TECHNICAL BULLETIN

Bell Helicopter TEXTRON

A Subsidiary of Textron Inc.

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DATE
REV

MODEL AFFECTED: **205B**

SUBJECT: **ENGINE TO TRANSMISSION (MAIN DRIVESHAFT) ALIGNMENT PROCEDURE**

HELICOPTERS AFFECTED: **All Model 205B helicopters.**

COMPLIANCE: This improved alignment procedure should be accomplished during modification of the aircraft or when the conditions listed in step (1a) through (1f) exist.

DESCRIPTION:

Bell Helicopter has received a report that the engine to transmission (main driveshaft) alignment procedure from the 205A-1 Maintenance Manual may be difficult to achieve on a 205B.

This bulletin provides all Bell 205B owners/operators with a revised procedure to carry out the Engine-To-Transmission (Main Driveshaft) alignment.

APPROVAL:

The engineering design aspects of this bulletin are FAA/DER approved.

MANPOWER:

Accomplishment of this bulletin during modification of the aircraft will not require additional man-hours.

MATERIALS:

Consumable Material:

The following material is required to accomplish this bulletin, however this material is considered consumable (bench stock) material and may not require ordering depending on the operators consumable material stock levels. This material may be obtained through your Bell Helicopter Textron Supply Center.

Part Number	Nomenclature	Quantity	Reference
299-947-100TY2CL2G50	MAGNOBOND 6398	A/R	C-317
MIL-A907 ANTISEIZE	ANTISEIZE COMPOUND	A/R	C-452

SPECIAL TOOLS:

204-011-178-001	Clevis Assembly
T101581	Hoist or equivalent
T101440	Jacks
T101419	Tool Set

WEIGHT AND BALANCE:

Not affected

ELECTRICAL LOAD DATA:

Not affected

PUBLICATIONS AFFECTED:

None affected

ACCOMPLISHMENT INSTRUCTIONS:

Engine-To-Transmission (Main Driveshaft) alignment.

1. Check alignment of the main driveshaft installation between the transmission input drive quill and the engine output shaft adapter when any of the following conditions exist.

a. Main driveshaft inspection reveals excessive wear of engine coupling spline or there are cracks in driveshaft components.

b. Replacement of main transmission.

c. Hard landing, which does not show apparent structural damage.

d. Replacement of engine or any engine mount component.

e. Major repair or replacement of components in center fuselage, tailboom, or pylon support structure.

f. Driveshaft misalignment is suspected for any other reason.

2. Position helicopter on level ground or level as closely as practical by use of jacks. Main rotor, if installed, must be restrained.

3. Remove transmission and engine cowlings.

4. Remove main driveshaft assembly, leaving engine output shaft adapter installed in end of engine output shaft.

5. Position transmission pylon with leveling jacks in accordance with steps 6 through 15.

6. Remove four pylon lateral mount bolt assemblies (6, figure 1), washers (7), and shouldered washers (8).

7. Remove cotter pin (13), nut (12), and washer (11), from upper lift link bolt assembly (10). Do not remove bolt (10) form lift link (14).

8. Remove cotter pin (1), nut (2), and washer (3) from bolt (4) securing 5th mount eyebolt (9) to transmission A-frame (5) and remove bolt (4).

-NOTE-

Hoist must be positioned so that lifting cable is in line with mast.

9. Using maintenance hoist (T101581) or equivalent and clevis assembly 204-011-178-001 attached to top of main rotor mast, raise transmission to point where upper lift link bolt (10) may be turned freely by hand. Replace bolt if binding occurs due to corrosion or galling. Apply anti-seize compound (C-452) to bore and OD of bushing. Check lower bolt for same conditions.

10. Install four transmission-levelling jacks (T101440) (two at each side) between transmission support case and top of pylon support structure. (Figure 2) Use shim plates if necessary to obtain proper jack height.

-NOTE-

Jacks will not lower simply by rotating jackscrew counter-clockwise. To lower jack a precise amount, rotate jack screw counter-clockwise ½ turn past desired point, and tap lightly on end of jackscrew to drive in wedge within jack. Rotate jackscrew ½ turn clockwise to obtain elevation originally desired.

11. Slacken pylon hoist cable.

12. Carefully adjust four levelling jacks equally so that transmission is held at height where upper lift link bolt turns freely. (Figure 2.)

13. Determine that transmission support points are all same height above pylon support structure by measuring at each pylon mount with a depth micrometer. (Figure 2.)

WARNING

Transmission jacks are to be used to pitch transmission fore and aft and roll transmission left or right to properly level assembly for driveshaft alignment checks. Extreme care must be taken when "raising" a jack not to deform pylon support structure. This can be avoided by lowering jack or jacks on opposite side or end of transmission same amount as a particular jack is raised. It is also important to determine degree of lift link bolt "looseness" any time a jack is adjusted. If, during rotation of lift link bolt in a check for freedom, bolt appears to get tighter after jack move, STOP Your move was in wrong direction or you failed to make opposite move on opposite jack or jacks.

14. Use a micrometer depth gage to measure from top surface of each transmission support-case mounting washer to top of pylon support structure. Measure at each of four mount locations; measurements should be equal within 0.020 inch (0.508 mm). Adjust jacks to achieve required tolerance. After each adjustment, recheck lift link bolt for freedom of movement. If four measurements cannot be brought

within tolerance, average two forward corner measurements and adjust aft corners to be within 0.020 inch (0.508 mm) of this average.

15. Upon completion of levelling, recheck lift link bolt to make sure it can be turned freely with fingers.

16. Alignment shall be checked and engine assembly shall be repositioned as required in accordance with steps 17 through 20.

17. Set target plate of engine-to-transmission driveshaft alignment tool set (T101419) with arrow of centre disc indexed at 72.5 degrees on inner scale of outer plate. Secure by tightening two washer-head screws at back of plate. (Figure 3.)

18. Install target plate on engine output shaft adapter. (Figure 3.)

19. Install alignment gage plunger of tool set (T101419) on transmission input quill coupling and secure with coupling clamp set. Rotate engine-flanged adapter to align target plate outer scale marking of 71.5 degrees in 12 o'clock position.

CAUTION

Alignment gage must be returned to its retracted position following each check of vertical and horizontal alignment. Do not attempt to reposition engine with plunger inserted in hole of target plate.

-NOTE-

To indicate correct alignment, largest diameter of plunger must enter hole in target plate. If misalignment is indicated, observe and note amount and direction of such misalignment. No correction of misalignment should be attempted before completion of angular alignment check of step 21. Required engine repositioning (shim changes) can be best determined if results of both checks are known.

20. Check horizontal and vertical alignment by inserting a suitable tool through access holes in alignment gage housing and pushing plunger aft, against retracting spring tension, toward target plate hole.

21. Perform angularity check in accordance with steps 22 through 26.

22. Mount dial indicator on forward end of alignment plunger.

23. Position dial indicator for contact at 2.5 inches (63.5 mm) radius (just inside outer scale numerals). Zero dial indicator at 12 o'clock position.

24. Rotate transmission input quill such that indicator is at 6 o'clock position. Run out must be +0.018 to +0.042 inch (+0.457 to +1.066 mm).

25. Rotate transmission input quill such that indicator is at 3 o'clock position. Zero indicator.

26. Rotate transmission input quill such that indicator is at 9 o'clock position. Run out must be –0.018 to +0.006 inch (-0.457 to +0.152 mm).

27. Engine clearance at aft firewall should be a minimum of 0.100 inch (2.54 mm). If engine does not clear firewall, engine mounts must also be shimmed to obtain required clearance.

28. Loosen screws around intake bellmouth in forward firewall and around attaching ring in rear firewall to allow engine to shift as necessary during alignment.

29. Shim engine tripod, bipod, and monopod as required to obtain required indicator readings and a plunger position that will allow plunger to enter target plate hole. (Refer to step 20.)

30. Check engine to firewall clearance to insure 0.100 inch (2.54 mm) minimum clearance exists. (Refer to step 27.)

31. If total laminated shim thickness (205-060-137-001 or 205-060-138-001) under any engine support fitting exceeds 0.188 inch (0.4775 mm), fabricate a plate of 2024-T4 aluminium alloy 0.100 inch (2.54 mm) thick using same outside dimensions as shim stock. Structural bond plate to engine service deck with adhesive (C-317). Total thickness of shims and plate under any engine mount fitting shall not exceed 0.288 inch (7.315 mm).

32. Reinstall engine support fittings with short end of fitting facing toward angle A. (Figure 3). Check support fittings screws and bolts for correct length.

33. Interface between engine and aft firewall at 9 o'clock position (looking forward) may result with this realignment. If this condition occurs accomplish step 34 through 36.

34. Remove aft upper firewall assembly and disassemble by removing 16 screws.

35. Remove aft section of firewall web and enlarge the 16 holes by drilling to 5/16 inch.

36. Deburr drilled holes. Reassemble firewall assembly using AN970-3 washers over enlarged holes and under the 16 screw heads.

37. Tighten screws around intake bellmouth in forward firewall and around attaching ring in rear firewall.

38. Check engine-to-firewall clearance to ensure a 0.100 inch (2.54 mm) minimum clearance still exists. (Refer to step 27.)

39. When alignment is correct, remove engine alignment tool set (T101419) and transmission leveling jacks (T101440). Retighten screws in firewalls as necessary.

40. Remove maintenance hoist (T101581) or equivalent and clevis assembly (204-011-178-001) from top of main rotor mast.

41. Install bolt (4, figure 1) through transmission A-frame (5) and 5th mount eyebolt (9) and install washer (3) and nut (2). Torque nut 25 to 33 foot-pounds (34 to 44 Nm) and cotter pin (1).

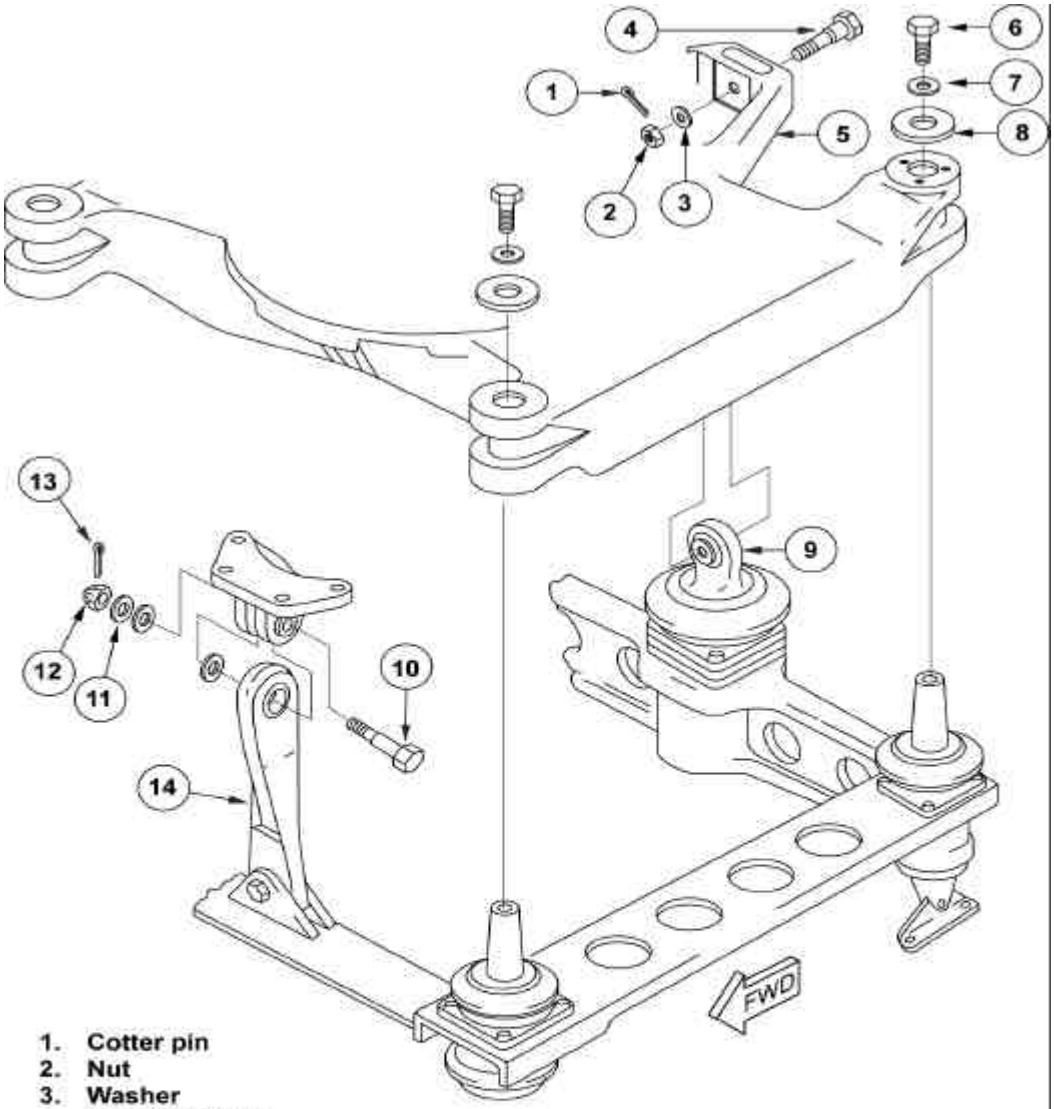
42. Install washer (11) and nut (12), on upper bolt assembly (10) in lift link (14). Torque nut 60 to 80 foot-pounds (81 to 108 Nm) and cotter pin (13). Install access doors on pylon island.

43. Install four shouldered washers (8), washers (7), and pylon lateral mount bolt assembly (6). Torque bolts 90 to 105 foot-pounds (122 to 142 Nm).

44. Install main driveshaft assembly.

45. Check fuel control and governor linkage for proper rigging and cushion.

46. Reinstall transmission and engine cowlings.



1. Cotter pin
2. Nut
3. Washer
4. Bolt assembly
5. Support case
6. Bolt (with locking insert)
7. Washer
8. Shouldered Washer
9. Eye bolt
10. Bolt assembly
11. Washer
12. Nut
13. Cotter pin
14. Lift link

Figure 1. Transmission support case pylon attachment.

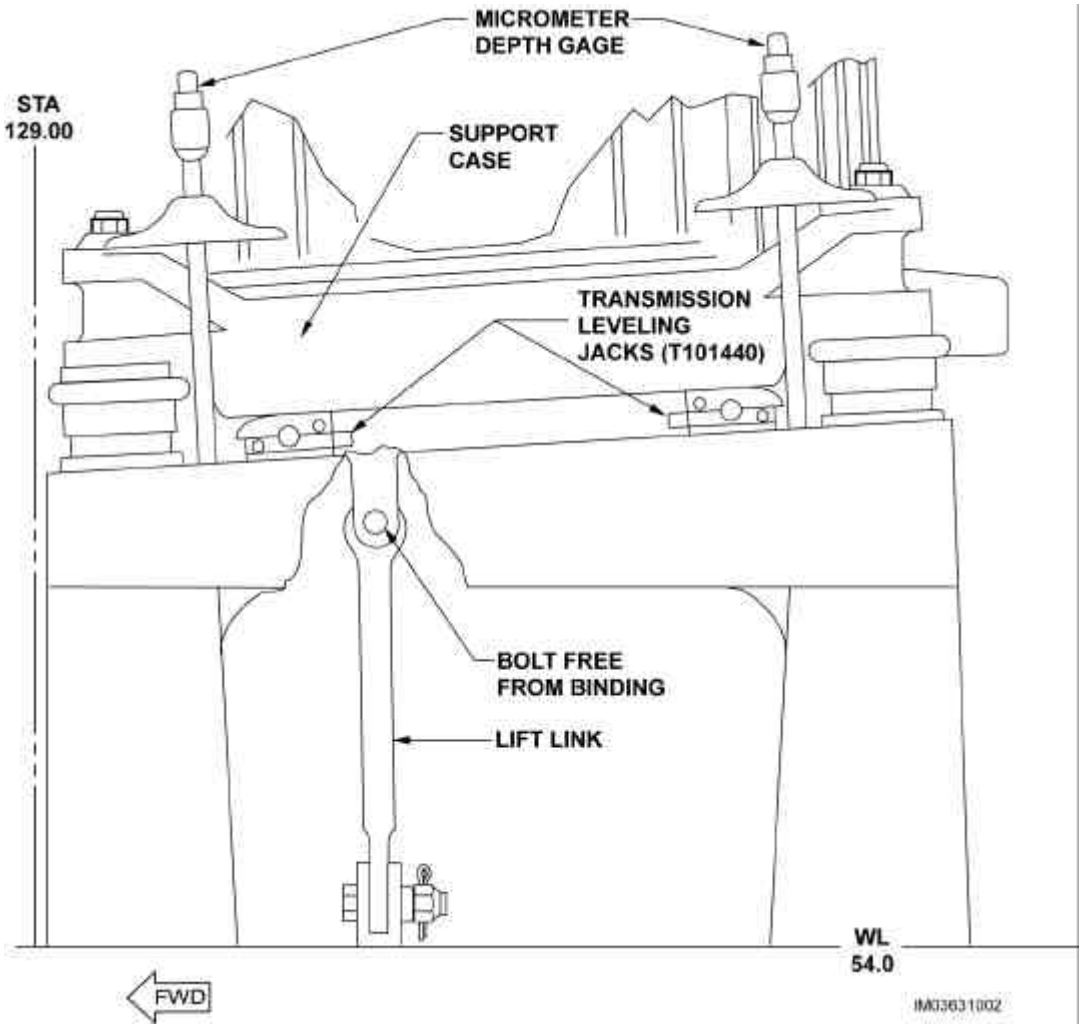


Figure 2. Pylon Levelling and Alignment.

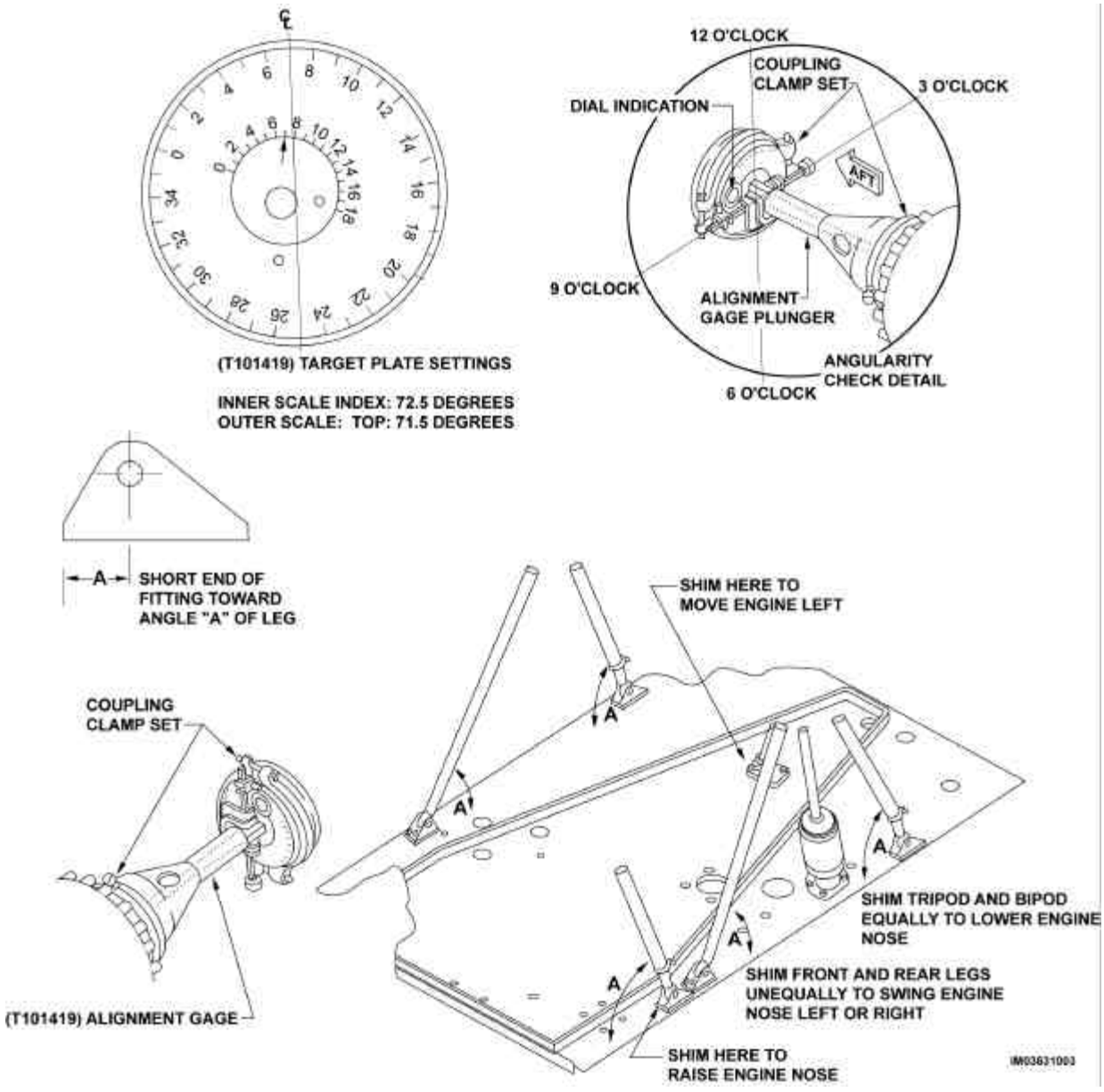


Figure 3. Engine to Transmission Driveshaft Alignment