

## SECTION V

# WEIGHT AND BALANCE

### INDEX

GENERAL.....	5-1
LOADING PROCEDURES.....	5-2
SAMPLE LOADING PROBLEM.....	5-3
LOADING GRAPH.....	5-4
FLIGHT ENVELOPE(S).....	5-5

### GENERAL

It is the pilot's responsibility to insure that the aircraft is loaded properly and within the weight and balance limitations. All flight performance, procedures and characteristics are based on this prerequisite.

If the aircraft is to be used for aerobatic flight, it must be loaded within the approved flight envelope. The rear center-of-gravity limit is considered critical. In addition, no baggage is allowed.

The gross weight limit is the same for both normal and acrobatic category. The importance of this limit cannot be over emphasized especially when performing aerobatics. Subjecting the aircraft to the maximum approved load factor limits in an overgross condition may result in damage or complete structural failure of the airframe.

The actual licensed empty weight and center of gravity (C.G.) of a specific aircraft can be found in Section 4 of the FAA Approved Airplane Flight Manual. All additional changes to the aircraft empty weight and C.G. after the time of manufacture must also be attached to Section 4 of the flight manual. From this information and the following instructions, the pilot can easily determine the "Useful Load" and proper loading distribution for the aircraft.

A loading graph and flight envelope is given in this section and in Section 4 of the FAA Approved Flight Manual as an aid to weight and balance calculation.

## LOADING PROCEDURE

1. Determine from the Weight and Balance Sheet, in the aircraft file, the "Licensed Empty Weight and Moment" (in lbs.). Enter these figures under "Your Airplane" of the Sample Loading Problem, Figure 5-1.
2. Full oil capacity can be assumed for all flights. For ease of future loading computations, the new "Empty Weight and Moment With Oil" should be determined and entered in the Sample Loading Problem under "Your Airplane".
3. Using the Loading Graph, Figure 5-2, determine the weight and the moment of the following items and enter these figures on the Sample Loading Problem.
  - a) Pilot
  - b) Rear Passenger
  - c) Wing Fuel - 40 Gals. Maximum Useable @ 6 Lbs./Gal.
  - d) Baggage - 100 Lbs. Maximum (Normal Category Only).
4. Add the "Aircraft Empty Weight and Moment with Oil" and all the items in Step 3 to determine the "Gross Takeoff Weight and Moment".
5. Using the Flight Envelope, Figures 5-3, determine that the gross takeoff weight and moment are within limits.

## WARNING

If the aircraft is not within the approved flight envelope limits, it must be reloaded. Under no circumstances should the aircraft be flown with an out of limits condition, particularly if aerobatic flight is contemplated.



SAMPLE LOADING PROBLEM				
ITEM	SAMPLE AIRPLANE		YOUR AIRPLANE	
	WEIGHT (lbs)	MOMENT (in-lbs)	WEIGHT (lbs)	MOMENT (in-lbs)
1) Licensed Empty Weight	1270	17851		
Oil-8qts @ 7.5 lbs/gals	+15	-543		
2) Licensed Empty Weight & Moment with Oil	1285	17308		
3) Pilot	190	3025		
Rear Passenger	190	8500		
Wing Fuel 40 Gals Max @ 6 lbs/gal	120 (20 gal)	3125		
Baggage-100 lbs Max (Normal Category Only)	-0-	-0-		
Gross Takeoff Weight & Moment	1785	31958		

NOTE:

- 1) Use Figure 5-2 loading graph to determine moment.
- 2) To determine Takeoff Center of Gravity (inches aft of datum), divide the Gross Takeoff Moment by the Gross Takeoff Weight. Center of Gravity Limits are listed in Section I.
- 3) The above sample problem is loaded for aerobatic flight conditions and assumes a 170 pound pilot and passenger with parachutes.

FIGURE 5-1 SAMPLE LOADING PROBLEM

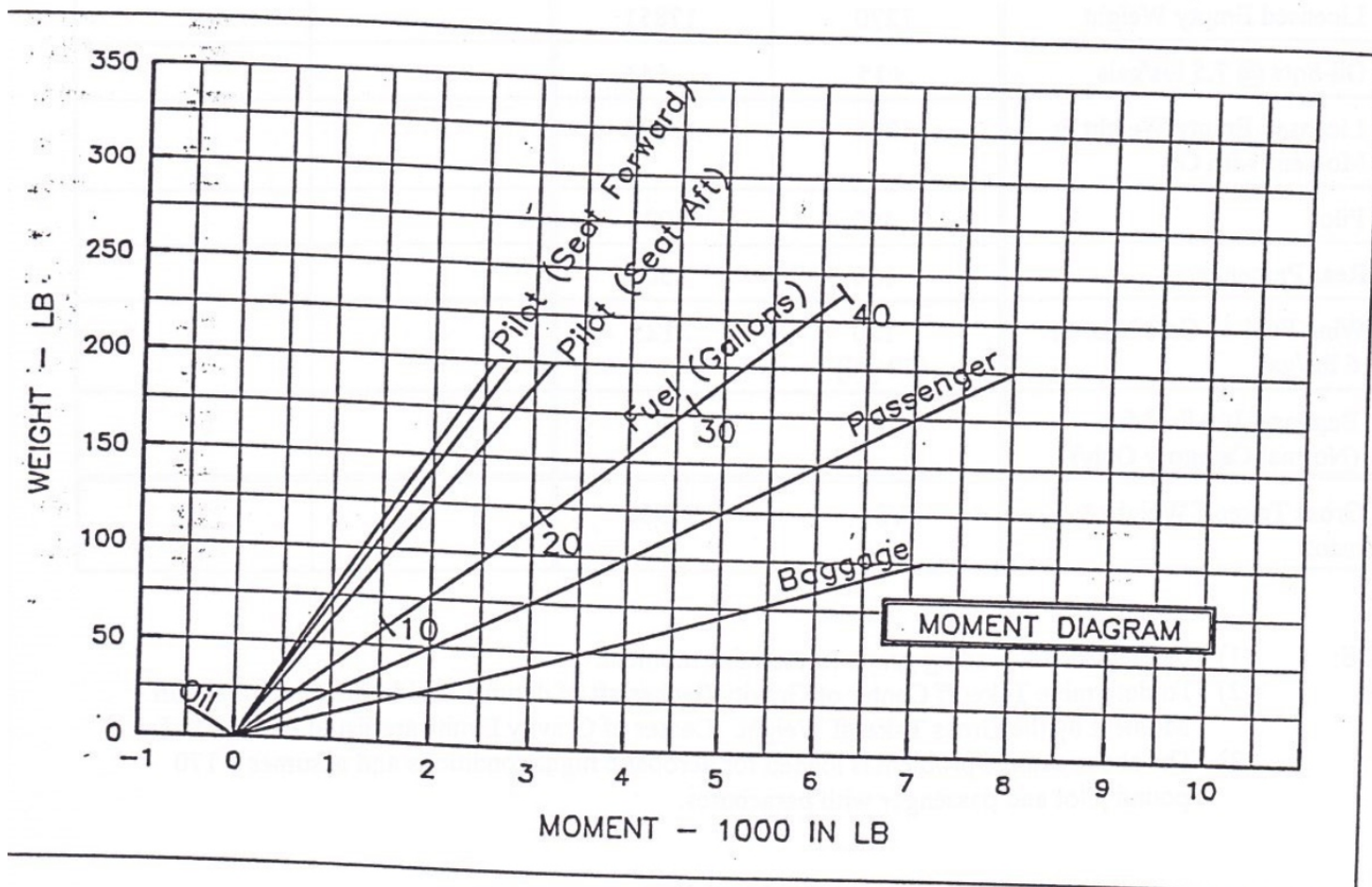


FIGURE 5-2 LOADING GRAPH



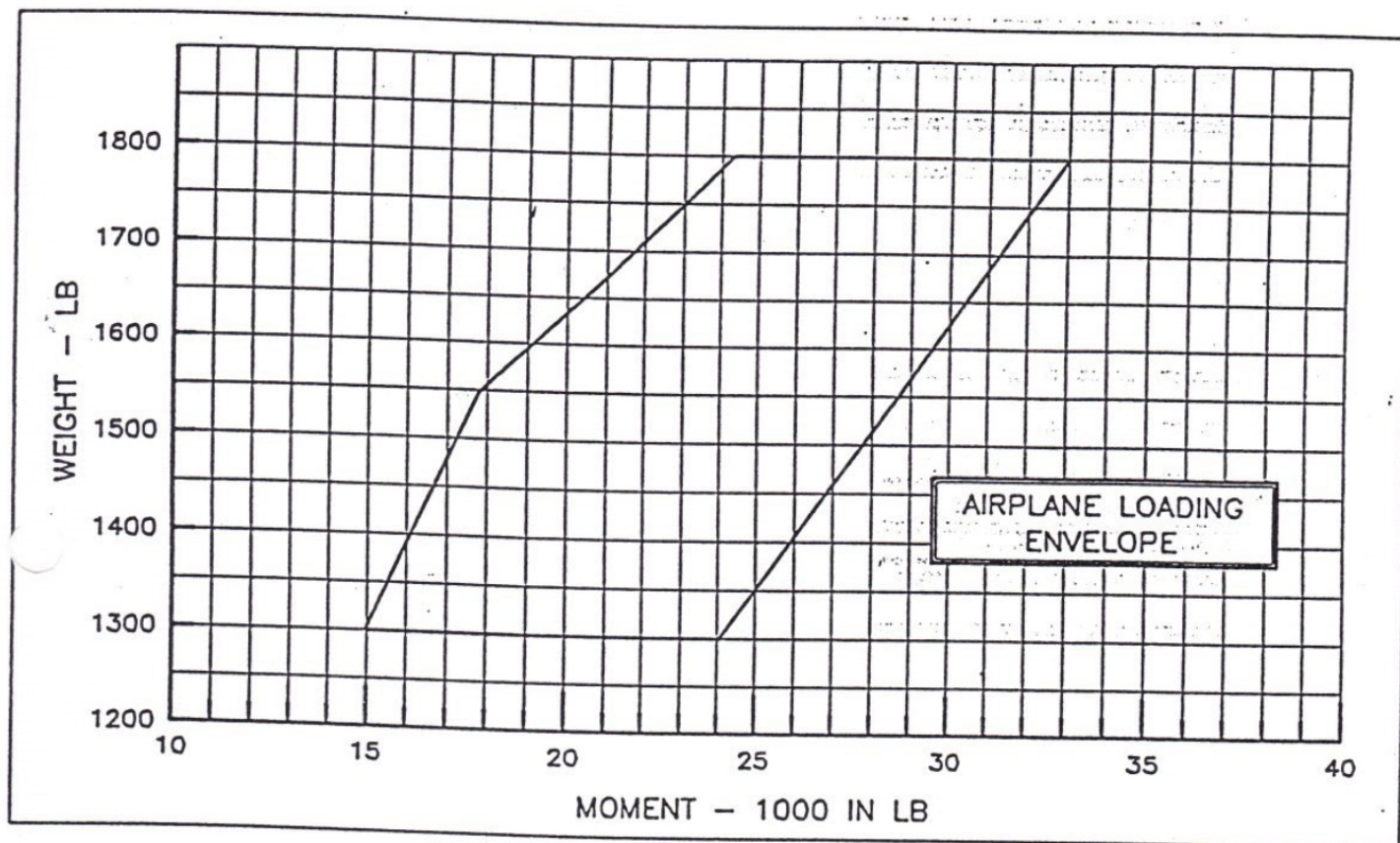


FIGURE 5-3 SUPER DECATHLON WEIGHT and BALANCE  
FLIGHT ENVELOPE