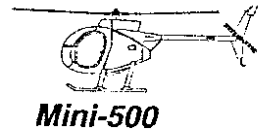




REVOLUTION

HELICOPTER CORP., INC.



1905 W. Jesse James Rd. * Excelsior Springs, Missouri 64024
Phone (816) 637-2800 * Fax (816) 637-7936

August 20, 1997

Revolution Helicopter Airworthiness Directive (AD) # 08201997

Affected Aircraft: All Mini-500 helicopters shipped on or before May 23, 1997, except for aircraft serial #0430.

AD Type: Urgent (Must be complied with before further operation of the aircraft).

Subject: Main transmission pinion support spacers.

In some isolated cases, we have had reports of multiple chip-light alerts for the main transmission. Although it is expected to have an occasional chip-light from normal brake-in, multiple chip-light alerts are not normal and indicate impending trouble. Upon factory examination of these reported cases, we were able to discover the problem and devise a method of solution.

The problem occurs with pressures being applied to the transmission case from the bending moments of the mast. This will cause a slight shift between the upper and lower transmission cases. When this shift occurs, the pinion bearings are pinched by the shifting parting-lines between the two case halves. The balls within the bearings are then forced to squeeze through tight spots, which will degrade the inner and outer bearing race, causing multiple chip-lights. If continued operation occurs, the bearing race will soon fail. In every case, the inner most bearing only failed. Even though the bearing race separated, a catastrophic failure has never occurred, but continued operation is not recommended. The bearing race material is mild steel, and did not damage the transmission pinion or ring.

On May 24, 1997 all Mini-500 main transmissions are assembled with four 3/8 inch diameter pins installed on each side of the pinion support area of the casting. The standard bolts are installed through the center of these pins. These pins are precision-ground, and add positive support to prevent shifting, where non-precision bolts would not. Revolution Helicopter will make the precision-pin upgrade available to all Mini-500 owners at a reduced price of \$16.50 plus shipping, provided they are purchased before October 30, 1997. After this date, the precision-pin upgrade will only be sold at its regular retail price of \$27.24 plus shipping. The upgrade includes four #0739 pins, and eight #0479 washers. To purchase this upgrade contact Revolution Helicopter Corp. at: (816) 637-2800.

Corrective Action:

1. It is not necessary to remove the main transmission from the aircraft, although it is advised to protect the engine compartment from contamination by covering the area below the main transmission with a plastic sheet. Refer to the drawings provided with this AD for better understanding.
2. It is absolutely essential to relieve any pressure that could be on the pinion bearings due to shifting that may have occurred between the transmission halves. To achieve this, loosen all vertical 1/4 inch bolts that secure the transmission halves together. Also loosen the four 3/8 inch bolts that secure the transmission to the frame. It is only necessary to loosen all bolts enough to allow the transmission halves to shift to a relaxed position around the pinion bearings. It is not necessary to remove the oil from the transmission.
3. After the bolts have been loosened, relax the transmission halves by gently shaking the main mast. With a plastic hammer tap the top half of the transmission case surrounding the pinion bearings, and also gently tap the main drive-sprocket left and right to further assist to relax the halves. Spin the mast so that the motion of the pinion bearings will relax themselves.
4. After the transmission halves have been relaxed, tighten the four 1/4 inch bolts that join the transmission halves together that surround the pinion only. Be sure to use a cross-tightening pattern procedure on the four 1/4 inch bolts, and

draw them down together. Apply 90 inch-pounds to tighten. During this tightening procedure, rotate the mast periodically to ensure that the pinion bearings are aligning the two transmission halves properly.

5. Now tighten the other 1/4 inch bolts that secure the transmission halves together, using the same torque specifications. Next, tighten the four 3/8 bolts that secure the main transmission to the frame. At this point, the pinion bearings should be in their relaxed shape, and guiding the transmission halves to their proper location.

6. Refer to Mini-500 assembly manual for further assistance. In section 6, page 16, fig. 61, remove bolts #0439, leaving parts #0133 in place. Remove the rubber isolator #0500. Procure a 1/2 inch diameter bolt, nut and washers. Insert the bolt into the 3/4 inch diameter whole on the transmission case in place of the rubber isolator. Use the procured washers on each side of the 3/4 inch diameter whole and tighten with procured 1/2 inch nut. This will allow extra holding power to ensure that the alignment between the transmission cases remains.

7. Remove one of the 1/4 inch bolts that surround the pinion on the side of the procured bolt, washers and nut set-up. Only allow one 1/4 inch bolt at a time to be loose, so that the others will help to hold position. It will be necessary to drill the 1/4 inch bolt hole in the transmission out to a size suitable for reaming. It is recommended to step-drill the hole using three or more different drills, progressively larger in diameter before the hole is large enough to finish by reaming. Step-drilling is recommended to assist in drilling the hole straight, by allowing the slightly larger drill to better follow the hole without walking-off. It is absolutely essential to drill the hole straight! Use cutting oil when drilling.

8. Use a precision reamer, and ream a through hole of 0.3750" + or - 0.0005" diameter. It is absolutely essential to achieve this tolerance. A drill will not work as a reamer! Using cutting oil and turning the reamer very slow will help. When finished, thoroughly clean the hole.

9. Using oil or anti-seize, install the precision pin #0739 into the hole. With a small hammer, gently tap the precision pin into the hole using a soft plastic punch. Do not hit directly against the precision pin with a metal object. Make sure the pin does not shear any metal from the hole. The precision pin should fit snug with no play.

10. Reinstall the 1/4 inch bolt, using two new washers #0479 supplied, and tighten to 90 inch-pounds.

11. Repeat this entire process to the other bolt on the same side that is being held with the procured bolt, washers and nut.

12. When finished, remove the procured bolt, washers and nut, and place on the other side of the transmission housing. Repeat the entire procedure to this side, until all four 1/4 inch bolts have been modified.

13. Reassemble the rubber isolator #0500, and any other component. Continue operation.

This procedure should prevent further bearing failures, unless some damage has already occurred. If chip-lights occur frequently after, it may be necessary to replace a pinion bearing.

Please date and sign this AD and fax or mail it back to Revolution Helicopter Corp.

If you have any questions, contact:

Revolution Helicopter Corp.
1905 West Jesse James Rd.
Excelsior Springs Missouri, 64024
Tel: (816) 637-2800
Fax: (816) 637-7936

Print Name: _____

Serial # _____

Signature: _____

Date: _____

