

SHERPA K650T SUMMARY NOTES on FLIGHT TESTS

This is not an engineering analysis such as I would do for certification tests by the FAA. It's a summary of my opinion on the flight characteristics of the latest version of the Sherpa aircraft. If you wish to know more about my background, you can find it on my website—bobtripp.com. This is also a brief summary of three flights made in the K650T during the period from September 6 – 8.

The first flight was made at a midweight and CG, the second at the most forward and light weight position we could reach, and the third was an attempt to go for max weight and aft CG. The TPE-337-5 engine was limited to 766SHP for takeoff and max continuous power. That makes the 75% power at 574HP, and 50% power at 383SHP. A brief note: Sherpa has elected to use an airspeed indicator marked in miles per hour rather than knots. For this report all speeds will be expressed in miles per hour IAS.

FIRST FLIGHT

The first takeoff at 4946 pounds was an eye-opener. We were off the ground in less than 3 seconds before I could advance the power lever to full thrust. This was with 120 gallons of fuel, two pilots and 100 pounds of ballast in the baggage area. This puts the CG at 25% of the wing chord. The clean stall speed was 61 mph. 30° flap resulted in 38 mph. With 15° nose up and heavy stick force requiring both hands. At this loading, there is no way a pilot would inadvertently stall the airplane. As expected at this CG the airplane was stable about all axes.

SECOND FLIGHT

This was an attempt to get as far forward CG as possible. The result was with 100 gallons of fuel and the two pilots resulting in a takeoff weight of 4672 lbs. and a CG of 21.2%. Another short takeoff was followed by an initial climb of over 2000 fpm. Stability in the clean configuration was quite positive as expected. In the 30 to 40° flap range, longitudinal stability is positive but the trim point can move easily. Our main purpose for this flight was to check power on stall characteristics. The first attempt, using 75% power, resulted in pitch attitudes that were ridiculous, well over 30°. Backing the power off to 50% gave stall speeds less than 40 mph with flaps 30° and less than 35 mph with flaps 40. With 30° flaps buffet started at 55 mph and a was at least 20 pounds of pull force required at the stall. With 40° of flaps there was continuous tale shake probably caused by a combination of power setting and strong down flow produced by the flaps. Basically, the airplane should not be flown with 40° flaps and power on. This means that if you are doing a go around maneuver with 40° of flaps set, they should be retracted immediately.

THIRD FLIGHT

This was a 2:40 flight at max weight, 6482 pounds, full fuel, 260 gallons, 715 pounds of ballast, giving an aft CG 32.5% wing chord. In an airplane of conventional configuration and a CG this far aft, the airplane will be nearing its neutral point. That means that stability will be zero to negative, and the airplane will tend to pitch up with power on its own. Obviously, this would be a limiting factor in any airplane's maneuvering envelope. At full power initial climb was 1800 fpm at 60 mph, and 1200 fpm at 90 mph. Level flight cruise data at 4500 feet resulted in 175 mph at 75% power, and 160 mph at 50% power using 45.6 GPH.

Clean stall was 69 mph, and with landing flaps 46 mph. Power on stall's were conducted with 50% power, since 75% again gave ridiculously high pitch attitudes and stick forces. Power on flaps up and flaps 30° stall speed was 35 mph, 30° banked turn was 43 mph, accelerated stall 45 mph. In all cases the recovery was with less than 20° bank and 200 feet loss of altitude. The buffet, stick force, and attitude should all provide sufficient warning. 40° flap stalls power on were not attempted because of the stick shake involved.

Longitudinal stability in cruise climb and descent was positive, though at times relatively light, and on the release of the stick would sometimes oscillate back through the original trim speed. Interestingly, cruise stability was done at less than 75% power. That setting would drive the airplane to the top of the green arc at 170 mph.

Lateral/directional stability was positive at 1.2Vs. Full pedal deflection would give 10° to 12° angles of bank. Airplane would recover in 5 to 10 seconds with three oscillations from full rudder pedal deflection. Dynamic recovery would be within 3 to 4 oscillations rudder pedal fixed or free.

No formal trim tests were run, but trim was adequate within the range we flew. At the present time there is no trim cut off switch on the stick. However, for a runaway trim situation, the procedure would be, flight idle, slow below 90 mph, and extend 10 to 30° of flaps. At that point the trim can be run to any extreme position without control forces being high.

SUMMARY

Sherpa Aircraft Company has developed a single-purpose airplane which meets its goals, to haul a large load out of a short strip. It is an unusual airplane with some unusual characteristics. It does its unique mission with quite some flair. It is tempting to call it a Super Cub on steroids. Actually, though it may look like that, it is entirely different airplane. With its high power loading and low takeoff and approach speeds, it is not an airplane for the inexperienced pilot. However, with a good check out, a pilot can accomplish his mission into primitive airstrips with loads that would humble almost any other airplane.