

P.O. BOX 3090 ONE AYRES WAY ALBANY, GEORGIA 31706-3090 PHONE 912/883-1440 FAX 912/439-9790

Service Bulletin No. SB-AG-38

27 June 1994

Page 1 of 5

Approval: FAA Approved

Vertical Fin Rear Spar Modification

MODELS AFFECTED:

All models of the S2R with the Ayres metal tail using the 40260 vertical fin assembly.

	<u>MODEL</u>	<u>SERIAL NUMBERS</u>
All models listed, Including any Serial number Listed ending in D.C. (dual cockpit)	S2R	1416R thru 2583R 5000R thru 5100R
	S2R-R3S	R3S-001 thru R3S-011
	S2R-R1340	R1340-001 thru R1340-030
	S2R-R1820	R0820-001 thru R1820-035
	S2R-T11	T11-001 thru T11-005
	S2T15	T15/27-001 thru T15/27-029, -031
	S2R-T34	T34/41-001 thru T34/41-201 -6000 thru -6049
	S2R-T45	T4001 thru T45-004
	S2R-T65	T65-001 thru T65-010
	S2RHG-T65	T65-001 thru T65-009
	S2R-G5	G5-101 and G5-102
	S2R-G6	G6-101 thru G6-115
	S2R-G10	G10-101 thru G10-105

REASON FOR PUBLICATION:

A report from the field that a crack was discovered at the upper rudder hinge mount. The hinge mount P/N 40204-1 bolts onto the web of the vertical fin rear spar. The spar web was cracked on the left and right sides of the top rudder hinge mount. The cracks began at the top edge of the spar web, and extended down along side the edges of the hinge mount. The crack on the left was 3 ¼ inches long, and skirted just outboard of the rivet hole. The crack on the right was just over three inches long, terminating at the center of a rivet hole. The center rudder bearing housing area also had vertical cracks on both sides, which were less than two inches long.

This bulletin describes a repair method for spars with a crack(s). It is further suggested as a modification to strengthen those spars without cracks. Current production vertical fins utilize the stronger assemblies described here.

The "shoe" inside the vertical fin was redesigned to further stiffen the spar web at the top. The intermediate rudder bearing mount was also stiffened with a redesigned doubler on the inside face of the spar. The doubler is now made of steel and has flanges on two edges to further stiffen it and the structure to which it attaches.

As a contributing factor, the spar assemblies that cracked had the top bearing completely seized from internal rust. The center bearing was partly seized for the same reason. This condition aggravates spar web flexing.

In consideration of the low number(two) of spars reports as cracked, and the contributing factor of the locked-up rudder hinge bearing, structural modification is at the operator's option, as long as no crack exists.

However, a continuing inspection of the hinge bearing mount areas, as well as the bearings themselves, is in order.

Should the operator desire to upgrade the spar to current production status, parts are available to do so. If SB-AG-32 (now AD-93-20-05) has not yet been complied with, it would be advisable to perform this bulletin along with SB-AG-32, since major disassembly is required to do either one.

COMPLIANCE

Visual inspection of the three rudder hinge bearing mounts, top, center and bottom, before next flight. If no crack(s) is detected, operation may continue. Repeat inspections are to be made at each successive are 100 hour/annual inspections. A log book entry is to be made referencing this service bulletin.

BY WHOM WORK WILL
BE ACCOMPLISHED:

A & P mechanic or equivalent

ESTIMATED MAN HOURS
FOR COMPLIANCE:

8 hours

ACCOMPLISHMENT
INSTRUCTIONS:

Remove the rudder and vertical fin from the aircraft. Remove the upper and center 40204-1 bearing assemblies and measure the four mount holes. The holes are to be from .189 to .191. Discard any assembly with oversized holes. Check the bearings inner race to be free. Replace any bearing that will not freely rotate 360°. Drill out the rear spar of the vertical fin. The 10 rivets on top, and 11 rivets each side, on top, must also be removed to release the "shoe" from the fin.

Drill off the 40268-4 bracket assy ("shoe") from the top. Save the 40268-6 plate assembly with the four floating nut plates on it.

Check the four bearing attach holes thru the spar web. The holes should be .189 to .191. Spar webs with oversized holes must be repaired or replaced, whether cracked or not.

Stop drill any existing crack. If the crack is more than 1.5 inches long, replace the spar web.

Drill off the aluminum 40026-1 doubler, and drill the four each nut plates off of it. Save the nut plates. Plug the two rivet holes in the center (approximately 1 1/8" apart) above and below the center hinge bearing.

Check the four bearing attach holes for size, and check the area for cracks. If crack (s) are found in this area, the spar must be placed.

Place the new steel 40026-2 doubler in position on the front of the spar. The flanges run horizontal. The lower face of the lower

flange is to be .88 inches from the center line of the four rivets in the rib flange. Mark the doubler to drill the four 3/8 diameter rudder hinge bolt holes. When the four holes are drilled, install the steel doubler and the four nut plates with counter-sunk MS20426AD3 rivets. If the upper end of the spar is to be repaired with the nesting doubler P/N 40262-3, then the center bearing and lower bearing must be shimmed to maintain rudder hinge bolt alignment. The shim P/N for the center hinge bearing is 40262-5. For the lower bearing, use P/N 40262-7. Install the rudder hinge with bolts. Drill the doubler for the existing rivets on the edge.

Add two additional rivets to each side. The first one to be midspaced between the ones you just installed, and the second one to be $\frac{3}{4}$ " above the top of the existing rivet. Now plug the two holes in the spar edge with MS20470AD3 rivets.

At the top, install the 40268-6 plate assembly (with nut plates) onto the new 40268-11 bracket assembly ("shoe"). The existing holes in the new 40268-11 fit the existing holes in the spar, but the part is shorter than the old one. Plug the remaining six No.30 holes with MS20470AD4 rivets. Install the new "shoe" onto the front of the spar. If the spar web requires repair due to oversized holes or cracks, install the nesting doubler P/N 40262-3 in the top of the aft face of the spar, match drilled to the hinge bearing and the "shoe". If the nesting doubler is required, shim the remaining two hinge bearings with parts described earlier.

Match drill the shoe per existing holes in the top and the side skins.

Plug the four holes in the side skins of the vertical fin. These holes are a result of the shorter "shoe".

Reinstall the reworked spar into the vertical fin, paint/touch up as required, and install the fin and rudder.

RECORD COMPLIANCE:

Ayres Corporation Service Bulletin No. SB-AG-38 complied with by modification per bulletin.