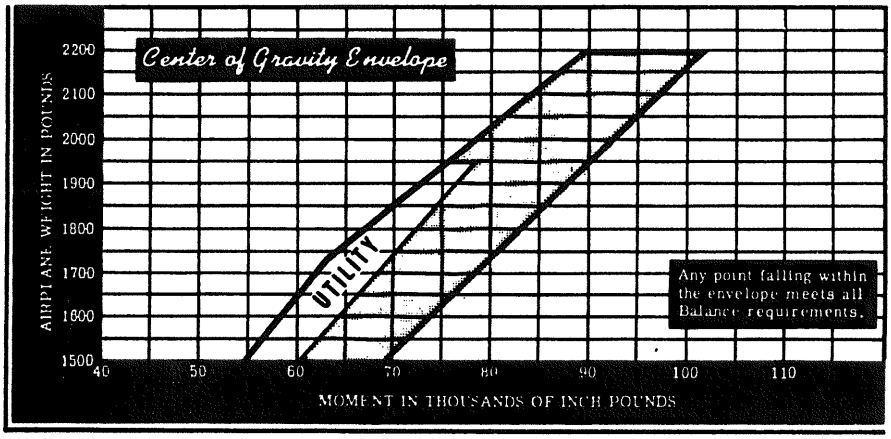
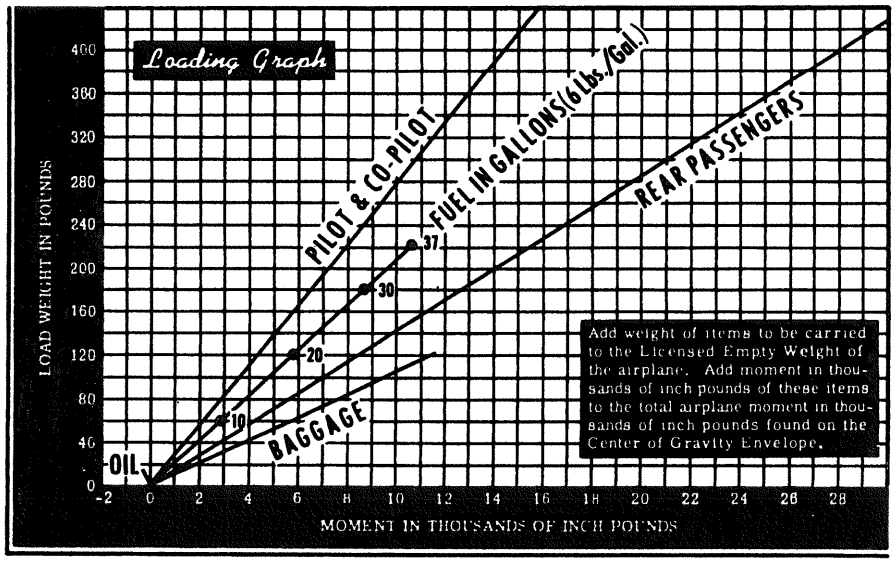
TACHOMETER.

Normal Operating Range:

At sea level .....2200-2450 (inner green arc)
At 5000 feet .....2200-2550 (middle green arc)
At 10,000 feet .....2200-2650 (outer green arc)
Maximum Allowable.....2700 (red line)





WEIGHT AND BALANCE.

All aircraft are designed for certain limit loads and balance conditions. These specifications for your 172 are charted on page 37.

A weight and balance report and equipment list for your particular airplane when it left the factory is furnished. Changes in original equipment affecting empty weight c. g. are required by the C.A.A. to be recorded in the repair and alteration form 337. Using the empty weight, c. g. location, and moment derived from the latest of these two sources, and following the example shown, the exact moment may be readily calculated. This exact moment, when plotted on the center of gravity envelope, will quickly show whether or not the c. g. is within limits. Refer to the loading graph for moment values of items to be carried.

The utility category is solely for the purpose of instructing and training in certain flight maneuvers. The weight and balance considerations limit the airplane to a pilot with or without co-pilot, full gas, no baggage and no rear seat baggage *or passenger.* The utility category envelope has been included in the weight and balance charts. The weight and moment of your airplane in the utility category may be determined by following the example shown for figuring a normal category airplane weight and moment. The utility weight and moment, when plotted on the center of gravity envelope, should fall within the "Utility" portion of the envelope for safe operation.

EXAMPLE FOR A NORMAL CATEGORY AIRPLANE WITH A LICENSED EMPTY WEIGHT OF 1290 LBS. AND A MOMENT OF 49,260 IN. LBS.

	WT.	MOMENT 1000
EMPTY WEIGHT (LICENSED)	1290	+49.3
OIL	15	− 0.3
PILOT & PASSENGER (1)	340	+12.2
REAR PASSENGERS (2)	290	+20.3
FUEL (MAXIMUM) 37 GAL.	222	+10.7
BAGGAGE (TO MAKE GR. WT.)	43	+ 4.1
Total	2200	96.6

Locate this point (2200-96.8) on the center of gravity envelope graph, and, since the point falls within the envelope, the above loading meets all balance requirements.

NOTE

The above problem is an example of only one of many different loading configurations. To best utilize the available payload for *your* airplane, the loading charts on page 37 should be consulted to determine proper load distribution.

SECTION V

operational data

THE OPERATIONAL DATA shown on the following pages are compiled from actual tests with airplane and engine in good condition and using average piloting technique and best power mixture. You will find this data a valuable aid when planning your flights. However, inasmuch as the number of variables included precludes great accuracy, an ample fuel reserve should be provided. The range performance shown makes no allowance for wind, navigational error, pilot technique, warm-up, take-off, climb, etc. All of these factors must be considered when estimating reserve fuel.

To realize the maximum usefulness from your 172, take advantage of the high cruising speeds. However, if range is of primary importance, it may pay you to fly at a low cruising rpm thereby increasing your range and allowing you to make the trip non-stop with ample fuel reserve. Use the range table on page 42 to solve flight planning problems of this nature.

In the table, (Figure 10), range and endurance are given for lean mixture, from 2500 feet to 12,500 feet and for rich mixture at altitudes of 2,500 feet and 5,000 feet. All figures are based on zero wind, 37 gallons of fuel for cruise, McCauley 7651 propeller, 2200 pounds gross weight, and standard atmospheric conditions. For lean mixture figures, mixture is leaned to maximum r.p.m. Allowances for fuel reserve, headwinds, take-offs and climb, and variations in mixture leaning technique should be made and are in addition to those shown on the charts. Other indeterminate variables such as carburetor metering characteristics, engine and propeller conditions, and turbulence of the atmosphere may account for variations of 10% or more in maximum range.

AIRSPEED CORRECTION TABLE
FLAPS UP OR DOWN

IAS	40	50	60	70	80	90	100	110	120	130	140
TIAS	52	58	65	73	82	92	101	111	120	130	139

Figure 7. Airspeed Correction Table

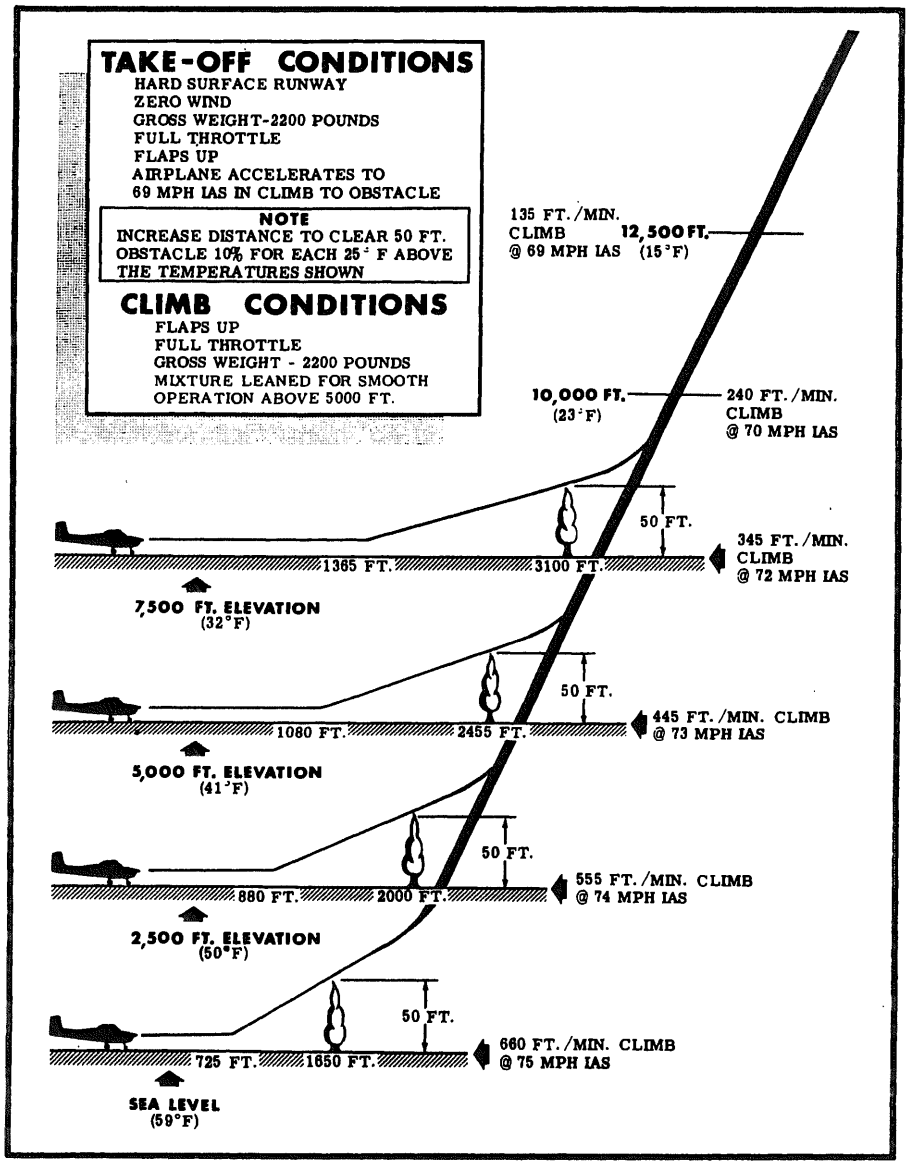


Figure 8. Take-Off Diagram

TAKE-OFF DATA

TAKE-OFF DISTANCE WITH FLAPS UP FROM HARD SURFACE RUNWAY.

GROSS WEIGHT LBS.	IAS AT 50 FT.	HEAD WIND MPH	AT SEA LEVEL & 59° F		AT 2500 FT. & 50° F		AT 5000 FT. & 41 ° F		AT 7500 FT. & 32°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50'OBSTACLE
1600	56	0	355	805	420	955	505	1145	610	1390
		15	230	525	275	630	335	765	375	950
		30	130	290	160	360	200	455	255	580
1900	63	0	515	1175	615	1400	750	1710	955	2175
		15	350	790	420	960	525	1190	675	1535
		30	210	475	260	590	330	745	435	990
2200	69	0	725	1650	880	2000	1080	2455	1365	3100
		15	505	1145	620	1405	775	1760	990	2255
		30	315	720	400	910	510	1160	675	1530

NOTE: INCREASE DISTANCES 10% FOR EACH 25 DEGREES F. ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

CLIMB DATA

GROSS WEIGHT LBS.	AT SEA LEVEL & 59° F			AT 5000 FT. & 41° F			AT 10000 FT. & 23° F			AT 15000 FT. & 5° F		
	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S. L. FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S. L. FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S. L. FUEL USED
1600	70	1115	1.0	66	860	1.9	63	605	2.9	59	350	4.3
1900	72	860	1.0	70	640	2.2	67	410	3.5	63	190	5.8
2200	75	660	1.0	73	445	2.6	70	240	4.7	68	30	10.9

NOTE: FLAPS UP, FULL THROTTLE, AND MIXTURE LEANED FOR SMOOTH OPERATION ABOVE 5000 FT.
FUEL USED INCLUDES WARM-UP AND TAKE OFF ALLOWANCE.

Figure 9. Take-Off & Climb Chart