SECTION 6

WEIGHT AND BALANCE AND EQUIPMENT LIST

TABLE OF CONTENTS

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6.1 GENERAL

INTRODUCTION

This section contains the weight and balance information required by the Civil Aviation Authority of New Zealand and United States of America Federal Aviation Administration. In order to achieve the performance and flight characteristics detailed in the handbook it is essential that the airplane be operated within the approved weight and centre of gravity limits.

Weight is important as it is the basis for many structural limits and critical flight characteristics. Weight in excess of the maximum takeoff weight (7500 lbs) may be a contributing factor in an accident, especially when combined with conditions of high altitude and temperature which may seriously reduce performance margins.

Safe operations require careful planning and a sound knowledge of airplane performance capabilities as affected by weight, altitude and temperature. In conditions of high altitude and/or temperature it may be necessary to limit the operating weight to below maximum limits to ensure adequate performance.

WARNING

It is the responsibility of the pilot to ensure that the airplane is loaded properly and operated within the prescribed limits. Operating outside of prescribed limits may result in an accident and serious or fatal injury.

A properly loaded and maintained airplane will perform as intended, and in accordance with the relevant performance predictions in this handbook.

6.2 AIRPLANE WEIGHING PROCEDURES

WEIGHING

The following paragraphs detail the procedure used to determine the empty airplane weight and balance figures. To calculate an accurate empty airplane weight it is essential that the procedures are followed.

Weighing the airplane should be accomplished on level ground in a hangar devoid of wind disturbance. The scales used must be properly calibrated and of sufficient capacity to support the airplane. The following checklist is used to ensure the airplane is correctly prepared for weighing.

Empty the cabin and cockpit of equipment which is not part of the basic airplane equipment eg, pilot related equipment such as flight bags and headsets.

Clean the airplane internally and externally.

Ensure the airplane is fitted only with that equipment listed on the airplane's weight and balance report (Figure 6-3) and equipment list shown as Figure 6-5, all other equipment and loose articles must be removed.

Drain all the fuel leaving only the unusable fuel in the tanks.

Ensure the engine oil level is filled to the full mark.

Check that the tires are correctly inflated and that the shock struts are correctly charged.

Fit the control column lock.

Flaps up.

Doors closed.

Place scales under each wheel and chock the main wheels ensuring that the brakes are OFF. Allow the airplane weight to settle evenly on the scales.

Next the airplane must be leveled. The airplane leveling points are shown in Figure 6-1.

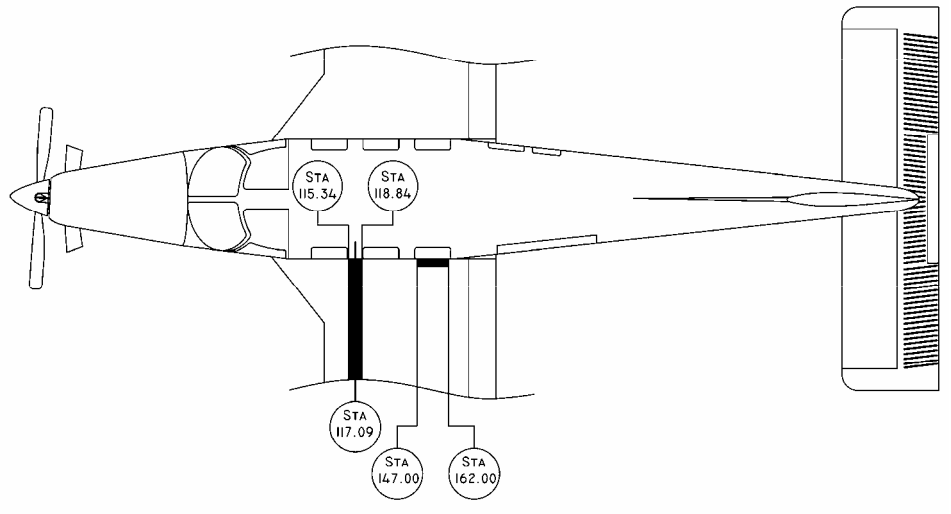

Figure 6-1, Airplane Leveling Points

Lateral Leveling Point:	Across the main wing spar.
Longitudinal Leveling Point:	Rivnuts (2) at STA 147 and 162, right hand side. Remove 10-32 UNF blanking screws and insert bolts of a suitable length to support a leveling board.

Place spirit levels at the lateral and longitudinal leveling points.

Level the airplane laterally by deflating the main wheel tires as required.

Level the airplane longitudinally (deflate nose wheel tire and/or shock strut as required). Recheck lateral and longitudinal level. The airplane is level when the bubbles are centred in both spirit levels.

Record the weight shown on each scale in the appropriate space in the weight and balance report (CAA 2102) shown as Figure 6-3.

Record the weight of the chocks in the appropriate space in the weight and balance report (CAA 2102) shown as Figure 6-3.

Measure the distance of the datum from the centre line of the main wheels, distance M. Record in the appropriate space on the weight and balance report (CAA 2102) shown as Figure 6-3.

Measure the distance between the centre of the nose wheel axle and the centre of the main wheel axle, distance L. Record in the appropriate space on the weight and balance report (CAA 2102) shown as Figure 6-3.

On completion of the weighing operation, ensure that the tires are inflated to the correct pressures and that the landing gear shock struts are correctly charged (refer to the airplane maintenance manual) before moving the airplane.

DATUM

The datum is defined as fuselage STA “0.00”.

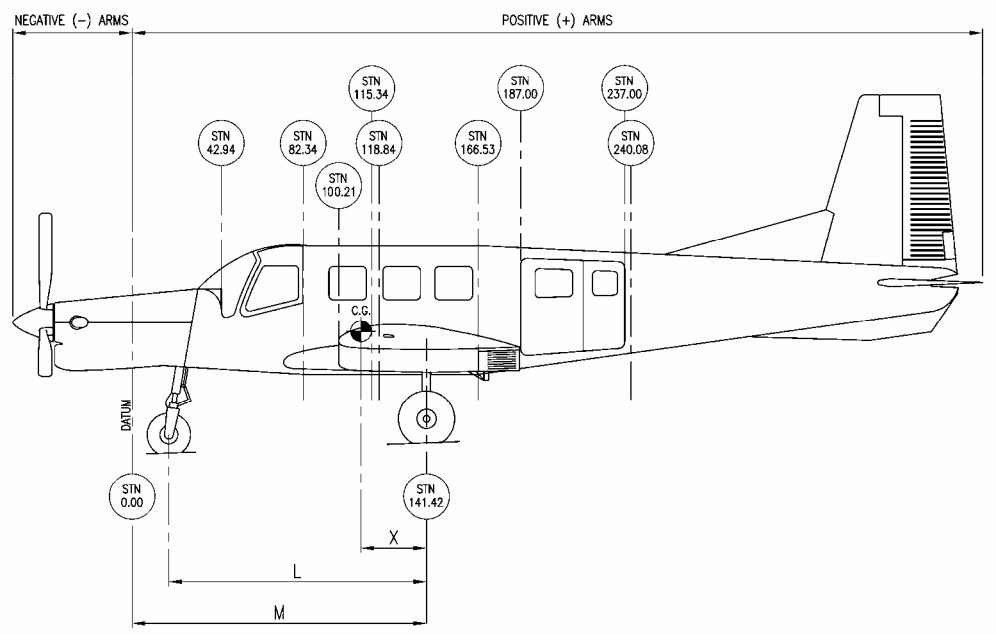

Figure 6-2, Airplane Arms and Stations

EMPTY AIRPLANE WEIGHT AND MOMENT CALCULATION

The following paragraphs describe the calculations used to calculate an empty airplane weight and moment.

Complete the front page of the weight and balance report form (CAA 2102) shown as Figure 6-3.

Record the data on the reverse side of the weight and balance report form (CAA 2102) shown as Figure 6-3.

Measurements

L = distance between the points of reaction, with the airplane in the weighing position. Refer to Figure 6-2 for an illustration of L.

M = distance of datum from the centre line of the main wheels. Refer to Figure 6-2 for an illustration of M.

W = total weight of both main wheels as read of the scales under each main wheel.

w = weight of the nose wheel as read off the scales under the nose wheel.

Calculations

Record the airplane weighing scale readings and chock weights on the weight and balance report (CAA 2102) shown as Figure 6-3.

WHEEL OR JACK POINT	SCALE READING kg. (lb.)	TARE WEIGHT kg. (lb.)	NET WEIGHT kg. (lb.)	
Left Main	1185	3 (chocks)	1182	
Right Main	1191.75	3 (chocks)	1188.75	
Total Both Mains	2376.75	6	2370.75	= W
Nose	757.75	-	757.75	= w
TOTAL AS WEIGHED	3134.50	6	3128.50	= W + w

Table 1, Example Weight Figures

Determine the net weights and enter on the weight and balance report (CAA 2102) shown as Figure 6-3.

Calculate the distance of the net weight centre of gravity arm forward of the main wheels using the following formula:

$$X = \frac{L \times w}{W + w}$$

Example:

Using entries from Table 1 above and a value for L of 125.44 inches

$$X = \frac{125.44 \times 757.75}{2370.75 + 757.75}$$

$$X = \frac{95052.16}{3128.50}$$

X = 30.38 ins.

Calculate the distance of the net weight centre of gravity aft of the datum, distance M, using the following formula:

M – X = Arm

Example:

140.96 – 30.38

M = 110.58 ins.

Enter arm in the weight and balance report (CAA 2102) shown in Figure 6-3.

Item	Description	Net Weight kg. (lb.)	Arm m. (in)	Moment kg.m (lb.in.)
1	Net Weight (W +w)	3128.50	110.58	345,949.5
2	Total items weighed but not part of empty weight			
3	Total items being part of empty weight not weighed			
4	Aircraft Empty Weight	3128.50	110.58	345949.5

Calculate the moment as follows and enter in the weight and balance report (CAA 2102) shown in Figure 6-3:

Net Weight x Arm = Moment

Example:

3128.50 x 110.58 = 345,949.53 lb.in

Repeat the above calculations for items weighed but not part of empty weight and items part of empty weight not weighed and enter in the weight and balance report (CAA 2102) shown in Figure 6-3.

Total the columns remembering to subtract the figures for items weighed but not part of empty weight and add the amounts for items part of empty weight not weighed and enter in the weight and balance report (CAA 2102) shown in Figure 6-3.

The completed weight and balance report (CAA 2102) shown in Figure 6-3 is to be inserted in the airplane logbook.

Ensure the appropriate airplane weight and balance record forms as shown in Figures 6-4 and 6-5 are completed and entered into the airplane flight manual.

CENTRE OF GRAVITY LIMITS

The forward limits are:

100.46 inches aft of datum at 4209 lbs or less
103.18 inches aft of datum at 5639 lbs
111.55 inches aft of datum at 7500 lbs
With linear variation between these points.

The aft limit is 125.60 inches aft of datum at all weights.

AIRCRAFT WEIGHT AND BALANCE REPORT

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND

Aircraft Registration ZK-.....Aircraft Type:
.....Report Ref. No: .....

1. The above aircraft was weighed at:.....on...../...../19 ..... by .....

	1.	2.	3.
Using weighing equipment Serial No's			
Date each scale last calibrated			

2. Reason for weighing..... Weighing equipment make and model:

3. Datum Reference..... 1. .....

3. Weighing position..... 2. .....

4. The aircraft was weighed in conformity with: 3. .....

Manufacturer's instructions: ☐

Other:..... ☐

EQUIPMENT LIST

The following items of equipment are included in the Empty Weight figure given in the Weight and Balance supplement of the Flight Manual.

Removable Equipment with Fixed Location Installed at Weighing	Quantity	Removable Equipment with Fixed Location Installed at Weighing	Quantity

CAA 2102
Rev 2. 01/97

Figure 6-3, Weight and Balance Report (CAA 2102)

Wheel or Jack Point	Scale Reading kg. (lb.)	Tare Weight kg. (lb.)	Net Weight kg. (lb.)	
Left Main				
Right Main				
*Total both Mains				= W
*Nose or Tail				=w
Total as weighed				= W + w

*NOTE: For Helicopter W = Total - both forward Jack Points
w = Total aft Jack Points

Item	Description	Net Weight kg (lb.)	Arm m. (in)	Moment kg.m (lb.in)
1.	Net Weight (W + w)			
2.	Total items weighed but not part of empty weight			
3.	Total items being part of empty weight not weighed			
4.	Aircraft Empty Weight			

The information required for entry in the loading data is:

Empty Weight = ...kg (lb.)

Distance of Empty Weight C.G

Aft/Fwd of Datum = ...m. (in)

Moment = ...kg.m (lb.in)

The Weight and Balance inspection recorded above has been carried out in accordance with the New Zealand Civil Aviation Rules currently in force and in respect of that work the aircraft is fit for release to service.

Signed: .....Licence or Approval No: .....

Date: ...../ ...../19 .....

NOTE: When completed, insert this form in the aircraft logbook.
Insert new pages in the aircraft or helicopter Flight Manual Weight and Balance Supplement as required by Advisory Circular AC 43.2.

AEROPLANES and GLIDERS

L =.....m. (in) M = ...m. (in)

$$X = \frac{L \times w}{W + w} = \frac{x}{+} = \text{.....m. (in)}$$

Nose Wheel or Jack Point: M - X = ...m. (in)

Tail Wheel or Jack Point: M + X = ...m. (in)

Where

L = measured distance between weighing points with aircraft in weighing position
M = Distance of datum from centre line of main wheels
X = Arm of the C of G for the 'as weighed' condition.

HELICOPTERS (Longitudinal C of G calculation)

L =.....m. (in) M = ...m. (in)

$$\text{Forward Datum } X = \frac{(W \times M)+(w \times L)}{W + w} = \text{.....m. (in)}$$

$$\text{Central Datum } X = \frac{-(W \times M)+(w \times L)}{W + w} = \text{.....m. (in)}$$

Where

L = Distance of Datum forward of aft jacking point
*M = (Forward datum) = Distance of datum fwd of fwd jack point
*M = (Central datum) = Distance of datum aft of fwd jack point
X = Arm of the C of G.
*NOTE: To be obtained from Manufacturers data

HELICOPTERS (Lateral C of G Calculation)

$$X = \frac{-(AL \times C) + (BR \times D)}{(C + D)} = \text{.....m. (in)}$$

Where

AL = Measurement of C/L to left Jacks
BR = Measurement of C/L to right Jacks
C = Weight on left Jacks
D = Weight on right Jacks
C/L to left is negative
C/L to right is positive
X = Arm of C of G from C/L
C/L = Longitudinal centre line

Figure 6-3, Weight and Balance Report (CAA 2102)

6.3 WEIGHT AND BALANCE RECORD

Figure 6-4 shows a sample weight and balance record form which is retained in the airplane handbook. This form is used to provide a continuous history of changes in structure and or equipment affecting weight and balance. This record should be updated to reflect changes to the basic airplane configuration and the effects of those configuration changes on the basic empty weight and centre of gravity. The information provided on this form allows for the correction of basic empty weight and centre of gravity with changes to the airplane's basic configuration as required for a particular task, eg removal of passenger seats for cargo operations.

AIRPLANE MODEL				SERIAL NUMBER				PAGE NUMBER			
DATE	ITEM No		DESCRIPTION OF ARTICLE OR MODIFICATION	WEIGHT CHANGE						RUNNING BASIC EMPTY WEIGHT	
				ADDED (+)			REMOVED (-)				
	In	Out		Wt. (lb)	Arm (in.)	Moment /1000	Wt. (lb)	Arm (in.)	Moment /1000	Wt. (lb)	Moment /1000

Figure 6-4, Weight and Balance Record

Weight and Balance Data

A new sheet is to be completed whenever revised weight and balance data is established either by weighing or calculation.

Aircraft Make and Model	
EMPTY WEIGHT (See Note 1)	
Datum Reference	STA 0.00
C of G POSITION (state Fwd or Aft of Datum)	
MOMENT	

Data established by calculation

Performed by:

On (date)	
Reason	
Report Ref (if applicable)	

If established by calculation, state when aircraft last weighed.

Notes:

1. Empty weight includes unusable fuel, fixed ballast, full operating fluids and items in the equipment list over page.

Figure 6-5, Weight and Balance Data Form

EQUIPMENT LIST

The following items of removable equipment are included in the empty weight data from the previous page. The equipment, if installed, becomes part of the empty airplane weight and moment calculation therefore remains in the airplane during the weighing process.

SERIAL No.	REGISTRATION No.	DATE

A) PROPELLER AND PROPELLER ACCESSORIES

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Propeller, Hartzell HC-3BTN-3D/T10282NS		137.0	-41.5
	Spinner Assembly, C-3065-1		14.0	-47.0

B) ENGINE AND ENGINE ACCESSORIES

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Engine, P&WC, PT6A-34		331.0	-9.6
	Starter/Generator, 200SGL129Q-1		21.9	18.0
	Engine Driven Fuel Pump, RG37060D/M		3.3	17.4
	Electric Fuel Pump, 1C54-5		3.3	112.7
	Propeller Overspeed Governor, E210507		3.3	-33.4
	Oil Cooler, L8538233		11.0	24.0
	Fuel Filter Assembly, 1743640-14		2.2	22.2
	Np Tacho Generator, MS25038-4		1.5	-33.4
	Ng Tacho Generator, MS25038-4		1.5	16.6

C) LANDING GEAR AND BRAKES

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Main Wheel Assemblies, 40-179A (2)		50.0	141.4
	Tires, 8.50-10-8TTAH (2)		46.0	141.4
	Inner Tubes, 8.50-10M (2)		6.0	141.4
	Brake Assemblies, 30-182 (2)		6.6	141.4
	Nose Wheel Assembly, 40-140A		5.5	16.4
	Nose Wheel Tire, 8.50-6-6TTAT		12.0	16.4
	Inner Tube, 8.50-6M		2.0	16.4
	Park Brake Valve, 60-10		0.3	44.0
	Brake Master Cylinders, 10-95(4)		2.0	36.7

D) ELECTRICAL EQUIPMENT

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Generator Control Unit, GCSG505-17		2.0	30.0
	Battery, G6381ES		80.0	248.0
	Stall Warning Device, C96801		0.2	100.2
	Stall Warning Horn		0.2	89.5
	Overspeed Warning Device		1.4	66.5
	Overspeed Warning Horn		0.2	89.5
	Flap Motor, NP 2446		4.8	172.5
	Post Lights, A350-CN-RD-BK-SH-28(10)		0.6	42.9
	Cockpit Light		0.2	66.5
	Landing Light (2), GE4596		0.8	101.0
	Strobe Power Supply, A413A-HAD-CF-14/28		2.0	243.0
	Strobe/Nav Light Assembly, A600-PG-28		0.8	127.7
	Strobe/Nav Light Assembly, A600-PR-28		0.8	127.7
	Tail Light Assembly, A555A-V-28		0.3	399.6
	Elevator Trim Motor, 409A6021-3		1.1	312.0
	Trim Switch, 402-4319 (2)		0.2	60.2
	Avionics Cooling Fan, ACF528		1.2	36.7
	Heated Pitot Head, 247711-2		1.1	130.7
	IPS Actuator, 1092TH10-F35		1.1	12.0

E) INSTRUMENTS

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Altimeter, 5934PM-3A203		0.9	41.9
	Airspeed Indicator, EA5172-6L		0.7	41.9
	Artificial Horizon, RCA26BK-2		2.3	41.9
	Directional Gyro, RCA15BK-1		2.3	41.9
	Turn and Slip Indicator, 1234T100-3TZ		1.2	41.9
	Vertical Speed Indicator, 7030-C103		0.8	41.9
	Trim Gauge Cluster, 1U431-005		1.2	41.9
	Encoder, SSD120-30A		0.6	31.0
	Magnetic Compass, C2400-L4P		0.7	39.8
	Torque Gauge, INS60-1		0.8	41.9
	ITT Gauge, INS60-2		0.6	41.9
	Ng Gauge, INS60-3		0.6	41.9
	Np Gauge, INS60-10		0.6	41.9
	Fuel Flow/Fuel Pressure Gauge, INS60-11GPS		0.7	41.9
	Clock, INS60-13		0.6	41.9
	Front Fuel Gauge, INS60-5		0.6	41.9

	Rear Fuel Gauge, INS60-6		0.6	41.9
	Volts/Amps Gauge, INS60-7		0.5	41.9
	Oil Pressure/Oil Temperature Gauge, INS60-8		0.5	41.9
	Outside Air Temperature Gauge, INS60-9		0.5	41.9
	Electronics International Interface Module, DIPM-1		0.6	39.8

F) RADIO EQUIPMENT

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Garmin GPS/NAV/COM, GNS430		6.6	39.8
	Communication Antenna, DMC70 (upper)		0.7	147.0
	Communication Antenna, DMC70 (lower)		0.7	109.5
	Garmin GPS/COM, GNC250XL		3.4	39.8
	GPS Antenna, GA 56 (2)		1.0	88.3
	Garmin Audio Panel, GMA340		1.6	39.8
	Garmin Transponder, GTX327		3.1	39.8
	Transponder Antenna, CI 105		0.3	45.5
	Emergency Locator Transmitter, 455-7063-01		3.3	253.5
	Emergency Locator Antenna, 110-318		0.1	258.0

G) AUTOPILOTS

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)

H) MISCELLANEOUS

ITEM No.	ITEM	MARK IF INSTALLED	WEIGHT (POUNDS)	ARM (INCHES)
	Pilot/Front Passenger Seats and Seat Belts, GA8-251011-11 (2)		44.6	66.5
	First Aid Kit, KIT-A		0.8	66.5
	Fire Extinguisher, FIREEXT .9		2.0	66.5
	Axe		1.5	66.5
	Aircraft Flight Manual		1.5	66.5

6.4 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

The determination of airplane weight and centre of gravity is a simple process with the use of weight and balance tables and forms provided.

WEIGHT

The determination of weight is simply the sum of the airplane basic empty weight (appropriate to the configuration in use) and all additional items of crew, passengers, payload and useable fuel. Copies of the sample forms at Figure 6-7 and Figure 6 -8 should be used to itemize and total the weights and moments of the basic airplane and added items.

CENTRE OF GRAVITY

The centre of gravity determination for the loaded airplane requires knowledge of the moments generated by the individual items of weight. The moment is expressed in inch pounds (in.lbs.) and is the product of weight multiplied by the distance from the datum, in inches at which the item is loaded.

Weight (lbs) x Arm (ins.) = Moment (in.lbs.)

The moment for the basic empty airplane is recorded on the weight and balance record. This figure should be added to the weight and balance loading form shown at Figure 6-7 or the loadsheet shown as Figure 6-8.

The moments for additional items must now be calculated and also added to the weight and balance loading form shown at Figure 6-7 or the loadsheet shown as Figure 6-8. These calculations are simplified by using the tables at Figures 6-9 and 6-10.

FUEL LOADING

In the left hand column of the table shown at Figure 6-9 select the appropriate quantity of fuel. Reading to the right, determine the weight of the fuel. Moving further right into the column representing the fuel tanks containing the fuel the moment may be read directly from the table. This figure may now be entered on the weight and balance loading form shown at Figure 6-7 or the loadsheet shown as Figure 6-8.

NOTE

For ease of working, the moments on tables and charts are displayed as in.lbs/1000. Care is required to ensure that values are added correctly.

BAGGAGE AND CARGO LOADING

Items of baggage or cargo must also be entered on the weight and balance loading form shown at Figure 6-7 or the loadsheet shown as Figure 6-8. The large cabin of the airplane offers considerable scope for loading cargo items. The weight of these items is multiplied by the arm (in inches from datum) to determine the moment. Figure 6-2

identifies reference stations along the cabins length to assist in the calculation of the arm at which cargo items are loaded. Moments calculated manually in this manner should be divided by 1000, in line with units used on tables and charts in this section.

When all loading items have been recorded on the loading form the weights and moments should be totaled at the bottom of the form shown at Figure 6-7 or the loadsheet shown as Figure 6-8.

The graph shown as Figure 6-6 is used to establish the centre of gravity position of the loaded airplane. Enter the form from the left hand side at the weight which represents the loaded airplane. Move horizontally to the right until this line intersects the diagonal line representing the totaled moments. From the point of the intersection, move down between the (near vertical) guidelines and from the bottom scale read off the centre of gravity position.

Ensure that the calculated weight and centre of gravity are within approved limits. If not, reload and recalculate the weight and balance as required.

LANDING WEIGHT AND CENTRE OF GRAVITY

It is required that the airplane weight and centre of gravity be maintained within limits for the entire flight and not just for the takeoff. In practical terms, and as a minimum, this will require an appreciation of the centre of gravity movement with fuel burn and an estimate of the landing weight based on the planned fuel consumption before landing, on the planned flight.

Landing weight can be determined by subtracting the weight of fuel used to destination, from the takeoff weight. There is provision for this on the weight and balance loadsheet shown at Figure 6-8. By recalculating the total airplane weight and moments based on the landing fuel load, an accurate landing weight and centre of gravity can be determined. In the passenger or cargo role all other items on the loading plan should remain unchanged. In some specialized roles such as parachute operations consideration must also be given to disposable payload which has been disposed of before landing.

EFFECTS OF FUEL BURN OFF ON CENTRE OF GRAVITY

The configuration of the fuel tanks on the standard airplane ensures that the front tanks remain full until all fuel in the rear tanks has been used. It is also required that the front tanks be full before filling rear tanks. Any flight, with full fuel loaded into the tanks, will result in a forward movement of the centre of gravity as fuel is used, until the rear tanks are empty. As fuel is used from the front tanks the centre of gravity movement is dependant on the loading condition of the airplane. At extreme aft loadings the centre of gravity movement will be further aft. At light weights and extreme forward loadings the centre of gravity movement may be slightly further forward.

WEIGHT AND MOMENT LIMITS

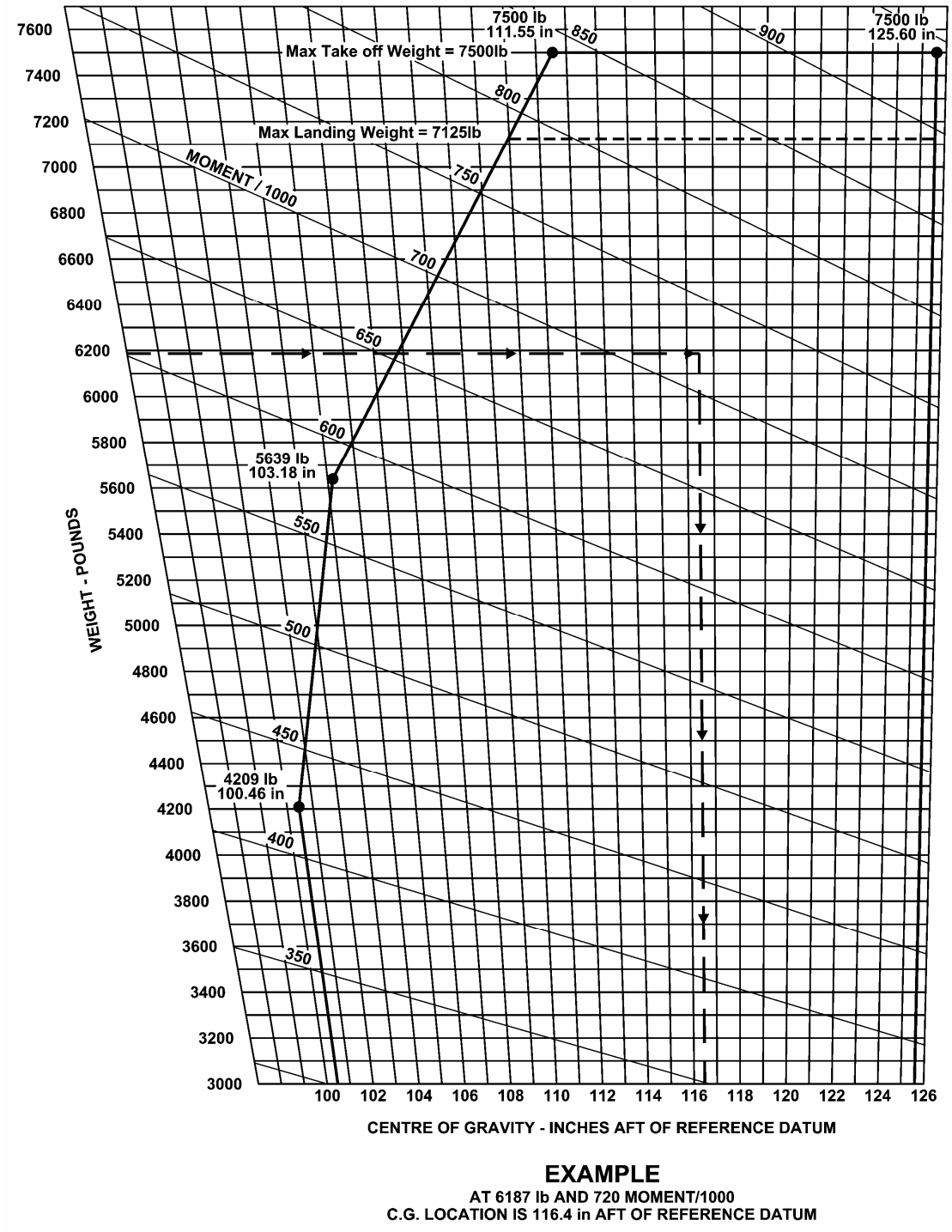

Figure 6-6, Weight and Balance Determination

WEIGHT AND BALANCE LOADING FORM

	WEIGHT	MOMENT (in.lbs)
Basic Empty Weight		
Pilot's Seats		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Cargo/Parachutists		
Front Tank Fuel (Usable)		
Rear Tank Fuel (Usable)		
Other		
Totals	*	*

Figure 6-7, Weight and Balance Loading Form

CAUTION

****Totals must be within approved weight and centre of gravity limits. It is the responsibility of the pilot to ensure that the airplane is loaded properly.***

WEIGHT AND BALANCE LOADSHEET

The weight and balance loadsheet shown in Figure 6-8 is an alternative form to the weight and balance loading form shown in Figure 6-7. The weight and balance loadsheet shown in Figure 6-8 allows the pilot to calculate weight and balance outcomes for all stages of the flight. The sub totals in rows 8 and 10 can be checked using the graph shown as Figure 6-6.

SERIAL No.	REGISTRATION No.	DATE

PAYLOAD COMPUTATIONS			
ITEM OCCUPANTS OR CARGO	ARM	WEIGHT	MOM/1000
BAGGAGE			
TOTAL PAYLOAD			

REF	ITEM	WEIGHT	MOM/1000
1.	BASIC EMPTY WEIGHT		
2.	PAYLOAD		
3.	WEIGHT (LESS FUEL) (sub- total)		
4.	FRONT TANK FUEL LOADING		
5	REAR TANK FUEL LOADING		
6.	RAMP CONDITION (sub-total)		
7.	LESS FUEL FOR START AND TAXI		
*8.	TAKEOFF CONDITION		
9.	LESS FUEL TO DESTINATION		
*10	LANDING WEIGHT		

Figure 6-8, Weight and Balance Loadsheet

CAUTION

****Totals must be within approved weight and centre of gravity limits. It is the responsibility of the pilot to ensure that the airplane is loaded properly.***

FUEL

LITRES	WEIGHT (POUNDS)	FRONT TANKS ARM 110.21 in.	REAR TANKS ARM 139.15 in.
		MOMENT / 1000	
40	70.4	7.76	9.80
80	140.8	15.52	19.59
120	211.2	23.28	29.39
160	281.6	31.04	39.18
200	352.0	38.79	48.98
240	422.4	46.55	58.78
280	492.8	54.31	68.57
284	500.0	55.11	69.58
320	563.2	62.07	-
360	633.6	69.83	-
400	704.0	77.59	-
440	774.4	85.35	-
480	844.8	93.11	-
520	915.2	100.86	-
552	971.5	107.07	-

GALLONS (US)	WEIGHT (POUNDS)	FRONT TANKS ARM 110.21 in.	REAR TANKS ARM 139.15 in.
		MOMENT / 1000	
10	67	7.38	9.32
20	134	14.77	18.65
30	201	22.16	27.97
40	268	29.54	37.29
50	335	36.92	46.62
60	402	44.30	55.94
70	469	51.69	65.26
75	503	55.44	69.99
80	536	59.07	-
90	603	66.46	-
100	670	73.84	-
110	737	81.22	-
120	804	88.61	-
130	871	95.99	-
140	938	103.38	-
146	978	107.79	-

Figure 6-9, Fuel Calculations

OCCUPANTS – PARACHUTE CONFIGURATION

WEIGHT (POUNDS)	PARACHUTISTS (with parachute)								
	(PILOT) ARM 66.50	ARM 93.00	ARM 106.25	ARM 119.50	ARM 132.75	ARM 146.00	ARM 159.25	ARM 172.50	ARM 185.75
	MOMENT / 1000								
120	7.98	11.16	12.75	14.34	15.93	17.52	19.11	20.70	22.29
130	8.64	12.09	13.81	15.54	17.26	18.98	20.70	22.43	24.15
140	9.31	13.02	14.88	16.73	18.59	20.44	22.30	24.15	26.00
150	9.98	13.95	15.94	17.93	19.91	21.90	23.89	25.88	27.86
160	10.64	14.88	17.00	19.12	21.24	23.36	25.48	27.60	29.72
170	11.31	15.81	18.06	20.32	22.57	24.82	27.07	29.33	31.58
180	11.97	16.74	19.12	21.51	23.90	26.28	28.67	31.05	33.43
190	12.64	17.67	20.19	22.71	25.22	27.74	30.26	32.78	35.30
200	13.30	18.60	21.25	23.90	26.55	29.20	31.85	34.50	37.15
210	13.97	19.53	22.31	25.10	27.88	30.66	33.44	36.23	39.01
215	14.30	20.00	22.84	25.69	28.54	31.39	34.24	37.09	39.94

Figure 6-10, Occupants Parachute Configuration

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