

Applies To

U2 – all sizes
Sport 2 – all sizes

Introduction

On the U2 and Sport 2 gliders, the forward pulley block for the VG system is anchored to the xbar center ball by a short loop of rope.

Two types of rope have been used in this application –

30J-3301 ROPE 4mm SUPER PRE-STRETCH, and
30J-3012 CORD - 3MM OC3-3Y YELLOW.

We recommend an upgrade of this rope connection on all gliders to the current configuration, detailed below. Regular subsequent inspection and periodic replacement of this rope is also necessary to preclude the possibility of an in-flight failure of this rope connection. When the VG is set to other than the full loose adjustment, this rope is under significant tension, and this tension increases as additional maneuvering loads or gust loads are placed on the glider in flight. If this rope were to fail in flight, the crossbar would move forward unrestricted, until the sweep wire became tight – thus placing a shock load on the sweep wire. Although we have received no reports



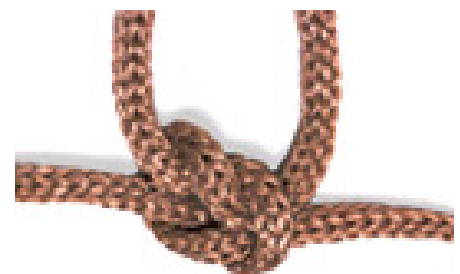
of in-flight failures of the sweep wire on any Wills Wing glider, we have seen anecdotal reports of sweep wire failure under shock load on other gliders, indicating that such a failure is possible.

There are three specific concerns with the integrity of this rope connection:

1. The security of the knot
2. Possible wear on the rope from the pulley block or other hardware that may have weakened the rope
3. Sufficient inherent strength of the rope, even in new condition

On gliders assembled prior to June of 2005, the rope used was a single loop of 4mm Super Pre-Stretch, (as shown in the photo above) and it was secured with a square knot (as illustrated below).

A square knot is not a considered a permanent knot, and thus is not an appropriate knot for this application. Subsequent to June of 2005, the knot was changed to a fisherman's knot, which is the knot that should be used in this application.



We have also determined that the 4mm Super Pre-Stretch rope is subject to wear in this application, and does not have the desired reserve of strength.

We are currently using 30J-3012 CORD - 3MM OC3-3Y YELLOW in this application. This material is more resistant to wear than is the 4mm Super Pre-Stretch, however it also has a slicker surface. Gliders on which this material was used that were assembled prior to May 15, 2007 used a single loop of this rope to make this connection, secured with a fisherman's knot. Testing of this type of loop has shown that under high loads, the knots may gradually slip. As a result, we are now using a double loop of this material, as shown.



Additional Parts Required

3 ft. 30J-3301

ROPE 4mm SUPER PRE-STRETCH

Tools Required

A hot knife

Procedures – Inspection, Replacement, Adjustment:

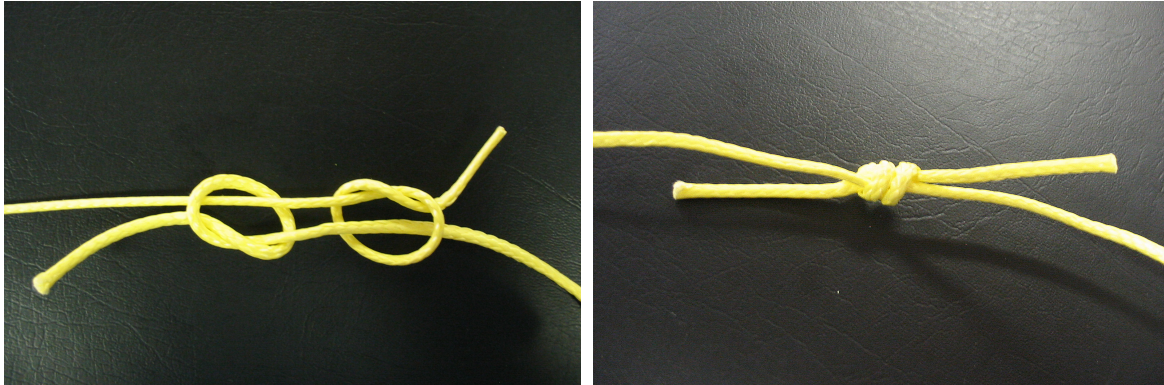
We are recommending that all Sport 2's and U2's be upgraded to the double loop of 3MM OC3-3Y YELLOW cord, and that all such gliders, even subsequent to this upgrade, be inspected on a regular basis for any sign of wear on the rope and to insure the integrity of the securing knots.

To inspect or replace the rope, set the glider up on the control bar and spread the wings about 2/3 of the way. It is not necessary to install any battens, or tension the crossbar.

To replace the rope, simply cut off the old rope and install the new one. Pass one end of the rope down through the bracket on the pulley block, then upwards through the hole in the xbar center ball, down again through the bracket, and then up through the ball a second time, following the routing as shown above, and bringing the two free ends of the rope together above the keel center between the ball and the pulley block.

Wills Wing Technical Bulletin

Tie the fisherman's knot as illustrated below, and then gradually adjust the length of the double loop to that shown in the photo above as you snug up the individual overhand knots and draw them together.



Note that the final adjusted length of the loop is important - if the rope loop is too long, the range of the VG system will be reduced. If the loop is too short, it will come under excessive tension when the glider is folded up, as the xbar center ball moves farther away from the back side of the hinge bracket assembly. The length of the loop should be such that with the wings spread about half way, the pulley block can be pulled about $\frac{3}{4}$ of an inch (20mm) away from the back edge of the hinge brackets. Check the rope again with the wings completely folded – it should be between snug and just slack, but not tight, and no more than just slack.

Once the adjustment of the length of the loop has been finalized, pull the individual overhand knots as tight as possible by pulling on the free end of the rope while restraining the associated knot, and then pull the two overhand knots together as tight as possible by pulling on the working ends of the rope just outside the overhand knots. When the knot is as tight and secure as you can make it, trim the free ends to no shorter than two inches, and heat-seal the ends.

Inspection Requirement

Assuming a new rope has been installed in the recommended configuration, then on subsequent inspections, three things need to be checked - the knots, the heat sealing of the ends of the rope, and wear on the rope.

Check the knots to make sure they are secure, and that a minimum of one inch of rope extends outside of each knot. Check that the ends of the rope are sealed and not frayed.

With respect to wear, in order to properly inspect the rope you will need to pull the loop of rope around sufficiently to expose all parts of the rope to visual inspection, including the parts inside the xbar center ball, and inside the pulley block. If there is any evidence of wear on the rope, replace it with a new rope.