Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

AS350 Series Flight Control Hydraulic Pump Drive

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1. Applicability

All AS350 Series helicopter hydraulic pump drive couplings incorporating a flat hydraulic pump drive belt P/N704A33-690-004 or a hydraulic pump drive shaft P/N 704A33-310-006.

2. Purpose

To alert operators and maintainers to the various maintenance requirements for the hydraulic pump drive system and changed maintenance requirements for the hydraulic pump drive splines.

3. Background

There have been a number of in flight "loss of control" accidents overseas and one similar non-fatal accident in Australia which have been attributed to the failure of the flight control system following the failure of the hydraulic pump drive spline coupling and/or drive belt.

Splined Coupling

- Overseas investigations indicate that in some cases the splined coupling driving the pump was badly worn, due to lack of lubrication and the case hardening of the male spline being below specification hardness. Adverse wear caused the drive splines to "slip", or to disengage.
- Eurocopter has issued Service Bulletin (SB) No. 29.00.04 which requires the installation of a sealing "O" ring on the groove of the pump drive shaft, a plug to retain the spline lubricating grease and has changed the lubrication frequency from 550 hours TIS or 2 years to each 110 hours TIS or 6 months. These changes are now in the maintenance manual.
- Eurocopter Service Letter (SL) 1808-29-06 also advises of improved methods of drive-spline maintenance. The spline assembly backlash check should be done each 100 hours or 6 months, in conjunction with a visual inspection of the splines for adverse wear. Field experience shows it is possible to achieve the manufacturers required backlash tolerance when, for example, a new spline is inserted into a worn female sleeve. The manufacturer recommends replacing both the male spline and female sleeve whenever the coupling assembly fails the backlash check.

Drive belts

- In addition to the overseas reports of in-flight drive belt failures CASA has received defect reports on failed hydraulic drive (flat) belts and anecdotal reports of this style belt which fail to meet the manufacturers recommended replacement period, often being rejected at routine inspections for excessive wear / fraying. While the manufacturer's response is that failures of the flat belt were due to a quality control issue which has been addressed, CASA takes this opportunity to bring to your attention that:
  - Flat drive belts require continual and careful inspection for defects such as wear, fraying, joint rupture and loss of drive tension.
  - Eurocopter has issued SB No. 63.00.08 to modify the hydraulic pump belt drive from a flat single belt to a multi-groove "V" belt with an increased service life, as an option.

Idler Bearings

- There is more than one type of drive belt idler bearing assembly employed. Operators and maintainers should review the specific belt idler bearing lubrication and retirement requirements to ensure they are correctly maintained or retired as required.

4. Recommendation

CASA strongly recommends that operators consider implementing the requirements detailed in Eurocopter SB No. 63.00.08, SB No. 29.00.04, and in SL 1808-29-06.

5. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address:

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Or in writing, to:

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