



SERVICE BULLETIN

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Subject: R-44 and R-22 Cargo Hook Gimbal.

Helicopters Affected: Robinson R-44 and R-22 series with Onboard Systems Cargo Hook Kits installed under FAA STC SR01064SE, SR00578SE, SR00557SE or SR00920SE.

Compliance: Advisory

Description: On or about June 16, 2005, an operator of an R-44 flying a fertilizer bucket experienced a failure of the P/N 232-049-00 Gimbal Assembly. This part is a link that goes between the helicopter and the cargo hook. Failure of this part caused the bucket, rigging and cargo hook to separate from the aircraft. As the hook departed, the manual release cable pulled the hook open, releasing the bucket and rigging. The bucket fell to the ground and the hook stayed with the aircraft hanging by the manual release cable. The helicopter landed safely with damage to an inspection panel on the belly.

Pictures of the failed parts were sent to Onboard Systems and from those pictures and some additional stress analysis we have developed a theory about the cause of the failure. The two biggest and most likely factors appear to be torque loading from the fertilizer bucket and tension on the ears of the gimbal from tightening the bolt and nut that attach the link assembly.

The torque loading comes from counteracting the torque of the slinger on the bucket. In the absence of aerodynamic aids such as rudders or tails on the bucket this torque is transmitted through the rigging up to the spreader bar, eventually being reacted through the hook and gimbal. Excessive tightening of the NAS6604 bolt that attaches the 232-050-01 link assembly to the gimbal will cause a residual tensile stress in the lug at the point of crack initiation in this case. It was probably a combination of these two and possibly some other factors still under investigation that led to the failure.

Please understand that at this time we have not completed a full investigation and determined the final corrective action. Based what we know now, there are several things that could be done that might prevent a reoccurrence before the final approved service bulletin instructions are issued.

The actions recommended by this service bulletin are described below.



Approval: This bulletin is **NOT** FAA approved.

Manpower: Inspection for cracks and re-torquing nut will take 0.3 man hours. Replacement of the gimbal will require 0.5 man-hours. Man-hours are based on hands-on time and may vary with personnel and facilities available. No machining operations are required. Installation consists of removing and replacing parts.

Required Material: 1 cotter pin

Special Tools: Not required

Weight and Balance: Not affected

Electrical Load Data: Not affected

Publications Affected: None

Accomplishment Instructions:

1. To be accomplished within 10 days of the release of this service bulletin: Remove P/N 510-115-00 cotter pin and loosen P/N 510-273-00 Nut. Tighten nut finger tight and then tighten to next available slot for cotter pin. Install new cotter pin.
2. To be accomplished within 10 days of the release of this service bulletin and then repeated every 8 hours of fertilizer bucket hook time: Visually inspect P/N 232-049-00 gimbal assembly for cracks in areas noted within Figure 1. If cracks are found replace gimbal before further use.

Figure 1

