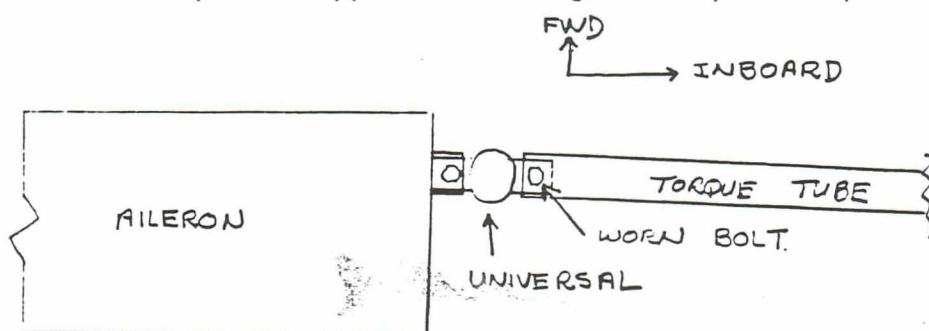


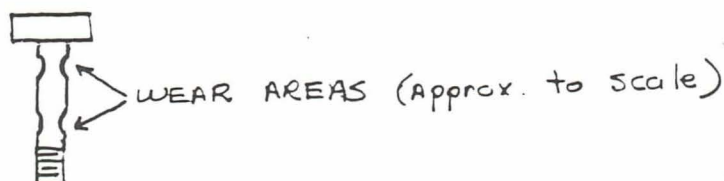
AILERON FREE-PLAY

Over the last several months, I have been noticing that the free-play in the ailerons seemed to be getting worse. I had been checking the bellhorns etc for loose bolts, but hadn't discovered anything. Finally, I decided to pull the ailerons to inspect the universal joints at the inboard edge of the ailerons and the torque tube and bearing in the wing root. Again, all connecting bolts were tight, but I noticed that there was movement between the aileron torque tube and the universal joint when the aileron was held and torque was applied to the wing root torque tube (See sketch).



I disassembled the torque tube from the universal joint and was surprised to find that the 3/16" bolt had been significantly worn down in two areas where it passed through the universal joint (See sketch).

AIRPLANE HAD
400 HOURS FLYING TIME



Apparently, there was some slight movement of the universal with respect to the bolt due to the hole in the universal being a little out of round (but not much) that grew as the bolt wore. This resulted in more and more free-play at the aileron. When I put a new 3/16" bolt in the hole, most of the slop was gone and the connection appeared to be airworthy. However, upon closer examination, I could still detect a slight movement when torque was applied. I then drilled the hole out with a "D" drill bit and press fit a 1/4" bolt in the hole. That eliminated any free-play from that connection. The right aileron was also inspected, but no wear was found on that side.

Based on this experience, I suggest that flyers be sensitive to the amount of free-play in their aileron system during walkaround inspections, and specifically determine the cause of any looseness in the system before it becomes serious. I found out that a seemingly "good" connection might not be as good as you originally thought.

Builders should pay particular attention to drilling accurate bolt holes for these connections. If I was doing it over, I'd drill a few thousands undersize and ream them out until I got a press fit.