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INITIAL FLIGHT TESTING OF YOUR QUICKIE

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Introduction

Once the construction of your Quickie is completed, you are ready to prepare your Quickie for flight testing. This task should not be taken lightly, and a thorough, professional approach will assure you of years of trouble-free fun.

The information contained in this document is intended to aid you as you prepare for first flight. It does not replace good common sense on your part. If you are not sure of some phase of preparation, call QAC and ask questions. Beware of individuals in your community who profess a great knowledge in this area; they may or may not be competent.

This document is divided into two basic sections:

1. Pilot preparation
2. Aircraft preparation

Pilot Preparation

Quite often while building a homebuilt aircraft, the owner-builder-pilot allows his own pilot proficiency to slip in order to expedite completion of his aircraft. This move is unwise.

We recommend the following steps to prepare oneself for first flight:

1. Ten hours of flying time in the last 3 months.
2. Checkout in at least 3 different types of aircraft shown in the logbook.
3. One hour of takeoff and landings in a taildragger within the preceding 3 months.
4. A private pilot certificate with no restrictions.
5. Study the Quickie Owner's Manual thoroughly

In addition, the pilot should feel confident in his ability to fly a new aircraft. If he does not, he should check out in different types of aircraft until he feels comfortable, even if it means delegating first flight in his Quickie to a more competent pilot.

The above are suggestions that we believe to be conservative and desirable before the first flight of any homebuilt aircraft.

Aircraft Preparation

Before the initial taxi tests of your Quickie are performed, you must carefully make a complete inspection of the entire aircraft, with particular emphasis on the flight systems. This is similar to what a factory built aircraft goes through before it is delivered to the dealer.

The following list can also be used for each annual inspection:

1. Check all fasteners for proper security and safetying.
2. Check control system travels at the surfaces:
 - a. Rudder travel ± 30 deg.
 - b. Aileron travel ± 25 deg.
 - c. Elevator travel ± 17 deg.
3. Ailerons should fair into the trailing edge of the wing with the control stick at neutral
4. Check that canopy sponge seals are in place and that canopy locking handle is adjusted so it must be forced hard up to lock. This is extremely important to eliminate any possibility of it being bumped open in flight. Verify that the secondary canopy latch functions properly.
5. Check elevator and aileron pushrods for proper installation (spacers, washers, bolts, locknuts, etc. installed properly).
6. Check elevator and aileron pushrods for freedom of movement throughout control travel.
7. Check pitch trim for proper function, and freedom of movement.
8. Check Elevator and aileron hinge attachments for security
9. Check elevator and aileron for freedom of movement throughout range without binding or chafing.
10. Check rudder pedals, cables and attachments for freedom of movement throughout range without binding or chafing.
11. Check brake system for freedom of movement
12. Check main tire inflation at 50-60 psi. Recheck 2 days later for leaks. Check axle bolts for function and security.
13. Check tailwheel area for freedom of movement and proper security.
14. Check safetying and security on all actuating mechanism hardware.

15. Check instrumentation: CHT, and Oil Temp with a match or hot water at the probe; check pitot-static system for leaks; check remainder of instrumentation on initial engine run.
16. Check Engine compartment: Propeller bolts for proper torque and safetying; propeller for proper track (within 1/8"); engine mount bolts for security and safety; oil level; throttle and carb heat controls for security and proper function; ignition wiring for security and redundancy; clock prop vertical when points open; and check baffling for tight fit around engine and cowl, otherwise overheating may occur.
17. Check Fuel system: fuel cap seals securely and vent system clear; Flow check your fuel system by removing the fuel inlet line to the carburetor and verifying that backup squeeze-bulb fuel pump flows a steady stream of fuel with constant squeezing of the bulb; check fuel shutoff valve for function; clean fuel filter after flushing entire system; calibrate fuel gauge by pouring fuel into tank in increments and marking gauge.
18. Check battery secured and vent line exits bottom of fuselage.

Weight & Balance

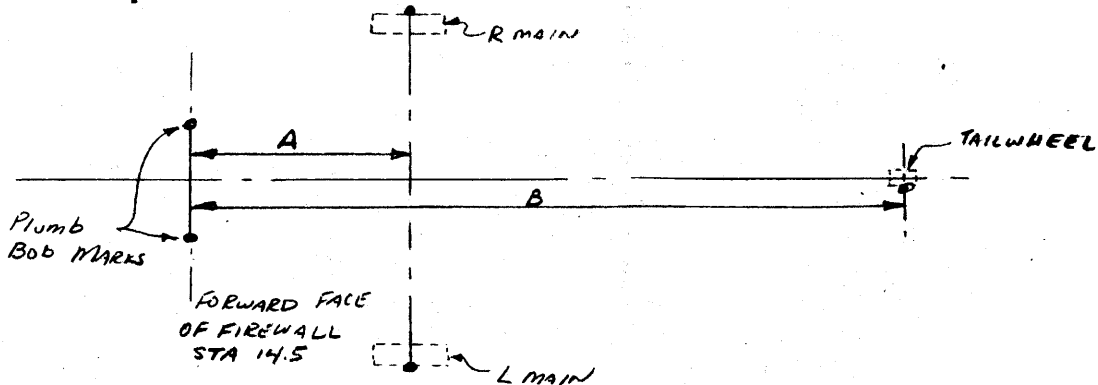
It is extremely important to do an accurate weight and balance on your Quickie to determine your aircraft's c.g. The measurements should be recorded in the aircraft logbook and used for all future c.g. computations. The following procedure is recommended for performing an accurate weight and balance:

Equipment required - 3 Scales (platform type preferred); one level; some chalk; a 12' tape measure; 3 pieces of 1" x 12" lumber to distribute the weight evenly over the scales; and miscellaneous wood to set the tailwheel scale on at the proper vertical height. Calibrate the scales by weighing a known object.

Level Assists Step 1 - Position the aircraft on the scales with the W.L. 0.00 line level. Record the scale readings with the aircraft only (i.e. no fuel, pilot, no baggage)

Step 2 - With the aircraft off of the scales, but still level, use your plumb bob to locate on the floor the centerlines of the main gear axles and the tailwheel. Also mark the location of each forward face of the firewall on the floor using the plumb bob.

Step 3 - Make the measurements shown below:



To get the moment arm (fuselage station) of the main gear add distance A to 14.5 (it should be about STA 42.3); To get the moment arm of the tailwheel, add distance B to 14.5 (it should be about STA 186.0).

Step 4 - Make a tabulation along the lines of the following:

<u>ITEM</u>	<u>GROSS WT</u>	<u>TARE</u>	<u>NET</u>	<u>ARM</u>	<u>MOMENT</u>
L Main	121.5 lb	-1.0 lb	120.5 lb	42.3	5097.2
R Main	123.0	-2.0 lb	121.0	42.3	5119.3
Tailwheel	3.0	-1.0 lb	2.0	186.0	372.0
Total			<u>243.5 lb</u>	<u>43.5</u>	<u>10587.5 IN-LB</u>
				↳ STA OF EMPTY CG.	

Divide the total moment by the total net weight to obtain the empty c.g.

Step 5 - Now you can perform some sample weight and balance calculations using the sample problem and curves in the Quickie Owners Manual. To be absolutely accurate, it would be a good idea to do another weight and balance with pilot in the aircraft since pilot location in cockpit will effect his moment and aircraft c.g. location. You should placard the maximum and minimum pilot weights allowable from your calculations on the instrument panel.

FLIGHT TESTING YOUR QUICKIE

After having spent months building your Quickie, you are going to be in a big hurry to fly it. This is a big mistake. Flight testing any new aircraft must be approached cautiously.

Read over the first parts of this document. Is everything checked and completed? Now think carefully; what else can you think of that you should do to get ready for first flight? Spend days or weeks, literally, thinking about that question.

If any item on the aircraft needs attention, fix it now! Do not do any engine runs or taxi tests until you are sure that the aircraft is ready to fly. Many taxi tests end up with an unexpected first flight; don't be caught unprepared.

Ground Tests - Run the engine in for at least 5 hours at various speeds, and with the cowling on. Watch all engine instruments for any signs of problems. Do not exceed 400 deg CHT. The Quickie Owner's Manual details how to properly adjust your engine. Frequently take the cowling off and carefully inspect the engine compartment for loose bolts, excessive vibration, or leaks. After the 5 hour runin, do a very careful inspection of everything in the engine compartment. Remember, don't rush. When you button up the cowling for the last time, be able to say to yourself that the aircraft is ready for first flight.

Basic Taxi Tests - Now you are ready to taxi the aircraft around on the ground for a little bit to get accustomed to the cockpit environment. Don't stop until you feel completely at home with the aircraft's very low speed characteristics; make sharp turns, apply brakes, listen for the sounds of the engine and aircraft.

Taxi Tests - Taxi tests can be divided up into two regimes; low-speed (under 30 mph) and high speed (over 30 mph). Spend at least 30 minutes in the low speed area getting used to the sound and feel of the aircraft. Always be prepared for a liftoff and first flight if it should accidentally liftoff. Now park the Quickie for a day to think about everything that you have learned. Do not do the high speed taxi tests until you have had this 1 day cooling off period.

High Speed Taxi and Liftoffs - Do these procedures in a basic aircraft like a Cessna 150 before doing them in your Quickie. Find an airport with the following conditions today:

1. Weather; wind calm, or straight down the runway and smooth, and no turbulence aloft (check with another aircraft)
2. Runway; smooth, at least 4500 feet long and preferably over 6000 ft long.

Check the aircraft to verify that you have about 3 gallons of fuel. Check yourself to make sure that you are not tired, or too exited. There is always tomorrow.

Perform high speed taxi tests at increasing speeds (i.e. 35 mph, 40 mph 45mph, and 50 mph). Repeat until you feel absolutely comfortable. Perform the tests by accelerating to the aim speed, bringing power smoothly to idle and decelerating to a stop.

Evaluate whether your airport has sufficient room to make a runway flight (i.e. liftoff, fly straight and level for about 5 seconds, and land). If it does, you may want to do this to feel out the aircraft.

First Flight - The first flight is just a short step up from the runway flight. The main items to look for are proper operation and function of all controls, and proper indications on all engine related instruments. The first flight should be only 15-20 minutes long; long enough to feel comfortable in the aircraft for landing, but not so long that you feel obliged to "ring" the aircraft out. After first flight, every part of the aircraft should be checked carefully to determine any problem areas.

The Flight Test Program - In subsequent flights, concentrate on learning more about the aircraft, and getting accustomed to flying it. Expand the operational envelope slowly (e.g. don't dive it to redline speed on the second flight, and don't operate in 50 knot winds right away) Remember there is no substitute for good judgement. Call QAC if you have any questions.

Random Comments on Flight Testing Your Quickie

1. Do not fly your Quickie unless all instruments standard in the Quickie Kit are installed and functioning properly.
2. Pay close attention to all limitations listed in the Pilot's Manual, particularly the RPM and temperature limits.
3. Your Quickie should touchdown tailwheel first with full aft stick, and also, the tailwheel should not lift off before the mains on takeoff with full aft stick. If either or both of these statements is not true for your aircraft, contact QAC for help. Basically, you will make a small adjustment to rigging the ailerons. These comments apply to mid-aft cg location. At forward cg the tailwheel may liftoff first on takeoff.
4. If you are seeing erratic airspeed indications on takeoff and/or in flight, contact QAC for help in modifying your cockpit static source.
5. Read the pilot's manual on the aircraft charging system; if the voltmeter is not between 13-15 volts above 2000 rpm, do not fly until the system is troubleshooted, even though a fully charged battery is sufficient for 1.5 hours flying.
6. Do not fly your Quickie if you find the vibration level to be so high that it concerns you. Our 77Q is relatively smooth, and yours should be also, unless you have one or more errors in the engine installation. Contact QAC for help on troubleshooting.
7. Remember, there is always tomorrow to fly your aircraft if it is not ready today; be cautious, conservative, and use common sense.
8. Do not fly the aircraft, or even perform taxi tests, until you have done an accurate weight and balance test.
9. We do not recommend that you fly your Quickie in the rain during the initial 20-30 hours of flying. Moisture on the canard causes an increase in the stick forces that the pilot feels, according to testing that we have done with 77Q. This change in force required might be disconcerting to a low time Quickie pilot. (the increased force required for a given airspeed will tend to drop the nose until the pilot corrects by increasing the force on the stick. Testing on 77Q has shown no change in minimum speed, but a large increase in force required)

