SLICK Service Bulletin

SB1-98A

TO: Aircraft manufacturers, distributors, dealers, engine overhaul facilities, owners and operators of Slick Aircraft Products aircraft magnetos.

SUBJECT: Mandatory impulse coupling inspections on certain 6-cylinder Textron Lycoming engines.

BACKGROUND INFORMATION: Field reports of magneto impulse coupling malfunctions resulting from unusually rapid wear of the impulse coupling pawl require an increase in the frequency of inspection intervals for impulse couplings used on the subject engines. In these cases, the impulse coupling may improperly engage the stop pin when the engine is operating, causing impulse coupling and accessory drive gear damage, which can lead to engine stoppage.

The rapid wear of impulse coupling pawls can be caused by a number of factors including excessive vibratory and/or radial forces resulting from an improperly maintained engine, propeller, motor mount, or other causes. An investigation is being conducted to determine the actual cause of the accelerated wear. However, preliminary investigations of field reports have found instances of magneto drive gear bushings in the engine crankcase being improperly repaired during engine overhaul. Improper repair of the magneto drive gear bushing can lead to misalignment of the magneto drive gear assembly and excessive vibratory and/or radial forces on the impulse coupling. Strict compliance with Lycoming Service Instruction No. 1140 and 1197A is required to ensure proper magneto impulse coupling operation.

Until the investigation is complete and a solution is developed that eliminates the accelerated wear of the impulse coupling pawls, the inspection frequency of impulse coupling pawls installed on the affected engines must be increased.

COMPLIANCE: If the service history of a Slick magneto impulse coupling installed on the affected engine model is unknown or the impulse coupling has been in service for more than 200 engine hours, perform the impulse coupling inspections according to this Service Bulletin within the next fifty (50) hours of engine operation or at the next annual inspection, whichever occurs first.

AND

Perform the impulse coupling inspections according to this Service Bulletin every 250 hours of engine operation, thereafter,

OR

Replace the impulse coupled magnetos installed on the affected engine models with Slick 6300 Series retard breaker and direct drive magnetos along with a Slick*START*™ magneto start booster in accordance with the latest revision of Lycoming Service Instruction 1495, or where FAA-PMA Approved (refer to the latest revision of publications L-1318 and SL2-96 for approved applications). Following installation of retard breaker and direct drive magnetos, compliance with this Service Bulletin is no longer required. Normal inspection intervals for non-pressurized Slick retard breaker and direct drive magnetos is every 500 hours of engine operation, with some pressurized Slick magneto models requiring more frequent inspections. Inspection requirements for all Slick magnetos are listed in Slick Service Bulletin SB2-80.

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PROOF OF COMPLIANCE: Appropriate logbook entries.

PARTS REQUIRED PER BULLETIN: Replacement impulse couplings and/or magnetos as required.

TOOLS REQUIRED PER BULLETIN: Slick T-106 impulse coupling hub puller, T-155 Rivet Gage, 0.140 inch feeler gage, 0.150 inch feeler gage, Slick Master Service Manual F-1100, standard shop tools. Magneto test stand capable of accurately indicating RPM.

WEIGHT CHANGE: None.

MAGNETO MODELS AFFECTED: The following Slick 6200 and 6300 Series impulse coupled magnetos when installed on Textron Lycoming engines:

Magneto Model	Impulse Coupling
6251	M-3333
6252	M-3333
6255	M-3635
6351	M-3333
6355	M-3635

ENGINE MODELS AFFECTED: The following Lycoming O-540 and IO-540 engines configured with fifth order counterweights:

O-540 A1D5, B2B5, B2C5, E4B5, E4C5, G1A5, G2A5, H2A5
IO-540 AC1A5, C1B5, D4A5, K1A5, K1B5, K1E5, K1G5, K1K5, L1C5, M1C5
AEIO-540 L1B5
TIO-540 AH1A, AJ1A, W2A

AIRFRAME MODELS AFFECTED: Britten Norman BN-2A, -2A-2, -2A-3, -2A-6, -2A-9, -2A-20, -2A-21, -2A-26, -2A-27, -2B-20, -2B-21, -2B-26, -2B-27, -2A-MKIII, -2A-MKIII-2, -2A-MKIII-3
Piper PA-24-250, PA-24-260, PA-25-235, PA-25-260, PA-32-260, PA-32-300

DETAILED INSTRUCTIONS: 250 HOUR INSPECTION

The 250 hour impulse coupling inspection must be performed each time the magneto accumulates either 250 hours of operation from the time of the last inspection, field overhaul, or since new or factory rebuilt. See magneto maintenance and overhaul manuals L-1037 or L-1363 for overhaul instructions.

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WARNING: Slick impulse couplings are manufactured as matched assemblies. Under no circumstances should a subassembly part from one impulse coupling be used with the mating part from another impulse coupling. The maintenance practice of mixing subassembly parts, even within the same impulse coupling assembly model numbers, is not approved and can lead to impulse coupling failure and subsequent magneto and engine stoppage.

1. Pre-Teardown Operation Inspection.

   A. Prior to removing the impulse coupling from the magneto, spin the impulse coupling in the direction of rotation stated on the magneto dataplate.

   B. The impulse coupling should engage the stop pin in the magneto below approximately 140 RPM. If the impulse coupling pawls slip past the stop pin or engage intermittently, the impulse coupling is not operating properly.

      NOTE: The speed at which the coupling pawls engage or disengage cannot be determined accurately when spinning the coupling by hand. Accurate RPM readings for such coupling engagement or disengagement can only be made when the magneto is driven at a constant speed by an electric motor or similar device.

      CAUTION: The magneto will produce spark voltage when impulse coupling is operated. Keep hands away from the distributor block, condenser stud, and high tension leads when impulsing the magneto.

2. Remove impulse coupling.

   A. Remove cotter pin, nut, and washer.

   B. Grasp shell of the impulse coupling assembly and gently pull the assembly outward to clear the unlatching cars of the impulse coupling hub assembly.

   C. Turn shell to release spring tension.

   D. Remove impulse shell and attach impulse spring.

   E. Engage Slick T-106 Impulse Coupling Hub Puller into grooves in the hub assembly. Tighten T-106 Puller Bolt and remove impulse coupling hub assembly.

3. Clean Impulse Coupling.

   A. All portions of the impulse coupling must be cleaned, exposing bare metal, to ensure reliable inspection.

   B. Use a suitable grease dissolving solvent to remove all oil or sludge buildups on impulse coupling.

4. Inspect Coupling.

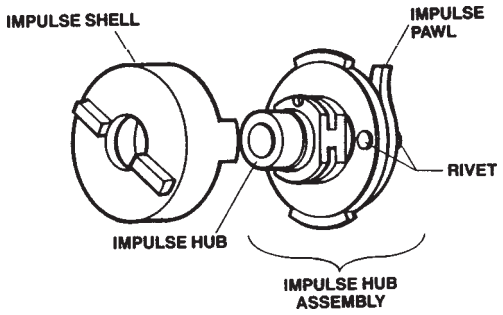

Figure One

NOTE: Impurity stringers, inclusions and heat checks may appear as surface discontinuities on impulse coupling components. These conditions are normal and generally do not, by themselves, require impulse coupling replacement.

A. Using acceptable procedures, inspect the impulse coupling shell and impulse coupling hub for cracks. Cracks are not acceptable. Replace impulse coupling as necessary.

B. Inspect the impulse coupling shell and hub for corrosion. Corrosion which impedes or affects impulse coupling operation is not acceptable. Replace impulse coupling as necessary.

C. Inspect the hub shaft and keyway for deformation or damage. Replace impulse coupling as necessary.

D. Inspect impulse coupling pawls. If the latching end that contacts the stop pin in the magneto frame is rounded, peened, flared, or excessively worn, replace the impulse coupling.

E. Inspect the impulse coupling hub and pawl plate for looseness. The hub and plate interface should be tight with no movement between the parts. Replace impulse coupling if hub to pawl plate fit is loose.

F. Inspect pawl retaining rivets. The rivets should not be loose or show evidence of movement.

G. Inspect upset end of pawl retaining rivets as detailed in Figure One. The outer diameter (O.D.) of the upset rivet head should be .282 ± .010. Replace impulse coupling if O.D. is undersize or oversize to diameter requirements.

H. Install the T-155 Rivet Gage over the rivet head as detailed in Figure Two.

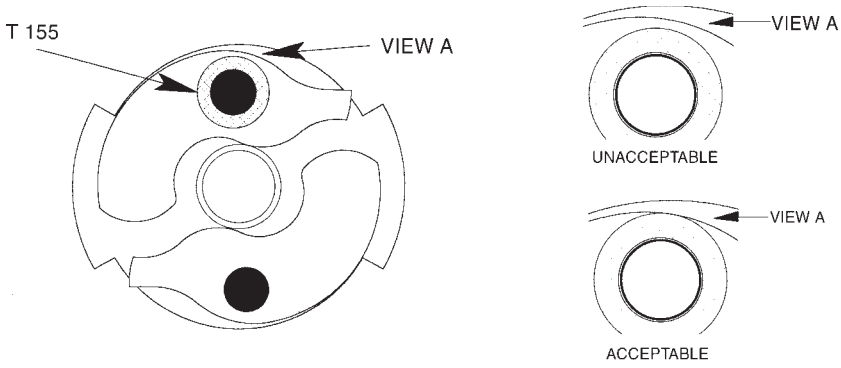

Figure Two

G. Align the outer edge of the pawl with the outer edge of the impulse coupling plate. Lift the inner edge of the pawl upward and push the pawl outward. If the inner edge of the pawl is not lifted when the pawl is pushed outward, the gaging will not be accurate. Refer to Figure Three.

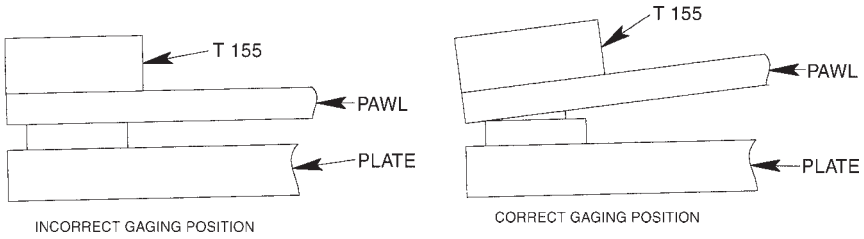

Figure Three

H. Rotate the pawl in an arc while pushing upward and outward on the pawl. Refer to Figure Three.

I. If the edge of the pawl is visible beyond or can be felt to extend beyond the edge of the T-155 Rivet Gage, then replace the coupling. Refer to Figure Two.

J. Measure the clearance between the boss on the underside of each impulse pawl and the pawl plate using a feeler gage. Position the latching end of the impulse pawl over the pawl plate as shown in Figure Four.

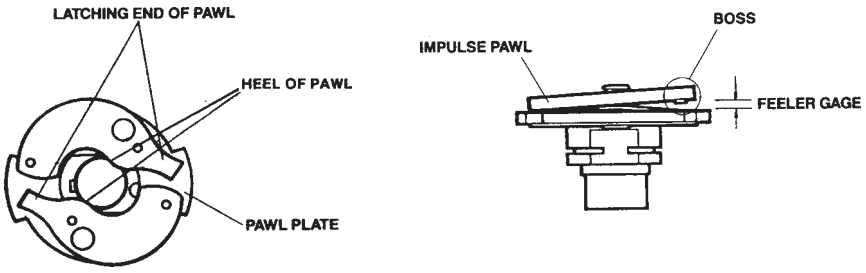

Figure Four

K. Maximum clearance for pawls with one (1) boss is 0.150 inch. Maximum clearance for pawls with two bosses is 0.150 inch for left hand rotation couplings and 0.140 inch for right hand rotation impulse couplings. If the feeler gage can pass between the full width of the boss and the pawl plate, replace the impulse coupling. See Figure Four. For coupling rotation, see magneto dataplate.

5. Reassemble Impulse Coupling.

A. Lubricate the pawl assembly with aircraft engine oil. Ensure that the pawls move freely.

B. Lubricate the hub and spring with aircraft engine oil.

C. Assemble the inner eye of the spring into the groove in the hub. Set the shell on the hub. There should be no spring tension in this position.

D. Hold the shell in one hand and the pawls with the thumb and forefinger of the other hand.

E. Pull the hub straight back slowly and far enough to clear the projections on the shell.

F. Hold the shell stationary and rotate the hub to wind the spring until the projections on the outer section of the pawl plate pass the projections on the shell. (Approximately one quarter revolution, 90°.) DO NOT WIND SPRING MORE THAN 1/4 TURN.

G. Make sure that the shell is seated on the hub and that it turns freely.

6. Inspect Stop Pin and Rotor Shaft

A. Inspect the stop pin for flat spots. Flat spots are a normal sign of wear and do not, by themselves, require corrective action. If the flat spots are excessive and cause the impulse coupling pawl to slip past the stop pin, either the impulse coupling, magneto frame, or both components need replacement. Refer to Section 1 for operation inspection and Section 4 for impulse coupling inspection.

B. Inspect magneto rotor shaft. Remove burrs and chips from shaft with a fine abrasive cloth and clean all surfaces. Chips and other abrasives must not contact oil seal. Dimples or indentation in the rotor shaft are not to exceed .006 inch depth. Replace the rotor shaft if the dimples exceed .006 inch depth. See Figure Five.

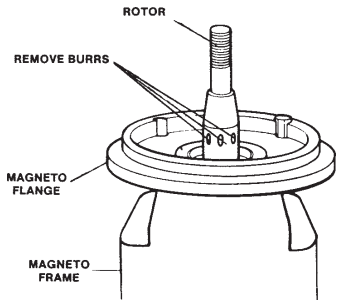

Figure Five

7. Install Impulse Coupling

   A. Install impulse coupling assembly onto the rotor shaft.

   B. Install magneto drive gear onto the magneto impulse coupling where applicable.

   C. Place the removed impulse coupling washer onto the shaft or magneto drive gear and washer as required.

   D. Place the removed impulse coupling nut onto the rotor shaft and torque to 120-320 in./lbs.

   E. Insert a cotter pin through the nut castellations and rotor shaft and secure appropriately.

      NOTE: If the cotter pin will not align with the pin hole in the specified torque range, remove the nut and lightly lap the bottom of the nut with a piece of emery cloth and repeat steps F and G.

   F. Grasp the magneto impulse coupling and "snap" through several times to ensure impulse coupling functions properly and does not bind. The couplings should return freely to the relaxed position.

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8. Operation Inspection.

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GENERAL MAINTENANCE: Slick Impulse couplings are designed to last to the TBO of the aircraft engine. To ensure consistent and reliable operation, these guidelines should be followed.

1. Perform inspection detailed in this Bulletin and found in the L-1037 or L-1363 magneto maintenance manuals.

2. Relubricate the coupling at each inspection and each time the magneto is removed from the engine.

3. Exercise the engine once a week or according to the engine manufacturer's specifications.

4. Change engine oil according to engine manufacturer's specifications.

5. No attempt should be made to repair impulse couplings.

MAGNETO OVERHAUL: Magneto impulse couplings must be removed and discarded at engine overhaul or recommended engine TBO. Magneto impulse couplings that are currently in service that were not replaced at magneto overhaul must be removed and discarded. Install replacement Slick impulse couplings.

WARRANTY: Void if prescribed maintenance schedules are not followed.

THIS SERVICE BULLETIN IS A SUPPLEMENT TO SLICK MAINTENANCE AND OVERHAUL MANUALS L-1037 AND L-1363. CHECK WITH SLICK TO BE SURE YOU HAVE THE MOST CURRENT REVISION OF SLICK MANUALS L-1037 AND L-1363 AND PERTINENT SERVICE LETTERS AND BULLETINS BEFORE PERFORMING MAINTENANCE OR OVERHAUL.