

AeroKits...

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Airworthiness Advice for Savannah/Bingo aircraft.

History:

There have been 3 reported instances of failure of the standard nosewheel axle which have resulted in considerable damage to the aircraft. Two of these cases are reported to be a result of hard landings. However, one operator reports no hard landings, but fairly rough ground in the taxi areas. Note that there are no reported instances of failure of the tundra tyre axle.

The typical failure is a crack developing transversely through the aluminium axle, and propagating between the external bearing retaining nut thread, and the internal thread for the axle retaining bolt. The cracking appears to start in the area of the external keyway for the bearing retaining nut tab washer. This is the weakest point of the axle and measurement has shown that the axle flexes longitudinally when vertical load or horizontal load is experienced as in travelling over rough ground, hard landings, and landing with the nose wheel off centre. Orientation of the cut keyway relative to the direction of the forces experienced by the axle may also be a contributing factor as there are many aircraft which have had no problems with the axle. Axles aligned so that the keyway is in the 9 o'clock position are probably less prone to cracking.

Suggested remedies;

1. The axle should be visually inspected before each flight for cracks. It must be realised however, that it may not be possible to detect a crack visually as the crack may propagate from the inside of the axle.
2. The axle should be removed and checked for straightness, and if straight should be drilled completely through in a lathe, and a 8mm socket head cap screw of the correct length fitted so that no part of the thread is inside the fork side plates. A nylock nut with suitable spacer washers can be used to retain the axle and apply compressive pressure on the axle. The drilling should be done to minimise gouging, pickups, or scoring of the internal hole in the axle. Alternatively a bolt could be made from 5/16" 4130 steel rod threaded each end for nylock nuts so that no thread is inside the fork side plates. It may be best to align the keyway in the axle within the 9 o'clock position.
3. Replace the aluminium axle with a steel axle of the same dimensions of the original axle. This fix will incur a weight penalty.