

**SECTION 6**

**WEIGHT AND BALANCE**

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**SECTION 6**

**WEIGHT AND BALANCE**

**GENERAL**

The helicopter must be flown only within weight and balance limits specified in Section 2. Loadings outside these limits can result in insufficient control travel for safe operation.

The center of gravity may be adjusted by adding removable ballast (any appropriate item of mass) to any under-seat baggage compartment. Recalculate weight and balance after adding ballast, and verify ballast meets baggage compartment limits given in Section 2.

Loaded helicopter weight and balance can be determined using the method given under **LOADING INSTRUCTIONS**.

In accordance with FAA procedures, the detail weight and balance data of this section are not subject to FAA approval. The loading instructions of this section, however, have been approved by the FAA as satisfying all requirements for instructions on loading of the rotorcraft within approved limits of weight and center of gravity and on maintaining the loading within such limits.

***CAUTION***

Fuel burn causes CG to move forward during flight. Always determine safe loading with empty fuel as well as with takeoff fuel. Payload may be limited by forward CG as fuel is burned.

**WEIGHT AND BALANCE RECORD**

The following form should be used to maintain a continuous record of your helicopter's weight and balance. Each time an item of equipment is removed or installed, an entry must be made and the new empty CG determined. The original factory weight and balance and an equipment list is supplied with each helicopter on a form which is inserted at the end of this section. This weight and balance provides the first entry in the Weight and Balance Record form.

***NOTE***

Calculated CG with full fuel and 150 lb pilot must be within CG limits. Following modification, adjustment to fixed nose ballast may be required. See R44 Maintenance Manual.



**LOADING INSTRUCTIONS**

The following table may be used when calculating loaded helicopter weight and CG position.

COMMON ITEM WEIGHT & CG

Item	Weight (lb)	Longitudinal arm (in.)	Lateral arm (in.) (+ = right side)
Pilot (right forward seat)		49.5*	+ 12.2
Left forward passenger		49.5*	- 10.4
Baggage under forward seats		44.0	± 11.5
Aft passengers and baggage under aft seats		79.5	± 12.2
Main fuel**		106.0	- 13.5
Aux fuel**		102.0	+ 13.0
Forward doors	7.5 each	49.4	± 24.0
Aft doors	7.0 each	75.4	± 23.0
Removable cyclic	0.6	35.8	- 8.0
Removable collective	0.8	47.0	- 21.0
Removable pedals (both pedals)	0.8	16.8	- 9.5

\* If additional backrest cushion is used, subtract thickness of compressed cushion.

\*\* A longitudinal arm of 104.5 in. may be used for combined main and aux fuel.

**LOADING INSTRUCTIONS (cont'd)**

The following sample calculation demonstrates how to determine loaded helicopter weight and center of gravity. A worksheet is provided on the page following the sample calculation for a weight and balance calculation for your helicopter. These may be compared with the CG limits given in Section 2 to determine safe loading. Both takeoff and empty fuel conditions must be within limits.

Lateral CG usually falls well within limits for conventional loadings. If an unusual lateral installation or loading occurs, lateral CG should be checked against the CG limits given in Section 2. The lateral reference datum is the aircraft centerline with items to the right positive and items to the left negative.

**LOADING INSTRUCTIONS (cont'd)**

**SAMPLE LOADING CALCULATION**

Item	Weight (lb)	Location		Moment	
		Long. Arm (in.)	Lat. Arm (in.) + = Right Side	Long. (in.-lb)	Lat. (in.-lb)
Basic empty weight	1460	106.2	0.2	155,052	292
Remove forward right door	-7.5	49.4	24.0	-371	-180
Remove forward left door		49.4	-24.0		
Remove aft right door		75.4	23.0		
Remove aft left door		75.4	-23.0		
Remove cyclic		35.8	-8.0		
Remove collective		47.0	-21.0		
Remove pedals (both)		16.8	-9.5		
Pilot (forward right seat)	170	49.5	12.2	8415	2074
Left forward passenger	170	49.5	-10.4	8415	-1768
Aft right passenger	160	79.5	12.2	12,720	1952
Aft left passenger	130	79.5	-12.2	10,335	-1586
Baggage under forward right seat	10	44.0	11.5	440	115
Baggage under forward left seat	10	44.0	-11.5	440	-115
Baggage under aft right seat		79.5	12.2		
Baggage under aft left seat	10	79.5	-12.2	795	-122
<b>Zero usable fuel weight and CG*</b>	<b>2112.5</b>	<b>92.9</b>	<b>0.3</b>	<b>196,241</b>	<b>662</b>
Usable main fuel at 6 lb/gal.	177	106.0	-13.5	18,762	-2390
Usable aux fuel at 6 lb/gal.	102	102.0	13.0	10,404	1326
<b>Takeoff Gross Weight and CG*</b>	<b>2391.5</b>	<b>94.3</b>	<b>-0.2</b>	<b>225,407</b>	<b>-402</b>

\* CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.



**LOADING INSTRUCTIONS (cont'd)**

LOADING CALCULATION WORKSHEET

Item	Weight (lb)	Location		Moment	
		Long. Arm (in.)	Lat. Arm (in.) + = Right Side	Long. (in.-lb)	Lat. (in.-lb)
Basic empty weight					
Remove forward right door		49.4	24.0		
Remove forward left door		49.4	-24.0		
Remove aft right door		75.4	23.0		
Remove aft left door		75.4	-23.0		
Remove cyclic		35.8	-8.0		
Remove collective		47.0	-21.0		
Remove pedals (both)		16.8	-9.5		
Pilot (forward right seat)		49.5	12.2		
Left forward passenger		49.5	-10.4		
Aft right passenger		79.5	12.2		
Aft left passenger		79.5	-12.2		
Baggage under forward right seat		44.0	11.5		
Baggage under forward left seat		44.0	-11.5		
Baggage under aft right seat		79.5	12.2		
Baggage under aft left seat		79.5	-12.2		
<b>Zero usable fuel weight and CG*</b>					
Usable main fuel at 6 lb/gal.		106.0**	-13.5		
Usable aux fuel at 6 lb/gal.		102.0**	13.0		
<b>Takeoff Gross Weight and CG*</b>					

\* CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.

\*\* A longitudinal arm of 104.5 in. may be used for combined main and aux fuel. Do not use combined main and aux fuel if calculating lateral arm.

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