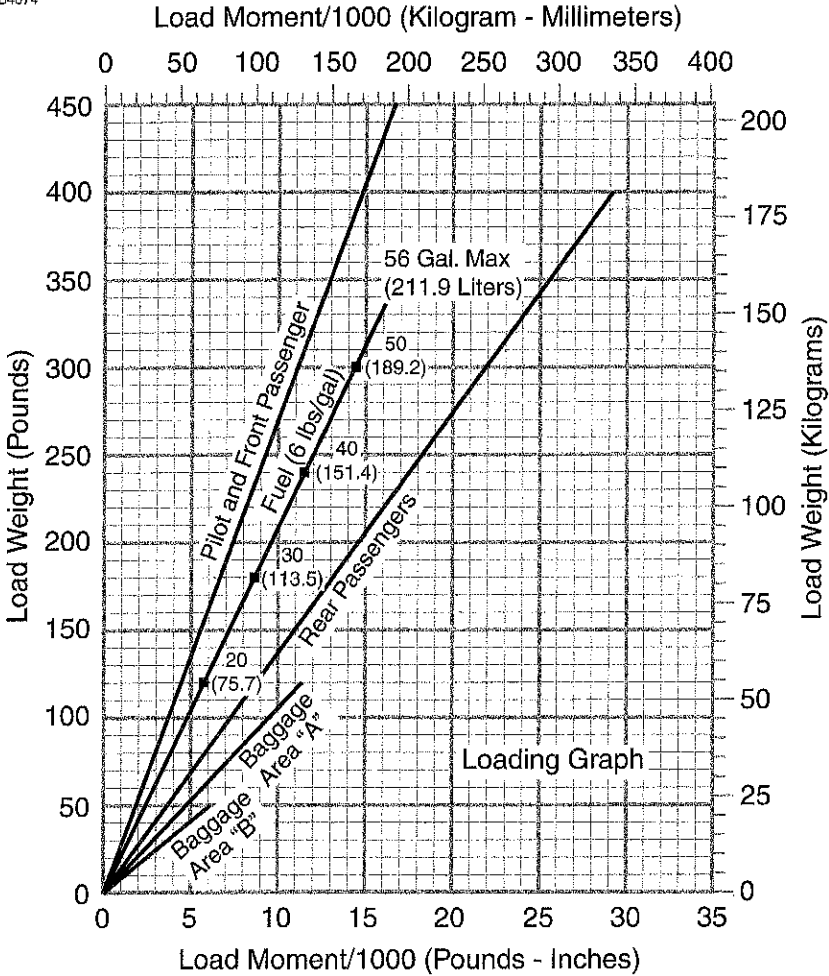
NOTE

When several loading configurations are representative of your operations, it may be useful to fill out one or more of the above columns so specific loadings are available at a glance.

Figure 6-3 (Sheet 2)

LOADING GRAPH

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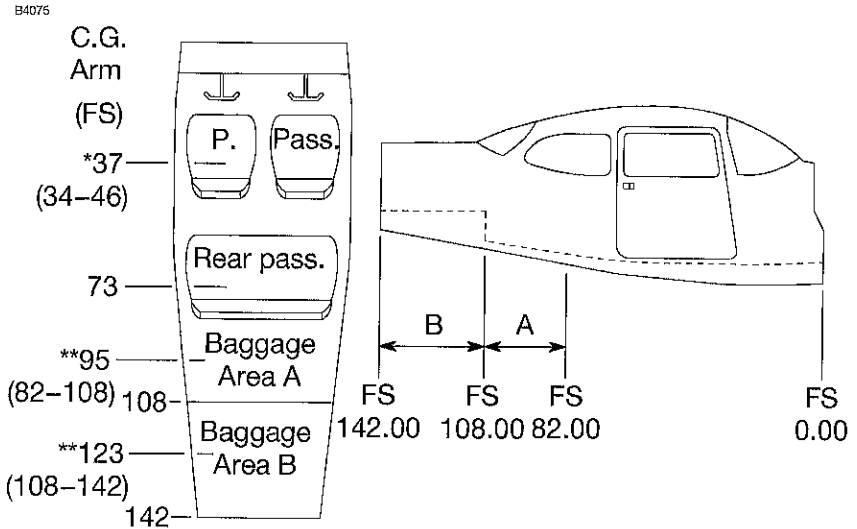


NOTE

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

Figure 6-4

LOADING ARRANGEMENTS



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*Pilot and front seat passenger center of gravity on adjustable seats positioned for average occupant. Numbers in parentheses indicate forward and aft limits of occupant center of gravity range.

**Arm measured to the center of the areas shown.

NOTE

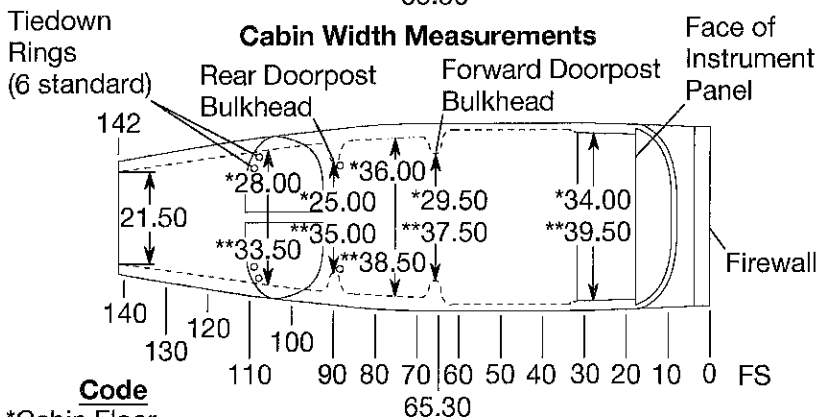
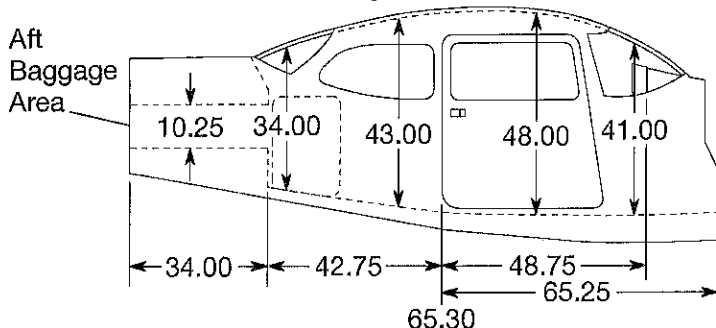
- The usable fuel C.G. arm is located at FS 48.00.
- The aft baggage wall (approximate FS 108.00) or aft baggage wall (approximate FS 142.00) can be used as a convenient interior reference point for determining the location of baggage area fuselage stations.
- To achieve an airplane loading within the utility category, it may be necessary to remove the rear passenger seat assembly from the airplane. Refer to Figure 6-9 for applicable weight and arm.

Figure 6-5

INTERNAL CABIN DIMENSIONS

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Cabin Height Measurements



Code

*Cabin Floor

**Lower Window Line

Door Opening Dimensions

	Width (Top)	Width (Bottom)	Height (Front)	Height (Rear)
Cabin Door	32.00	37.00	40.50	39.00
Baggage Door	15.25	15.25	22.00	21.00

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NOTE

- Maximum allowable floor loading is 200 pounds per square foot.
- All dimensions shown are in inches.

Figure 6-6

CENTER OF GRAVITY MOMENT ENVELOPE

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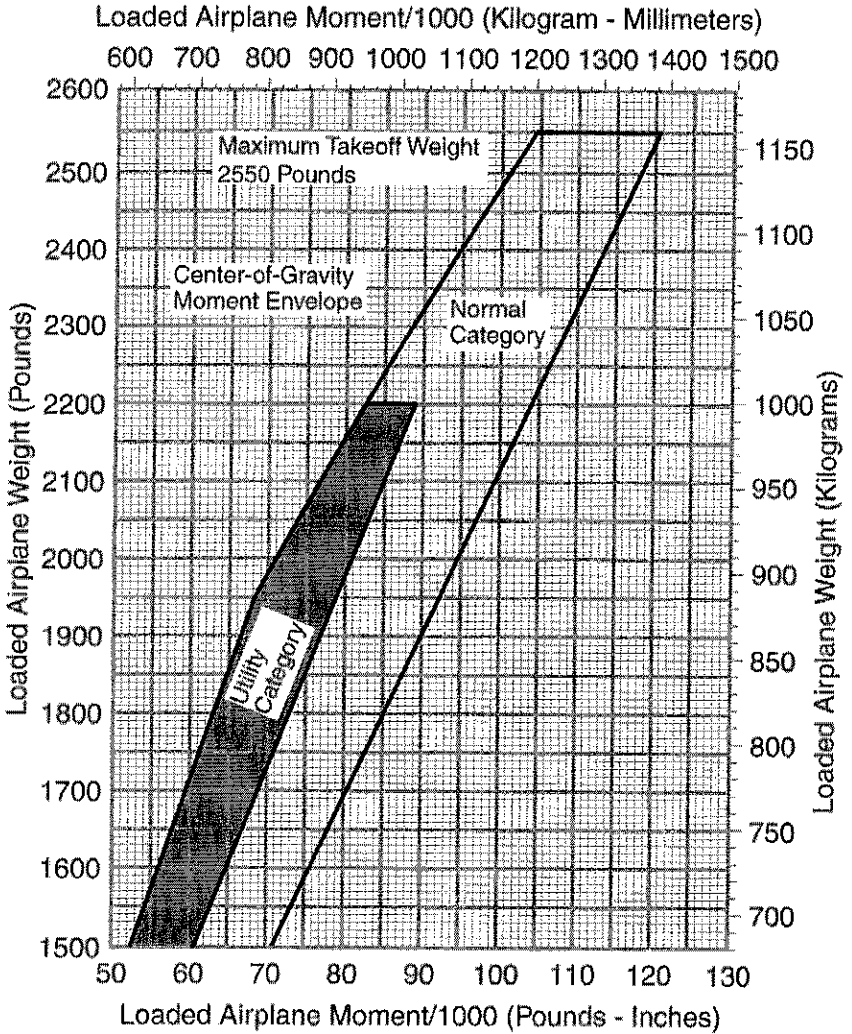


Figure 6-7

CENTER OF GRAVITY LIMITS

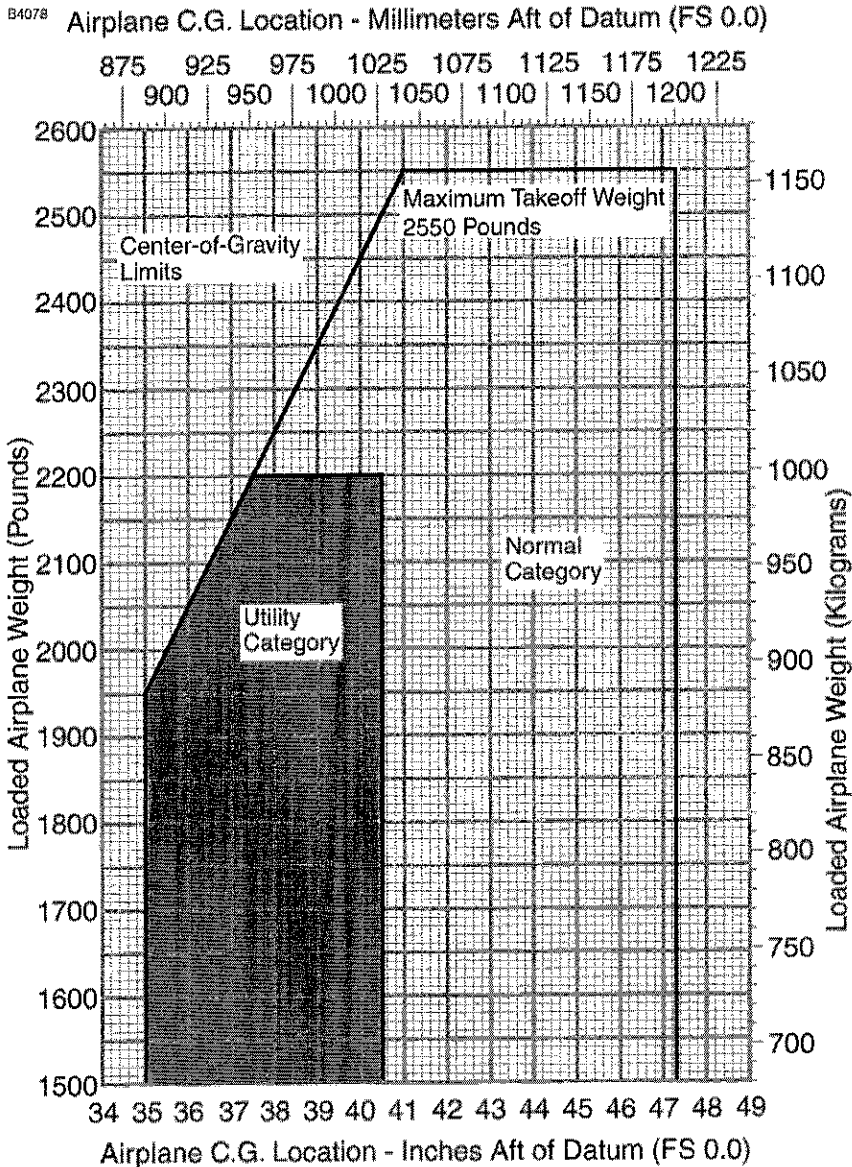


Figure 6-8