DEPARTMENT OF THE ARMY
UNITED STATES ARMY AVIATION TEST BOARD
Fort Rucker, Alabama 36360

STEBG-TD

29 JUN 1966

SUBJECT: Letter Report, Product Improvement Test of UH-1B Tail-Boom Fitting, RDT&E Project No. None, USATECOM Project No. 4-5-0101-04

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

1. References.

a. Letter, AMCPM-IR-T, Headquarters, US Army Materiel Command, 27 April 1965, subject: "UH-1B Product Improvement Test UH-1B Aircraft S/N 63-8659."

b. Letter, SMOSM-EEL-UH-1-19, Headquarters, US Army Aviation Materiel Command, 27 April 1965, subject: "Product Improvement Test, UH-1B Helicopter."

c. Letter, AMSTE-BG, Headquarters, US Army Test and Evaluation Command, 1 June 1965, subject: "Test Directive, USATECOM Project No. 4-5-0101-( ), Product Improvement Test, UH-1B Items."

d. Report of Test, USATECOM Project No. 4-3-0100-08, "Logistical Evaluation of the UH-1B Helicopter at High Takeoff Gross Weight," US Army Aviation Test Board, 28 June 1965.

e. Message, AMCPM-IR-T, AMC 10132, Commanding General, US Army Materiel Command, 2 September 1965, subject: "UH-1 Test Program and Meeting at ATB, 31 August 1965, UH-1 Test Program."

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f. Letter, STEBG-TP-A, US Army Aviation Test Board, 9 September 1965, subject: "Iroquois Test Coordination Meeting."

g. Letter, SMOSM-EAA, Headquarters, US Army Aviation Materiel Command, 20 September 1965, subject: "Product Improvement Test - UH-1B Helicopter."

h. Letter, AMCPM-IR, Headquarters, US Army Materiel Command, 21 September 1965, subject: "Trip Report, United States Army Aviation Test Board."

i. Plan of Test, USATECOM Project No. 4-5-0101-( ), "UH-1B Items, Product Improvement Test," US Army Aviation Test Board, 8 October 1965.

j. Letter, STEBG-TP-A, US Army Aviation Test Board, 19 October 1965, subject: "Iroquois Test Coordination Meeting."

k. Letter, AMSTE-BG, Headquarters, US Army Test and Evaluation Command, 21 October 1965, subject: "Test Directive, USATECOM Project No. 4-5-0101-04, Product Improvement Test, UH-1 Tail Boom Fitting."

2. Background.

a. Numerous cracking failures of the original production UH-1B upper-left-hand tail-boom attaching fittings occurred in the field when the helicopters were operated at high gross weights. The fittings cracked approximately 18 inches aft of the tail boom bulkhead. To correct this problem, a stronger fitting was designed and incorporated (MWO 55-1520-211/28) in the UH-1B fleet. In September 1964, one of the modified fittings cracked after 553 hours of operation at high take-off gross weights (reference d). The crack was two inches aft of the tail-boom bulkhead and extended through the first rivet hole. Subsequently several similar failures were reported to have occurred in the Republic of Vietnam in UH-1B Helicopters after approximately 500 hours of operation.

b. As a result of these failures, MWO 55-1520-211-40/1 was incorporated in all UH-1B Helicopters as a retrofit and in the test vehicle (UH-1B S/N 63-8659) in March 1965.

c. The Iroquois Project Manager requested that the modified fitting be tested for 1100 flight hours at high takeoff gross weights on a priority basis as one of several test items under USATECOM Project No. 4-5-0101-( ), "UH-1B Items Product Improvement Test." Responsibility for this test was given to the US Army Aviation Test Board (USAAVNTBD) (reference k) as USATECOM Project No. 4-5-0101-04, "Product Improvement Test, UH-1 Tail Boom Fitting."

3. Description of Materiel. The upper-left-hand tail-boom attaching fitting of the UH-1B has been modified by MWO 55-1520-211-40/1 to incorporate a bond line of AF 120 adhesive and to eliminate the two forward rivets in order to provide a more even distribution of tail-boom loads. This is shown in the photographs attached as inclosures 1 through 4. Longeron fitting "A" is the old fitting, and "B" is the new one. In inclosure 1 the two arrows point to the forward rivets that have been eliminated.

4. Test Objectives.

a. To provide quantitative data relative to loads in the tail boom of the test helicopter.

b. To determine the suitability of the modified UH-1B upper left tail boom attaching fitting (MWO 55-1520-211-40/1).

5. Method.

a. The test item was mounted in the tail boom of a UH-1B Helicopter, which was loaded to maximum allowable takeoff gross weight, using a maximum permissible forward center of gravity. Five maximum performance takeoffs (two downwind) and five landings from a steep approach (two downwind) were made during each flying hour. Flying was conducted so as to simulate the most stringent field conditions. At the end of every one-hour flight, the helicopter was loaded with weights to a gross weight of 8,600 pounds.

b. The manufacturer instrumented the tail boom and the modified fitting, and strain gauge readings were recorded using an oscillograph installed in the helicopter. During the first hour of each three-hour flight period, the oscillograph recorder was operated for 20 minutes. The oscillograph was calibrated daily. The oscillograph records were shipped to the manufacturer throughout the test period.

c. The modified fitting was visually inspected daily. At the end of the test, it was inspected visually and by means of an X-ray to ascertain if any unknown failure had occurred. The entire tail boom was then airlifted to the manufacturer for further analysis.

6. Summary of Results.

a. The modified tail-boom fitting operated for 1106.5 hours with no failure. Oscillograph reports were submitted daily and no unsatisfactory conditions were found.

b. The X-ray inspection at conclusion of the test showed no cracks or elongated rivet holes.

c. No problems were encountered in maintaining the test item.

7. Conclusion. The modified upper-left tail-boom attaching fitting for the UH-1B (MWO 55-1520-211-40/1) is suitable for Army use.

8. Recommendation. It is recommended that the modified UH-1B tail-boom fitting (MWO 55-1520-211-40/1) continue to be incorporated in all UH-1B Helicopters.

Raymond E. Johnson

4 Incl
as

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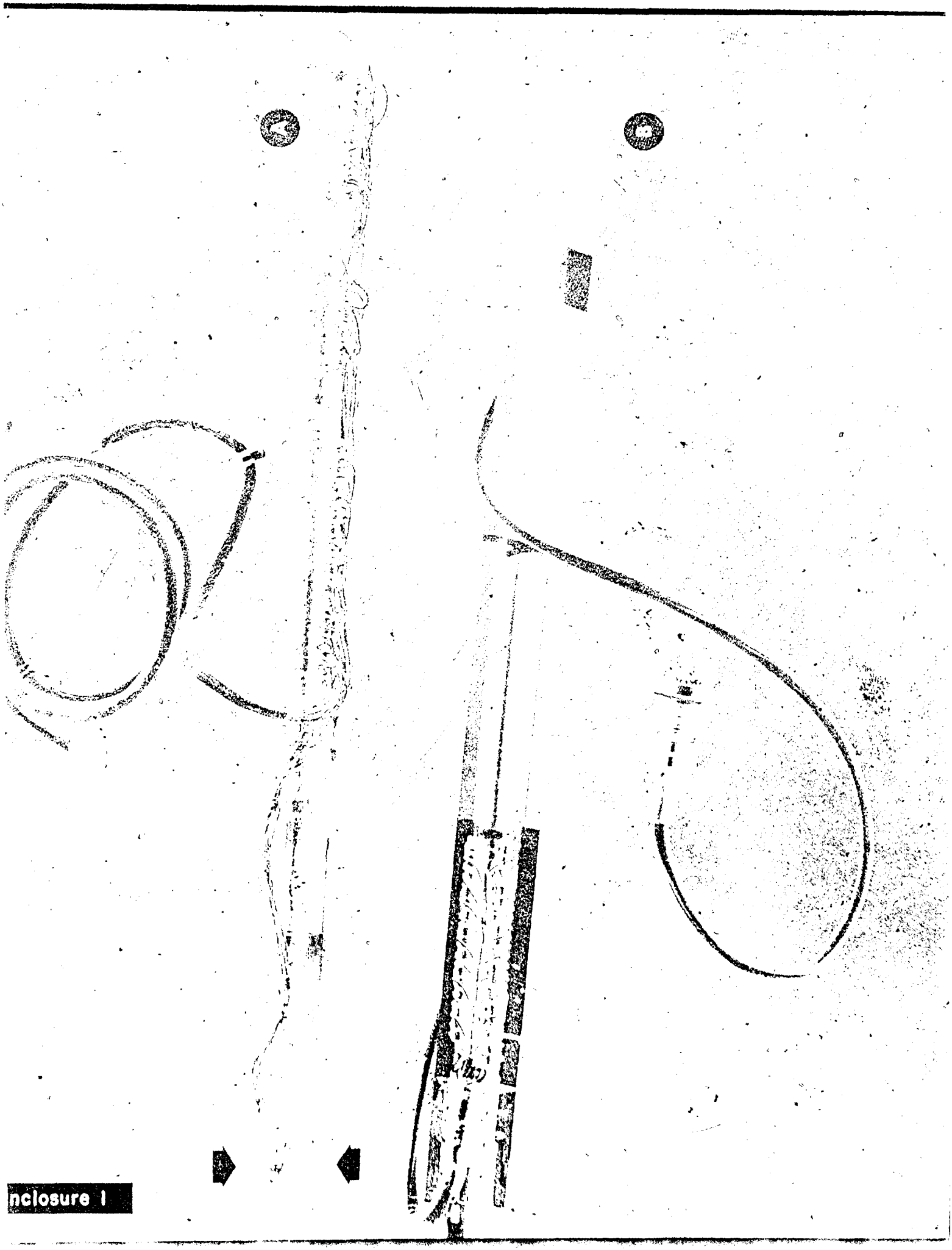

nclosure 1

Enclosure 2

Enclosure 3