Bulletin: TB19940802 Cable Maintenance Date: 8/17/1994 Page 1 of 1

Applies To:

All Wills Wing Gliders

Inspection / Service Requirement:

The cables which support the glider's airframe are critical components of the glider's structure, and must be maintained in an air worthy condition. It is a general practice in the design of aircraft structures to design to an ultimate strength of 1.5 times the highest expected load in normal service. Hang glider cables, like other structural components on the glider, are typically designed with a structural safety factor of only about 50% above the expected maximum load. No significant loss in cable strength can be tolerated.

A cable with even a single broken strand must be replaced before the glider is flown again. A cable which has been bent sharply enough to have taken a permanent set (will not lie flat in a straight line or smooth, large radius curve when all tension is removed) must also be replaced immediately. If it is not, subsequent tensioning and de-tensioning of the cable will induce fatigue, and the cable will fail. In tests we have conducted, a cable bent sharply one time to 90 degrees, and then loaded to the equivalent of a normal flight load 100 times (corresponding to 100 or fewer flights), failed at only 56% of its original strength. We have seen cases in the field where cables with no visible sign of damage failed in flight due to having been kinked and subsequently fatigued. In one case the glider in question was only 18 months old.

A bottom side wire can commonly become kinked in this manner if the thimble is cocked on the tang when the crossbar is tensioned. Some degree of fatigue due to repeated bending of cables is almost unavoidable in an aircraft that is assembled and disassembled with every flight. Bottom side wires are subject to the highest loads in flight, and are therefore the most critical. This is why we recommend that these wires be replaced annually, even if there is no known damage. The requirement for immediate replacement of a cable known to have been bent or otherwise damaged supercedes this annual replacement requirement. All wires should be carefully pre-flighted before every flight, inspected in detail every six months, and replaced when there is any doubt about their condition.

Replacement cables should always be obtained from the factory, or, if not from the factory, from a reliable source known to use proper fabrication procedures. We have seen fatal accidents caused by improperly made cables that appeared to be perfectly OK on visual inspection, but failed in flight at a load much below the intended design strength of the cable.