

6.7 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

- Add the weight of all items to be loaded to the basic empty weight.
- Use the Loading Graph (Figure 6-13) to determine the moment of all items to be carried in the airplane.
- Add the moment of all items to be loaded to the basic empty weight moment.
- Divide the total moment by the total weight to determine the C.G. location.
- By using the figures of item (a) and item (d) (above), locate a point on the C.G. range and weight graph (Figure 6-15). If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight	3102.0	86.8	269189
Pilot and Front Passenger	340.0	85.5	29070
Passengers (Center Seats) (Forward Facing)		118.1	
Passengers (Center Seats) (Aft Facing) (Optional)	50.0	119.1	5955
Passengers (Rear Seats)	340.0	157.6	53584
Passenger (Jump Seat) (Optional)		118.1	
Baggage (Forward)		22.5	
Baggage (Aft)		178.7	
Zero Fuel Weight (4000 Lbs Max)	3832	93.3	357698
Fuel (93 Gallons Maximum) - Standard (123 Gallons Maximum) - Optional	738	93.6	69077
Total Loaded Airplane	4570	93.4	426775

The center of gravity (C.G.) of this sample loading problem is at 93.4 inches aft of the datum line. Locate this point (93.4) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

Figure 6-9

SECTION 6
WEIGHT AND BALANCE

PIPER AIRCRAFT CORPORATION
PA-34-200T, SENECA II

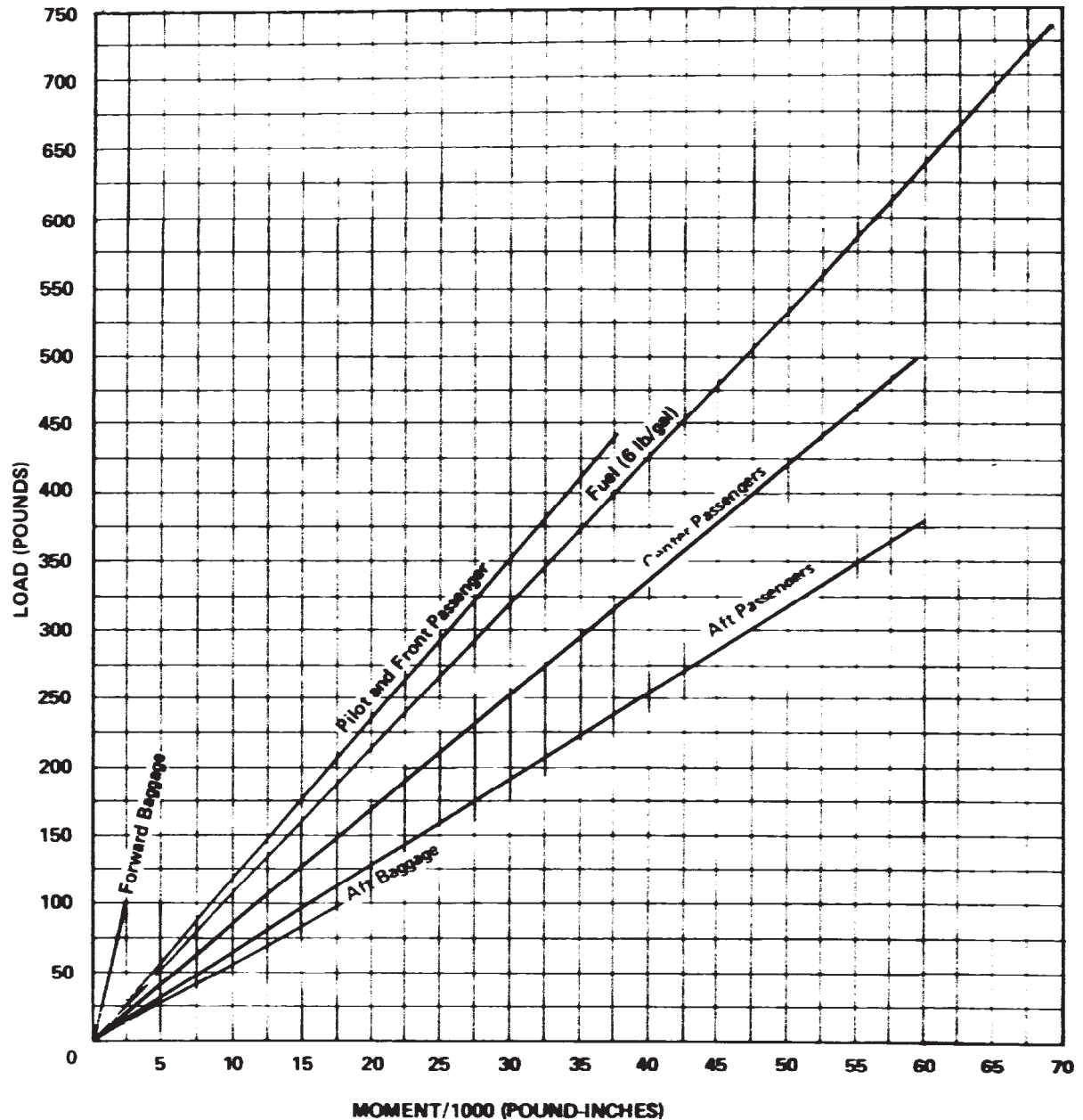
	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight	3105.2	85.8	269514
Pilot and Front Passenger	355	85.5	30357.5
Passengers (Center Seats) (Forward Facing)		118.1	
Passengers (Center Seats) (Aft Facing) (Optional)		119.1	
Passengers (Rear Seats)	335	157.6	52796
Passenger (Jump Seat) (Optional)		118.1	
Baggage (Forward)	100	22.5	2250
Baggage (Aft)	100	178.7	17870
Zero Fuel Weight (4000 Lbs Max)	3995		372782.5
Fuel (93 Gallons Maximum) - Standard (123 Gallons Maximum) - Optional	908 550	93.6	57667.2
Total Loaded Airplane	4547	93.3	424449.7

Totals must be within approved weight and C.G. limits. It is the responsibility of the airplane owner and the pilot to insure that the airplane is loaded properly. The Basic Empty Weight C.G. is noted on the Weight and Balance Data Form (Figure 6-5). If the airplane has been altered, refer to the Weight and Balance Record for this information.

WEIGHT AND BALANCE LOADING FORM

Figure 6-11

LOADING GRAPH

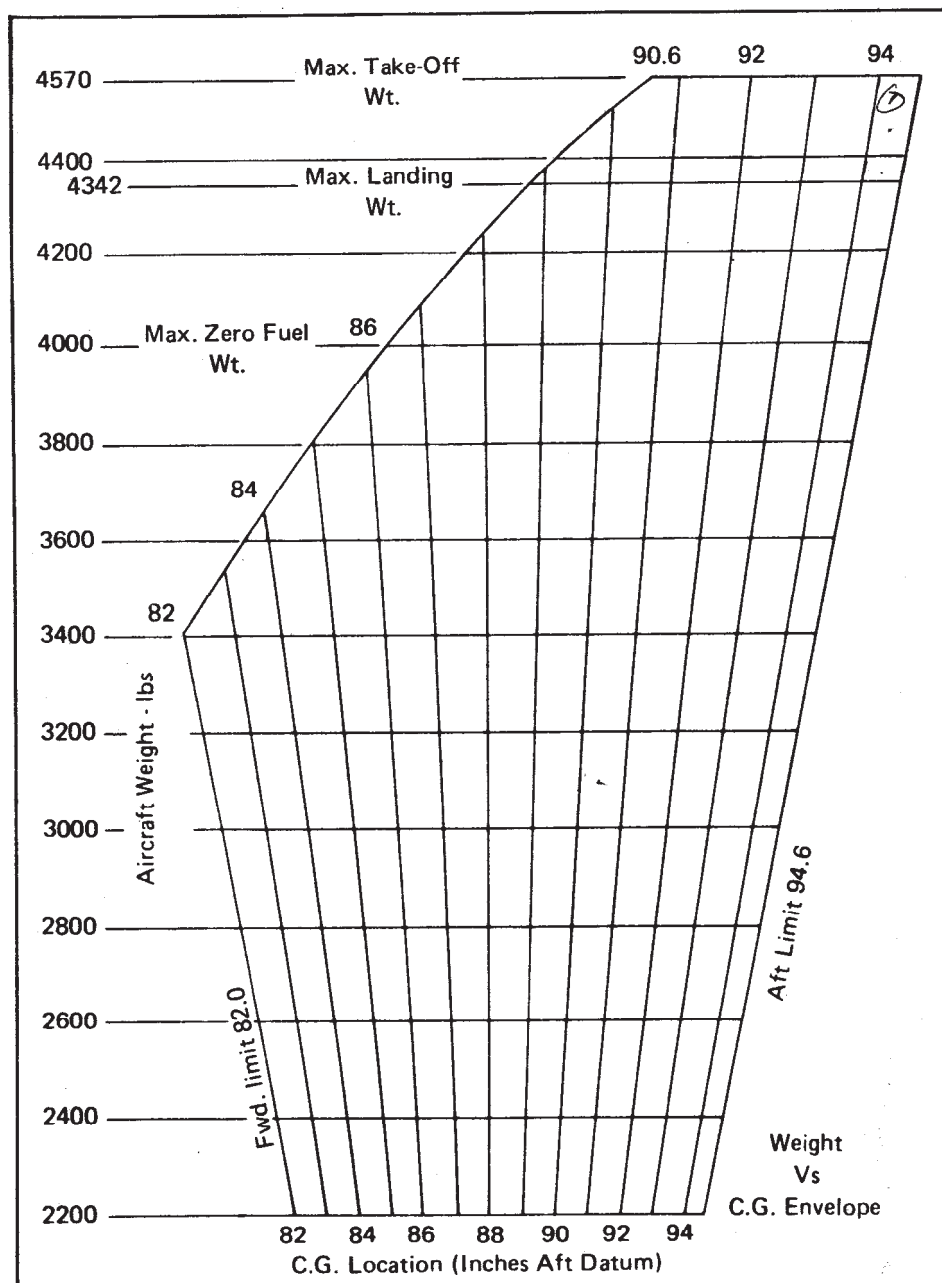


LOADING GRAPH

Figure 6-13

SECTION 6
WEIGHT AND BALANCE

PIPER AIRCRAFT CORPORATION
PA-34-200T, SENECA II



Moment change due to retracting Landing Gear = - 32 in.-lbs.

C. G. RANGE AND WEIGHT

Figure 6-15

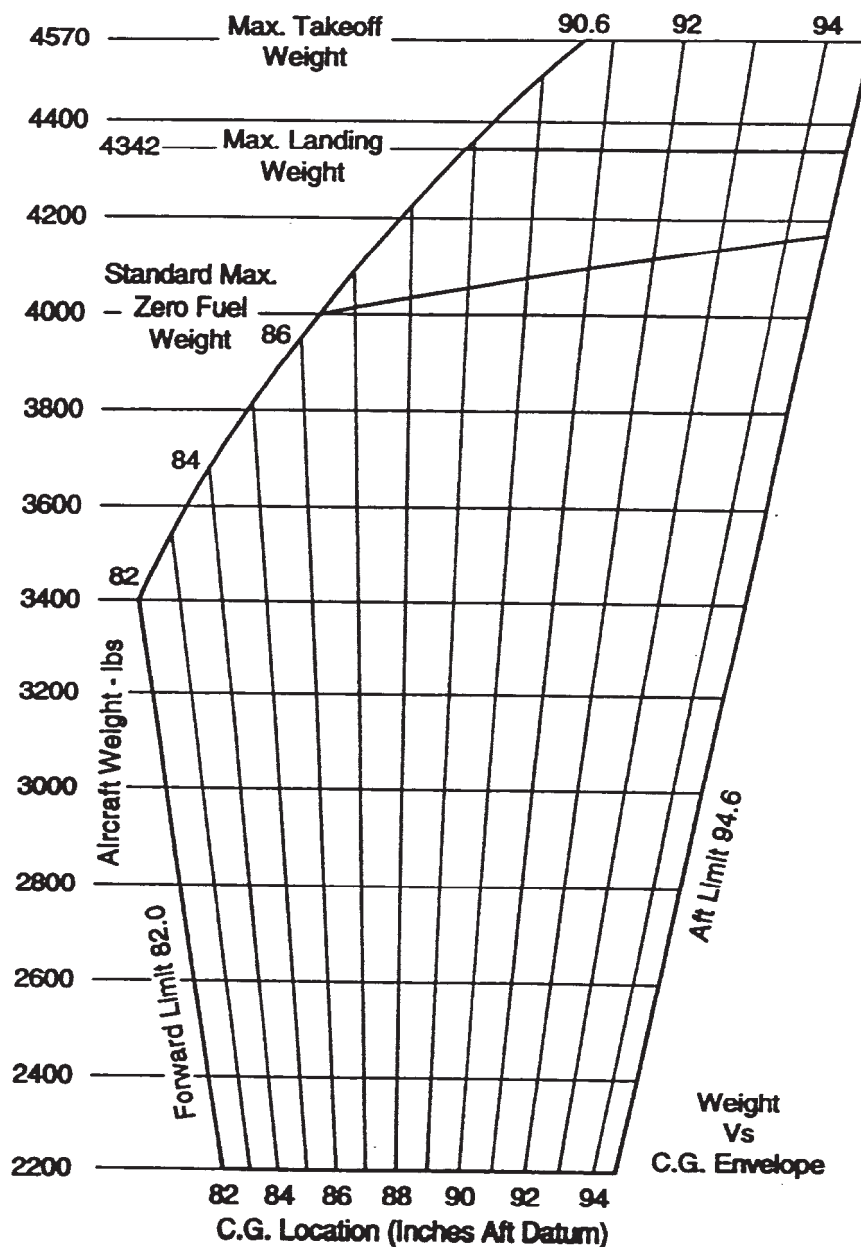
SECTION 6

WEIGHT AND BALANCE

NO CHANGES EXCEPT:

6.1 GENERAL

The addition of the ATS, Inc. Vortex Generator Kit increases the Zero Fuel Weight of Seneca II aircraft. Use the following C.G. Envelope Diagram.



Moment change due to retracting Landing Gear = -32 in.-lbs.

C.G. RANGE AND WEIGHT

For optional equipment Zero Fuel Weight increase see P.O.H.

Date: August 3, 1994



6.8 INSTRUCTIONS FOR USING THE WEIGHT AND BALANCE PLOTTER

This plotter is provided to enable the pilot quickly and conveniently to:

- (a) Determine the total weight and C.G. position
- (b) Decide how to change his load if his first loading is not within the allowable envelope.

Heat can warp or ruin the plotter if it is left in the sunlight. Replacement plotters may be purchased from Piper dealers and distributors.

When the airplane is delivered, the basic weight and basic C.G. will be recorded on the computer. These should be changed any time the basic weight or C.G. location is changed.

The plotter enables the user to add weights and corresponding moments graphically. The effect of adding or disposing of useful load can easily be seen. The plotter does not cover the situation where cargo is loaded in locations other than on the seats or in the baggage compartments.

Brief instructions are given on the plotter itself. To use it, first plot a point on the grid to locate the basic weight and C.G. location. This can be put on more or less permanently because it will not change until the airplane is modified. Next, position the zero weight end of one of the six slots over this point. Using a pencil, draw a line along the slot to the weight which will be carried in that location. Then position the zero weight end of the next slot over the end of this line and draw another line representing the weight which will be located in this second position. When all the loads have been drawn in this manner, the final end of the segmented line locates the total load and the C.G. position of the airplane for takeoff. If this point is not within the allowable envelope it will be necessary to remove fuel, baggage, or passengers and/or to rearrange baggage and passengers to get the final point to fall within the envelope.

Fuel burn-off and gear movement do not significantly affect the center of gravity.

SAMPLE PROBLEM

A sample problem will demonstrate the use of the weight and balance plotter.

Assume a basic weight and C.G. location of 2850 pounds at 83.5 inches respectively. We wish to carry a pilot and 5 passengers. Two men weighing 180 and 200 pounds will occupy the front seats, two women weighing 115 and 135 pounds will occupy the middle seats and two children weighing 80 and 100 pounds will ride in the rear. Two 25 pound suitcases will be tied down in the front baggage compartment and two suitcases weighing 25 pounds and 20 pounds respectively, will be carried in the rear compartment. We wish to carry 60 gallons of fuel. Will we be within the safe envelope?

- (1) Place a dot on the plotter grid at 2850 pounds and 83.5 inches to represent the basic airplane. (See illustration.)
- (2) Slide the slotted plastic into position so that the dot is under the slot for the forward seats, at zero weight.
- (3) Draw a line up the slot to the 380 pound position ($180 + 200$) and put a dot.
- (4) Move the slotted plastic again to get the zero end of the middle seat slot over this dot.
- (5) Draw a line up this slot to the 250 pound position ($115 + 135$) and place the 3rd dot.

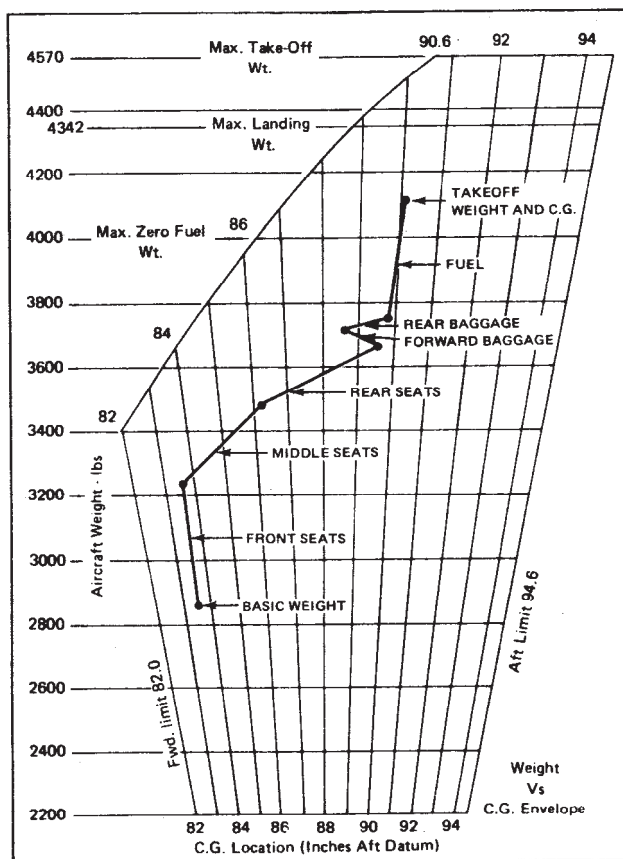
SECTION 6 WEIGHT AND BALANCE

PIPER AIRCRAFT CORPORATION
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- (6) Continue moving the plastic and plotting points to account for weight in the rear seats (80 + 100), forward baggage compartment (50), rear baggage compartment (45), and fuel tanks (360).
- (7) As can be seen from the illustration, the final dot shows the total weight to be 4115 pounds with the C.G. at 90.1. This is well within the envelope.
- (8) There will be room for more fuel.

As fuel is burned off, the weight and C.G. will follow down the fuel line and stay within the envelope for landing.

SAMPLE PROBLEM



Moment change due to retracting Landing Gear = -32 in.-lbs.