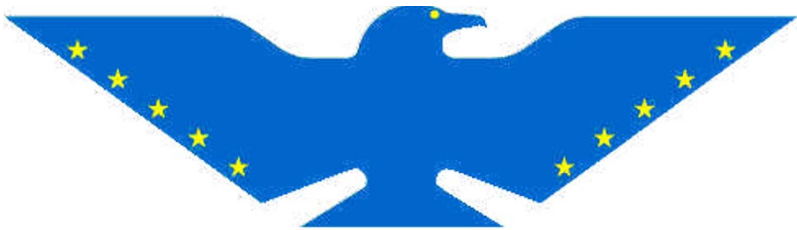


PILOTS OPERATING MANUAL

STORMAIRCRAFT

CENTURY LSA

(Equipped with ROTAX 912 ULS Engine)



STORMAIRCRAFT

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SECTION 1 - GENERAL

INTRODUCTION

Section 1 provides basic data and information of general interest.

DESCRIPTIVE DATA

Engine:

number of engines	1
engine manufacturer	ROTAX
engine model	912 UL S2
engine type	normally aspirated, 4-cyl, 4-stroke, liquid/air cooled engine with opposed cylinders, dry sump forced lubrication with separate 0,8 gal oil tank, 2 carburetors, mechanical and electric fuel pumps, Ducati electronic dual ignition, electric starter, integrated reduction gear 1/2,43.

Horsepower rating and engine speed 100 BHP at 5800 RPM (max. 5 min.)
95 BHP at 5500 (continuous).

Propeller:

number of blades	3
propeller type	Ground adjustable
propeller diameter	1,78 m

Fuel:

number of tank	2 Wings Leading edges tanks
fuel capacity both	125 l
total usable	121,2 l

Oil:

Oil tank capacity	3.0 l
-------------------------	-------

Detailed information on the ROTAX 912 ULS engine shall be found on the engine Manufacturer operating manual.

Maximum Aircraft Weights:**Sport Light Aircrafts**

Standard Empty Weight Basic.....	348 kg
Maximum useful load	252 kg

Cabin and Entry Dimensions:

detailed dimensions of the cabin interior and canopy opening are illustrated in sect. 4.

Baggage Space Dimensions:

dimensions of the baggage area are illustrated in detail in section 4.

SECTION 2 - PERFORMANCE SPECIFICATIONS FOR LSA ACTIVITY**SPEED:**

maximum at sea level 120 knots

cruise (75% power at 2000 ft, ISA conditions) 110 knots

CRUISE:

75% at 2000 ft (ISA Conditions)..... range 800 Nm

32 gal usable fuel time 6,5 hrs

RATE OF CLIMB AT SEA LEVEL: 850 fpm

SERVICE CEILING: 12000 ft

TAKEOFF PERFORMANCE (ISA Conditions, Sea Level):

ground roll 131,1 m

total distance over 50 ft obstacle 251,5 m

LANDING PERFORMANCE (ISA Conditions, Sea Level):

ground roll 195,1 m

total distance over 50 ft obstacle 457,2 m

STALL SPEED:

flaps up, power off 42 knots

flaps down, power off 38 knots

MAXIMUM WEIGHT:

Sport Light aircrafts Rules..... 600kg

STANDARD EMPTY WEIGHT:

Sport Light Aircraft ... 348 kg

MAXIMUM USEFUL LOAD:

Sport Light Aircraft..... 252 kg

BAGGAGE ALLOWANCE: 45 kg**WING LOADING:**Sport Light Aircraft 57 kg/m²**POWER LOADING:** 6 kg/hp**TOTAL FUEL CAPACITY:**

Standard wing tanks 125 l

OIL CAPACITY: 3 l

ENGINE:

model ROTAX 912 UL S2

power/rpm 100 hp / 5800 rpm

PROPELLER:

model WOODCOMP SR200
type 3 blades ground adjustable
diameter 1,78 m

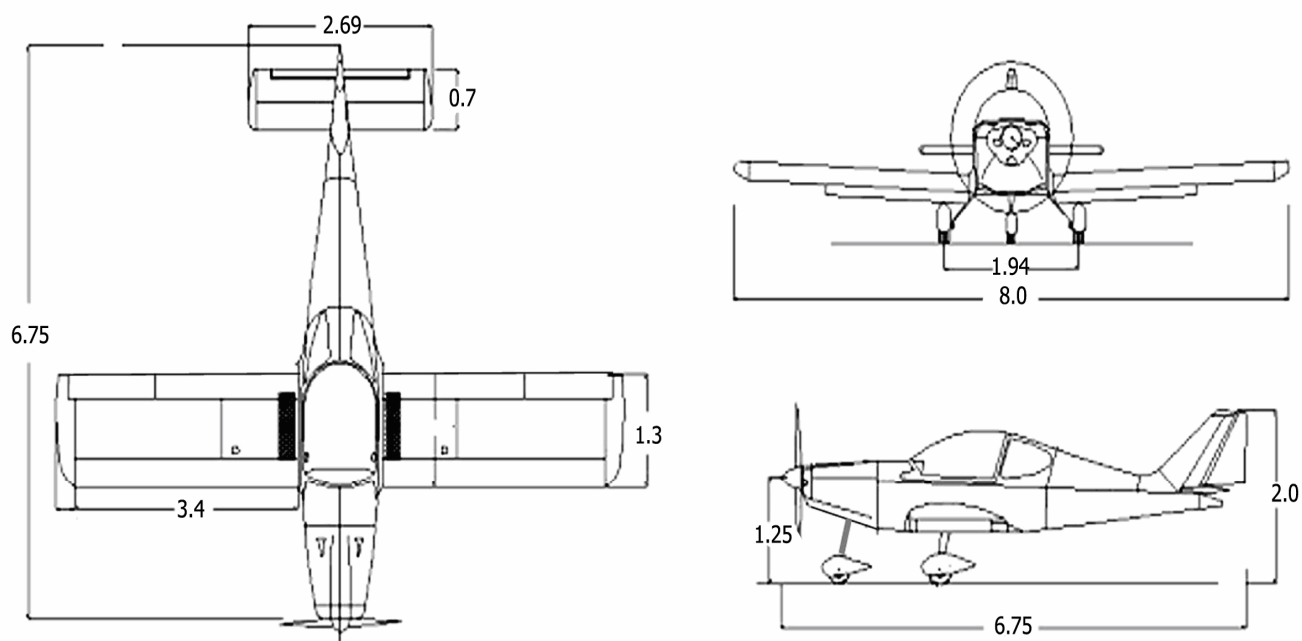


fig. 1-1 Principal Dimensions (in meter)

SECTION 3 - LIMITATIONS

INTRODUCTION

Section 3 includes operating limitations and instrument markings necessary for the safe operation of the airplane, its engine, standard system and standard equipment.

AIRSPEED LIMITATIONS

Airspeed limitation and their operational significance are shown in figure 3-1.

SPEED	knots	REMARKS
VNE never exceed speed L.S.A limited to	170 120	do not exceed this speed in any operation.
VNO maximum structural cruising speed	110	do not exceed this speed except in smooth air, and then only with caution.
VA maneuvering speed	90	do not make full or abrupt control movements above this speed.
VFE max. flap VLE extended speed	70	do not exceed this speed with flaps down.

fig. 3-1 Airspeed Limitations

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in figure 3-2.

MARKING	Knots VALUE or RANGE	SIGNIFIANCE
white arc	45 – 65	full flap operating range.
green arc	50 - 110	normal operating range.
yellow arc	110 - 120	operation must be conducted with caution.
red line	120	max. speed all operations.

fig. 3-2 Airspeed Indicator Markings

POWER PLANT LIMITATIONS

Engine operation limits for takeoff and continuous operation:

maximum power	95 hp
maximum engine speed	5500 rpm
Maximum oil temperature	130° C - 266° F
Minimum oil temperature	50° C - 120° F
maximum oil pressure	6 bar - 87 psi
minimum oil pressure	0,8 bar – 12 psi (below 3500 rpm)
Normal operating pressure	2,0 ± 5,0 bar (29 ± 73 psi) (above 3500 rpm)
Detailed operating information shall be found in the Engine Manufacturer Manual.	

POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code significance are shown in figure 3-3.

INSTRUMENT	RED LINE min. limit	GREEN ARC normal operating	RED LINE max. limit
tachometer	not ind	1500 - 5500 rpm	5800 rpm
oil temp.	not ind	122°f – 248°f	266° - 284°f
oil pressure	2 bar – 29 psi	2 - 5 bar - 29 – 73 psi	7 bar 100 psi
Cylinder Head temp.	50° C – 120° F	75° C – 125° 167° F – 257° F	135° - 284°f
fuel pressure	0,15 bar – 2,2 psi	0,2 - 0,4bar - 3 – 5,8 psi	0,5 bar - 7,2 psi

fig. 3-3 Power Plant Instrument Markings

WEIGHT LIMITS FOR SPORT PILOT AIRCRAFT FLYING ACTIVITY

maximum takeoff weight (MTOW)	600 kg
maximum landing weight	600 kg
maximum weight in baggage area	45 kg

DESIGN CENTER OF GRAVITY LIMITS AND RANGE

Forward: 30 centimetres from the Wing Leading edge at 408 kg or less, with straight line variation to 47 centimeters aft of Datum at all weights.

Afterward: 50,8 cm aft of datum at all weights.

The reference datum is the Leading edge of the wing.

MANEUVER LIMITS

This airplane is designed for limited aerobatics flight.

No aerobatics maneuvers are approved except those listed below:

chandelles	maximum entry speed	105 knots
lazy eights	maximum entry speed	105 knots
steep turns	maximum entry speed	105 knots
stalls	use slow deceleration	

Higher speed can be used if abrupt use of controls is avoided.

Aerobatics that may impose high loads should not be attempted.

The important thing to bear in mind in flight maneuvers is that the airplane is clean in aerodynamic design and will build up speed quickly with nose down attitude.

Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads.

In the execution of all maneuvers avoid abrupt use of controls.

FLIGHT LOAD FACTOR LIMITS (Normal Category Rules) Gross Weight : 600 kg

Flaps up	+ 4,4 g	- 2 g
Flaps down	+ 4 g	- 1,2 g

The design load factors are at least 150% of the above, calculated for the LSA version of the aircraft (i.e. MTOW of 600 kg), and in all cases, the structure meets or exceeds the design loads.

However, it is highly recommended not to reach the above mentioned Load Factor Limits.

FUEL LIMITS

The aircraft is equipped with 2 fuel tanks, located in leading edge of wings, for 124,95 l total capacity.

However the total usable fuel (all flight conditions) is 121,16 l.

The unusable fuel which remains in the bottom of the fuel tank is approximately 3,79 l.

Approved fuel grades and colors:

- Leaded or Unleaded automotive fuel
- 100LL grade aviation fuel (blue)

SECTION 4 - WEIGHT AND BALANCE

INTRODUCTION

This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference.

Procedures for calculating the weight and moment for various operations are also provided.

AIRPLANE WEIGHING PROCEDURE

a) Preparation:

- 1) inflate tires to recommended operating pressure
- 2) drain all fuel
- 3) drain all oil
- 4) raise flap to the fully retracted position
- 5) place the aircraft leveled

b) Leveling:

- 1) place scales under each wheel (440 lbs minimum capacity for scales)
- 2) release brakes
- 3) check aircraft leveled

c) Weighing:

- 1) record the weight shown on each scale deducting the tare if any.

d) Measuring (ref. figure 4-1):

- 1) obtain measurement A by measuring horizontally (along the airplane center line) from a line stretched between the main wheel centers to a plumb bob dropped from the wing Leading Edge.
- 2) obtain measurement B by measuring horizontally and parallel to the airplane center line, from center of nose wheel axle, left side, to a plumb bob dropped from the line between the main wheel centers.
Repeat on right side and average the measurements.

Using weights from (L –R - N) and measurements from (B) the airplane weight and C.G. can be determined by completing figure 4-5.

The basic empty weight may be determined completing figure 4-6.

WEIGHT AND BALANCE

The following procedure will enable you to operate your aircraft within the prescribed weight and C.G. limitations.

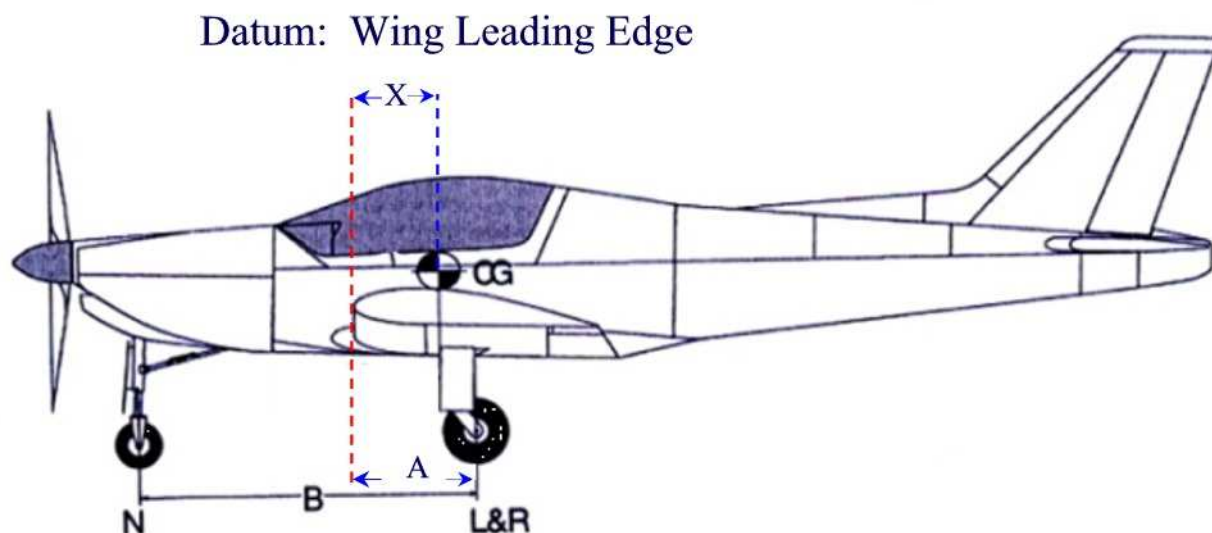


fig. 4-1 Measurements

To figure weight and balance, use the sample problem form, loading graph and C.G. moment envelope as follows:

take the basic empty weight and moment from appropriate weight and balance records carried in your airplane and enter them in the column titled “YOUR AIRPLANE” on the sample loading problem. Use the loading graph to determine the moment for each additional item to be carried on the aircraft, then list these on the loading problem.

Total the weights and moments and plot these values on the C.G. moment envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

SCALE POSITION	SCALE READING (kg)	TARE	SYMBOL	NET WEIGHT (kg)
LEFT WHEEL	151,50 kg	0	L	151 kg
RIGHT WHEEL	151,05 kg	0	R	151 kg
NOSE WHEEL	46,27 kg	0	N	46 kg
SUM OF NET WEIGHTS		0	W	348 kg

$$X = \text{ARM} = (A) - \frac{(N) * (B)}{W}$$

(A) = 57.91 centimeters

(B) = 166.37 centimetres

Fig. 4-5 Sample Aircraft Weighing and determination of CG station

ITEM	WEIGHT (kg)	X CG ARM (cm)	= MOMENT (kg/cm)
AIRCRAFT BASIC EMPTY WEIGHT	348 kg	36 cm	12528

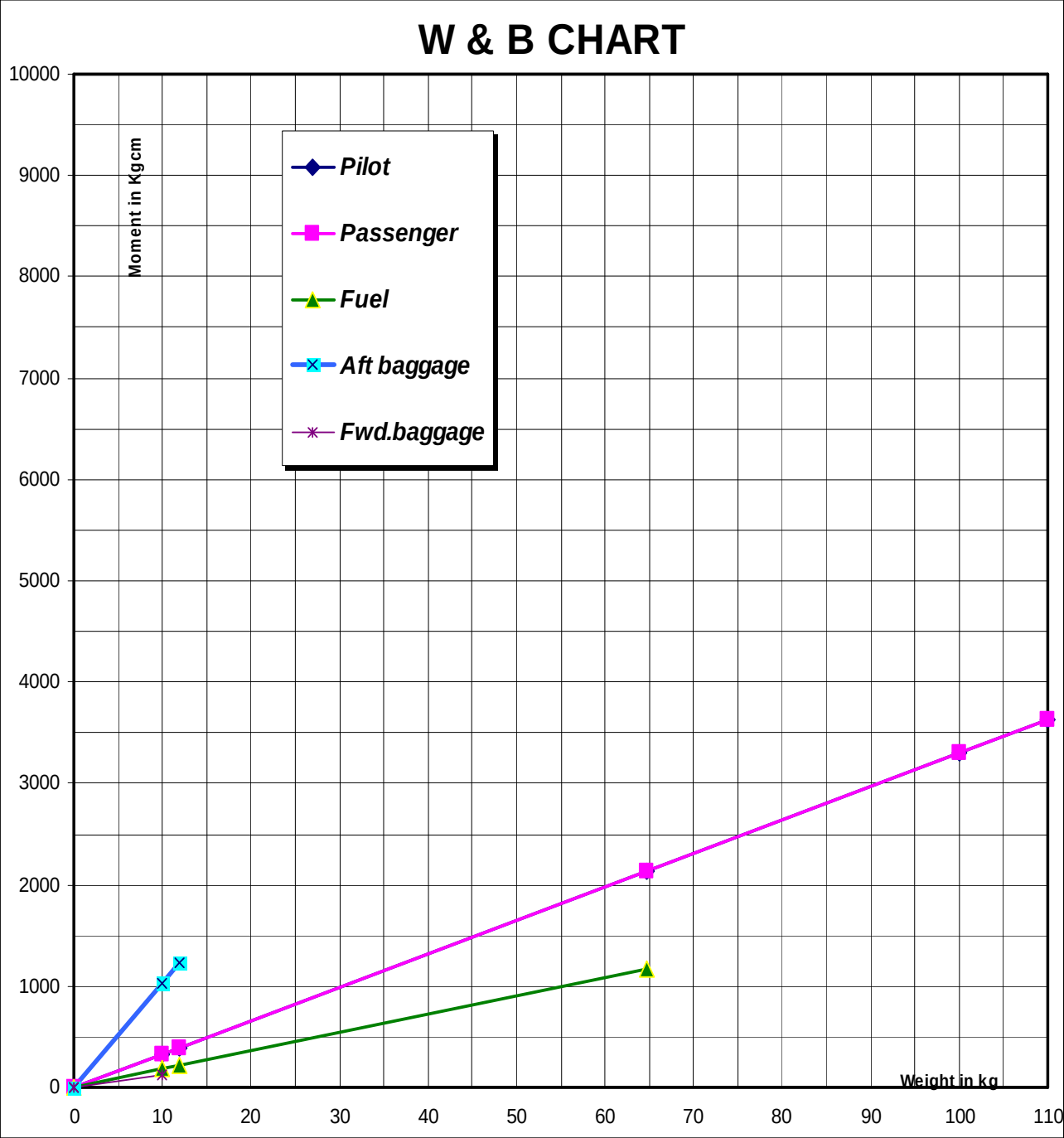
Fig. 4-6 Sample Aircraft Basic Empty Weight and Moment

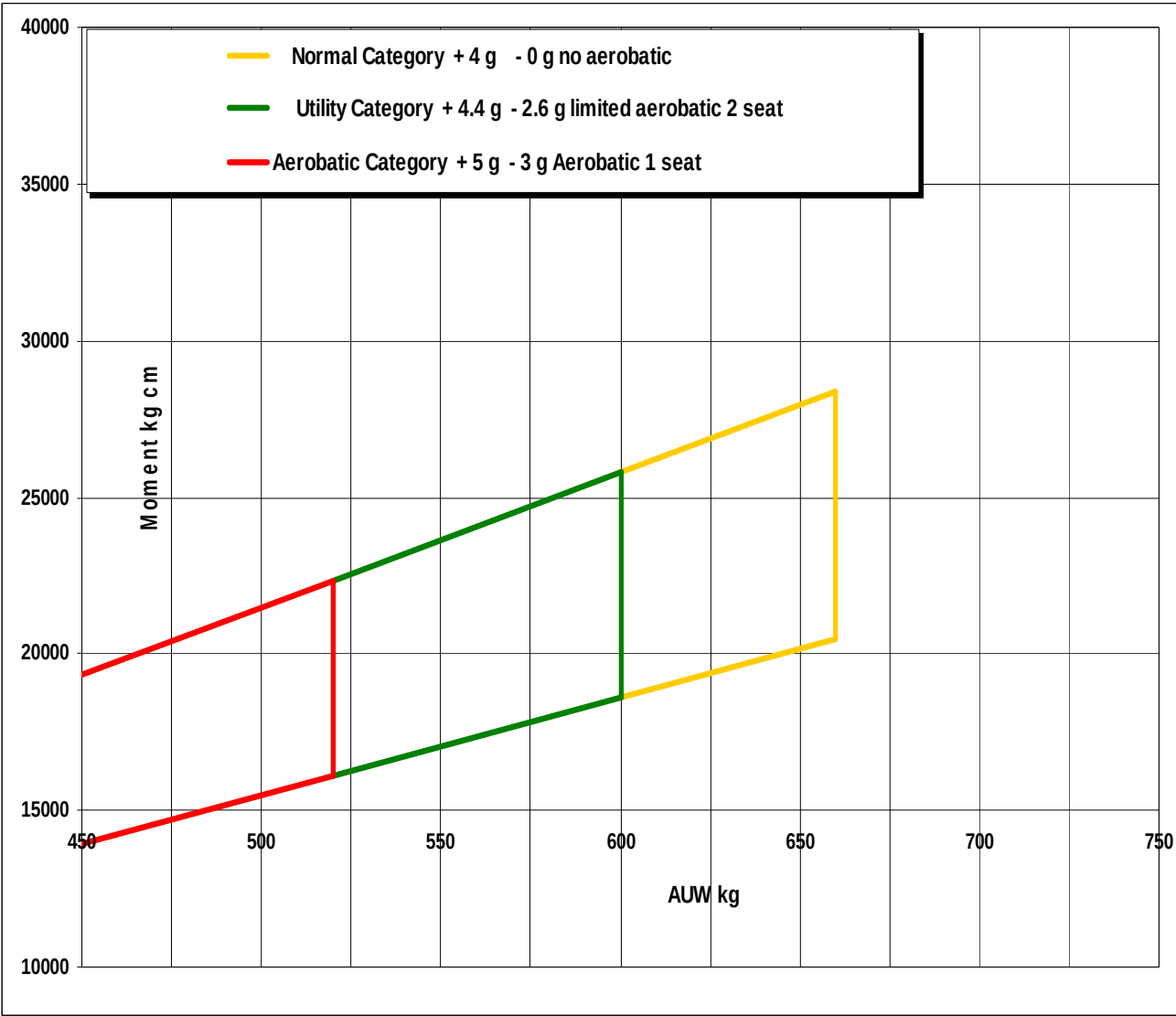
SAMPLE LOADING PROBLEM	SAMPLE AIRPLANE WEIGHT (kg)	MOMENT	YOUR AIRPLANE WEIGHT (kg)	MOMENT
BASIC EMPTY WEIGHT	348 kg	12528		
FUEL 98,44 l.	71 kg	1278		
PILOT & PASSENGER	160 kg	5280		
BAGGAGE AREA	18 kg	1854		
TOTAL WEIGHT & MOMENT	597	20940		
Locate this point (597 at 20940 on the CG Moment Envelope graph)				

Fuel Arm from Leading Edge of Wing = 18 cm

Pilot & Passenger Arm from Leading Edge Wing..... = 33 cm

Baggage Area From Leading Edge Wing..... = 103 cm





SECTION 5 - PERFORMANCE

INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy.

The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

USE OF PERFORMANCE CHARTS

Performance data is presented in tabular form to illustrate the effect of different variables. Conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

SAMPLE PROBLEM

The following sample flight problem utilize information from the various charts to determine the predicted performance data for a typical flight.

The following information is known:

EXAMPLE:

Airplane configuration:

- takeoff weight 600 kg
- usable fuel 75,72 l

Takeoff conditions:

- field pressure altitude 1500 ft
- temperature 27,78°C (16,11°C above standard)
- wing component along runway 13 knots headwind
- field length 426,72 m

Cruise conditions:

- total distance 400 sm
- pressure altitude 5500 ft
- temperature 20,00°C (16,11°C above standard)
- expected wind enroute 10 knots headwind

Landing conditions:

- field pressure altitude 2000 ft
- temperature 25,00°C
- field length 457,20 m

TAKE-OFF

The takeoff distance chart (fig.5-3) should be consulted keeping in mind that the distances shown are based on normal takeoff technique.

Conservative distances can be established by reading the chart at the next higher value of altitude and temperature.

For example, in this particular sample problem, the take-off distance information presented for a pressure altitude of 2000 ft and a temperature of 86°F should be used and results in the following:

- ground roll 167,64 m
- total distance to clear a 50 ft obstacle 396,24 m

These distances are well within the available take-off field length, however, a correction for the effect of wind may be made based on **Note 3** of the take-off chart: decrease the ground roll by 10% for 10 knots head wind.

The correction for a 13 knots headwind is:

$$(13 \text{ knots} : 10 \text{ knots}) \times 10 = 13\%$$

This results in the following distances corrected for wind:

- a) ground roll (zero wind) 167,64 m
- b) decrease in ground roll (550ft x 13%) 21,34 m
- c) corrected ground roll (a-b) 143,26 m
- d) total distance to clear a 50 ft obstacle (zero wind) 396,24 m
- e) decrease in total distance (4300 ft x 13%) 51,82 m
- f) corrected total distance to clear a 50 ft obstacle (d-f) ... 344,42 m

CRUISE

The cruising altitude should be selected based on a consideration of trip length, wind aloft, and the airplane's performance.

A typical cruising altitude and the expected wind enroute have been given for this sample problem.

The cruise performance chart (fig. 5-5) is entered at 6000 ft altitude and 20,00°C above standard temperature.

The engine speed chosen is 4500 RPM, which result in the following:

- power 48%
- true airspeed 100 knots
- cruise fuel flow 14,39 l x hour

FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in figure 5-4 and 5-5. For this sample problem, figure 5-4 shows that a climb from 2000 ft to 6000 ft requires 3,79 l of fuel.

The corresponding distance during the climb is 10 nm.

These value are for standard temperature and are sufficiently accurate for most flight planning purposes.

However, a further correction for the effect of a non-standard temperature is to increase the time, fuel, and distance by 10% for each 13,33°C above standard temperature, due to the lower rate of climb.

In this case, assuming a temperature 16,11°C above standard, the correction would be:

$$(61^{\circ}\text{F} : 46^{\circ}\text{F}) \times 10 = 20\%$$

With this factor included the fuel estimate would be calculated as follows:

- a) fuel to climb (standard temperature) 4,54 l
- b) increase due to non-standard temp. (4,54 l x 20%) 0,76 l
- c) corrected fuel to climb (a + b) 5,30 l

Using a similar procedure, the distance to climb results 14 nm.

The resultant cruising distance is:

- d) total distance 400 nm
- e) climb distance 14 nm
- f) cruise distance (d - e) 385 nm

With an expected 10 knots headwind, the ground speed for cruise is predicted to be:

$$100 \text{ knots} - 10 \text{ knots} = 90 \text{ knots}$$

Therefore, the time required for the cruise portion of the trip is:

$$385 \text{ sm} : 90 \text{ knots} = 4,3 \text{ hours}$$

The fuel required for cruise is: 4,3 hours x 14,39 l = 61,72 l

The total estimate fuel required is as follows:

- g) engine start, taxi, and takeoff 3,03 l
- h) climb 5,30 l
- i) cruise 61,72 l
- j) total fuel required (g + h + i) 70,05 l

This will leave a reserve of: 75,72 l – 70,05 l = 5,68 l

Once a flight is underway, ground speed checks will provide a more accurate basis for estimating the time enroute and the corresponding fuel required to complete the trip with ample reserve.

LANDING

A procedure similar to takeoff should be used for estimating the landing distance at the destination airport.

Figure 5-6 presents landing distances for various airport altitude and temperature combinations using the short field landing technique.

The distances corresponding to 609,60 m and 30,00°C are as follows:

- ground roll 131,06 m
- total distance to clear a 50-ft obstacle 304,80 m

A correction for the effect of wind may be made based on Note 2 of the landing chart using the same procedure as outlined for takeoff.

STALL SPEEDS CHART

Condition: power off;

STALL SPEED CHART		Knots			
		Angle of Bank			
		0°	30°	45°	60°
GW: 600 kg	UP	42	47	59	77
	10°	40	45	54	68
	20°	38	43	52	66
	32°	36	38	46	61

Fig. 5 - 1 Stall speed chart

RATE OF CLIMB (maximum)

Conditions: flaps up; full throttle.

RATE OF CLIMB		Propeller: 3 blades Ground Adjustable				
Engine: Rotax 100 hp	Press.Altitude	Rate of Climb – ft x min				
	ft	Climb Speed				
		Knots	- 15 C	-18 C	21 C	38 C
GW: 600 kg	SL	64	980	905	835	760
	2000	63	859	782	712	637
	4000	61	739	662	592	515
	6000	60	617	547	476	395
	8000	59	497	427	357	275
	10000	58	375	306	235	47
	12000	57	255	235	217	-

Fig. 5 - 2 Rate of climb chart

TAKE-OFF DISTANCE CHART

Conditions: flaps 10°; full throttle prior to brake release; paved, level, and dry runway; zero wind; distances are given in feet.

TAKE-OFF DISTANCE CHART													
Weight	Take off Speed		Press	0,00°C	0,00°C	10,00°C	10,00°C	21,11°C	21,11°C	29,44°C	29,44°C	37,78°C	37,78°C
	kg	Lift off		at 50 ft	Alt ft	A	B	A	B	A	B	A	B
GW: 600 kg	45 knt	55 knt	S.L.	92	170	107	191	124	243	149	309	184	411
			1000	105	190	122	242	147	306	179	405	217	519
			2000	120	238	143	304	178	399	215	510	267	628
			3000	142	301	175	397	210	505	260	618	345	751
			4000	167	395	208	501	256	612	335	741	427	884
			5000	204	496	252	606	328	734	415	873	494	1.019
			6000	249	602	319	726	407	862	484	1.011	593	1.196
			7000	313	719	398	856	477	1.000	583	1.177	-	-
			8000	392	850	471	993	576	1.163	-	-	-	-
A = Without Obstacle B = 50 ft Obstacle				Fig. 5 - 3 Take-off distance chart									

Notes:

- 1) normal take-off technique as specified in Section 7
- 2) decrease distances 10% for each 10 knots headwind. For operation with a tailwind up to 10 knots, increase distances 10% for each 2 knots
- 3) where distance value has been deleted, climb performance after lift-off is less than 45,72 meter x minutes at take-off speed
- 4) for operation on a grass runway, increase distances by 15% of the ground roll figure
- 5) "A" means ground roll distance; "B" means total distance to clear a 50-ft obstacle.

TIME, FUEL, AND DISTANCE TO CLIMB CHART (maximum rate of climb)

Conditions: flaps up; full throttle (5500 RPM); standard temperature; zero wind.

Notes:

1) add 1 gal of fuel for engine start, taxi and takeoff

2) increase time, fuel and distance by 10% for each 7,78°C above standard temp.

Weight kg	Pressure altitude ft	Temp. °C	Climb speed knots	Rate of climb fpm	Time min.	From sea level	
						Fuel used l	Distance nm
600	s.l.	16	72	720	0	0	0
	1000	13	72	700	2	0,76	2,5
	2000	11	71	660	3	1,89	4,2
	3000	9	71	620	5	2,65	6,7
	4000	7	70	580	7	3,79	9
	5000	5	70	530	9	4,92	11,5
	6000	3	69	480	11	6,06	15
	7000	1	69	425	14	7,19	18
	8000	-1	68	375	17	8,71	21
	9000	-3	68	315	20	10,22	26
	10000	-5	67	275	23	12,12	30
	11000	-7	67	220	27	14,01	36
	12000	-9	66	180	33	15,90	42,5

fig. 5-4 Time, fuel and distance to climb chart

CRUISE PERFORMANCE CHART

Conditions: weight 600 kg; zero wind.

Pres. Alt.	RPM	20°C below standard temp.			standard temperature			20°C above standard temp.		
		BHP	knots	l/h	BHP	knots	l/h	BHP	knots	gal/h
2000	5500	95	120	26,5	95	118	27,3	72	116	20,5
	5200	90	116	22,8	73	113	20,5	68	111	19
	5000	75	110	19,7	65	107	18,2	60	106	17,1
	4500	65	105	17,5	57	103	16,3	53	102	15,2
	4400	54	110	15,2	50	98	14,4	47	96	14,1
	4200	47	95	13,7	44	93	13,3	42	90	12,2
4000	5500	90	118	25	78	116	22	70	113	19,4
	5200	85	113	20,9	69	110	19,3	64	108	18,2
	5000	70	106	18,6	61	105	17,1	57	103	16,7
	4500	60	103	16,7	54	102	15,2	50	100	14,8
	4400	51	100	14,4	48	98	13,7	45	95	13,3
	4200	45	95	13,3	42	93	12,2	40	91	12,2
6000	5500	84	116	23,9	77	113	20,9	69	111	19,4
	5400	79	112	22	73	110	20,1	67	108	19
	5200	70	108	19,3	64	107	17,8	60	105	17,1
	5000	62	105	17,5	57	103	16,3	53	100	15,2
	4500	54	101	15,5	51	100	14,8	48	97	14,4
	4400	48	96	13,7	45	95	13,3	42	93	12,2
8000	5400	74	112	20,5	68	110	19	63	106	18,2
	5200	65	107	18,2	60	106	17,1	57	104	16,7
	5000	58	105	16,3	54	102	15,2	51	101	14,8
	4500	52	100	15,2	48	99	14,1	45	98	13,3
	4400	46	96	13,3	43	94	12,2	40	93	12,2
10000	5400	69	110	19,3	64	110	18,2	59	108	17,1
	5200	61	107	17,1	57	107	16,3	53	106	15,2
	5000	55	104	15,5	51	103	14,8	48	102	13,7
	4500	49	99	14,1	45	98	13,7	43	98	12,2
12000	5300	61	108	17,1	57	107	16,7	53	106	15,6
	5200	58	106	16,3	54	105	15,2	50	104	14,4
	5000	52	102	15,2	48	102	14,1	45	101	13,3
	4500	46	100	13,3	43	99	12,2	41	98	12,5

fig. 5-5 Cruise performance chart

LANDING DISTANCE CHART

Conditions: flaps 32°; power off; normal braking; paved, level, and dry runway; zero wind.

Notes:

- 1) normal landing technique as specified in Section 7.
- 2) decrease distances 10% for each 10 knots headwind. For operation with a tailwind up to 10 knots, increase distances 10% for each 2 knots
- 3) for operation on a grass runway, increase distances by 15% of the ground roll figure
- 4) “a” column is ground roll distance; “b” column is total distance to clear a 50-foot obstacle.

LANDING DISTANCE CHART													
Weight kg	Take off Speed		Press. Alt ft	0,00° C	0,00°C	10,00°C	10,00°C	21,11°C	21,11° C	29,44° C	29,44° C	37,78° C	37,78° C
	Lift off ft	at 50		A	B	A	B	A	B	A	B	A	B
GW: 1320 lbs	45 knt	59 knt	S.L.	128,1	238,1	148,5	267,4	172,3	340,2	208,5	431,6	256,4	574,3
			1000	146	265,5	170,7	338,1	205,2	428,6	250,3	566,7	302,7	726,1
			2000	168	332,3	200	425,5	248,2	558,1	300,3	713	373,7	878,2
			3000	198,2	421	243,9	555,4	292,7	706,9	363,4	864,2	481,9	1.050,7
			4000	237,8	552,6	290,2	700,8	357	857,1	468,5	1.037,3	597,8	1.237,2
			5000	285,3	694,1	351,5	848,3	458,8	1.026,6	581	1.221,1	691	1.426,8
			6000	347,8	841,9	446,6	1.015,9	569,1	1.206,1	676,7	1.414,6	829,1	1.673,1
			7000	438,3	1.006,2	556	1.197,9	667,9	1.400	815,7	1.646,6	-	-
			8000	548,1	1.189,1	658,7	1.389,9	805,6	1.627,4	-	-	-	-
A = Without Obstacle				Fig 5 - 6 Landing distance chart (meters)									
B = 50 ft Obstacle													

SECTION 6 - EMERGENCY PROCEDURES

INTRODUCTION

Section 6 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered.

However should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

AIRSPEDS FOR EMERGENCY OPERATION

Engine failure after takeoff	48 knots
Maneuvering speed:	
600 kg.....	105 knots
544 kg	100 knots
454 kg	90 knots
Maximum glide speed	60 knots
Landing without engine power flap up	58 knots
Landing without engine power flap down ..	52 knots

OPERATIONAL CHECKLISTS

ENGINE FAILURE

Engine failure during takeoff run:

- 1) Throttle IDLE
- 2) Brakes APPLY
- 3) Wing flap RETRACT
- 4) Fuel pump OFF
- 5) Ignition switch OFF
- 6) Master switch OFF

Engine failure immediately after takeoff:

- 1) Airspeed 48 knots
- 2) Fuel shut off valve OFF
- 3) Fuel pump OFF
- 4) Ignition switch OFF
- 5) Wing flap AS REQUIRED
- 6) Master switch OFF

Engine failure during flight:

- 1) Airspeed 70 knots
- 2) Fuel shut off valve ON
- 3) Fuel pump ON
- 4) Ignition switch START if propeller is stopped

FORCED LANDINGS**Emergency landing without engine power:**

- 1) Airspeed 58 knots (flap up) 52 knots (flap down)
- 2) Fuel shut off valve OFF
- 3) Fuel pump OFF
- 4) Ignition switch OFF
- 5) Wing flap AS REQUIRED (in short final FULL)
- 6) Master switch OFF
- 7) Touchdown SLIGHTLY TAIL LOW
- 8) Brakes APPLY HEAVILY

Precautionary landing with engine power:

- 1) Airspeed 55knots
- 2) Wing flap 20°
- 3) Selected field FLY OVER note terrain and obstruction
- 4) Wing flap RETRACT after reached safe altitude and speed
- 5) Radio and electrical switches OFF
- 6) Wing flap FULL DOWN in short final
- 7) Airspeed 50 knots
- 8) Master switch OFF
- 9) Touchdown SLIGHTLY TAIL LOW
- 10) Ignition switch OFF
- 11) Brakes APPLY HEAVILY

Ditching:

- 1) Radio TRANSMIT MAYDAY on 121,5 MHz
- 2) Object in baggage area SECURE or JETTISON
- 3) Approach with high winds, heavy seas ... INTO THE WIND
- 4) Approach with light winds, heavy swells .. PARALLEL TO SWELLS
- 5) Wing flap FULL IN SHORT FINAL
- 6) Power ESTABLISH 300 FT/MIN DESCENT AT 50 knots
- 7) Touchdown LEVEL ATTITUDE AT 300 FT/MIN DESCENT
- 8) At touchdown protect face with folded coat or similar
- 9) Airplane EVACUATE
- 10) Life vest and raft INFLATE AS LIVING THE AIRCRAFT

FIRES

During start on ground:

- 1) Cranking CONTINUE to get a start which would suck the flames and accumulated fuel through the carburetor and into the engine.

IF ENGINE STARTS

- 2) Power 2500 RPM for a few minutes.
- 3) Engine SHUTDOWN and inspect for damage.

IF ENGINE FAILS TO START

- 4) Cranking CONTINUE to obtain a start
- 5) Fire extinguisher OBTAIN
- 6) Engine SECURE
 - a) Master switch OFF
 - b) Ignition switch OFF
 - c) Fuel pump OFF
 - d) Fuel valve OFF
- 7) Fire EXTINGUISH using fire extinguisher, wool blanket or dirt.
- 8) Fire damage INSPECT.

Engine fire in flight:

- 1) Mixture IDLE CUT OFF
- 2) Fuel shutoff valve OFF
- 3) Master switch OFF
- 4) Cabin heat and air OFF
- 5) Airspeed 92 knots (if fire is not extinguished increase glide speed to find an airspeed which will provide an incombustible mixture).
- 6) Forced landing EXECUTE as described in emergency landings.

Electrical fire in flight:

- 1) Master switch OFF
- 2) All other switches OFF (except ignition switch)
- 3) Cabin heat and air OFF
- 4) Fire extinguisher ACTIVATE if available

WARNING

After discharging an extinguisher within a closed cabin, ventilate the cabin.

If fire has been extinguished and electrical power is necessary for continuance of flight:

- 5) Master switch ON
- 6) Circuit breakers CHECK for faulty circuit, DO NOT RESET
- 7) Radio-elect. switches ON one at time to localize short circuit
- 8) Cabin heat and air ON

Cabin fire:

- 1) Master switch OFF
- 2) Cabin heat and air OFF
- 3) Fire extinguisher ACTIVATE if available

WARNING

After discharging an extinguisher within a closed cabin, ventilate the cabin.

- 3) Land the airplane as soon as possible.

ICING

Inadvertent icing encounter:

- 1) Turn pitot heat switch ON if installed
- 2) Turn back or change altitude to obtain an outside air temperature that is less conducive to icing
- 3) Pull cabin heat control full out to obtain maximum defrosting temperature
- 4) Open the throttle to increase engine speed and minimize ice build-up on propeller blades
- 5) Plan a landing at the nearest airport. In case select a suitable off airport landing site
- 6) With an ice accumulation of 0,4 in or more on the wing leading edge, be prepared for significantly higher stall speed
- 7) Approach at 65 to 70 knots depending upon the amount of ice accumulation
- 8) Perform a landing in level attitude.

LANDING WITH A FLAT MAIN TIRE

- 1) Wing flap FULL DOWN
- 2) Approach NORMAL
- 3) Touchdown GOOD TIRE FIRST

Note:

Hold airplane off flat tire as long as possible with aileron control.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Over-voltage light illuminates:

- 1) Master switch OFF
- 2) Master switch ON
- 3) Over-voltage light OFF

If over-voltage light illuminates again:

- 4) Flight TERMINATE as soon as practical.

Ammeter shows discharge:

- 1) Alternator OFF
- 2) Non essential electrical equipment OFF
- 3) Flight TERMINATE as soon as practical.

AMPLIFIED PROCEDURES

ENGINE FAILURE

If an engine failure occurs during the takeoff run, the most important thing to do is to stop the airplane on the remaining runway.

Those extra items on the checklist will provide added safety during a failure of this type.

Prompt lowering the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takeoff. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions.

Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway.

Never try to get back to the runway.

The checklist procedures assume that adequate time exists to secure the fuel and ignition system prior to touchdown.

After an engine failure in flight, the best glide speed of 60-65 knots should be established as soon as possible.

While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure.

If time permits, an engine restart should be attempted as shown in the checklist.

If the engine cannot be restarted, a forced landing without power must be completed.

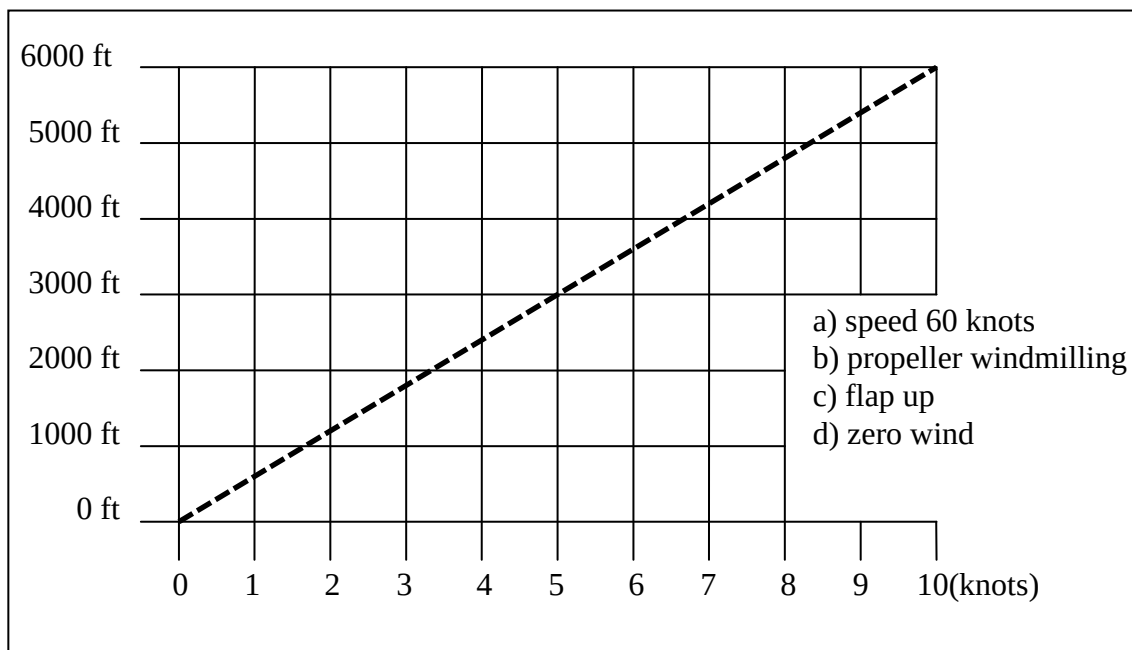


figure 6-1 Maximum glide

FORCED LANDINGS

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable field and prepare for the landing as discussed in the checklist for engine-off emergency landings.

Before attempt an off airport landing with engine power available, one should drag the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed under the precautionary landing with engine power checklist.

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area and collect folded coats for protection of occupants face at touchdown.

Transmit Mayday message on 121,5 Mhz giving location and intentions.

LANDING WITHOUT ELEVATOR CONTROL

Trim the airplane for horizontal flight with an airspeed of approximately 60-65 knots and flap lowered to 10° by using throttle and elevator trim controls.

Then, **DO NOT CHANGE THE ELEVATOR TRIM SETTING**; control the glide angle by adjusting power exclusively.

At flareout, the nose-down moment resulting from power reduction is an adverse factor and the airplane may hit on the nose wheel. Consequently, at flareout, the trim control should be set at the full nose-up position and the power adjusted so that the airplane will rotate to the horizontal attitude for touchdown.

Close the throttle at touchdown.

ENGINE FIRES

Although engine fires are extremely rare in flight, the steps of the appropriate checklist should be followed if one is encountered.

After completion of this procedure, execute a forced landing.

DO NOT ATTEMPT TO RESTART THE ENGINE.

The initial indication of an electrical fire is usually the odor of burning insulation.

The checklist for this problem should result in elimination of the fire.

FLIGHT IN ICING CONDITION

The flight into icing condition is prohibited. An inadvertent encounter with this condition can best be handled using the checklist procedures. The best procedure, of course, is to turn back or change altitude to escape icing conditions.

SPINS

INTENTIONAL SPINS ARE PROHIBITED

Should an inadvertent spin occurs, the following recovery procedure should be used:

- 1) Retard throttle to idle position
- 2) Place aileron in neutral position
- 3) Apply and HOLD full rudder opposite to the direction of rotation
- 4) Just AFTER the rudder reaches the stop, move the control stick BRISKLY forward far enough to break the stall
- 5) HOLD these control inputs until rotation stops
- 6) As rotation stops, neutralize rudder, and make smooth recovery from the resulting dive.

ROUGH ENGINE OPERATION OR LOSS OF POWER

Spark plug fouling:

A slight engine roughness in flight may be caused by one or more spark plugs becoming fouled by carbon or lead deposits.

Proceed to the nearest airfield for repairs.

An obvious power loss in single ignition operation is evidence of spark plug or ignition unit trouble.

Ignition malfunction:

A sudden engine roughness or misfiring is usually evidence of ignition problems. Proceed to the nearest airfield for repair.

Low oil pressure:

If a loss of oil pressure is accompanied by normal oil temperature, there is the possibility that the oil pressure gage or relief valve is malfunctioning.

A leak in the line to the gage is not necessarily cause for an immediate precautionary landing because an orifice in this line will prevent a sudden oil loss from the engine sump.

However, a landing at the nearest airfield would be advisable to inspect the source of trouble.

If a total loss of oil pressure is accompanied by a raise in oil temperature, there is a good reason to suspect that an engine failure is imminent. Reduce engine power immediately and select a suitable forced landing field.

Use only the minimum power required to reach the desired touchdown spot.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Introduction:

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and over-voltage warning light.

However the cause of these malfunctions is usually difficult to determine.

Broken or loose alternator wiring is most likely the cause of alternator failures, although other factors could cause the problem.

A damaged or improperly adjusted voltage regulator can also cause malfunctions.

Problem of this nature constitute an electrical emergency and should be dealt with immediately.

Electrical power malfunctions usually fall into two categories:

- 1) excessive rate of charge
- 2) insufficient rate of charge

The paragraphs below describe the recommended remedy for each situation.

Excessive rate of charge:

After engine starting and heavy electrical usage at low engine speeds (such as extended taxiing) the battery condition will be low enough to accept above normal charging during the initial part of the flight.

However, after thirty minutes of cruising flight, the ammeter should be indicating less than two needle widths of charging current. If the charging rate were to remain above this value on a long flight, the battery would overheat and evaporate the electrolyte at an excessive rate.

Electronic components in the electrical system could be adversely affected by higher than normal voltage if a faulty voltage regulator setting is causing the overcharging.

To preclude these possibilities, an over-voltage sensor will automatically shut down the alternator and the over-voltage warning light will illuminate if the charge voltage reach approximately 16 volts. Assuming that the malfunction was only momentary, an attempt should be made to reactivate the alternator system.

To do this, turn the master switch off and then on again.

If the problem no longer exists, normal alternator charging will resume and the warning light will go off.

If the light comes on again, a malfunction is confirmed.

In this event, the flight should be terminated and/or the current drain on the battery minimized because the battery can supply the electrical system for only a limited period of time.

Insufficient rate of charge:

If the ammeter indicates a continuous discharge rate in flight, the alternator is not supplying power to the system and should be shut down since the alternator field circuit may be placing an unnecessary load on the system. All nonessential equipment should be turned off and the flight terminate as soon as practical.

SECTION 7 - NORMAL PROCEDURES

INTRODUCTION

Section 7 provides checklist and amplified procedures for the conduct of normal operations.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted the following speeds are based on maximum weight of 1320 lbs and may be used for any lesser weight.

Climb right after Takeoff:

- normal climb out 55 - 65 knots
- short field takeoff (flaps 20°) 45 knots

Climb, flaps up:

- normal 55 – 65 knots
- best rate of climb (sea level) 65 knots
- best rate of climb (10000 ft) 60 knots
- best angle of climb 55 knots

Landing approach:

- normal approach (flaps up) 55 – 58 knots
- normal approach (flaps 20°) 55 knots
- short field approach (full flaps) 50 knots

Balked landing (go around):

- maximum power (flaps 20°) 50 knots

Maximum recommended turbulent air penetration speed:

- weight 600 kg 105 knots
- weight 544 kg 100 knots
- weight 454 kg..... 95 knots

In case of severe turbulence reduce to 80 knots at all weight.

Maximum demonstrated crosswind velocity:

- all weights 20 knots

CHECKLIST PROCEDURES

Preflight inspection

Visually check the airplane for general conditions during walk around inspection.

In cold weather, remove even small accumulation of frost, ice or snow from wing, tail and control surfaces. Also make sure that control surfaces contain no internal accumulation of ice or debris.

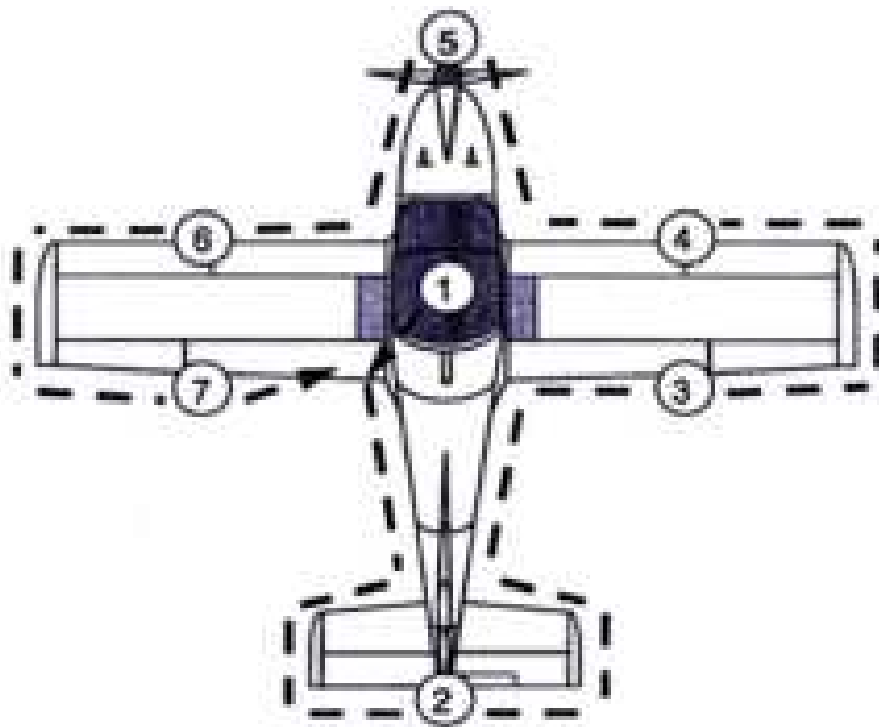


fig. 7-1 Preflight inspection

Cabin:

- | | |
|----------------------------------|----------------|
| 1) control stick lock | REMOVE |
| 2) ignition switch | OFF |
| 3) master switch | ON |
| 4) fuel quantity indicator | CHECK QUANTITY |
| 5) master switch | OFF |
| 6) fuel shutoff valve | ON |

Empennage:

- | | |
|---------------------------|--|
| 1) rudder gust lock | REMOVE |
| 2) tail tie down | DISCONNECT (if installed) |
| 3) control surfaces | CHECK freedom of movement and security |

Right wing trailing edge:

- | | |
|--------------------|--|
| 1) aileron | CHECK freedom of movement and security |
| 2) wing flap | CHECK security |

Right wing leading edge:

- | | |
|---------------------------------|-------------------------------------|
| 1) wing tie down | DISCONNECT |
| 2) stall warning opening | CHECK for stoppage (if installed) |
| 3) main wheel strut- tire | CHECK for proper inflation and wear |
| 4) fuel tank filler cap | CHECK if secure locked |

Nose:

- | | |
|--------------------------------|---|
| 1) engine oil level | CHECK fill to 0,8 gal for extended flight |
| 2) propeller and spinner | CHECK for nicks and security |
| 3) carburetor air filter | CHECK for foreign matter |
| 4) nose wheel strut-tire | CHECK condition |
| 5) nose tie down | DISCONNECT |

Left wing leading edge:

- | | |
|---------------------------------|--|
| 1) Main wheel strut-tire | CHECK for proper inflation and wear |
| 2) Static source and pitot | CHECK for cleanliness. |
| 3) Landing lights | CHECK for condition and cleanliness (if inst.) |
| 4) Wing tie down | DISCONNECT |
| 5) fuel tank filler cap | CHECK if secure locked |

Left wing trailing edge:

- | | |
|--------------------|--|
| 1) aileron | CHECK freedom of movement and security |
| 2) wing flap | CHECK security |

Before first flight of the day and after each refueling, use sampler cap and drain small quantity of fuel from fuel tank sump quick drain valve to check for water, sediment and proper fuel grade.

Before starting engine:

- | | |
|--|-----------------|
| 1) preflight inspection | COMPLETE |
| 2) seats, belts, shoulder harnesses | ADJUST and LOCK |
| 3) fuel shutoff valve | ON |
| 4) radios, electrical equipment | OFF |
| 5) brakes | TEST and SET |
| 6) circuit breakers | CHECK IN |

Starting engine:

- | | |
|--------------------------|------------------------------------|
| 1) master switch | ON |
| 2) fuel pump | ON |
| 3) primer | AS REQUIRED |
| 4) throttle | OPEN 0,4 in |
| 5) propeller area | CLEAR |
| 6) ignition switch | START (release when engine starts) |
| 7) oil pressure | CHECK |

Before takeoff:

- | | |
|------------------------|--------------------|
| 1) Doors lock..... | CLOSED and LATCHED |
| 2) parking brake | SET |

3) flight controls	FREE and CORRECT
4) flight instruments	SET
5) fuel shutoff valve	ON
6) fuel pump	ON
7) elevator trim	TAKE OFF position
8) throttle	3000 RPM
9) throttle	CHECK IDLE
10) throttle	1500 - 2000 RPM
11) engine instruments and ammeter	CHECK
12) radios	SET
13) flashing beacon, nav. lights	AS REQUIRED (if installed)
14) throttle friction	ADJUSTED

TAKEOFF

Normal takeoff:

1) wing flaps	TAKEOFF position
2) landing gear	DOWN
3) throttle	FULL OPEN
4) elevator control	LIFT NOSE WHEEL at 19-20 knots
5) climb out	49 – 60 knots

Short field takeoff:

1) wing flaps	TAKEOFF position
2) brakes	APPLY
3) throttle	FULL OPEN
4) brakes	RELEASE
5) elevator control	SLIGHTLY TAIL LOW
6) climb out	55 knots (with obstacles ahead)

ENROUTE CLIMB

Normal climb:

1) airspeed	55 – 60 knots
2) throttle	FULL OPEN (5500 RPM)
3) fuel pump	OFF

If maximum performance climb is necessary, use speeds shown in the “Rate of Climb chart” in Section 5.

CRUISE

Normal cruise:

1) power	4800 - 5000 RPM
2) elevator trim	ADJUST

BEFORE LANDING**Prior to the downwind:**

- 1) seats, belts, harnesses ADJUST and LOCK
- 2) airspeed Reduce and trim to 65 knots

In the traffic pattern:

- 1) altitude As required (standard 1000 ft over airfield)
- 2) fuel pump ON
- 3) airspeed 55 – 65 knots
- 4) flaps 10°

LANDING (Final leg)**Normal landing:**

- 1) airspeed 50 –55 knots
- 2) wing flaps FULL DOWN
- 3) airspeed 55 – 50 knots
- 4) touchdown MAIN WHEELS FIRST
- 5) landing roll LOWER NOSE WHEEL GENTLY
- 6) braking MINIMUM REQUIRED

Short field landing:

- 1) airspeed 47 – 50 knots
- 2) wing flaps FULL DOWN
- 3) airspeed MAINTAIN 45 knots
- 4) power REDUCE to idle as obstacle is cleared
- 5) touchdown MAIN WHEELS FIRST
- 6) brakes APPLY HEAVILY
- 7) flaps RETRACT

Balked landing (Go Around):

- 1) throttle FULL OPEN
- 2) wing flaps RETRACT to 10°
- 3) airspeed 50 knots
- 4) wing flaps RETRACT

After landing:

- 1) wing flaps UP
- 2) fuel pump OFF

SECURING AIRPLANE

Engine shutoff:

- | | |
|---------------------------------------|-----------|
| 1) brakes | SET |
| 2) radios, electrical equipment | OFF |
| 3) throttle | 1500 RPM |
| 4) ignition switch | OFF |
| 5) master switch | OFF |
| 6) control lock | INSTALLED |

AMPLIFIED PROCEDURES

BEFORE ENGINE START

Carry out pre-flight checks.

PRE-FLIGHT CHECKS

WARNING: Ignition "OFF" Before cranking the propeller switch off both ignition circuits and anchor the aircraft. Have the cockpit occupied by a competent person.

Operating media:

WARNING: Carry out pre-flight checks on the cold or Juke warm engine only! **Risk of burning and scalds.**

Check for any oil-, coolant- and fuel leaks. If leaks are evident, rectify before flight.

Check coolant level in the overflow bottle.

NOTE: The level in the overflow bottle should be between min. and max. mark.

Check oil level and replenish as required.

Prior to oil check, turn the propeller by hand several times to pump oil from the engine into the oil tank, or let the engine idle for 1 minute.

This process is finished when air is returning back to the oil tank and can be noticed by a murmur from the open oil tank.

NOTE: Oil level should be between max. and min. mark of the oil level gauge but must never be below min. mark. Before longer periods of operation ensure that oil level is at least up to mid-position.

Difference between max.- and min.- mark = 0,2 gal (1.6 liq pt)

STARTING ENGINE

Ordinarily the engine starts easily with one or two strokes of primer in warm temperatures to six strokes in cold weather, with the throttle open approximately 0,4 in. In extremely cold temperatures, it may be necessary to continue priming while cranking.

Weak intermittent firing followed by puffs of black smoke from the exhaust stake indicate overpriming or flooding.

The starting should be suspended for a while before attempting again without priming.

If the engine is underprimed, most likely in cold weather with a cold engine, it will not fire at all and additional priming will be necessary.

As soon as the cylinders begin to fire, open the throttle slightly to keep it running.

After starting, if the oil gage does not begin to show pressure within 30 seconds in the summertime and about twice that long in very cold weather, stop the engine and investigate.

Lack of oil pressure can cause serious engine damage.

WARNING! Do not take the engine into operation if any person is near the aircraft.

Fuel cock open

Starting carb..... activated

NOTE: If the engine is already in operating temperature, start the engine without choke.

Throttle lever set to idle position..~

Master switch on

Ignition both circuits switched on

Starter button actuate

ATTENTION: Activate starter for max. 10 sec. only (without interruption), followed by a cooling period of 2 minutes!

As soon as engine runs, adjust throttle to achieve smooth running at approx. 2500 r.p.m.

Check if oil pressure has risen within 10 seconds and monitor oil pressure. Increase of engine speed is only permitted at steady oil pressure readings above 2 bar (30 psi).

At an engine start with low oil temperature, continue to observe the oil pressure as it could drop again due to the increased flow resistance in the suction line.

De-activate starting carb.

ATTENTION: Since the engine comprises a reduction gear with shock absorber, take special care of the following:

To prevent impact load, start with throttle lever in idle position or at the most up to 10% open. For the same reason, wait for around 3 sec. after throttling back to partial load to reach constant speed before re-acceleration.

For checking the two ignition circuits, only one circuit may be switched off and on at times.

ATTENTION: Do not actuate starter button (switch) as long as the engine is running. Wait until complete stop of engine!

TAXIING

While taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized to maintain directional control and balance.

See figure 7-2 Taxiing diagram.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.

The nose wheel is designed to automatically center straight ahead. Taxiing the airplane is accomplished by the use rudder pedals and brakes.

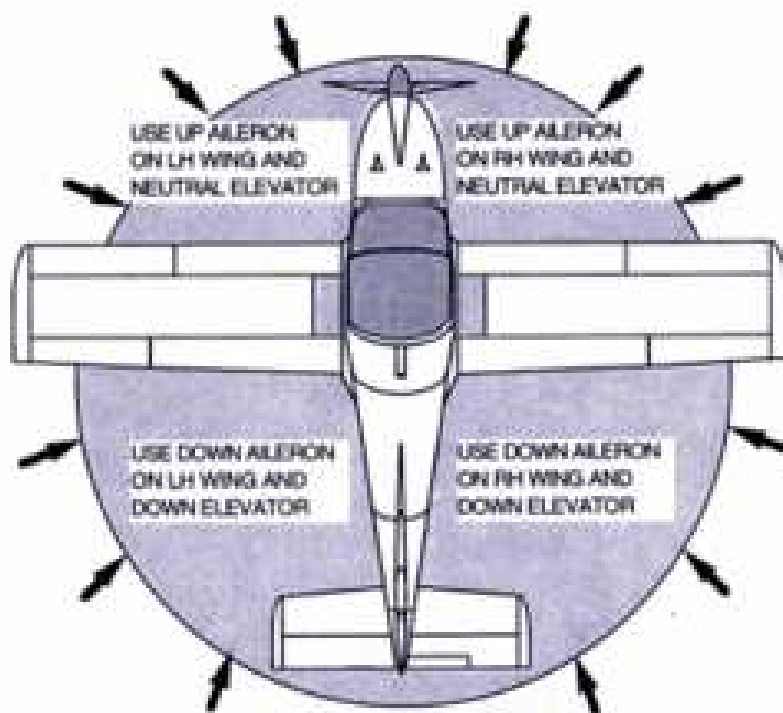


fig. 7-2 Taxiing diagram

PRIOR TO TAKE-OFF

Warm-up:

Most of the warm-up will have been conducted during taxi, an additional warm-up before takeoff should be restricted to the checklist procedure.

Since the engine is cowed for efficient in-flight cooling, precaution should be taken to avoid overheating on the ground.

Warming up period:

Start warming up period at 2000 r.p.m. for approx. 2 minutes, continue at 2500 r.p.m., duration depending on ambient temperature, until oil temperature reaches 50° C (120° F).

— Check temperatures and pressures. **Throttle response:**

— Short full throttle ground test (consult Aircraft Operator's Manual since engine speed depends on the propeller used).

ATTENTION: After a full-load ground test allow a short cooling run to prevent vapour formation in the cylinder head.

IGNITION CHECK

Prior to flights verification of proper alternator and voltage regulator operation is essential. Such verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light or by operating the wing flaps during the engine run-up (3000 rpm).

In all the cases, the ammeter will remain within a needle width of its initial position if the alternator and voltage regulator are operating properly.

Ignition check:

- Check the two ignition circuits at **4000 r.p.m.**
- Speed drop with only one ignition circuit must not exceed **300 r.p.m.**
- **120 r.p.m.** max. difference of speed by use of either circuit, A or B.

NOTE: The propeller speed depends on the actual reduction ratio.

TAKEOFF

Power check:

It is important to check full-throttle engine operation early in the takeoff run. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff. If this occurs you are justified in making a thorough full-throttle static run-up before another takeoff is attempted.

In the takeoff run the engine should run smoothly and turn approximately 5400 to 5600 RPM.

Full throttle run-ups over gravel are especially harmful to propeller tips; when takeoff must be made over a gravel surface, it is very important that the throttle be advanced slowly.

This allows the airplane to start rolling before high RPM is developed, and the gravel will be blow back of the propeller rather than pulled into it.

When unavoidable small dents appear in the propeller blades, they should be immediately corrected as described in Section 8 under Propeller care.

After full throttle is applied, adjust the throttle friction lock, clock-wise to prevent the throttle from creeping back from a maximum power position.

Similar friction lock adjustment should be made as required by other flight conditions to maintain a fixed throttle setting.

Flap setting:

Normal Take offs : Position 1 down = $\pm 10^\circ$

Short field takeoffs are performed with flaps at Position 2 down position. = $\pm 20^\circ$
Takeoffs with no flap is however suggested in case of sensible cross wind component.

Short field takeoff:

If an obstruction dictates the use of a steep climb angle, after liftoff accelerate to and climb out at 60 knots with flaps retracted. This speed provides the best overall climb speed to clear obstacles when taking into account the turbulence often found near ground level.

Crosswind takeoff:

Takeoff into strong crosswinds normally are performed with the minimum or no flap setting necessary for the field length, in order to minimize the drift angle immediately after takeoff.

The airplane must be accelerated to a speed slightly higher than normal, than pulled off firmly to prevent possible setting back to the runway while drifting.

When clear of the ground, make a coordinated turn into the wind to correct for drift.

Climbing with engine running at take-off performance is permissible (max. 5 minutes). See Rotax Operator's Manual Chapter 10.1), 10.1.1) and 10.1.2).

WARNING: Monitor oil temperature, cylinder head temperature and oil pressure. Limits must not be exceeded! See Chapter 10.1) Operating Limits.

ATTENTION: Respect "cold weather operation" recommendations, see Chapter 10.3.9).

ENROUTE CLIMB

When conducting the following climbs, the engine shall be set at 5500 RPM.

Normal climb:

normal climbs are conducted at 60 knots with flaps up and full throttle for best engine cooling.

Best rate of climb:

the best rate of climb speeds range from 65 knots at sea level to 60 knots at 10000 ft with flaps up and full throttle.

Best angle of climb:

if enroute terrain dictates the use of a steep climb angle, climb at the best angle of climb speed of 55 knots with flaps up and full throttle.

CRUISE

Normal cruising is performed between 55% and 75% power. The engine RPM and corresponding fuel consumption for various altitudes can be determined by the data contained in Section 5.

The data in Section 5 shows the increased range and improved fuel economy that is obtainable when operating at lower power settings and higher altitudes.

The use of lower power settings and the selection of cruise altitudes on the basis of the most favorable wind conditions are significant factors that should be considered on every trip to reduce fuel consumption.

To determine the most reliable and most favorable altitude and power setting for a given trip, refer to Section 5, fig. 5-5.

STALL

The stall characteristics are conventional for the flaps up and flaps down configurations. Slight elevator buffeting may occur just before the stall with flaps and landing gears down.

The stall warning horn (if installed) produce a steady signal 5 to 10 knots before the actual stall is reached and remains on until the airplane attitude is changed.

Stall speeds for various combinations of flap setting and bank angle are summarized in Section 5.

SPINS

Intentional spins are prohibited.
--

In case an inadvertent spin occurs, the following recovery technique should be used:

- 1) VERIFY THAT THROTTLE IS IN THE IDLE POSITION AND AILERONS ARE NEUTRAL
- 2) APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION
- 3) JUST AFTER THE RUDDER REACHES THE STOP, MOVE ELEVATOR CONTROL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL
- 4) HOLD THIS CONTROL INPUT UNTIL ROTATION STOPS
- 5) AS ROTATION STOPS, NEUTRALIZE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

Variations in basic airplane rigging or in weight and balance due to installed equipment or cockpit occupancy can cause differences in behavior, particularly in extended spins. However the above recovery procedure should always be used and will result in the most expeditious recovery from any spin.

LANDING

The traffic pattern can be made with power-on or power-off at speed of 60 – 65 knots with flaps up, in “Base” and “Final” legs, reduce speed to 60 – 55 knots with flaps down.

Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speed.

Actual touchdown should be made with power-off and on the main wheels first.

The nose wheel should be lowered smoothly to the runway as speed is diminished controlling direction with rudder.

Short field landing

For a short field landing in very smooth air conditions, make a short final approach at 52 knots with full flaps, using enough power to control the glide path and the speed.

After all approach obstacles are cleared, progressively reduce power and maintain 46 knots by lowering the nose of the airplane.

Touchdown should be made with power-off and on the main wheels first.

Immediately after touchdown, apply heavy braking as required.

For maximum brake effectiveness, retract the flaps, hold full nose-up elevator, and apply maximum brake pressure without sliding the tires.

Slightly higher approach speeds 62 knots should be used under turbulent air conditions.

Crosswind landing

When landing in a strong crosswind, use the minimum flap setting required for the field length and at an airspeed of 65 knots. Use a low wing into the wind, crab angle, or a combination method of drift correction and land in a nearly level attitude.

Balked landing

In a bailed landing (go-around) climb, the wing flaps setting should be reduced to position 1 = $\pm 10^\circ$ immediately after full power is applied.

Upon reaching a safe altitude and airspeed, the flaps should be retracted to the full up position.

COLD WEATHER OPERATION

Prior to starting in cold mornings, it is advisable to pull the propeller through several times by hand to break loose or limber the oil, thus conserving battery energy.

WARNING

When pulling the propeller through by hand, treat it as if the ignition switch is turned on.

A loose or broken ground wire on either magneto could cause the engine to fire.

In extremely cold weather, the use of an external preheater is recommended to reduce wear and abuse to the engine and its electrical system.

Cold weather starting procedures are as follows:

- 1) with ignition switch OFF and throttle closed, PRIME the engine four to ten strokes as the propeller is being turned over by hand

NOTE

After priming, push the primer all the way in and lock in position to avoid possibility of engine drawing fuel through the primer.

- | | |
|--------------------------|-------------|
| 2) propeller area | CLEAR |
| 3) master switch | ON |
| 4) fuel pump | ON |
| 5) throttle | OPEN 0,4 in |
| 6) ignition switch | START |
| 7) oil pressure | CHECK |

NOTE

If the engine does not start during the first few attempts, it is probable that the spark plugs have been frosted over. Preheat must be used before another start is attempted.

WARNING

Pumping the throttle may cause raw fuel to accumulate in the intake air duct, creating a fire hazard in the event of a backfire. If this occurs, maintain a cranking action to suck flames into the engine.

During cold weather operations, no indication will be apparent on the oil temperature gage prior to takeoff if outside air temperatures are very cold.

After a suitable warm-up period (2 to 5 minutes at 2000 RPM), accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is ready for takeoff.

SECTION 8 - HANDLING, SERVICE AND MAINTENANCE

INTRODUCTION

This section contains recommended basic procedure for proper ground handling, routine care and servicing of your airplane.

GROUND HANDLING

The airplane is maneuvered on ground by hand with the tow-bar attached to the nose wheel or by pulling the aircraft by the propeller blades.

When towing with a vehicle, do not exceed the nose gear turning angle of 35° either side of center, or damage to the gear may result.

While towing with a vehicle, do not exceed the man-walk speed.

PARKING

When parking the airplane, head into the wind and set the parking brakes.

Do not set the parking brakes during cold weather when accumulated moisture may freeze the brakes, or when the brakes are overheated.

Tie-down the aircraft if parking brakes are not installed.

TIE-DOWN

In severe weather, proper tie-down procedure is the best precaution against damage by gusty or strong winds.

To tie-down the airplane proceed as follows:

- 1) set the parking brake and install the control stick lock
- 2) install surface control locks on ailerons and rudder
- 3) tie sufficiently strong ropes to the wing and tail tie-down fittings and secure each rope to a ramp tie-down
- 4) tie a rope to an exposed portion of the engine mount and secure to a ramp tie-down
- 5) install pitot and static source tubes cover.

JACKING

When a requirement exists to jack the entire airplane off the ground, i.e. for landing gears maintenance and operational tests, use the jacking points located under each wing root, firewall pad and in the tail skid

Individual main landing gear may be jacked by using the jack pad which is incorporated in the main landing gear vertical strut (optional).

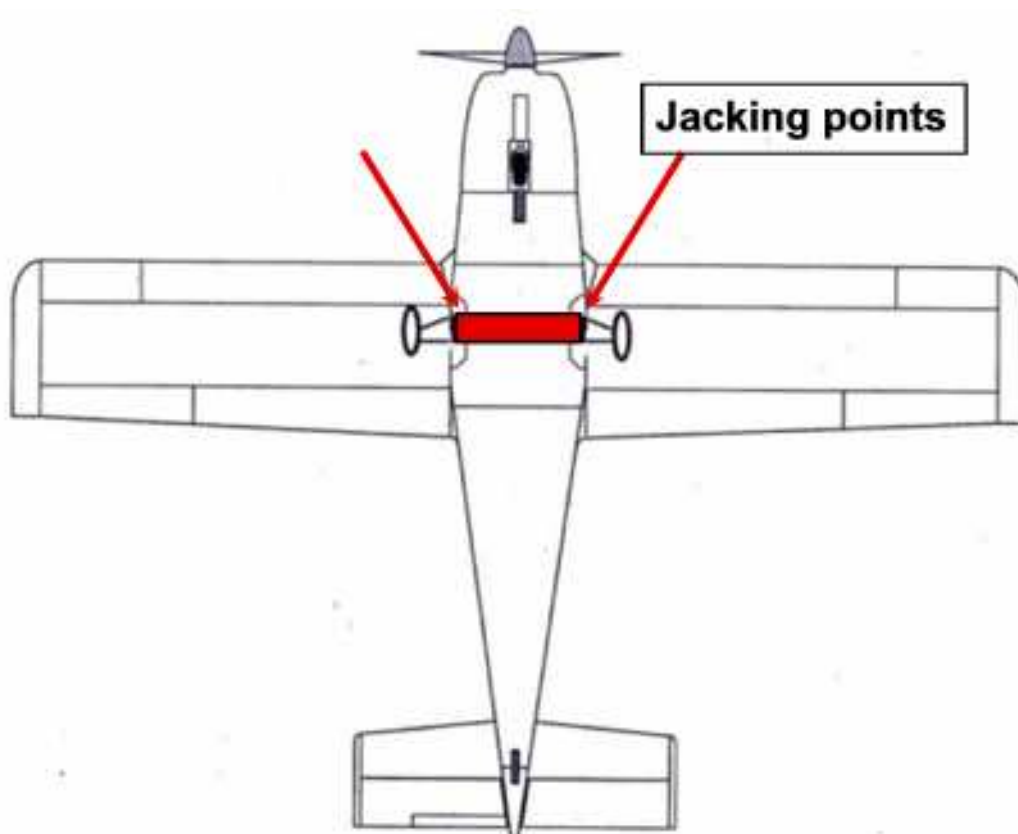


Fig. 8-1 Jacking points

LEVELING

Longitudinal leveling of the airplane is accomplished by placing a level on the baggage compartment floor behind the pilot and passenger seat.

FLYABLE STORAGE

Airplanes placed in a non-operational storage for a maximum of 30 days are considered in flyable storage status.

Every seventh day during these periods, the propeller should be rotated by hand through at least five revolutions; this action limbers the oil and prevents any accumulation of corrosion on engine cylinder walls.

For maximum safety check that the ignition switch is OFF, the throttle is CLOSED, and the airplane is secured before rotating the propeller by hand.

After 30 days the airplane should be flown for 30 minutes or a ground run-up should be made just long enough to produce an oil temperature within the lower green arc range.

Engine run-up also helps to eliminate excessive accumulations of water in the fuel system and other air spaces in the engine.

Keep fuel tank full to minimize condensation in the tank.

SERVICING

In addition to the preflight inspection covered in Section 7, servicing the airplane is also necessary.

OIL SERVICING

Use only lubricating oils recommended by the engine manufacturer.

Do not operate on less than 0,5 gal of oil in the engine oil tank.

For normal flight less than 3 hours, fill to 0,5 gal; for extended flight fill to 0,7 gal.

Change engine oil at least every 6 months even though less than the recommended hours have accumulated.

Reduce intervals for prolonged operation in dusty areas and cold climates.

FUEL SERVICING

The approved fuel are:

- SUPER Automotive gasoline
- Unleaded Automotive gasoline
- 100LL grade aviation fuel (blue)

LANDING GEAR

The suggested nose and main wheels tire pressure is 26 psi (1,8 bar).

EXTERIOR CLEANING AND CARE

The plastic windshield and canopy should be cleaned with an aircraft windshield cleaner; if it is not available, the plastic can be cleaned with soft cloths moistened with Stoddard solvent to remove oil and grease; then, carefully washing with mild detergent and plenty of water; rinse and dry with a clean moist chamois.

Never use gasoline, benzene, acetone, carbon tetrachloride, anti-ice fluid or glass cleaner to clean the plastic since these materials will attack the plastic and may cause it to craze.

Unless freezing rain or sleet is anticipated, do not use a canvas cover on the windshield since the cover may scratch the plastic surface.

Normally, waxing is unnecessary to keep the painted surfaces bright, however, if desired, the airplane may be waxed with a good automotive wax.

PROPELLER CARE

Preflight inspection of propeller blades for nicks, and wiping them occasionally with an oily cloth to clean of grass and bug stains, will assure long trouble-free service.

Small nicks on the propeller should be dressed out as soon as possible since these nicks produce stress concentrations, and if ignored may result in cracks.

Never use an alkaline cleaner on the blades.

ENGINE CARE

The engine may be cleaned with Stoddard solvent, or equivalent, then dried thoroughly. Particular care should be given to electrical equipment before cleaning; ignition units, starter, alternator etc., should be protected before using solvents.

INTERIOR CARE

To remove dust and loose dirt from the upholstery and carpet, clean interior regularly with a vacuum cleaner.

Oily spots may be cleaned with household spot removers.

The plastic trim, instrument panel and control knobs need only to be wiped off with a damp cloth.

Never use volatile solvents since they likely craze the plastic.

