

SERVICE BULLETIN SB-EV97-UK-013 Issue 1

Kit Built Eurostar Aircraft, Rudder Stop Swages

30th August 2011

Classification: - Recommended

Nature of Defect

Crimped Nicopress swages are used on the homebuilt Eurostar aircraft to act as rudder stops. Evektor have found that, on some factory built aircraft the swages have not been correctly crimped, with the possibility that high loads on the rudder pedals may move the crimps and hence the rudder stop positions. We assume that on homebuilt aircraft the swages have been correctly crimped, but this bulletin is to recommend that they are checked, and corrected if necessary. On homebuilt aircraft the swages should have been crimped with a genuine Nicopress tool, using the "Oval m" size, or an alternative "bolt together" simple tool with a crimp diameter of approx 8.5 mm. If an incorrect tool has been used it is possible that the swages have not been correctly crimped.

Airworthiness Implications

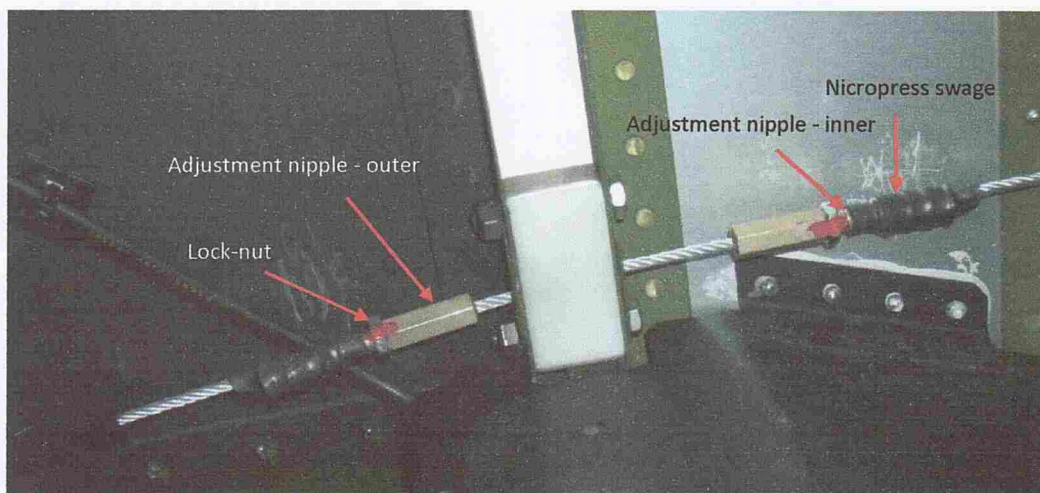
If the rudder stops are moved away from their design positions, excessive rudder deflection can result, applying high loads to the rudder and fin in flight. Under certain circumstances, there may also be the possibility of rudder stall.

Aircraft Affected

It is recommended that all homebuilt EV-97 Eurostar aircraft are checked and rectified as necessary.

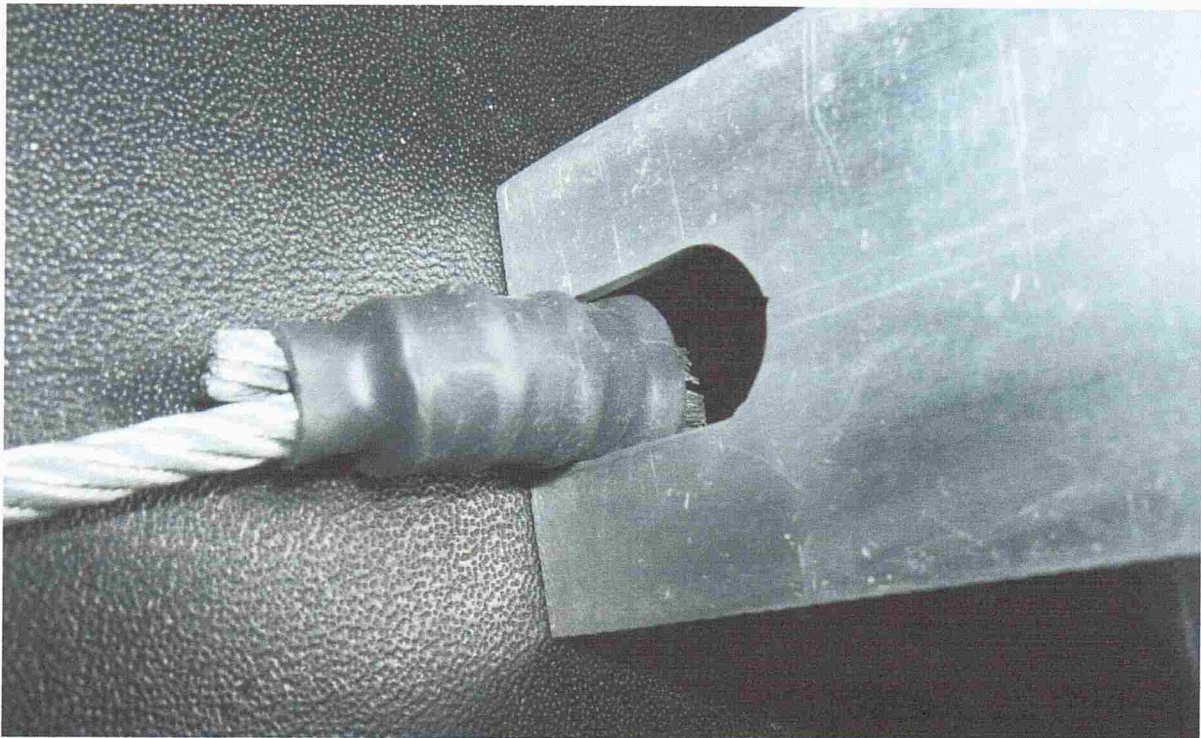
Inspection Required

An incorrectly crimped swage can be detected quite simply by checking its width using the gauge supplied by Cosmik, Part Number Cosmik G1. The gauge is designed to be used with the heat shrink on the swage and tests have been performed to ensure that variations in heat shrink thickness cannot invalidate the test. Swages are fitted on each side of the fuselage adjacent to the seat, as shown below, one in front and one behind the plastic block.



Proceed as follows:

- Remove the seats, backrests and interior trims adjacent to the seat, from each fuselage side. Take care when removing the seat and seat back to ensure that the Velcro stuck to the seat pan with contact adhesive does not become detached. With the Velcro on the seat back released, the top of the seat cover slides off vertically.
- Offer the GO/NO GO gauge up to the swage, ensuring that the gauge edges touch the pressed, rounded surfaces of the swage and not the flattish region between them. Do not force the gauge over the swage, this will risk crushing the heat shrink, giving a false result. The gauge should slide over easily. The photo shows the way to check the swage. Note that there is a short length of “dummy” wire in each swage as well as the rudder cable that passes right through.
- There are 3 crimped regions on each swage; check each region on each swage. There are 4 swages acting as rudder cable stops.



If the gauge slides comfortably over each crimped region, then the swage has been correctly crimped and no further action is necessary. Replace the seats and trim and enter the inspection and bulletin number in the log book.

If the gauge does NOT fit over the swage, then the following corrective action is required:

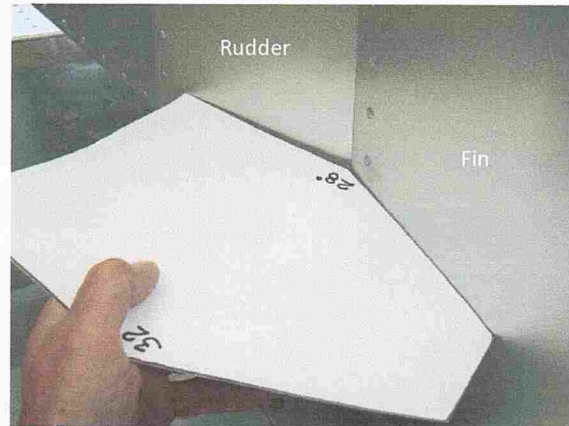
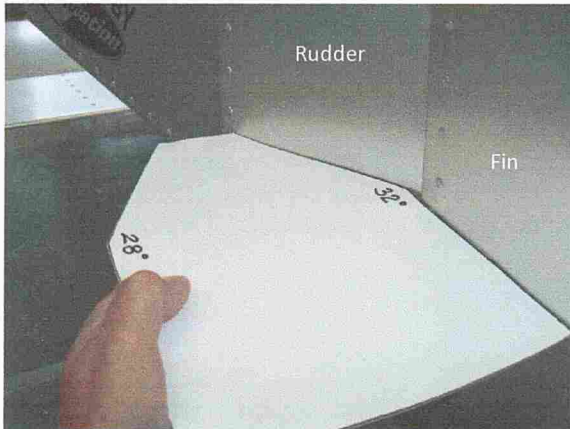
Rectification Action

You will need the following items:

- Loctite 648;
- Degreasing solvent and cloth;
- Sharp knife

- A) **Note:** Check if the swaged rudder cable stops have moved by measuring the rudder deflections. The deflections can be checked using the drawing at the end of this bulletin.

Make a template by pasting the drawing onto a sheet of stiff card and cutting round the heavy line. Get a helper to push one outer rudder pedal until the stop just contacts and then check that the deflection is between 32° and 28° using the template. Repeat with your helper pressing the other rudder pedal.



If the deflection in either direction exceeds 32° , then this indicates that the swage has moved; this can be corrected a small amount by the adjustment nipples.

1. Cut off the end of the heat shrink covering the adjustment nipple inner end, leaving the heat shrink over the swage. Take care not to damage the cable.
2. Try to slide each adjustable screw along the cable. If this is not possible, then Loctite has already been applied and actions 3 to 12 inclusive are not required. If the screw can be moved, then:
3. Try to slide the adjustment nipple 30mm clear of the swage, to uncover the cable. If this is not possible, then slacken the lock nut (spanner sizes are 8mm and 10mm) and screw the inner part of the adjuster into the outer part, so that around 28 to 30mm of cable is uncovered between the swage and the adjustment nipple inner.
4. Thoroughly degrease the uncovered cable using Isopropyl alcohol or acetone, taking care not to damage the paintwork.
5. Place a piece of cloth or paper under the cable to collect any Loctite drops.
6. Apply Loctite 648 to the uncovered cable between the adjuster and the Nicopress swage.
7. Now slide the adjustment nipple inner against the swage and turn it to distribute the Loctite evenly.
8. Slide the adjuster back clear of the swage and repeat the Loctite application until it just fills the spaces in the steel cable. Then slide the screw against the swage.

Note: Take great care not to allow surplus Loctite to reach the adjuster's threads. It is advisable to limit the movement of the adjustment nipple inner back and forth so that its end cannot form a build up of surplus Loctite contaminating the adjuster's thread.

9. Wipe off any surplus Loctite.

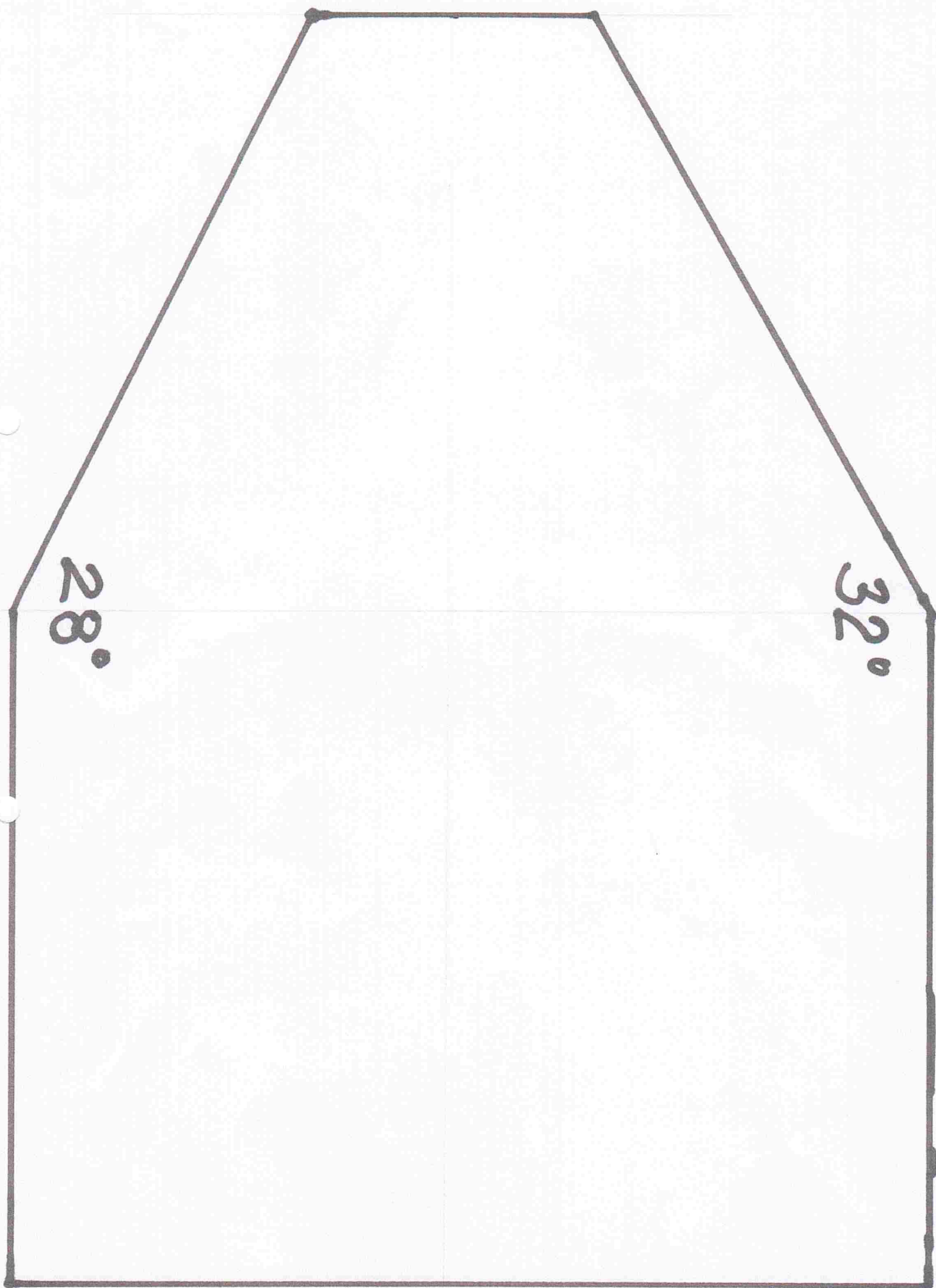
10. Allow the Loctite to cure for at least 10 minutes, and avoid moving the screw during this time. Gentle heat from a hairdryer or warm air gun will speed the cure.
11. Repeat steps 3 through 10 on the other 3 stops/adjusting screws.
12. Leave the Loctite to cure fully for 72 hours at room temperature.
13. When the joints are completely cured, adjust the stops to achieve a rudder deflection of $30^{\circ} \pm 2^{\circ}$ in each direction. Tighten the locknut and paint tell-tale on the locknut and female adjustment nipple. Note that the stops should be positioned so that the adjusters on both sides touch the nylon block assemblies at the same time.

Note: if you are unable to adjust the stops to achieve the above deflections, contact Cosmik Aviation for further instructions.

14. Replace the seats and trim.
15. Record the work in the aircraft's log book, quoting this Service Bulletin number, and have a second qualified person inspect the work and countersign the entry. Keep a copy of this bulletin in the aircraft records.
16. Please report the work by e mail, quoting aircraft registration, to Cosmik Aviation. E mail address is: nigel@skydrive.co.uk Please let us know whether any of the swages had moved and needed rectification.



Nigel Beale



28°

32°