Step 187: Inspect the Control System

Make a final check to verify that all flight control surfaces have the prescribed travel, as follows:

Ailerons: 22.5°(±2.5°) up, 17.5° down (±1°)
Elevator: 23° up, 20° down (±1°)
Rudder: 25° left and right (±1°)

Adjust the control stops, as necessary. Verify that the ailerons have the same travel on both sides, that all control surfaces respond correctly to control system inputs, and that all controls work smoothly without binding or excessive friction.

Verify that the flaps have full travel and that both flaps extend the same amount at each notch; the flaps should be fully retracted (with the flap track bearings at the ends of their slots) when the handle is in the lowest notch and fully extended when the handle is in the highest notch.

Check that all engine, propeller and accessory controls work smoothly and provide full travel (stop to stop).

Warning Make sure that none of the controls, when fully deflected, interferes with the movement of any of the other controls. In particular, check for interference between the control sticks and the throttle and mixture controls. Take steps to alleviate any unacceptable interference.

Check all control cables for proper routing and tension. All cables should contact only pulleys, fairleads, nylon guide blocks or other dedicated wear blocks. Install nylon or phenolic wear blocks if the cables rub on the fuselage cage or other parts of the airframe.

Insert a piece of wire into the inspection hole in each rod end bearing in the control system to verify that there are enough threads engaged. If the wire goes through the hole, the rod end bearing needs to be threaded further onto the control rod. Double check that all jam nuts are properly torqued (with a wrench) and witness-painted.

Make sure that the elevator, rudder, aileron and trim tab counterweights are tightly secured and do not contact any part of the airframe during any part of the control surface's range of travel.

Check the elevator trim system (regardless of whether it's electric or manual) for free travel throughout the entire range. Check to make sure that the trim position indicator registers properly when the trim tab is in the neutral position and, if necessary, adjust the indicator to achieve this.

Finally, make sure all moving parts are lubricated properly. We recommend light grease, except for rod end bearings, which should be lubricated with a greaseless spray lubricant (such as LPS).

Completed: [ ]

Step 188: Inspect the Landing Gear, Wheels and Brake System

Make a thorough inspection of the entire landing gear system. Make sure the tires are inflated properly and the main wheel axle nuts are cotter-pinned. Inspect all other fasteners for proper installation and tightness (see the following sub-section). Make sure the brake lines are adequately protected from rocks or other ground debris, and that they are routed well clear of the tires so that chafing cannot occur.

BLEED THE BRAKES

Aircraft brakes are bled from the bottom to the top (i.e., from the caliper to the master cylinder(s)). Use a fluid pump (such as an oil pump can) with a clear tube attached to the brake caliper bleeder fitting. Open the bleeder and pump fluid from the caliper through the master cylinder(s) to the reservoir until no air bubbles are evident in the reservoir; then, tighten the bleeder fitting. As the reservoir fills, siphon the fluid back down into the pump or some other container to prevent overflow. Repeat for both brake calipers until the brakes feel solid. Finally, drain the reservoir until it is about **7/8** full. A soft pedal means there is trapped air in a line or the master cylinder. Try loosening a fitting at the master cylinder (one at a time) while pumping from below. Also try depressing the master cylinder by pressing on the pedal will sometimes displace trapped air.

FASTENER INSPECTION AND SAFETYING

Before flying your Sportsman, it's imperative that you perform a systematic inspection of the entire airframe, with an emphasis on checking that each fastener is properly installed, tightened and safetied as necessary. Use the following general guidelines for your inspection:

A) Check that each bolt, screw and clevis pin has the proper grip length; if more than three washers are needed for an assembly, use the next size smaller fastener.

B) Check that all nuts are tightened firmly (unless the connection is meant to rotate) and that **at least one-and-a-half threads** show past the end of each nut.

C) Verify that all castle nuts are safetied with a cotter pin of the correct size and that both ends of each cotter pin are fully bent over.

D) Check that all clevis pins are properly cottered and that a washer is installed under each cotter pin.

E) Non-self-locking nuts that cannot be cotter-pinned to prevent rotation, such as the jam nuts that lock rod end bearings on control pushrods, should be checked for tightness. For these nuts, we recommend applying witness paint across the interface of the nut with the part it's tightened against as an inspection aid to detect rotation of the parts. Such rotation breaks the paint seal, indicating the need for corrective action. For witness paint, use a small dab of brightly colored fingernail polish or a product called "Torque Seal" made specifically for this application. Torque Seal is available direct from Glasair Aviation; order P/N 620-0642-501.

What follows is a system-by-system checklist to assist you in inspecting every fastener in the airframe. In using the checklist, keep in mind the following points:

A) **The checklist covers the components of the standard kit only**. Thus, the absence of a particular item from the checklist does not relieve you of the responsibility of verifying the safety of that item. In particular, the engine compartment should obviously be subjected to the most rigorous scrutiny.

B) **The checklist covers standard aircraft fasteners only**. Not included but still vital to check is the security of cable ties, loop clamps, plumbing fittings, etc. Check all plumbing and wiring for consistent use of standard installation practices. In particular, be on the lookout for any existing or potential chafing problems involving electrical wiring or fluid lines.

C) **The order of items on the checklist is not necessarily the best order in which to make the inspection**. The list is broken up by major system, but in some cases, inspection covers, fairings and so on from one system will have to be left off until the fasteners of a later system have been inspected. Just be certain that at the end of the process, all the items have been checked, and if you are forced to undo a fastener that you have already inspected, be sure to somehow note that it will require re-inspection later.

Step 195: Inspect the Fuselage Structure

- ☐ Fuselage shell/cage attach tab screws and nuts
- ☐ Forward shell attach fitting bolts and nuts
- ☐ Upper and lower shell attach fitting screws, bolts and nuts
- ☐ Aft shell attach fitting screws, bolts and nuts
- ☐ Fuselage strut attach fitting screws, bolts and nuts
- ☐ Wing pivot assembly bolts, nuts and cotter pins
- ☐ Engine mount bolts and nuts
- ☐ Firewall screws and nuts
- ☐ Forward inter-bulkhead shearweb bolts and nuts (after final government airworthiness inspection). Use 15 each AN3-4A bolts, AN960D10 aluminum washers and AN364-1032A nylon self-locking nuts to secure the shearweb.
- ☐ Aft inter-bulkhead shearweb bolts. Use 15 each AN3-4A bolts with AN960D10 aluminum washers threaded into the MF5000-3 nutplates.

Completed: [ ]

- ☐ Trim tab counterweight bolts and nuts (manual trim only)
- ☐ Lower rudder hinge bolts and nuts
- ☐ Upper rudder hinge bolts (check both fin-side and rudder-side hinge halves)
- ☐ Upper and lower rudder hinge pivot bolts, nuts and cotter pins
- ☐ Rudder counterweight screws

Completed: [ ]

Step 202: Inspect the Rudder Control System

- ☐ Rudder control support bracket screws and nuts
- ☐ Brake master cylinder mounting bracket screws and nuts
- ☐ Rudder control pivot push nuts
- ☐ Rudder pedal pivot bolts, nuts and cotter pins
- ☐ Brake master cylinder bolts, nuts and cotter pins
- ☐ Rudder spring shackle clevis pins and cotter pins (early kits only)
- ☐ Forward rudder cable clevis pins and cotter pins
- ☐ Forward pulley group pivot bolts, nuts and cotter pins
- ☐ Forward pulley group cable guard pins and cotter pins
- ☐ Rudder cable turnbuckles (safety wire or clip)
- ☐ Bulkhead A pulley pivot bolts, nuts and cotter pins
- ☐ Bulkhead A pulley bracket cable guard pins
- ☐ Aft rudder cable clevis pins and cotter pins

Completed: [ ]

Step 203: Inspect the Elevator Control System

- ☐ Elevator/aileron control yoke bearing block bolts and nuts
- ☐ Forward elevator cable clevis pins and cotter pins
- ☐ Elevator cable turnbuckles (safety wire or clip)
- ☐ Aft elevator cable bolts, nuts, clevis pins and cotter pins
- ☐ Bellcrank mounting bracket bolts and nuts
- ☐ Bellcrank pivot bolt, nut and cotter pin
- ☐ Pushrod/bellcrank bolt, nut and cotter pin
- ☐ Pushrod/control horn bolt, nut and cotter pin

- ☐ Pushrod rod end jam nuts (witness paint)
- ☐ Trim tab cable end or pushrod/control horn bolt, nut and cotter pin
- ☐ Trim tab cable end or pushrod rod end jam nuts (witness paint)

Completed: [ ]

Step 204: Inspect the Aileron Control System

- ☐ Left and right control stick pivot bracket pivot bolts, nuts and cotter pins
- ☐ Left and right control stick mounting bolts and nuts
- ☐ Left and right primary actuation cable clevis pins and cotter pins
- ☐ Left and right forward aileron pulley pivot bolts, nuts and cotter pins
- ☐ Left and right forward aileron pulley guard straps
- ☐ Left and right aft aileron pulley pivot bolts, nuts and cotter pins
- ☐ Left and right aft aileron pulley guard straps
- ☐ Left and right crossover pulley pivot bolts, nuts and cotter pins
- ☐ Left and right aft wing spar aileron guide-pulley bracket bolts and nuts
- ☐ Left and right aft wing spar aileron guide-pulley pivot bolts, nuts and cotter pins
- ☐ Left and right aft wing spar aileron guide-pulley guard straps
- ☐ Left and right bellcrank/cable bolts, nuts, clevis pins and cotter pins
- ☐ Left and right bellcrank pivot bolts, nuts and cotter pins
- ☐ Left and right bellcrank/pushrod bolts, nuts and cotter pins
- ☐ Left and right pushrod rod end jam nuts (witness paint)
- ☐ Left and right pushrod/aileron bolts and safety wire
- ☐ Left and right hinge bolts and safety wire
- ☐ Aileron cable turnbuckles (safety wire or clip)
- ☐ Aileron servotab hardware (nuts, bolts and cotter pins)
- ☐ Left and right counterweight attach bolts

Completed: [ ]

Step 205: Inspect the Flap Control System

- ☐ Flap handle pivot bolt and nut
- ☐ Flap ratchet plate mounting bolts and nuts

- ☐ Flap ratchet plate roll pin
- ☐ Flap handle/cable bolt, nut, clevis pins and cotter pins
- ☐ Left and right center flap pulley pivot bolts, nuts and cotter pins
- ☐ Left and right center flap pulley cable guard pins
- ☐ Left and right outboard flap pulley pivot bolts, nuts and cotter pins
- ☐ Left and right aft wing spar flap guide-pulley pivot bolts, nuts and cotter pins
- ☐ Left and right aft wing spar flap guide-pulley cable guard pins
- ☐ Left and right bellcrank cable-retainer clip mounting bolts and nuts
- ☐ Left and right bellcrank pivot bolts, nuts and cotter pins
- ☐ Left and right bellcrank/pushrod bolts, nuts and cotter pins
- ☐ Left and right pushrod rod end jam nuts (witness paint)
- ☐ Left and right pushrod/flap bolts, nuts and cotter pins
- ☐ Left and right flap-track bearing mounting bolts, nuts and cotter pins
- ☐ Flap cable turnbuckles (safety wire or clip)

Completed: [ ]

Step 206: Inspect the Manual Trim System

Electric Trim Option If you've installed the electric trim system, **skip this step.**

- ☐ Forward trim cable jam nuts (witness paint)
- ☐ Gear box traveler block set screw (witness paint)
- ☐ Travel stop cable clamps (witness paint)
- ☐ Mounting bracket/cage screws
- ☐ Gear box/mounting bracket screws
- ☐ Aft cable retainer clip screws

Completed: [ ]