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ARMY AVIATION TEST BOARD FORT RUCKER ALA  
MODIFICATION OF THE TRANSMISSION OF THE UH-1B HELICOPTER EQUIPP--ETC(U)  
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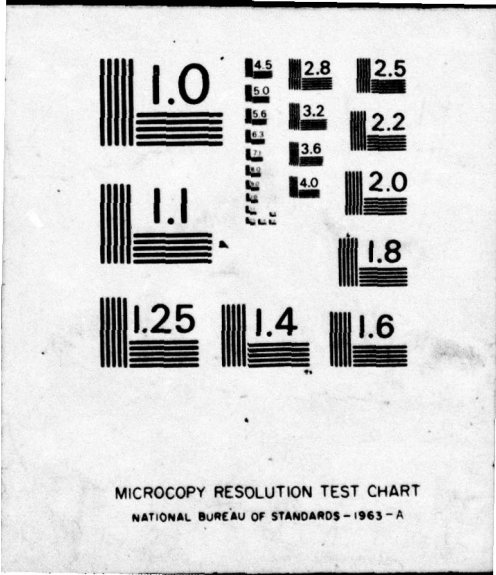
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DEPARTMENT OF THE ARMY  
UNITED STATES ARMY AVIATION TEST BOARD  
Fort Rucker, Alabama 36360

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SUBJECT: Feasibility Study. Modification of the Transmission of the UH-1B Helicopter Equipped with a 540-Rotor System for Use as a Universal Transmission for Standard UH-1B and UH-1D Helicopters. USATECOM Project No. 4-4-0108-12 (AVN No. 02-66-03)

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TO: Commanding General  
US Army Materiel Command  
ATTN: AMCPM-IR  
Washington, D.C. 20315

1. Reference. Message, APG 3301, Commanding General, US Army Test and Evaluation Command, 1 March 1966, subject: "Universal Transmission, UH-1."

2. Background.

a. ~~At the present time~~ separate transmissions for the UH-1B, UH-1B/540, and UH-1D ~~are~~ <sup>were</sup> in the supply system. A need ~~exists~~ <sup>EXISTS</sup> for the development of a common or universal transmission that ~~can~~ <sup>could</sup> be easily adapted for use in the three helicopters.

b. In view of this need, the aircraft manufacturer submitted Engineering Change Proposal (ECP) UH-1B/D-242, on 21 July 1965. The ECP incorporated a "nude" transmission concept and was developed for a transmission that had not entered the supply system. The Iroquois Project Manager initiated a study to determine the feasibility of using one of the three production UH-1 transmissions as the basis for a universal transmission. The Project Manager authorized the 10th Aviation Group, Fort Benning, Georgia, to modify a UH-1B/540 transmission for installation on a UH-1D and a UH-1B. The concept of modifying a UH-1B/540 transmission for use in standard UH-1B and UH-1D Helicopters proved worthy of further investigation. The Project Manager requested a detailed test of this concept be conducted. The Commanding General, USATECOM directed the US Army Aviation Test Board to conduct this test under USATECOM Project No. 4-4-0108-12.

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3. Objectives.

a. Purpose. To determine the feasibility of modifying the transmission of the UH-1B Helicopter equipped with a Model 540 rotor system (UH-1B/540) to permit its use as a universal transmission for all UH-1B and UH-1D Helicopters.

b. Test Objectives.

(1) To determine the procedures, active man-hours, and parts required to modify a UH-1B/540 transmission for installation in standard UH-1B and UH-1D Helicopters.

(2) To determine variations from published installation instructions and, if variations exist, the active man-hours required to install the modified transmission.

(3) To determine the categories of maintenance at which the modification and the installation of the universal transmission are to be performed.

(4) To determine any variations in run-up and test flight procedures resulting from installation of the test transmission in the UH-1D and UH-1B Helicopters.

4. Scope of Test. The feasibility study was conducted at Fort Rucker, Alabama, from 25 February 1966 through 2 March 1966.

a. The transmission used as the basic test item was a standard UH-1B/540 transmission. Its size and the positions of mounting points were measured to insure commonality with the standard UH-1B and UH-1D transmissions.

b. The UH-1B/540 transmission was modified for use in the UH-1D Helicopter by adding or substituting components common to the UH-1D. The modified transmission was installed in the UH-1D Helicopter and a run-up and one-hour test flight was conducted.

c. On the basis of determinations made from modifying the UH-1B/540 transmission to a UH-1D transmission configuration, qualified project personnel determined the functions necessary to modify the

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UH-1B/540 transmission to a UH-1B transmission configuration. With the concurrence of the Iroquois Project Manager, the modified transmission was not installed or flight tested in the UH-1B Helicopter.

5. Summary of Results.

a. Man-Hours, Parts, and Procedures.

(1) UH-1D. Two helicopter mechanics (MOS 67N20) required a total of four active man-hours to modify a UH-1B/540 transmission to a UH-1D configuration. Parts and procedures are listed in inclosures 1 and 2.

(2) UH-1B. One helicopter mechanic (MOS 67N20) required 0.3 active man-hour to modify a UH-1B/540 transmission to a UH-1B configuration. No parts were required. The two wires on the tachometer generator had to be reversed.

b. Installation Instructions.

(1) No variations from the procedures outlined in TM 55-1520-210-35 were required to install the modified UH-1B/540 transmission in UH-1D and UH-1B Helicopters.

(2) Since UH-1B/540 transmission has two hydraulic pump mounting pads, the unused right hand pad must remain covered.

c. Maintenance Categories. Modification and installation of the UH-1B/540 transmission required the direct-support category of maintenance.

d. Run-Up and Test Flight Procedures. No variation from standard run-up and test flight procedures was required in the UH-1D.

7. Conclusion. Modifying the UH-1B/540 transmission to permit its use as a universal transmission for all UH-1B and UH-1D Helicopters is feasible.

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Distribution: (See page 4)

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UH-1D Parts Required To Modify a UH-1B/540

Transmission for Use in a UH-1D Helicopter

<u>Name and Federal Stock Number</u>	<u>Quantity</u>
1. Quill Assembly, Generator Offset FSN 1560-987-5152	1
2. Bracket*, General Support FSN 1560-992-6471	1
3. Spacer*, Sleeve FSN 5340-729-6675	3
4. Spacer*, Sleeve FSN 5340-950-6477	1
5. Bolt*, Machine FSN 5306-576-5635	4
6. Shim* FSN 5340-989-2978	1
7. Washer*, Flat FSN 5310-167-0821	8
8. Washer*, Flat FSN 5310-187-2400	4
9. Nut*, Extended Washer, Hex FSN 5310-807-1477	4
10. Oil Filler Assembly:	
a. Adapter FSN 1560-690-7294	1
b. Filler Assembly, Neck and Scupper FSN 1560-961-1345	1
c. Washer, Flat FSN 5310-187-2354	8
d. Nut, Extended FSN 5310-807-1468	4

\*Parts required to install Quill Assembly, Generator Offset.

<u>Name and Federal Stock Number</u>	<u>Quantity</u>
e. Elbow, Tube FSN 4730-722-7216	1
f. Nut, Plain, Hex FSN 5310-208-4112	1
g. Packing, Preformed FSN 5330-263-8030	1
h. Tube Assembly, Metal FSN 1560-992-6473	1
i. Cap Assembly, Transmission FSN 1560-992-6473	1
11. Oil Hose Inlet FSN 4720-759-7303	1

Steps Required to Modify a UH-1B/540 Transmission  
for Use in a UH-1D Helicopter

1. Remove Plate Assembly, FSN 1560-898-1684, from UH-1B transmission (figure 119, page 2-240, TM 1520-210-35P).
2. Install UH-1D Quill Assembly, Generator Offset (item 1, inclosure 1) using parts 2 through 9 of inclosure 1 (figure 123, page 2-430, TM 55-1520-210-35P).
3. Remove Oil Filter Assembly, FSN 1560-796-5004, from UH-1B/540 transmission (figure 156A, page 2-691, TM 55-1520-210-35P).
4. Install UH-1D Filler Assembly (items 10.a through 10.i, inclosure 1) (figure 117, page 2-415, TM 55-1520-210-35P).
5. Remove Oil Hose, Inlet, FSN 4702-758-0172, from UH-1B/540 transmission (figure 156A, page 2-691, TM 55-1520-210-35P).
6. Install UH-1D Oil Hose, Inlet (item 11, inclosure 1) (figure 7-6, page 7-12, TM 55-1520-210-20).
7. Reverse the two wires on the tachometer generator.