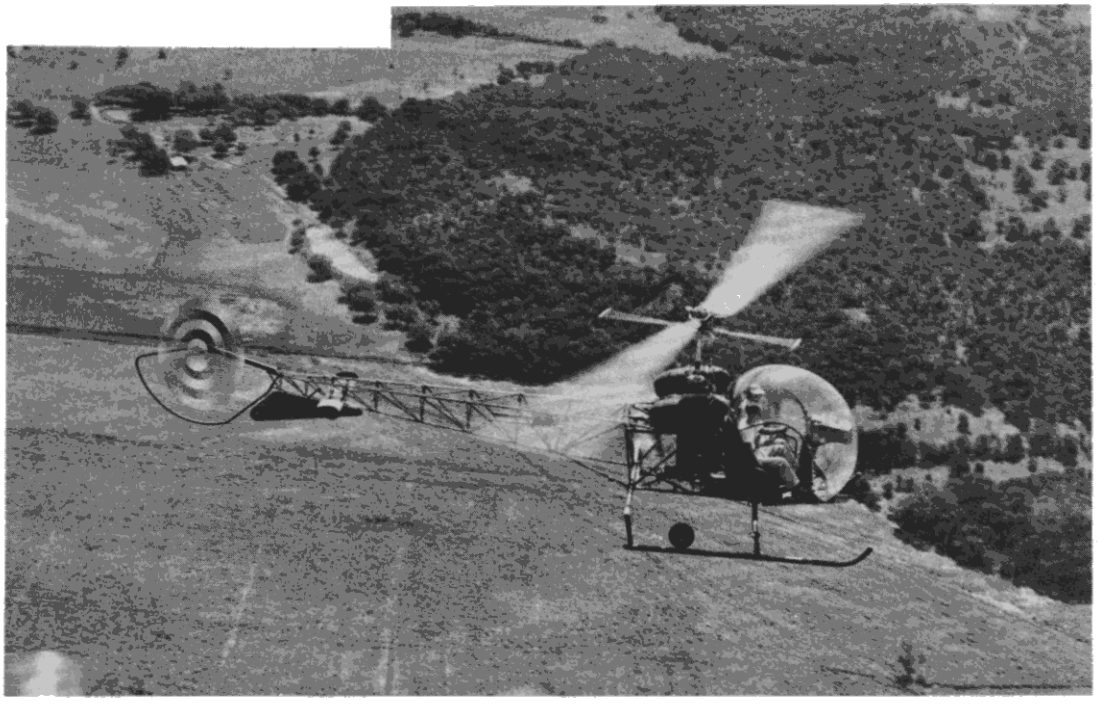
FLIGHT MANUAL



BELL HELICOPTER

THIS MANUAL SUPERSEDES THE ISSUE OF JUNE 16, 1953.

MODEL 47G

TYPE CERTIFICATE NO. H-1

REGISTRATION NO. _____

APPROVED BY C. W. Van Ramburg for

CHIEF OF AIRCRAFT ENGINEERING BRANCH
CIVIL AERONAUTICS ADMINISTRATION

DATE July 1, 1954

BELL Aircraft CORPORATION
TEXAS DIVISION
POST OFFICE BOX 482 FORT WORTH 1, TEXAS

This Document Must Be Carried In The Aircraft At All Times

LIST OF REVISED PAGES ISSUED

REVISION NO.	PAGES AFFECTED BY LATEST REVISION	C.A.A. APPROVED DATE
1	A and B	August 25, 1954
2	A and B	C. L. Johnston 10/18/55
3	A, B, C and 6	[signature] for C. L. Johnston 7-11-57
4	A and B	H. H. Slaughter 5-28-58

NOTE: Revision Symbol (Black Vertical Line) Indicates Revised Text.

LIST OF REVISED KIT PAGES AND LATEST REVISION DATE OF EACH PAGE WHICH MUST BE INSERTED IN THIS MANUAL WHEN THE APPLICABLE KIT IS INSTALLED IN THE HELICOPTER

NAME OF KIT	REVISED PAGE	LATEST REVISION DATE
LITTER CARRIERS, COVERED	Page 1 of 2	July 1, 1954
NIGHT FLYING	Page 1 of 1	July 1, 1954
FLOAT LANDING GEAR	Page 1 of 1	October 18, 1955
LITTER CARRIER (STOKES)	Page 1 of 1	July 15, 1957
DUSTER	Page 1 of 3	July 1, 1954
SPRAYER	Page 1 of 2	July 1, 1954
FLOAT-COVERED LITTER CONFIGURATION	Page 2 of 2	July 1, 1954
HYDRAULIC BOOST CONTROLS	Page 1 of 1	July 15, 1957

LIST OF C.A.A. APPROVED KITS AND NUMBER OF KIT PAGES WHICH MUST BE INSERTED IN THIS MANUAL WHEN KIT IS INSTALLED

NOTE: The supplemental kit pages, for handbook insertion, contain only the information which is different from the basic manual.

NAME OF KIT	PART NUMBER	NUMBER OF PAGES	DATE ISSUED
LITTER CARRIERS, COVERED	47-706-334	2	June 16, 1953
DUAL CONTROLS	47-706-069	1	June 16, 1953
NIGHT FLIGHT	47-706-335-3	1	June 16, 1953
FLOAT LANDING GEAR	47-350-009-19	1	Aug. 4, 1953
LITTER CARRIER (STOKES) SKID OR FLOAT LANDING GEAR	47-350-011 47-706-044	1	Aug. 12, 1953
CARGO CARRIER LONG BOX TYPE	47-708-012	1	Aug. 12, 1953
WINTERIZED COWLING	47-340-175	1	Oct. 27, 1953
CABIN HEATER AND DEFROSTER	47-706-428	1	Oct. 27, 1953
DUSTER	47-706-461	3	Jan. 11, 1954
SPRAYER	47-706-070	2	April 30, 1954
HYDRAULIC BOOST CONTROLS	47-690-003	1	May 26, 1954
FLOAT-COVERED LITTER CONFIGURATION	47-706-479 ---	2	May 26, 1954
CARGO CARRIER (BIN TYPE)	47-706-009	1	Aug. 25, 1954
ROTOR BRAKE - POWER OPERATED	47-706-589	1	May 28, 1958

TABLE OF CONTENTS

SECTION 1 OPERATING LIMITATIONS

COMPLIANCE WITH SECTION I OF THIS MANUAL IS MANDATORY

*WEIGHT LIMITATION.

1. Maximum approved gross weight 2350 pounds.

*AIRSPEED LIMITATIONS.

NOTE

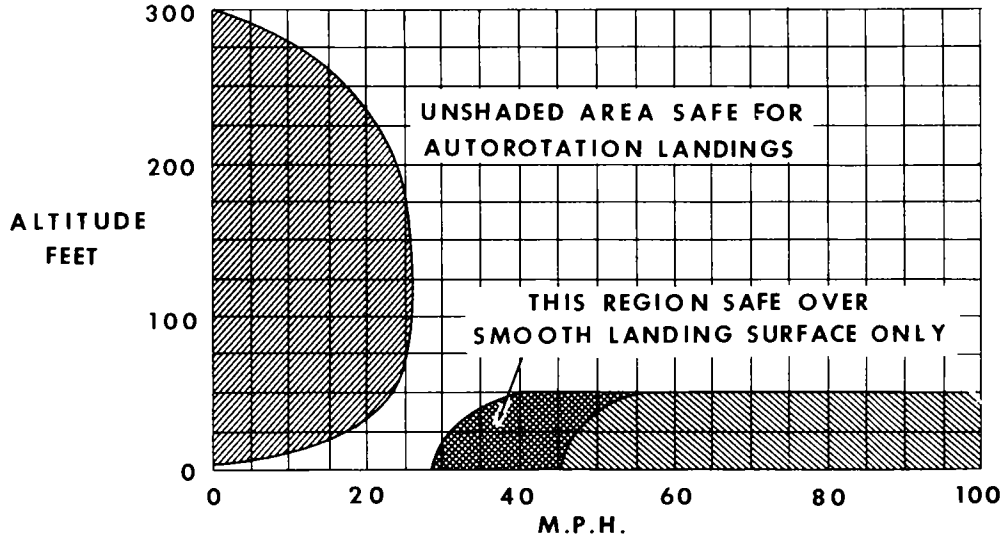
All airspeed values given throughout this handbook are for Calibrated Airspeed (CAS).

1. Vne 100 mph (87 knots) sea level to 1400 feet (with large area synchronized elevator). Vne 90 mph (78 knots) sea level to 4000 feet (with small area synchronized elevator). Refer to synchronized elevator illustration on page 4 for type of elevator installed.

2. Vne as stated on supplemental kit sheets when any external loading kit is installed.

3. Above 1400 feet decrease Vne 3.5 mph (3 knots) per 1000 feet (with large area synchronized elevator). Above 4000 feet decrease Vne 3.5 mph (3 knots) per 1000 feet (with small area synchronized elevator.

*AIRSPEED vs. ALTITUDE LIMITATIONS.



*ROTOR LIMITATIONS.

1. Maximum 360 rpm.

2. Minimum 294 rpm.

CAUTION

Avoid continuous operation at rotor speed of 200 to 230 rpm to minimize vibration resonance of the stabilizer bar.

*POWER PLANT LIMITATIONS. Franklin Engine 6V4-200-C32.

1. Fuel octane 91 min.

2. Idling rpm 1500 to 1700.

3. Operating rpm 2900 to 3100.

4. Oil pressure 40 to 60 psi.

5. Cylinder head temperature 224°C.

* PLACARDS

1. The flight restrictions imposed by this placard are effective when the helicopter is equipped with the SMALL AREA synchronized elevator.

THIS HELICOPTER TO BE OPERATED IN ACCORDANCE WITH APPROVED OPERATING LIMITATIONS
CABIN LOADING
MAXIMUM ALLOWABLE WEIGHT IN CABIN 550 LBS
MINIMUM ALLOWABLE WEIGHT IN CABIN 150 LBS
AIRSPEED LIMITATIONS
BASIC CONFIGURATION- 90 MPH-SEA LEVEL TO 4000 FEET
ABOVE 4000 FEET DECREASE VNE 3.5 MPH PER 1000 FEET
FEET PROTRACTED REARWARD FLIGHT PROHIBITED
NO AEROBATIC MANEUVERS PERMITTED

2. The flight restrictions imposed by this placard are effective when the helicopter is equipped with the LARGE AREA synchronized elevator.

THIS HELICOPTER TO BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE CAA APPROVED ROTORCRAFT FLIGHT MANUAL
CABIN LOADING
MAXIMUM ALLOWABLE WEIGHT IN CABIN 550 LBS
MINIMUM ALLOWABLE WEIGHT IN CABIN 150 LBS
AIRSPEED LIMITATIONS
BASIC CONFIGURATION-Vne 100 MPH-SEA LEVEL TO 1400 FEET
ABOVE 1400 FEET DECREASE Vne 3.5 MPH PER 1000 FEET
PROTRACTED REARWARD FLIGHT PROHIBITED
NO ACROBATIC MANEUVERS PERMITTED

* TABLE OF INSTRUMENT MARKINGS

ROTOR TACHOMETER	Red Line	294 rpm
	Red Line	360 rpm
	Green ARC	322-360 rpm
	Yellow ARC	294-322 rpm
	Yellow ARC	200-230 rpm
ENGINE TACHOMETER	Red Line	2900 rpm
	Red Line	3100 rpm
	Green ARC	2900-3100 rpm
AIRSPEED INDICATOR	Red Line	90 or 100 mph
MANIFOLD PRESSURE GAGE	Red Line	28.8 in.
ENGINE GAGE OIL TEMPERATURE ENGINE	Red Line	40°C
	Red Line	110°C
	Green ARC	40°-110°C
OIL TEMPERATURE TRANSMISSION	Red Line	130°C
	Green ARC	40°-130°C
CYLINDER HEAD TEMPERATURE GAGE	Red Line	100°C
	Red Line	224°C
	Green ARC	100°-224°C
ENGINE GAGE OIL PRESSURE	Red Line	40 psi.
	Red Line	60 psi.
	Green ARC	40-60 psi.
CARBURETOR AIR TEMPERATURE	Red Line	-30° and 50°C
	Green ARC	32° to 50°C
	Green ARC	-30° to - 2°C
	Yellow ARC	- 2° to 32°C

* CENTER OF GRAVITY LIMITS.

1. Forward: 3 inches forward of Station O.

2. Aft: 4 inches aft of Station O.

NOTE

Station O is located 2.00 inches forward of centerline of main rotor mast.

* TYPE OF OPERATION.

1. Basic configuration of the helicopter permits its use as a three-place aircraft.

2. Alternate configurations permit the installation and use of approved kits which permit the helicopter to be used for specialized purposes. The approved kits which can be installed, for utility purposes, are listed on page B of this Flight Manual.

* LOADING LIMITATIONS

STANDARD LOADING

CABIN LOAD LBS.	FUEL GALS.	EXTERNAL LOAD
MINIMUM 150	0 TO 43	TO 2350 LBS. TOTAL GROSS WEIGHT
MAXIMUM 550	0 TO 43	

ALTERNATE LOADING

CABIN DOORS REMOVED

CABIN LOAD LBS.	FUEL GALS.	EXTERNAL LOAD
MINIMUM 165	0 TO 43	TO 2350 LBS. TOTAL GROSS WEIGHT
MAXIMUM 565	0 TO 43	

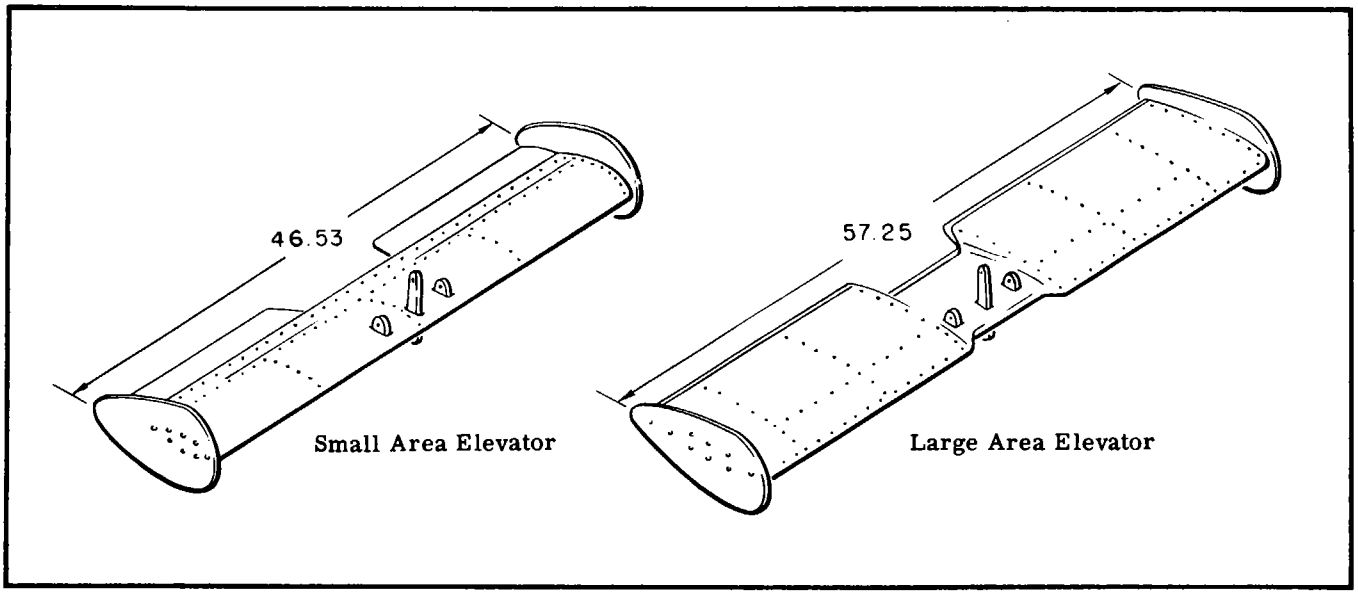
WARNING

HELICOPTER WEIGHT EMPTY, FUEL, CABIN LOAD AND EXTERNAL LOAD SHALL NOT EXCEED 2350 LBS MAXIMUM GROSS WEIGHT.

* LOADING RESPONSIBILITY

It is the responsibility of the owner and pilot to insure safe loading of the helicopter. The empty weight, empty weight cg and useful load are noted on the actual weight and balance sheet included in this manual for the helicopter as delivered from the factory. Alterations, added equipment, cg variation, and useful load information must be recorded and approved on Alteration and Repair Form (ACA-337) which shall then become part of the helicopter file.

SYNCHRONIZED ELEVATORS



SECTION 2 OPERATING PROCEDURES

* SERVICING.

1. Fuel, Minimum Octane 91.

2. Oil, Aviation Grade.
   SAE 40 Above 40°F.
   SAE 30 Below 40°F.

* PRE-ENGINE STARTING.

1. Check controls for freedom of movement-adjust friction.

2. Mixture control RICH.

3. Carburetor heat control COLD.

4. Prime engine by opening and closing throttle 2 or 3 times.

5. CLOSE throttle.

* WARM-UP AND GROUND TEST.

1. Idle engine at 1500 to 1700 rpm until oil pressure reaches 40 psi minimum.

2. Run engine at 1700 to 1800 rpm until clutch is fully engaged, which is apparent when tachometer needles are synchronized.

CAUTION

Avoid continuous operation at rotor speed of 200 to 230 rpm to minimized stabilizer bar resonance. Apply sufficient cyclic control stick into the wind to maintain the rotor in a near horizontal plane.

3. Increase engine rpm to approximately 2200 to prevent clutch slippage and hold until oil temperature reaches 40°C minimum.

4. Check magnetos at 3100 rpm and minimum pitch after head temperature reaches 100°C. A drop of 200 rpm is permissible with no engine roughness.

* ENGINE SHUT-DOWN PROCEDURE.

1. Idle engine until cylinder head temperature drops approximately 25°C.

2. Stop engine by moving mixture control to CUT OFF.

3. Ignition switch OFF after engine stops.

4. Increase main rotor pitch, not to exceed 1/3 the range, to reduce rotor rpm.

CAUTION

In high winds increase pitch carefully and do not exceed 1/3 the pitch range. Apply control stick into the wind to maintain the rotor in a near horizontal attitude.

5. Moor aft blade with mooring block by drawing blade down lightly against static stop and tying web strap to tail boom.

* EMERGENCY PROCEDURES.

ENGINE FAILURE. Execute a normal autorotative descent and establish a level attitude prior to ground contact. At a height of approximately 10 feet apply collective pitch in sufficient quantity to stop descent as ground contact is made.

* TAIL ROTOR FAILURE.

1. Immediately execute an autorotative descent and maintain an airspeed of at least 40 mph.

2. Make a normal autorotative landing.

* DITCHING WITHOUT POWER.

1. Execute a normal autorotative descent and land at minimum surface speed.

2. Apply full lateral stick to the "RIGHT" to roll the helicopter on to the "RIGHT" side.

* HYDRAULIC BOOST FAILURE

NOTE

The following information is applicable ONLY to helicopters Serial No. 1703 and subsequent and to hydraulic boost equipped helicopters with hydraulic irreversible valves installed in accordance with Service Instruction No. 250 SI.

Hydraulic boost failure will be evident by feed-back forces being transmitted to the cyclic stick when a control motion is made. Feed-back forces may not be present or are negligible when the cyclic stick is held fixed or during autorotation. Feed-back forces encountered when moving the cyclic stick will be proportionate in intensity to an envelope of factors directly effected by airspeed, gross weight and climatic turbulence. When hydraulic boost power loss is detected, reduce cyclic control motions to the minimum required to complete the flight and MAKE NECESSARY MOVEMENTS AT A RATE OF TRAVEL NOT FASTER THAN ONE FULL DISPLACEMENT, stop to stop, PER SECOND.

If jamming of the controls or a condition of the controls tending to over-ride the pilot is experienced the hydraulic system by-pass valve, located on the top side of the box beam, should be immediately pulled UP to relieve hydraulic pressure at the cylinders. The jammed cylinder may then be broken loose by exerting pressure on the control stick and the above emergency procedure followed.

SECTION 3

PERFORMANCE INFORMATION

NOTE

TEMPERATURE VALUES SHOWN ON THE PERFORMANCE CHARTS ARE FOR THE PRESSURE ALTITUDES STATED.

TOTAL LANDING DISTANCES IN FEET OVER 50' OBSTACLE
"POWER OFF" SKID GEAR

Gross Weight	Pressure Altitude Feet	At -13°F -25°C	At 23°F - 5°C	At 59°F 15°C	At 95°F 35°C
1950*	S.L.	140	150	160	170
	2,000	150	160	170	180
	4,000	160	170	180	190
	6,000	170	180	190	200
	8,000	180	190	200	210
	10,000	190	200	210	220
2350	S.L.	200	210	220	230
	2,000	210	220	230	240
	4,000	220	230	240	250
	6,000	230	240	250	260
	8,000	240	250	260	270
	10,000	250	260	270	---

Ground Skid limited to approximately 40 ft.

Above distances are based on a landing approach at approximately 34 mph and then steady deceleration through the 50 ft. altitude to ground contact.

* Distances are estimated from 2350 lb flight test data, S.L. performance.

MAXIMUM RATE OF CLIMB
(At 45 mph)
(R/C) Max. - Ft./Min.*

Gross Weight	Pressure Altitude Feet	At -13°F -25°C	At 23°F - 5°C	At 59°F 15°C	At 95°F 35°C
1950	S.L.	1,130	1,120	1,110	1,090
	2,000	1,020	1,010	990	960
	4,000	900	890	860	820
	6,000	780	760	720	680
	8,000	660	630	580	530
	10,000	520	490	430	360
2350	S.L.	860	830	800	760
	2,000	740	710	670	620
	4,000	630	580	530	470
	6,000	500	450	390	330
	8,000	370	310	250	180
	10,000	230	170	90	30

*NOTE: When the helicopter is equipped with high performance rotor blades, increase the above figures by 30 ft/min.

VERTICAL RATE OF CLIMB
(R/C) Vertical - Ft./Min.*

Gross Weight	Pressure Altitude Feet	At -13°F 25°C	At 23°F - 5°C	At 59°F 15°C	At 95°F 35°C
1950	S.L.	900	790	720	610
	2,000	630	540	450	310
	4,000	340	220	110	---
	6,000	50	---	---	---
2350	S.L.	220	90	---	---

*NOTE: When the helicopter is equipped with high performance rotor blades, increase the above figures by 70 ft/min.

TAKE-OFF DISTANCES IN FEET TO CLEAR 50' OBSTACLE
SKID GEAR

Gross Weight	Pressure Altitude Feet	At -13°F -25°C	At 23°F - 5°C	At 59°F 15°C	At 95°F 35°C
1950*	S.L.	90	120	160	220
	2,000	120	170	240	350
	4,000	220	280	390	830
	6,000	360	530	1,000	---
	8,000	600	---	---	---
2350	S.L.	140	180	230	310
	2,000	180	250	350	---
	4,000	310	---	---	---

Distances represent a forward speed climb at approximately 30 mph from a hovering in ground effect altitude.

* Distances are estimated from 2350 lb flight test data, S.L. performance.

HOVERING CEILING

GROSS WEIGHT	TEMPERATURE	HOVERING CEILING PRESSURE ALTITUDE - FT.	
		In Ground Effect	Out of Ground Effect
1950	-25°C -13°F	9,300	6,300
	- 5°C 23°F	8,700	5,400
	15°C 59°F	8,000	4,600
	35°C 95°F	7,400	3,800
2350	-25°C -13°F	4,900	1,500
	- 5°C 23°F	4,200	500
	15°C 59°F	3,500	---
	35°C 95°F	2,800	---

*NOTE: When the helicopter is equipped with high performance rotor blades, increase the above figures by 500 Feet.

AIRSPEED INSTALLATION CORRECTION TABLE

BASIC CONFIGURATION

MODEL 47G ENGINE FRANKLIN 6V4-200-C32

Indicated Air Speed (IAS) corrected for position and instrument error equals Calibrated Air Speed (CAS). Determine corrected IAS from the following table.

IAS	CAS
20 mph	22 mph
25 mph	26 mph
30 mph	31 mph
35 mph	35 mph
40 mph	40 mph
45 mph	45 mph
50 mph	50 mph
60 mph	59 mph
70 mph	68 mph
80 mph	77 mph
90 mph	86 mph
100 mph	96 mph
104 mph	100 mph

OPERATION vs. ALLOWABLE WIND

Helicopter flight and landing operations can be safely accomplished with wind conditions up to 20 mph; however, this is not to be considered a limiting value as maximum operating wind velocities have not been established.

SECTION 4

CHARTS AND TABLES

INTRODUCTION

The charts and tables contained in this section provide information and conversion data useful to the operator, for purposes of transposing information to the type desired.

TEMPERATURE CONVERSION TABLE

°F ←	°C	°F →	°C
-85	-65	-54	
-76	-60	-51	
-67	-55	-48	
-58	-50	-46	
-49	-45	-43	
-40	-40	-40	
-31	-35	-37	
-22	-30	-34	
-13	-25	-32	
- 4	-20	-29	
5	-15	-26	
14	-10	-23	
23	- 5	-21	
32	0	-18	
41	5	-15	
50	10	-12	
59	15	- 9	
68	20	- 7	
77	25	- 4	
86	30	- 1	
96	35	2	
104	40	4	
113	45	7	
122	50	10	
131	55	13	
140	60	16	
149	65	18	
158	70	21	
167	75	24	
176	80	27	
185	85	29	
194	90	32	
203	95	35	
212	100	38	
221	105	41	
230	110	43	
239	115	46	
248	120	49	
257	125	52	

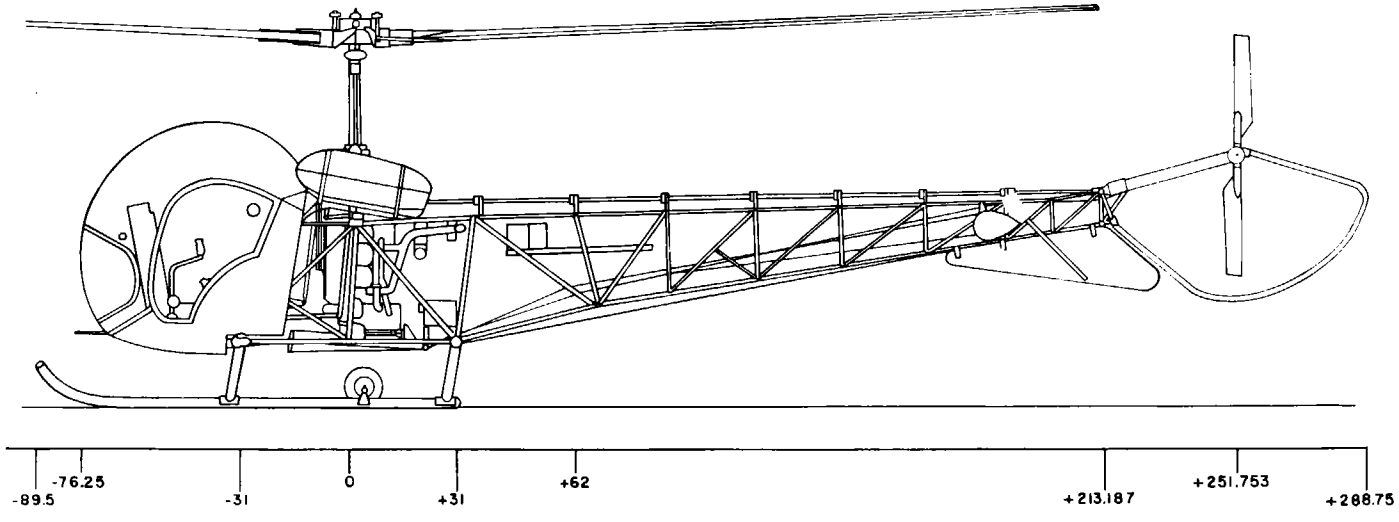
VELOCITY CONVERSION TABLE

Knots ←	MPH	Knots →	MPH
0	0	0	
4	5	6	
9	10	12	
13	15	17	
17	20	23	
22	25	29	
26	30	35	
30	35	40	
35	40	46	
39	45	52	
43	50	58	
48	55	63	
52	60	69	
56	65	75	
61	70	81	
65	75	86	
69	80	92	
74	85	98	
78	90	104	
82	95	110	
87	100	115	
91	105	121	
95	110	127	
100	115	132	
104	120	138	
108	125	144	

STANDARD ATMOSPHERIC
TABLE

Pressure Altitude Ft.	Standard Temperature °F	°C	Atmospheric Pressure inches Hg.
0	59.0	15.0	29.92
1,000	55.4	13.0	28.86
2,000	51.9	11.0	27.82
3,000	48.3	9.1	26.81
4,000	44.7	7.1	25.84
5,000	41.2	5.1	24.89
6,000	37.6	3.1	23.98
7,000	34.0	1.1	23.09
8,000	30.5	- 0.8	22.22
9,000	26.9	- 2.8	21.38
10,000	23.3	- 4.8	20.58
11,000	19.8	- 6.8	19.79
12,000	16.2	- 8.8	19.03
13,000	12.6	-10.8	18.29
14,000	9.1	-12.7	17.57
15,000	5.5	-14.7	16.88
16,000	1.9	-16.7	16.21
17,000	- 1.6	-18.7	15.56
18,000	- 5.2	-20.7	14.94
19,000	- 8.8	-22.6	14.33
20,000	-12.3	-24.6	13.75
21,000	-15.9	-26.6	13.19
22,000	-19.5	-28.6	12.63
23,000	-23.0	-30.6	12.10
24,000	-26.6	-32.5	11.59
25,000	-30.2	-34.5	11.10

STATIONS DIAGRAM



NOTE

STATION O - Centerline of weld cluster just forward of leveling lugs (approximately 2 in. forward of centerline of mast). Leveling lugs on lower left hand longeron aft of mast.

NOTES

NOTES

EQUIPMENT

Date: June 16, 1953
CAA APPROVED

LITTER CARRIERS, COVERED.

INTRODUCTION

The Bell-Litter Carrier Kit No. 47-706-334 consists of two covered litters, which are mounted one on each side of the helicopter, and all attachment fittings required to complete the installation. The Covered Litter Carriers when used in combination with the Winterized Cowl, requires the installation of the Deflector Assembly Scoop, Part No. 47-340-185, for purposes of controllability.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATIONS.

Vne 90 mph (with covered litters installed).

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

TYPE OF OPERATION.

The approved capacity of each litter is 225 pounds and covers must be installed for all flight operations.

CAUTION

Unusable fuel, with litters installed, is 7 US gallons which is indicated by a red arc on the fuel gage.

LOADING LIMITATIONS.

NOTE

When cargo is carried on the litter platform loading shall be equally distributed both sides of loading line, to maintain cg, and secured to prevent shifting.

EQUIPMENT

Date: June 16, 1953
CAA APPROVED

LITTER CARRIERS, COVERED.

LOADING LIMITATIONS.

External loading is based upon a 1408 lb basic ship configuration. Corrections must be applied for all kits, including the loading kit, and additional special equipment so as not to exceed the 2350 lb maximum loading.

CAUTION

Unsymmetrical loading, is permitted only, in the carrier opposite the pilot, when flying solo and shall not exceed the pilot's weight by more than thirty (30) pounds.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: June 16, 1953
CAA APPROVED

DUAL CONTROLS.

INTRODUCTION

The dual control equipment contained in Bell Kit No. 47-706-069 consists of a right hand cyclic control stick, collective pitch lever-throttle control, tail rotor control pedals and the required linkage to complete the installation. When installed, the dual controls permit operation of the helicopter from either the left or right hand seat.

SECTION 1. OPERATING LIMITATIONS

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated if necessary to return empty weight cg within allowable limits.

EQUIPMENT

Date: June 16, 1953
CAA APPROVED

NIGHT FLYING.

INTRODUCTION

Bell Night Flying Kit Nos. 47-706-335-3 and -4 both consist of a ground adjustable landing light, navigation lights, instrument panel lights, cockpit light, wiring harness and circuit breaker switches. Installation of the night flying kit permits night flying operations of the helicopter when ground contact flight conditions can be maintained.

SECTION 1. OPERATING LIMITATIONS

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

NIGHT FLIGHT LIMITATIONS.

Night flight operation is limited to visual contact flight conditions. Orientation shall be maintained through visual reference to ground objects solely as a result of lights on the ground or adequate celestial illumination.

SECTION 2. OPERATING PROCEDURES

NIGHT FLIGHT.

This helicopter has not been demonstrated to comply with the handling standards for instrument flight.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: August 4, 1953
CAA APPROVED

FLOAT LANDING GEAR.

INTRODUCTION

The equipment in the Bell-Float Landing Gear Kit No. 47-350-009-19 or 47-350-011 consists of two cell type inflatable floats, mounting cross tubes, spoilers, large area synchronized elevator and all attachment fittings and parts required to equip the helicopter for water operation. The spoilers, (47-706-212) mounted near the forward end of the float mounting tubes, and the large area synchronized elevator (47-267-101 or 47-267-106) must be installed for all flight operation.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATIONS.

Vne 90 mph (with float gear installed).

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and ballast must be readjusted, if necessary, to return empty weight cg within allowable limits.

SECTION 2. OPERATING PROCEDURES

WARM UP AND GROUND TEST.

CAUTION

Anchor or moor the helicopter before starting the engine to prevent rotating, due to torque, before the tail rotor reaches effective rpm.

FLOAT LANDING GEAR.

TAXIING.

Taxi at slow speed to prevent the float bows from nosing under.

NOTE

Safe operation can be accomplished in waves up to 18 inches (trough to crest) and 360° turns can be executed in winds up to 20 mph.

Revised October 18, 1955

EQUIPMENT

Date: August 12, 1953
CAA APPROVED

LITTER CARRIER, (Stokes)

INTRODUCTION

The Bell-Litter Carrier Kit consists of two litters, which are mounted one on each side of the helicopter, and all attachment fittings required to complete the installation. Kit Nos. for applicable landing gear equipment are as follows:

47-706-044 for skid or float equipped helicopters.

The approved capacity of each litter is 225 pounds. When the litters are installed, the large area synchronized elevator (47-267-101 or 47-267-106) must be installed for all flight operations.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATION.

Vne 90 mph (with litter carriers installed).

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

LOADING LIMITATIONS.

CAUTION

Unsymmetrical loading is permitted only, in the carrier opposite the pilot, when flying solo and shall not exceed the pilots weight by more than thirty (30) pounds.

BELL HELICOPTER
Model 47G

EQUIPMENT — Date: August 12, 1953

CARGO CARRIER (LONG BOX TYPE) — C.A.A. APPROVED

INTRODUCTION

The Bell Cargo Kit No. 47-708-012 consists of two, curved top quick detachable, cargo carriers with the required attachment parts and fittings. Each cargo carrier has a loading capacity of 200 pounds and a loading space of 9.5 cu. feet, which is easily accessible through a side loading weather-proof door with locking provisions. When the helicopter is equipped with cargo carriers, the large area synchronized elevator (47-267-101 or 47-267-106) must be installed for all flight operations.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATION.

Vne 90 mph (with cargo carriers installed)

PLACARDS.

200 LB. MAX. LOAD (located on inside each cargo carrier door)
LOAD SYMMETRICALLY ABOUT THIS LINE (located on yellow center loading line inside each cargo carrier)

CENTER OF GRAVITY LIMITS.

WARNING

SECURE CARGO AFTER LOADING TO PREVENT SHIFTING AND CHANGING CG LOCATION.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

LOADING LIMITATIONS.

CAUTION

UNSYMMETRICAL LOADING IS PERMITTED ONLY IN THE CARGO CARRIER OPPOSITE THE PILOT, WHEN FLYING SOLO, AND SHALL NOT EXCEED THE PILOT'S ACTUAL WEIGHT.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: October 27, 1953
CAA APPROVED

WINTERIZED COWLING

INTRODUCTION

Bell Winterized Cowl Kit No. 47-340-175 consists of the engine cowling enclosure, cowl flap control and the required materials to complete the installation. When installed the helicopter can be operated at all O.A.T.'s below +40°F. The use of Winterized Cowling in combination with Covered Litters requires the installation of the Deflector Assembly Scoop, Part No. 47-340-185, for purposes of controllability.

NOTE

Cowling should be utilized for helicopter operation at any O.A.T. below +40°F. that causes sub-normal operating temperatures.

SECTION 1. OPERATING LIMITATIONS

PLACARD.

Remove cowl above +40°F.

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty cg within allowable limits.

SECTION 2. OPERATING PROCEDURES

BEFORE STARTING ENGINE.

Cowl flap control "FULL OPEN".

WARM-UP AND GROUND TEST.

Adjust cowl flap control to maintain operating temperatures.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: October 27, 1953
CAA APPROVED

CABIN HEATER AND DEFROSTER.

INTRODUCTION

Bell Cabin Heater and Defroster Kit No. 47-706-428 consists of two (2) exhaust muff assemblies, which supply the heat source, a forced air cage blower, connecting ducts, heater-defroster outlet, supporting mountings and clamps, heat selector valve and operating switch. The heater selector valve has provisions for installation of two additional ducts to supply heated air to the litters. The heater operating switch is located on the lower center section of the instrument panel. Heater intake air is selected by movement of the damper control which supplies either fresh or recirculated cabin air to the heater blower.

SECTION 1. OPERATING LIMITATIONS

PLACARD.

WARNING - HEATER OPERATION
FOR ALL FLIGHTS UNDER 10 MPH HEATED AIR MUST
BE BY-PASSED OVERBOARD

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

SECTION 2. OPERATING PROCEDURES

WARM-UP AND GROUND TEST.

Turn heater BLOWER switch "ON" immediately after starting engine.

CAUTION

Heater blower shall be operating at all times during engine operation to prevent over-heating the muff assemblies and heater ducts.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: January 11, 1954
CAA APPROVED

DUSTER.

INTRODUCTION

The Bell Duster Kit No. 47-706-461 consists of two dust hopper bins, electrical harness, operating switches, Vortox Air Cleaner, high solidity cooling fan, forward location battery support rack, large area synchronized elevator (47-267-101 or 47-267-106) and the required materials to complete the installation. The Vortox Air Cleaner, supplied with the kit, provides clean dust free air to the carburetor and thereby prevents engine damage. The high solidity cooling fan is required to supply additional air for efficient dust distribution. The forward battery support is supplied to relocate the battery in the forward position and the synchronized elevator must be installed for controllability purposes. Cabin doors shall be removed when dusting operations are being performed. The approved capacity of each hopper is 350 pounds.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATIONS.

Vne 90 mph (with dusting equipment installed).
Dusting under 20 mph is prohibited.
Hovering, rearward and sideward flight while dusting is prohibited.

PLACARDS.

CAPACITY 350 POUNDS (to be located on each hopper).

OPERATING LIMITATIONS.

Doors must be removed for dusting operations.

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated in the forward position to return empty weight cg within allowable limits.

LOADING LIMITATIONS.

Minimum cabin load 130 pounds.
Maximum cabin load 350 pounds.

EQUIPMENT

Date: January 11, 1954
CAA APPROVED

DUSTER.

LOADING LIMITATIONS.

External loading is based upon a 1408 lb basic ship configuration. Corrections must be applied for all kits, including the loading kit, and additional special equipment so as not to exceed the 2350 lb maximum loading.

CAUTION

Unsymmetrical loading is permitted only in the carrier opposite the pilot, when flying solo and shall not exceed the pilot's weight by more than thirty (30) pounds.

SECTION 2. OPERATING PROCEDURES

Prepare duster for operation by turning master switches ON.
Release dust by holding, control stick, trigger switch ON.

NOTE

Dusting operations are accomplished with the use of the Vortox Air Cleaner, but in the event the Cleaner becomes clogged and loss of power is evident the cleaner can be BY-PASSED. This will supply the carburetor with UNFILTERED air and a landing is necessary, before continuing dusting, to clean the Vortox Air Cleaner and return the air supply to Vortox filtered air. THE RETURN OF CARBURETOR AIR FROM "BY-PASS" TO VORTOX FILTERED AIR CAN ONLY BE GROUND ACCOMPLISHED.

DUSTING.

When dusting with sulphur, compliance with the latest Safety Regulation Releases and Airworthiness Maintenance Bulletins is mandatory.

As nearly as can be ascertained from the information available, the primary causes of fire, while engaged in spreading sulphur with aircraft and corresponding preventive measures, are as follows:

EQUIPMENT

Date: January 11, 1954
CAA APPROVED

DUSTER.

DUSTING.

1. CARELESSNESS. In spite of all mechanical corrective measures taken to insure freedom from fire due to causes enumerated in subsequent items, the importance of using extreme care when handling sulphur dust cannot be over-emphasized. The following precautions should be considered at all times during sulphur dusting operations:

(a.) Dusting with a dirty aircraft coated with oil and sulphur dust is inviting trouble. Aircraft used for spreading sulphur should be kept as clean as possible at all times.

(b.) The engine exhaust system should be maintained free from leaks and the best grades of lubricating oil should be used in order to decrease carbon formation.

(c.) Care should be exercised while loading the hopper in order to prevent foreign matter such as wire, paper, etc., from getting in the hopper. Such foreign matter may cause a spark or clog the agitator shaft and cause it to overheat, thus causing a fire.

(d.) Smoking in the vicinity of sulphur should never be permitted.

(e.) Fires which occur while dusting with sulphur usually occur during conditions of low relative humidity. Relative humidity is usually lowest on a given day during the late morning and afternoon. Therefore, as a further precaution against sulphur dust fires, dusting should be done only in the early morning or evening, preferably during the early morning.

(f.) The throttle should not be opened suddenly except in case of emergency. A sudden blast of exhaust frequently throws sparks from the exhaust into the swath, in spite of precautions.

It is also suggested that the hopper gate be closed prior to the completion of a pass. This may reduce the efficiency of the dusting operations slightly, however, the pilot can always make a trip across the ends to spread dust on the parts of the field missed by closing the gate early.

(g.) The hazards of dusting with sulphur must not be minimized because of previous favorable experience. Remember, it takes only one act of carelessness or inattention to cause a disastrous fire.

EQUIPMENT

Date: April 30, 1954
CAA APPROVED

SPRAYER.

INTRODUCTION

The Bell Sprayer Kit No. 47-706-070 consists of two liquid hopper tanks, pump, spray boom, control switches, electrical harness, forward location battery support rack, inter-tank connecting tubing, hoses, fittings and the required attachment parts to complete the installation. The battery shall be located in the forward position to improve the controllability and will also result in a more desirable cyclic stick position. When the helicopter is equipped with the sprayer kit the large area synchronized elevator (47-267-101 or 47-267-106) must be installed for all flight operations. The approved capacity of each hopper tank is 350 pounds.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATIONS.

Vne 90 mph (with sprayer equipment installed).
Spraying at airspeed less than 15 mph is prohibited.
Spraying while hovering or in a sideward or rearward flight is prohibited.

WARNING

The use of spray liquids having a flash point lower than kerosene is prohibited.

PLACARDS.

350 LB. STRUCTURAL LIMIT FOR LOADING - SEE FLIGHT MANUAL (located on top of hopper tank).

WARNING

DO NOT OPERATE WITHOUT COVER (located on top of hopper tank).

EQUIPMENT

Date: April 30, 1954
CAA APPROVED

SPRAYER.

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated in the forward position to return empty weight cg within allowable limits.

LOADING LIMITATIONS.

Minimum cabin load 130 pounds.
Maximum cabin load 350 pounds.
External loading is based upon a 1408 basic ship configuration. Corrections must be applied for all kits, including the loading kit, and additional special equipment so as not to exceed the 2350 lb maximum loading.

CAUTION

Unsymmetrical loading is permitted in the carrier opposite the pilot, when flying solo and shall not exceed the pilot's weight by more than thirty (30) pounds.

SECTION 2. OPERATING PROCEDURES.

OPERATION.

PUSH SPRAY VALVE circuit breaker IN.
Prepare sprayer for operation by turning SPRAY VALVE switch ON.
Release spray by holding control stick trigger switch ON.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: May 26, 1957
CAA APPROVED

HYDRAULIC BOOST SYSTEM FOR FOR AND AFT LATERAL CYCLIC CONTROL SYSTEM

INTRODUCTION

The Bell-Hydraulic Boost Control Kit No. 47-706-479 or the 47-690-003 factory installed boost control system consists of fore and aft hydraulic cylinders, lateral hydraulic cylinders, engine driven hydraulic pump and all attachment fittings, linkage, controls and parts required to equip the helicopter with hydraulic boost controls.

SECTION 1. OPERATING LIMITATIONS

PLACARDS.

IN EVENT OF HYDRAULIC BOOST FAILURE REDUCE AIRSPEED TO 40-60 MPH, LAND WITHIN 20 MINUTES.

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

SECTION 2. OPERATING PROCEDURES

EMERGENCY PROCEDURE.

In the event of failure of the hydraulic pressure system an airspeed of 40 to 60 mph should be maintained and a landing shall be accomplished within 20 minutes. Feedback forces will be encountered in the cyclic control stick and will be proportionate in intensity to an envelope of factors directly effected by airspeed, gross weight and climatic turbulance. Feedback forces are negligible when the helicopter is in autorotation.

If jamming of the controls or a condition of the controls tending to over-ride the pilot is experienced the hydraulic system by-pass valve located in the box beam floor should be immediately pulled to relieve hydraulic pressure at the cylinders. The jammed cylinder may then be broken loose by exerting pressure on the control stick and the above emergency procedure followed.

BELL HELICOPTER
Model 47G

EQUIPMENT

Date: May 26, 1954
CAA APPROVED

FLOAT-COVERED LITTER CONFIGURATION.

INTRODUCTION

This supplement is for use only when the Model 47G helicopter is equipped with both the Float Kit and the Covered Litter Kit. The helicopter, when operated in this configuration, has an increased flat plate drag area which decreases the rate of climb performance, but does not materially affect the landing, take-off distance, vertical rate of climb and hovering ceiling performance. For this reason a RATE OF CLIMB table, applicable only to this configuration, has been included in this supplement. The large area synchronized elevator, either 47-267-101 or 47-267-106, must be installed for all flight operations.

SECTION 1. OPERATING LIMITATIONS

AIRSPEED LIMITATION.

Vne 90 mph (with floats and covered litters installed).

CENTER OF GRAVITY LIMITS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

TYPE OF OPERATION.

The approved capacity of each litter is 225 pounds and covers must be installed for all flight operations.

CAUTION

Unusable fuel, with litters installed, is 7 US gallons which is indicated by a RED ARC on the fuel gage.

LOADING LIMITATIONS.

NOTE

When cargo is carried on the litter platform loading shall be equally distributed both sides of loading line, to maintain cg, and secured to prevent shifting.

EQUIPMENT

Date: May 26, 1954
CAA APPROVED

FLOAT-COVERED LITTER CONFIGURATION

LOADING LIMITATIONS.

External loading is based on a 1408 basic ship configuration. Corrections must be applied for all kits, including the loading kit, and additional special equipment so as not to exceed the 2350 pound maximum gross weight.

CAUTION

Unsymmetrical loading is permitted only, in the carrier opposite the pilot, when flying solo and shall not exceed the pilot's weight by more than thirty (30) pounds.

SECTION 3. PERFORMANCE INFORMATION

MAXIMUM RATE OF CLIMB
(At 40 MPH)
(R/C) Max - Ft./Min.*

Gross Weight Lb.	Pressure Altitude Ft.	At -13°F -25°C	At 23°F - 5°C	At 59°F 15°C	At 95°F 35°C
1950	S.L.	1230	1110	1015	925
	2000	1045	925	815	715
	4000	860	730	615	515
	6000	670	535	415	300
	8000	470	330	210	100
	10,000	275	130	10	-
2350	S.L.	925	820	735	650
	2000	760	650	555	470
	4000	595	480	380	285
	6000	430	305	200	100
	8000	250	125	20	-
	10,000	80	-	-	-

*NOTE: When the helicopter is equipped with high performance rotor blades, increase the above figures by 30 Ft./Min.

BELL HELICOPTER
Model 47G

EQUIPMENT — Date: August 25, 1954

CARGO CARRIER (BIN TYPE) — C.A.A. APPROVED

INTRODUCTION

The Bell, Cargo Kit No. 47-706-009 consists of two, top loading quick detachable metal cargo carriers with the required attachment parts and fittings. A hinged cover on the top of each carrier provides easy access to the 13 cubic foot loading compartment and is secured by trunk type latches with built in locks. A vertical bulkhead in the center of each carrier prevents cargo shift when loaded and cargo weight should be distributed equally, on each side of the bulkhead, to maintain cg within safe operating limits. Cargo capacity of each carrier is 200 pounds. The large area synchronized elevator (47-267-101 or 47-267-106) must be installed for flight operations when the helicopter is equipped with cargo carriers.

SECTION 1.

OPERATING LIMITATIONS

AIRSPEED LIMITATIONS.

Vne 90 mph (with cargo carriers installed)

PLACARDS.

MAXIMUM WEIGHT IN THIS COMPARTMENT 200 LBS. (located on underside of each cargo carrier cover)

CENTER OF GRAVITY LIMITS.

WARNING

CARGO LOADS SHALL BE EQUALLY DISTRIBUTED EACH SIDE OF VERTICAL BULKHEADS.

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

LOADING LIMITATIONS.

External loading is based upon a 1408 lbs. basic ship configuration. Corrections must be applied for all kits, including the loading kit, and additional special equipment so as not to exceed the 2350 lbs. maximum loading.

CAUTION

Unsymetrical loading is permitted only, in the carrier opposite the pilot, when flying solo and shall not exceed the pilot's weight by more than thirty (30)pounds.

EQUIPMENT

Date: May 28, 1958
CAA APPROVED

ROTOR BRAKE - POWER OPERATED

INTRODUCTION

The Power Operated Rotor Brake Kit No. 47-706-589 when installed provides an easy method of stopping the rotor after engine shut-down. This kit can only be installed when the helicopter is equipped with hydraulic boost controls as the boost control hydraulic pump is utilized to provide rotor brake operating pressure. The kit consists of the rotor brake unit, valves, accumulator, fittings, tube assemblies, switch, circuit breaker, electrical cabling and all hardware required to complete the installation. The operating switch is conveniently located for pilot operation and is mounted on the left side of the instrument panel box beam.

SECTION I OPERATING LIMITATIONS

CENTER OF GRAVITY LIMITS

Actual weight change shall be determined after kit is installed and battery relocated, if necessary, to return empty weight cg within allowable limits.

SECTION 2 OPERATING PROCEDURES

ENGINE SHUT-DOWN PROCEDURE.

1. Accomplish steps 1 through 4 of shut-down procedure.

2. Check rotor brake circuit breaker IN.

3. After rotor speed has decreased to 75 rpm lift rotor brake switch guard, move switch UP and HOLD until rotor stops.