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REPORT ON

ENGINEERING TEST OF MODIFICATION OF MACHINE GUN PEDESTAL MOUNT ON M151, 1/4-TON, 4X4, UTILITY TRUCK

by

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ENGINEERING TEST OF MODIFICATION OF MACHINE GUN PEDESTAL MOUNT ON M151, 1/4-TON, 4X4 UTILITY TRUCK

Report No. DPS-761

Dates of Test: 1 November 1961 to 7 September 1962

ABSTRACT

Endurance and firing tests were conducted on the M31 pedestal mount which mounts the caliber .50 machine gun, M85C, and 7.62-mm machine guns, M73C and M60.

Endurance and firing tests were conducted on the XM4 pedestal mount which mounts the 7.62-mm machine guns, M73C and M60.

Firing tests were conducted on a XM4 pedestal mount modified by lowering the height 3-1/2 inches and making the upper portion removable.

The XM4 pedestal mount was found acceptable for use except for the trigger guard striking the minimum elevation stop bolt.

Dispersion of the M60 machine gun mounted in the modified XM4 pedestal mount is satisfactory. No durability mileage was accumulated on the modified XM4 pedestal mount.

CONTENTS

(The Annex is on file in the Technical Library, APG, for reference purposes. It may be consulted there.)

1. INTRODUCTION

In November 1961, a modified M31 pedestal mount and associated equipment were received at this installation for test in accordance with a directive dated 28 August 1962 (Appendix A). The mount, with caliber .50, M85C machine gun and a fully loaded ammunition box was to be subjected to a 2000-mile durability test conducted in conjunction with the vehicle endurance test then in progress. A stipulated 3000 rounds of ammunition was to be fired to determine gun stability and mount reliability.

During the test, ATAC indicated that US CONARC has no requirement for the caliber .50 machine gun, M85C, mounted on the M151 truck (Appendix A-9). Test on the modified M31 pedestal mount was terminated at this time.

A newly designed pedestal mount, XM4, was designed by ATAC and shipped to this installation for test. The XM4 pedestal mount carries the 7.62-mm machine guns, M60 and M73C. Test was started again following the test plan of the original directive (Appendix A-1) according to directions in teletype (Appendix A-9). During the course of the test on the XM4 pedestal mount, instructions were received from ATAC to modify the mount by removing the plate between the left and right pedestal supports (Appendix A-10). ATAC also furnished a heavier gage bridge to be installed and tested for the remainder of the test (Appendix A-11).

At the conclusion of the durability and firing test on the XM4 pedestal mount, a modified XM4 pedestal mount was delivered to this installation for test. This mount was 3-1/2 inches lower and the upper section was removable. Firing tests were conducted on the modified mount to determine effects of modification on machine gun dispersion. No durability mileage was accumulated on the modified XM4 pedestal mount. Tests were concluded at this point and all test materiel was returned to ATAC.

2. DESCRIPTION OF MATERIEL

The original pedestal mount kit for the M151 truck consisted of a M31 pedestal mount, a tubular support assembly, a separate cradle, pintle, and ammunition tray assemblies for each type gun, 7.62-mm machine guns, M73C and M60, and caliber .50 machine gun, M85C (Figure 1).

One end of the tubular support assembly is attached to the pedestal column and the other end is attached to the top of the left and right rear-wheel housing (Figure 2).

The pedestal column was mounted on two support assemblies which form a bridge over the winterization heater and were bolted to the floor of the vehicle (Figure 3). All mount-attaching areas on the vehicle were reinforced.

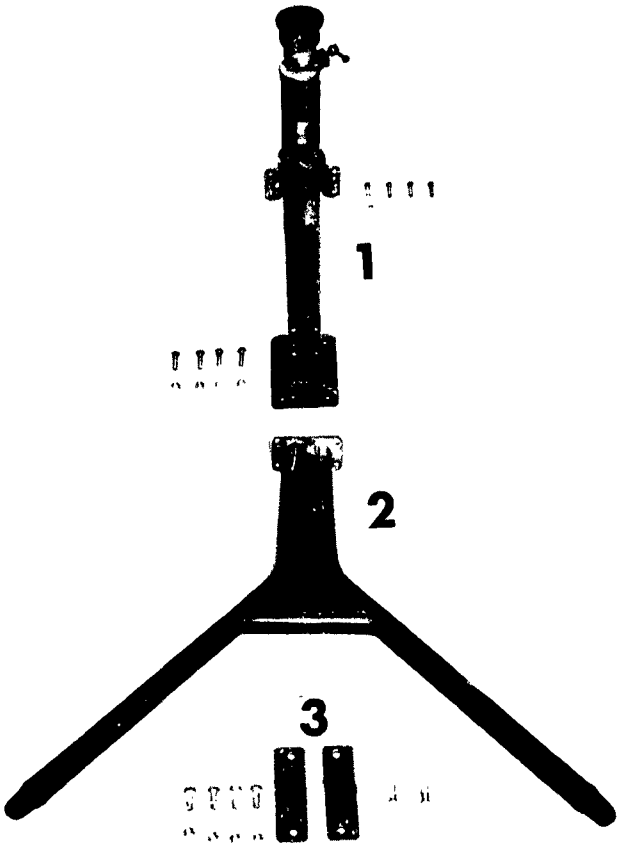

Figure 1: M31 Pedestal Mount. 1 - Pedestal Column. 2 - Tubular Support Legs. 3 - Mounting Brackets.

Figure 2: Mounting Position Tubular Support Assembly on Right-Wheel Housing, M31 Pedestal Mount.

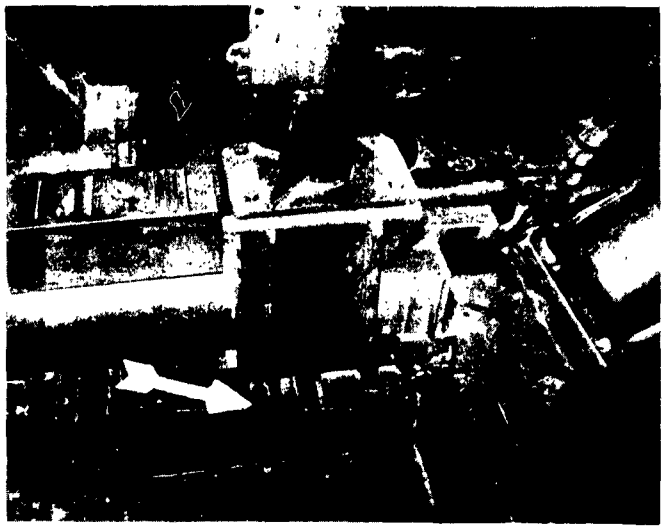

Figure 3: Bridge Support Assembly for Pedestal Column, M31 Pedestal Mount.

The cradle, pintle, and ammunition tray assemblies for each gun were designed for use with the current standard pintle socket, thereby affording universal vehicle application when flexible machine gun installations are required.

The complete pedestal mount installed on the M151 truck with the caliber .50 machine gun, M85C, locked in travel position is shown in Figure 4.

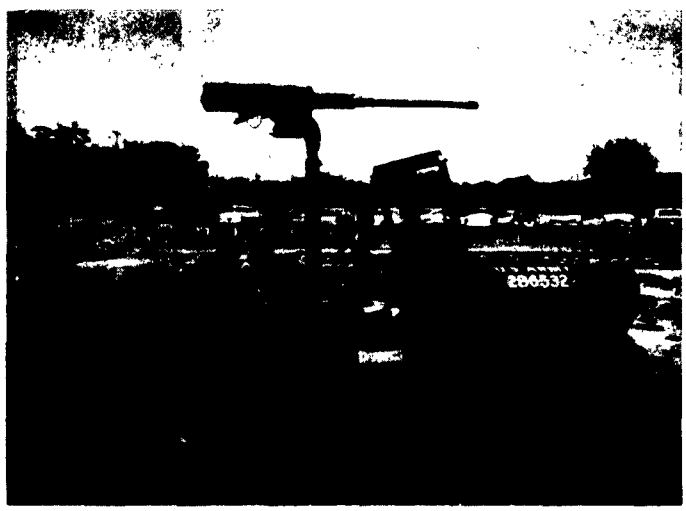

Figure 4: Truck, Utility, 1/4-Ton, 4x4, M151, with M31 Pedestal Mount and Caliber .50 Machine Gun, M85C.

The new test kit, which was substituted for the M31 pedestal mount, consisted of a lightweight XM4 pedestal mount, a tubular support assembly connected to the pedestal column, a separate cradle, pintle, and ammunition tray assemblies for each gun, 7.62-mm machine guns, M60 and M73C (Figure 5).

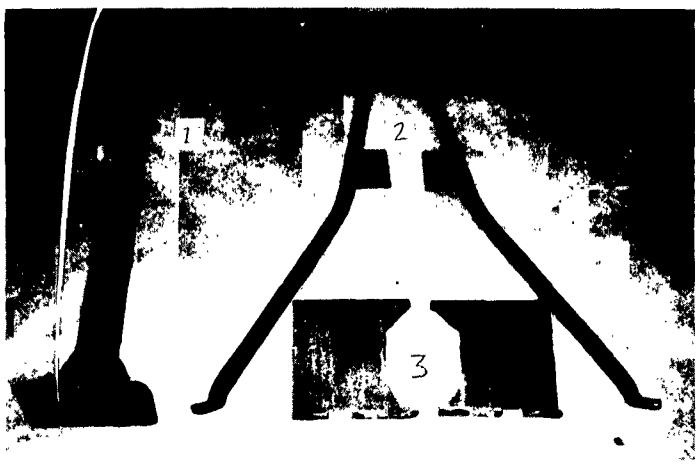

Figure 5: XM4 Pedestal Mount. 1 - Pedestal Column. 2 - Support Legs. 3 - Bridge Support.

The pedestal mount is a metal column designed to accept either the XM142, XM143, or XM144 gun mount and formed at the base so that it can be installed in the M151 truck. Support attachments were included for fastening to the left and right side of the vehicle body structure. Figure 6 shows the XM4 pedestal mount installed on the M151 utility truck.

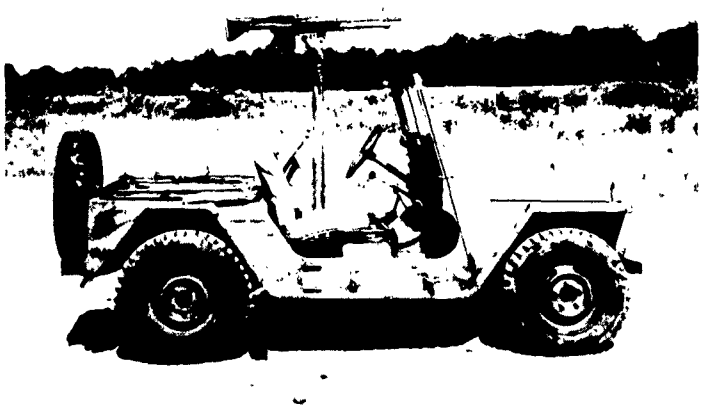

Figure 6: Truck, Utility, 1/4-Ton, 4x4, M151, with XM4 Pedestal Mount and 7.62-mm Machine Gun, M60.

The XM142 gun mount is a cradle type, designed for the 7.62-mm machine gun, M60. It includes an ammunition tray, and by means of a pintle, was adapted to the XM4 mount (Appendix A-7).

The XM143 gun mount is a cradle designed to accept the 7.62-mm machine gun, M73C. It also includes an ammunition tray and was adaptable to the XM4 mount by a pintle.

The XM144 gun mount is a cradle designed to accept the caliber .50 machine gun, M85C. Like the others, it included an ammunition tray and was adaptable to the XM4 mount. The ends of the tubular support assembly connect to the left and right sides of the vehicle structure (Figure 7).

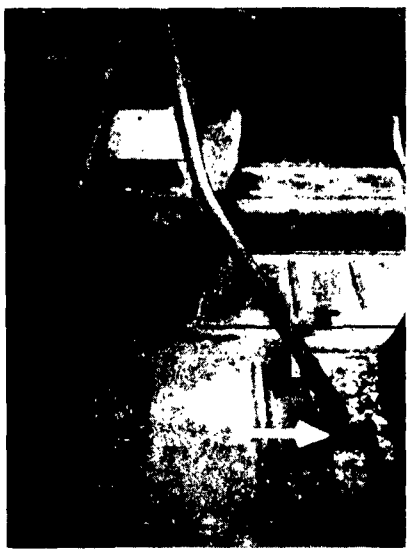

Figure 7: Connection of XM4 Pedestal Mount Pedestal Column Tubular Support Assembly to Vehicle Body Structure.

The pedestal column was mounted on two support assemblies which form a bridge over the winterization heater and which is bolted to the vehicle floor (Figure 8). All mount attachments on the vehicle were reinforced.

Because of failures which occurred during service tests, the XM4 did not satisfy all requirements. Several recommended modifications were made upon instructions from ATAC (Appendix A-4).

ATAC directed that modifications be made to the XM4 pedestal mount (Appendix A-10) to prevent strain on the tubular support legs. This modification consisted of cutting the bridge plate (Figure 9). It was then decided by ATAC that the original bridge support for the pedestal column should be heavier gage (Appendix A-11). This 1/4-inch thick bridge support is shown in Figure 10.

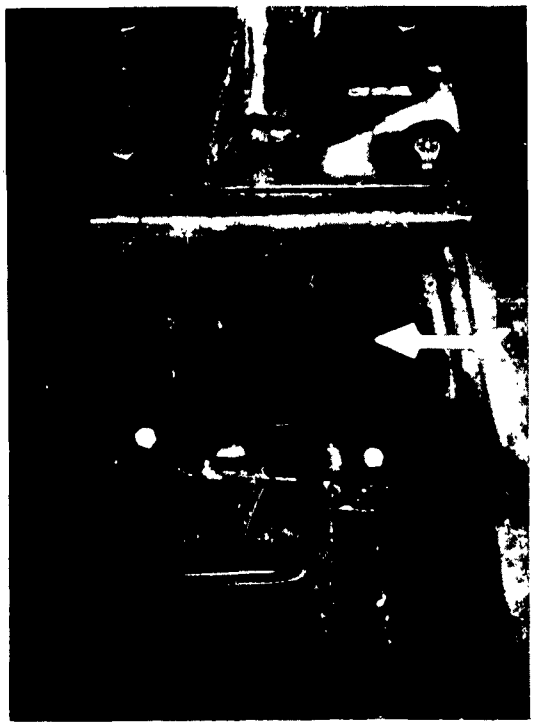

Figure 8: Bridge Support Assembly for XM4 Pedestal Column.

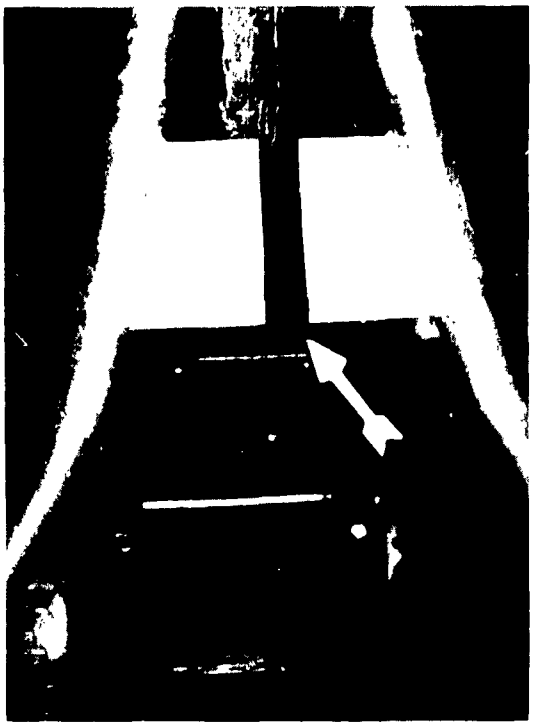

Figure 9: Modified XM4 Pedestal Mount with Bridge Plate Cut between Tubular Support Legs.

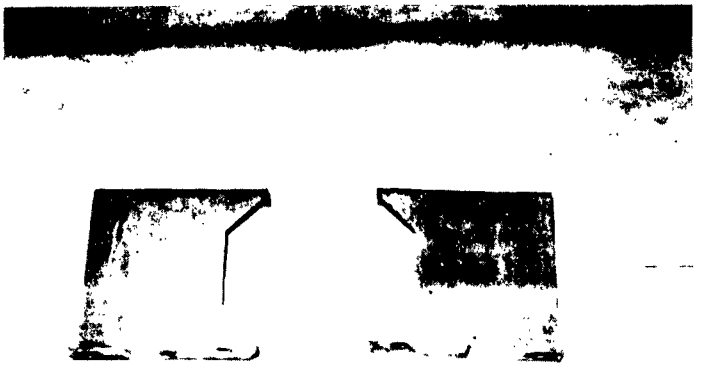

Figure 10: New Bridge Support Assembly for XM4 Pedestal Column.

This modification was expected to alleviate the high-frequency vibrations encountered during secondary road operations. Further modifications consisted of reducing the over-all height 3-1/2 inches for better gunner compatibility. Also, the 13-inch section above the support leg bracket was made removable from the XM4 pedestal column to permit air delivery from the AC-1 aircraft (Figure 11).

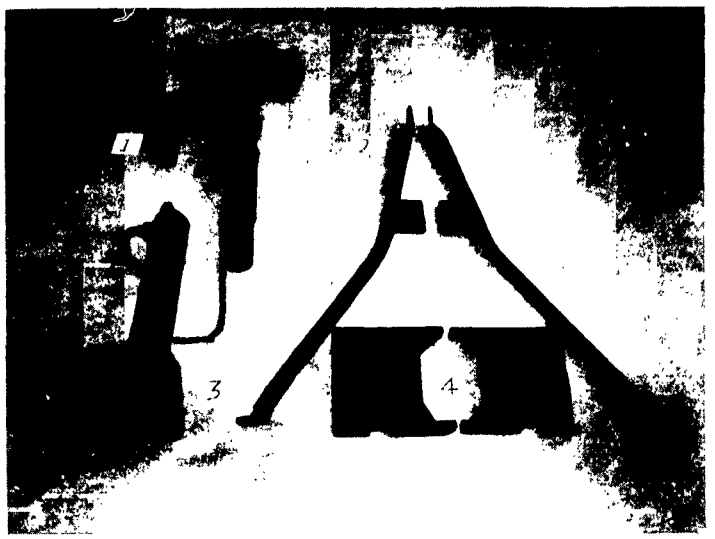

Figure 11: Modified XM4 Pedestal Mount Components. 1 - XM142 Gun Mount. 2 - Pedestal Column with Removable Section. 3 - Modified Tubular Support Legs. 4 - Heavier Bridge Support.

3. DETAILS OF TEST

3.1. Procedure and Results

3.1.1 M31 Pedestal Mount. The testing program consisted of compatibility, durability, and machine gun firing tests.

3.1.1.1 Installation of Modified M31 Pedestal Mount. Installation instructions were provided by ATAC. Obstacles such as seats, muffler, and drive shaft were removed to eliminate interference while installing the pedestal mount. The time required to install the M31 pedestal mount was approximately 40 man-hours. The vehicle floor was scribed with intersecting lines, using measurements from prints supplied by ATAC. At proper intersections of lines, four 0.47-inch holes were drilled through the floor, rail, and filler. Baseplates were welded to the vehicle understructure to insure maximum strength for the pedestal-mount support assembly which forms a bridge over the winterization heater. Reinforcement plates were welded according to

specifications to strengthen the wheel housing to which are connected the tubular support brackets from the pedestal column (Figure 12). All bolts were torqued between 55 and 65 foot-pounds.

Figure 12: Wheel-Housing Reinforcement Plates for XM4 Pedestal-Mount Support Brackets.

3.1.1.2 Durability Operations. The vehicle was operated 2000 miles on the Perryman cross-country course to determine the durability of the M31 pedestal mount. The caliber .50 machine gun, M85C, with weight to simulate ammunition was mounted on the pedestal mount throughout the cross-country testing.

Upon notification that there was no requirement for the caliber .50 machine gun, M85C, mounted on the M151 truck by ATAC (Appendix A-9), tests were concluded on the M31 pedestal mount after 2000 miles had been accumulated. No machine gun firing was conducted on the M31 pedestal mount.

3.1.2 XM4 Pedestal Mount. After the test on the modified M31 pedestal mount was suspended, a new pedestal mount, XM4, was furnished for test.

3.1.2.1 Installation of XM4 Pedestal Mount. Installation instructions were again provided by ATAC. Seats, muffler, and drive shaft were removed temporarily to eliminate interference while installing the mount. Time required to install the mount was approximately 20 man-hours. This is half the time required to install the M31 pedestal mount. The reduction in installation time is attributable to the modification of the tubular support assembly which connects to the pedestal column. This assembly was mounted on the understructure of the vehicle instead of the wheel housing, eliminating the need to weld reinforcement brackets to the wheel housings.

The vehicle floor was scribed with intersecting lines. At specified intersections, four 0.46-inch holes were drilled through the floor, rail, and filler. Baseplates were welded to the understructure to insure sufficient strength for the pedestal support assembly and pedestal tubular-support assembly. Figures 13 and 14 show the baseplates installation positions on the vehicle's understructure. All bolts were torqued between 55 to 65 foot-pounds in accordance with installation instructions.

Figure 13: Rear Baseplates for XM4 Pedestal Mount's Tubular Support Assembly.

Figure 14: Front Baseplates Welded to Understructure for XM4 Pedestal Mount Support Assembly.

3.1.2.2 Durability Operation. The vehicle was operated 2000 miles at Perryman cross-country to test durability of the XM4 pedestal mount. A total of 197 miles had been completed prior to the modification of the tubular support legs (Figure 9). For test purposes, the original 197 miles were not considered. Durability testing resumed for an additional 1000 miles, at which time, upon authority received by teletype (Appendix A-11), the original bridge support was replaced by a heavier gage (1/4-inch) bridge (Figure 10). The XM4 pedestal mount was then given a complete visual inspection and the 7.62-mm machine guns, M60 and M73C, were fired to determine the degree of accuracy and dispersion obtained from the XM4 mount. Durability testing resumed for an additional 2000 miles.

3.1.2.3 XM4 Pedestal Mount Firing Test. The 7.62-mm, M73C and M60 machine guns were zeroed from the pedestal mount at a 1000-inch range and fired for accuracy and dispersion purposes. The ammunition type fired was cartridge, 7.62-mm, NATO, 4-ball, M80, with one tracer, M62 linked, lot FAL-79076. The machine guns were fired from a 0° angle with respect to the front of the vehicle and from a maximum side angle of 36°. Both the M73C and M60 machine guns were fired with pintle locked and unlocked in azimuth.

3.1.3 Modified XM4 Pedestal Mount. At the completion of the XM4 pedestal mount durability testing, ATAC, upon recommendations from USCONARC,

introduced a modified XM4 pedestal mount (2-piece pedestal column) to be installed on the M151 truck.

3.1.3.1 Installation of Modified XM4 Pedestal Mount. Installation instructions were followed in installing the new 2-piece pedestal column in place of the original 1-piece column. The modified pedestal column was installed with no difficulty.

3.1.3.2 Modified XM4 Pedestal Mount Firing Test. Prior to the modified XM4 pedestal mount firing test, a teletype was received from ATAC (Appendix A-12), which stated that the requirement for the M73C machine gun mounted on the M151 truck no longer existed. All testing on the M73C machine gun was terminated at this point.

The travel and pintle were secured while zeroing the 7.62-mm machine gun, M60. The zero was then confirmed with five single rounds. Ten rounds were fired, one round at a time, with the gun relaid before firing each round at a 1000-inch range to determine the accuracy of the pedestal-mount machine gun system with the travel and pintle locks unlocked.

During the dispersion firing phase, five 20-round groups were fired with the travel and pintle locks secured to determine 100 per cent and 80 per cent extreme dispersion.

During the functional and durability firing phase, 3000 rounds were fired. Approximately 700 rounds were fired in erratic bursts from various positions of azimuth and elevation to determine general functioning of the system. The remaining rounds were fired with the pedestal locked in elevation and azimuth to test durability of the system during extensive firing.

3.2 Results

3.2.1 M31 Pedestal Mount Durability Operation. No defects were found in the M31 pedestal mount after 2000 miles of cross-country operation. Further testing of the mount was cancelled when the M85C machine gun testing portion was terminated (Appendix A-9).

3.2.2 XM4 Pedestal Mount Durability Operation. The XM4 pedestal mount was subjected to 5000 miles of cross-country operation. An inspection at 1200 miles revealed that the pintle lock had developed a small degree of free play at the pin which holds the pintle shaft in the pedestal column (Figure 15, Defect Record APG-1, Appendix B-1).

An attempt was made to hold the pin in place by expanding the diameter, accomplished by center punching the ends around the edge (Figure 16).

Figure 15: Pintle-Lock Shaft Pin for XM142 Gun Mount.

Figure 16: Pintle-Lock Shaft Pin, Ends Center Punched in Attempt to Hold Pin in Place.

The pin came loose again. It was removed and replaced by a standard 1/2-inch bolt (Figure 17). There was no further indication of failure of this item throughout the durability test.

An inspection after 3000 miles revealed failures of the rear tubular support gussets (Figure 18). This defect was corrected by installing new reinforcement gussets (Defect Record APG 2, Appendix B-2).

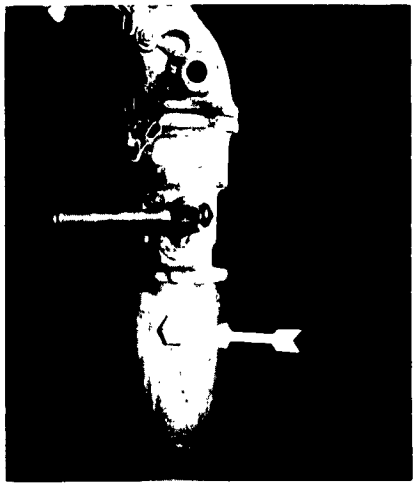

Figure 17: Half-Inch Bolt Replacing Pintle-Lock Shaft Pin in XM4 Pedestal Mount.

Figure 18: Cracked Right Rear Reinforcement Gusset on XM4 Pedestal Mount. Similar Cracks in Left Rear.

Upon completion of the test, a breakdown inspection was conducted on all components of the mount assembly. The components were found to be in satisfactory condition.

During inspection of the pintle assembly, it was noted that if the 7.62-mm machine gun, M60, was at full elevation, the trigger arm guard would rest against the minimum elevation stop (Figure 19). Further investigation indicated that the trigger arm guard would be damaged if force was applied to the weapon, thus possibly eliminating the ability of the weapon to function (Defect Record, APG 3, Appendix B-3).

A crack in the weld of the minimum elevation stop developed in the area shown in Figure 19. The crack was welded before final testing was conducted.

Moderate wear was found on the pintle-travel lock pin (Figure 20) and the lock mount, XM142 (Figure 21).

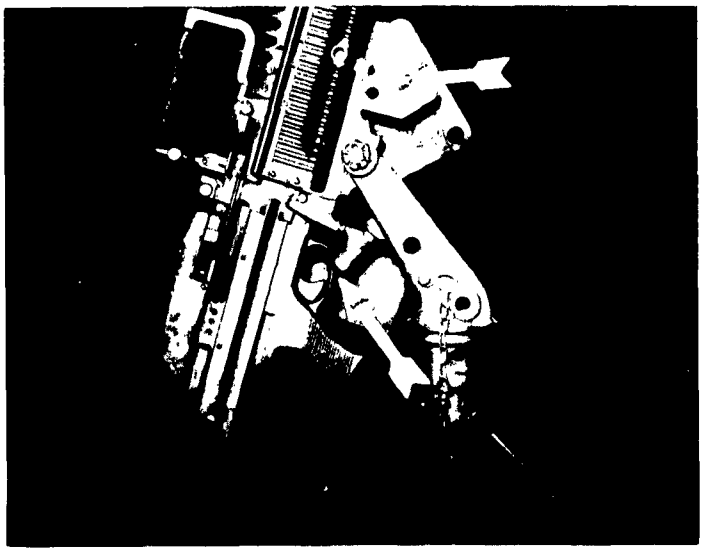

Figure 19: Pintle Lock Assembly with 7.62-mm Machine Gun, M60, Mounted on XM4 Pedestal Mount. 1 - Trigger Arm Guard Contacting Minimum Elevation Stop. 2 - Reinforcement Weld.

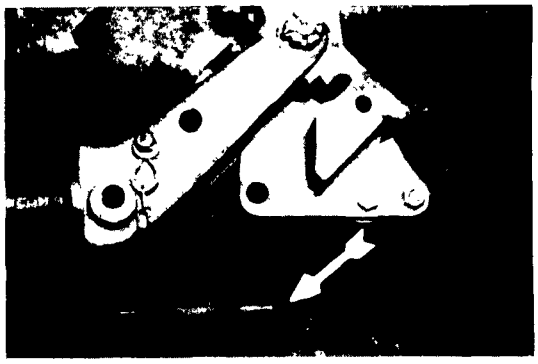

Figure 20: Worn Pintle-Travel Lock Pin.

Figure 21: Worn Pintle-Lock Mount, XM142.

3.2.2.1 XM4 Pedestal Mount Firing Results. The OPM 60-230, dated 4 November 1957, indicates that the group extreme dispersion of various machine gun mounts should be within the limits outlined in Table I.

Table I. Extreme Dispersion of Machine Gun Mounts

Pintle Lock	Extreme Dispersion, mils Vertical	Horizontal
Locked	6.0	6.0
Unlocked	10.0	10.0

In most cases at 100 per cent extreme dispersion, OPM limits were not met while firing the 20-round continuous burst. Recording the individual hits indicated that if the maverick rounds were eliminated, OPM limits could be met. Table II summarizes the accuracy firing program showing the extreme dispersion and center of impact at 100 per cent and 80 per cent hit scale.

Table II. Accuracy Firing Data - 7.62-mm, M73C and M60 Machine Guns on XM4 Pedestal Mount

Target size: 4 by 6 feet.
Range: 1000 inches.

Position of Gun	No. of Groups	Rounds per Group	Pintle Lock	Type of Fire	100% ED[a] V	100% ED[a] H	100% CI[b] V	100% CI[b] H	80% ED[a] V	80% ED[a] H	80% CI[b] V	80% CI[b] H
				M73C Machine Gun								
Front	10	1	Locked	Single	10.6	3.6	1.6 L	0.2 L	9.7	2.4	1.5 L	0.1 L
Side	10	1	Locked	Single	12.7	4.2	1.9 L	1.3 L	5.2	3.3	1.8 L	1.1 L
Front	5	20	Locked	Burst	15.6	5.8	2.1 H	1.7 L	10.4	4.2	1.8 H	1.4 L
Side	5	20	Locked	Burst	13.8	5.3	3.0 H	1.1 L	9.6	3.3	2.6 H	0.8 L
Front	10	1	Unlocked	Single	21.6	9.1	4.5 L	3.2 R	13.8	6.1	4.2 L	2.5 R
Side	10	1	Unlocked	Single	6.8	6.8	1.1 H	0.5 R	3.8	3.4	1.0 H	0.3 R
Front	5	20	Unlocked	Burst	11.2	11.7	0.8 H	1.0 R	7.5	7.4	0.7 H	0.9 R
Side	5	20	Unlocked	Burst	15.9	15.5	0.3 H	0.6 R	11.1	9.2	0.4 H	0.5 R
				M60 Machine Gun								
Front	10	1	Locked	Single	2.6	1.6	0.7 H	0.9 L	1.6	2.0	0.6 H	0.8 L
Side	10	1	Locked	Single	4.7	2.6	2.0 H	0.6 L	4.4	1.6	1.5 H	0.4 L
Front	5	20	Locked	Burst	15.2	3.0	1.8 H	0.1 R	11.9	2.1	1.5 H	0.1 R
Side	5	20	Locked	Burst	18.7	5.9	7.3 H	3.5 R	13.8	5.0	6.1 H	2.9 R
Front	10	1	Unlocked	Single	6.1	2.2	2.0 H	0.1 L	3.5	1.0	1.4 H	0.1 L
Side	10	1	Unlocked	Single	4.2	3.5	2.6 H	0.9 L	3.9	1.8	2.1 H	0.9 L
Front	5	20	Unlocked	Burst	15.3	11.9	2.4 H	0.9 L	9.3	8.8	1.9 H	0.7 L
Side	5	20	Unlocked	Burst	17.8	14.3	5.9 H	0.7 L	12.9	9.8	4.9 H	0.6 L

[a]Extreme dispersion (vertical and horizontal in mils).
[b]Center of impact (vertical and horizontal in mils).

3.2.3 Modified XM4 Pedestal Mount Firing Results. The results of the 7.62-mm machine gun, M60, accuracy firing were within the limits specified in Table I. Tables III and IV summarize the firing program showing the extreme dispersion and center of impact for 100 per cent and 80 per cent of the rounds.

Table III. Accuracy Firing Results of 7.62-mm Machine Gun, M60, mils

Position of gun: Front and center.
Range: 1000 inches.
Ten groups, one round per group - pintle lock unlocked.

100 Per Cent				80 Per Cent			
Extreme Dispersion		Center of Impact		Extreme Dispersion		Center of Impact	
Vert	Hor	Vert	Hor	Vert	Hor	Vert	Hor
5.25	4.50	1.35 H	1.00 R	1.85	1.70	0.20 H	0.40 R

Table IV. Dispersion Firing Results of 7.62-mm Machine Gun, M60, mils

Position of gun: Front and center.
Range: 1000 inches.
Twenty rounds per group - pintle lock locked.

No. of Group	100 Per Cent				80 Per Cent			
	Extreme Dispersion		Center of Impact		Extreme Dispersion		Center of Impact	
	Vert	Hor	Vert	Hor	Vert	Hor	Vert	Hor
1	2.70	2.25	2.34 H	0.16 R	2.10	3.20	2.03 H	0.20 R
2	4.10	4.05	2.55 H	0.76 L	2.55	2.95	2.16 H	0.62 L
3	3.80	4.05	2.29 H	1.80 R	2.00	3.10	1.38 H	1.38 R
4	5.10	3.90	1.04 H	0.88 R	2.70	3.00	1.02 H	0.53 R
5	5.10	5.70	0.60 H	1.21 R	3.90	5.10	0.82 H	0.82 R
Avg	4.16	3.99	1.76 H	0.66 R	2.65	3.47	1.48 H	0.46 R

3.3 Observations

3.3.1 Compatibility of the XM4 Pedestal Mount Assembly. The pedestal mount does not interfere with the vehicle driver and permits firing of the machine gun while the driver and assistant driver are seated.

It permits a 360-degree traverse of the 7.62-mm machine gun, M60. Field of fire is limited only by the ability of the gunner to move behind the machine gun as it is traversed. The machine gun can be fired from a 50-degree angle left and right of front center and from a 40-degree angle left and right of rear center. Minimum safe depression is approximately 20 degrees and maximum safe operational elevation is 70 degrees in all gunner positions.

Experienced gunners of varying heights fired the 7.62-mm machine gun, M60 on the modified XM4 pedestal mount. The gunners expressed their preference for the modified XM4 mount because of the ease with which it can be manipulated and held on the target. This is attributed to the reduction of the over-all height of the XM4 mount by 3-1/2 inches.

During the functional firing phase, no trouble was encountered with the machine gun, feed ejection system, or pedestal mount.

After completing the 3000-round durability firing, a final breakdown inspection was conducted on all the pedestal mount components. All parts were found to be in satisfactory condition.

4. CONCLUSIONS

It is concluded that:

a. The XM4 pedestal mount installed on the M151 utility truck is compatible with the vehicle (ref par. 3.3.1).

b. The trigger guard of the 7.62-mm machine gun, M60, can be damaged by contacting the minimum elevation stop which could disable the machine gun (ref par. 3.2.2).

c. Accuracy, dispersion, and functional results obtained from firing the 7.62-mm machine gun, M60, on the modified XM4 pedestal mount were satisfactory (ref par. 3.2.3).

d. Lowering the pedestal mount by 3-1/2 inches has increased the gunner's ability to operate the machine gun (ref par. 3.3.1).

e. Moderate wear noted in the pintle-travel lock pin and lock mount XM142 on XM4 pedestal mount are normal and corrective measures are not necessary (ref par. 3.2.2).

5. RECOMMENDATIONS

It is recommended that:

a. The modified XM4 pedestal mount be endurance tested prior to production release.

b. Minimum elevation stop be designed to prevent damage to 7.62-mm machine gun, M60, trigger guard when gun is fully elevated.

SUBMITTED:

M. S. Varhola

M. S. VARHOLA
Sp/4, Ord Corps
Test Director

REVIEWED:

P. R. Gula

P. R. GULA
Chief, Tracked
Vehicle Branch

C. D. Montgomery

for W. A. GROSS, JR.
Chief, Automotive
Division

APPROVED:

ROBERT W. SAMUEL
Lt Col, Ord Corps
Deputy Director for
Engineering Testing
Development and Proof Services

APPENDICES

APPENDIX A

Correspondence

HEADQUARTERS
UNITED STATES ARMY ORDNANCE TANK-AUTOMOTIVE COMMAND
1501 BEARD, DETROIT 9, MICHIGAN ETKawa/em/22275

IN REPLY REFER TO:

ORDMC-REC.2

28 August 1961

SUBJECT: Mount, Machine Gun M151 Vehicle

TO: Commanding General
Aberdeen Proving Ground
ATTN: ORDBG-DP-TU, Lt Benedict
Aberdeen, Maryland

1. Acceptance of the new design machine guns necessitated developments of machine gun mounts for all current standard and new design Ordnance vehicles.

2. In March 1961, this Command initiated a development program for a pedestal mount capable of installation on the Truck, 1/4 Ton, 4x4, Utility M151, along with suitable cradle, pintle and ammunition tray assemblies to accept the 7.62MM M60 Machine Gun; 7.62MM M73C Machine Gun and Caliber .50 M85C Machine Gun.

3. The complete kit consists of a modified M31 pedestal mount, a separate cradle, pintle and ammunition tray assembly for each gun and a tubular support assembly, one end of which is attached to the pedestal and the other end is attached to the top of the left and right vehicle wheel housings. The pedestal is mounted to two support assemblies which form a bridge over the winterization heater and in turn are bolted to the vehicle floor. All the mount attaching areas on the vehicle are reinforced. The reinforcing and mount attaching components are vehicular equipment and will be issued as a separate kit.

4. The cradle, pintle and ammunition tray assemblies for each gun are designed for use with the current standard pintle socket, thereby affording universal vehicle application when flexible machine gun installations are required.

5. Inasmuch as the M151 Vehicles and new weapons are currently being issued to troops, this Command is conducting an expedited program to release an engineering package for the procurement of mounts in production quantities at the earliest possible date.

6. One complete kit consisting of a pedestal mount, three (3) separate cradles, pintle and ammunition tray assemblies for the M60, M73C and M85C Machine Guns along with vehicular reinforcing and mount attaching hardware, will be ready for shipment to your facility on 18 September 1961 for an engineering evaluation.

7. The M73C Machine Gun Cradle, Pintle and Ammunition Tray Assemblies are being submitted for retest. Initial tests were conducted at the Aberdeen Proving Ground with the M31 Pedestal Mount on the M38A1 Vehicle during March 1961.

8. It is requested that your facility submit a formal cost estimate to this Command, ATTN: ORDMC-REC.2, Mr. E. Kawa, with a copy to Chief of Ordnance, ATTN: ORDTW-CVS, Mr. W. Morawski, for the proposed plan of test outlined below:

a. Installation:

(1) Determine the time, effort, tools required and difficulties encountered to install the vehicle reinforcing brackets, mount attaching brackets and pedestal mount assembly to the Truck, 1/4 Ton, 4x4, Utility M151.

(2) Prepare photographs of the complete installation and any problem areas.

(3) Install the cradle, pintle and ammunition tray for the Caliber .50 M85C Machine Gun.

b. Operation:

(1) Determine the physical interferences and compatibility of the mount and gun combination with the existing on-vehicle-equipment, vehicle occupants and gunner.

(2) Determine the maximum elevation, depression and azimuth available without damage to the vehicle.

(3) With a fully loaded box of Caliber .50 ammunition, determine the ease of manipulation and service of the gun at various angles of elevation, depression and azimuth.

(4) Determine time and effort required to replenish ammunition to the gun.

(5) Determine time and effort required for barrel removal and installation.

c. Firing:

(1) Lock the cradle in travel position with the gun directly to the vehicle front and fire three thousand rounds (3000) of ammunition to determine gun stability and mount reliability.

(2) Fire a sufficient number of rounds on the 1000 inch range to establish dispersion and accuracy of the system.

9. The above procedure will be repeated with each cradle, pintle and ammunition tray assembly.

10. Upon completion of firing, the components will be disassembled and inspected for visual signs of wear or damage.

11. A two thousand (2000) mile durability test will be conducted with the Caliber .50 M85C Machine Gun and a fully loaded box of ammunition installed on the vehicle. This portion of testing may be conducted in conjunction with vehicle endurance tests now in progress.

12. Furnish five (5) copies of final formal report to this Command, ATTN: ORDMC-REC.2, Mr. E. Kawa.

FOR THE COMMANDER:

Bernard J. Merritt
BERNARD J. MERRITT
Components Branch

COPY/cjz

HEADQUARTERS

UNITED STATES CONTINENTAL ARMY COMMAND

FORT MONROE, VIRGINIA

ATDEV-2 5 July 1962

SUBJECT: Reports of Service Tests on Pedestal Mount for 7.62-MM and .30 Caliber Machine Guns on Truck, Utility, 1/4-Ton, 4x4, M151

TO: Chief of Research and Development
Department of the Army
Washington 25, D. C.

1. Reference is made to:

a. Letter, ATDEV-2, HQ USCONARC, 27 October 1960, subject: "Pedestal and Ground Mounts for 7.62-MM Machine Guns."

b. Message, ATDEV-2 709445, 1 June 1962 (NOTAL).

2. Attached are reports of service tests on the pedestal mount for 7.62-MM and .30 caliber machine guns on Truck, Utility, 1/4-Ton, M151 prepared by the US Army Armor, Infantry and Airborne, Electronics and Special Warfare Boards.

3. General guidance for a universal pedestal suitable for mounting on the M38A1 and M151 1/4-ton trucks is indicated in reference 1a above. USCONARC recommendations based on the reports were submitted by reference 1b.

4. This headquarters concludes that:

a. Pedestal mount for 7.62-MM and .30 caliber machine guns as tested will be suitable for US Army use on the M151, 1/4-ton truck when the following changes have been applied:

(1) Reduce the over-all height of the pedestal mount three (3) inches for better gunner-weapon compatibility.

(2) Modify so that a thirteen (13) inch section above the support legs bracket on the pedestal mount for the 7.62-MM and .30 caliber machine gun on the M151, 1/4-ton truck can be removed to permit air delivery from AC-1 aircraft.

b. The pedestal mount as modified above will be marginally compatible with M38 series vehicles.

COPY/cjz

5. HQ USCONARC recommends:

a. That the pedestal mount be modified:

(1) To reduce the over-all height three (3) inches.

(2) So that a thirteen (13) inch section above the support legs bracket can be removed to permit air delivery from AC-1 aircraft.

b. The pedestal mount modified as outlined above for the M151, 1/4-ton truck be type classified Standard A and that troop issue be expedited.

c. That one each production mount be shipped to the US Army Armor, Infantry and Airborne, Electronics and Special Warfare Boards for confirmatory test.

d. No action be taken to redesign the mount in order to improve its compatibility with the M38 series vehicle.

FOR THE COMMANDER:

/s/ Lee L. Stewart
/t/ LEE L. STEWART
Colonel, AGC
Asst Adjutant General

3 Incl
1. Ltr Rept, ATBBG P-2195, USA Armor Bd, 15 Jun 62, subj: Rept of Proj No 2195, Svc Test of Pedestal Mt for Trk, Util, 1/4-Ton, 4x4, M151, w/2 incl
2. Ltr Rept, ATBC (P-2980), USA Inf Bd, 3 May 62, subj: Rept of Proj No. 2980, Svc Test of Pedestal Mt for 7.62-MM and .30 cal MG on Trk, Util, 1/4-Ton, 4x4, M151, w/2 incl
3. Ltr Rept, ATBF-AB 162, USA Abn, Elct & Sp Warfare Bd, 4 May 62, subj as abv, w/1 incl

Copies furnished:
CofOrd
DCSLOG
(See Next Page)

COPY/cjz

ATDEV-2 5 July 1962

SUBJECT: Reports of Service Tests on Pedestal Mount for 7.62-MM and .30 Caliber Machine Guns on Truck, Utility, 1/4-Ton, 4x4

Copies furnished (Cont'd)

- DCSOPS
- Comdt
  - USAARMS
  - USAIS
- Pres
  - USA Abn, Elect & Sp Warfare Bd (w/o incl 3)
  - USA ATB
  - USA Armor Bd
  - USA Inf Bd
  - USA Maint Bd
- Dir, Marine Corps Ldg Force Dev Ctr
- HQ, USMC, Code AO4
- Comdr, ASTIA
- USCONARC LO
  - APG
  - OTAC
  - Pentagon (wo incl)

COPY/cjz

Mr. Morawski/mb/53749

ORDTW-CVS

11 October 1961

SUBJECT: Assignment of Nomenclature

TO: Commanding General
Ordnance Tank-Automotive Command
1501 Beard Street
Attn: ORDMC-REC.2
Detroit, Michigan

1. Nomenclatures have been assigned and are listed with description of the items as outlined below:

a. PEDESTAL, GUN MOUNT: XM4.

(1) Purpose: To be installed in TRUCK, UTILITY: 1/4 Ton, 4x4, M151 to support any one of the following:

(a) MOUNT, GUN: XM142 (for mounting MACHINE GUN, 7.62MM: M60);

(b) MOUNT, GUN: XM143 (for mounting MACHINE GUN, 7.62MM: flexible, M73C);

(c) MOUNT, GUN: XM144 (for mounting MACHINE GUN, CALIBER .50: flexible, M85C).

(2) Design: A metal column (post) designed to accept either the XM142, XM143 or XM144 Gun Mount and formed at the base in such a manner to be installed in the M151 Truck. Will include support attachments for fastening to the left and right wheel housings of the Truck.

b. MOUNT, GUN: XM142.

(1) Purpose: For mounting MACHINE GUN, 7.62MM: M60 on PEDESTAL, GUN MOUNT: XM4 in TRUCK, UTILITY: 1/4 Ton, 4x4, M151.

(2) Design: Cradle type designed to accept the M60 Machine Gun. Includes an ammunition tray and is adapted with a pintle in order to be fastened to the XM4 Pedestal.

COPY/cjz

ORDTW-CVS 11 October 1961
SUBJECT: Assignment of Nomenclature

c. MOUNT, GUN: XM143

(1) Purpose: For mounting MACHINE GUN, 7.62MM: flexible, M73C on PEDESTAL, GUN MOUNT: XM4 in TRUCK, UTILITY: 1/4 Ton, 4x4, M151.

(2) Design: Cradle type designed to accept the M73 C Machine Gun. Includes an ammunition tray and is adapted with a pintle in order to be fastened to the XM4 Pedestal.

d. MOUNT, GUN: XM144.

(1) Purpose: For mounting MACHINE GUN, CALIBER .50: flexible, M85C on PEDESTAL, GUN MOUNT: XM4 in TRUCK, UTILITY: 1/4 Ton, 4x4, M151.

(2) Design: Cradle type designed to accept the M85C Machine Gun. Includes an ammunition tray and is adapted with a pintle in order to be fastened to the XM4 Pedestal.

FOR THE CHIEF OF ORDNANCE:

/t/ G. D. CARNAHAN
Colonel, Ord Corps
Chief, Arty & Veh Sys Branch
Research and Development Division

Copy furnished:
CG, Ord Wpns Comd, Attn:
ORDOW-TS, Rock Island, Ill.

DATE: 5 DEC 61
ACTION: D&PS

INFO: COMPT
D/C
CONARC LIAISON

EUAØ63WME344

RR RUEPAP

DE RUWMEE 22B

ZNR

R Ø418ØØ2

FM CGUSAORDTANKAUTMVCOMD DET

TO CGABERDEENPG MD

DA GRNC

BT

UNCLAS TT 2ØØ35 FOR ORDBG-DPS-A/M REYNOLDS

FROM ORDMC-REC.2/KAWA SGD MERRITT

REQUEST THAT TESTING OF THE PEDESTAL MOUNT AND CRADLE ASSEMBLIES FOR THE M151 VEHICLE BE SUSPENDED. THE CAL .5Ø MACHINE GUN INSTALLATION WILL NO LONGER BE REQUIRED, THEREFORE A LIGHT WEIGHT VERSION CASLE OF MOUNTING THE 7.62MM M73C AND M6Ø MACHINE GUNS WILL BE DIRECTED TO YOUR INSTALLATION ON OR BEFORE 1 JAN 62. FURTHER REQUEST THAT THE NEW MACHINE GUN INSTALLATION BE TESTED IN ACCORDANCE WITH INITIAL TEST PLAN FURNISHED ON 28 AUG 61. A TWO THOUSAND MILE DURABILITY TEST WILL BE INCLUDED

BI

CFN TT2ØØ35 ORDBG-DPS-A/M ORDMC-REC.2/KAWA M151 .5Ø 7.62MM M73C M6Ø

1 62 28 61

Ø4/1835Z RUWMEE

NNNNEUAØ14WMDØ9Ø

RR RUEPAP

DE RUWMEE 21B

ZNR

R 2Ø18ØØZ

date: 21 FEB 62
ACTION: D&PS

FM CGUSAORDTANKAUTMVCOMD DET

TO CGABERDEENPG MD

DA GRNC

BT

UNCLAS TT 22893 FOR ORDBG-DPS-A VARHOLLA FROM ORDMC-REC.2 E KAWA SGD MERRITT

REFERENCE TELEPHONE CONVERSATION HELD ON 19 FEB 62 BETWEEN P.F.C. M. VARHOLLA, ABERDEEN PROVING GROUND, AND MR E KAWA, THIS COMMAND, RELATIVE TO PEDESTAL MOUNT FOR M151 VEHICLE. THIS IS TO CONFIRM VERBAL INSTRUCTIONS ISSUED YOUR INSTALLATION TO MODIFY THE PEDESTAL MOUNT ASSEMBLY BY REMOVING THE PLATE BETWEEN THE LEFT AND RIGHT PEDESTAL SUPPORTS

BT

CFN TT22893 ORDBG-DPS-A ORDMC-REC.2 E 19 62 E M151

2Ø/2232Z RUWMEE

NNNNEUAØ8ØUMB214

RR RUEPAP

DE RUWMEE 42B

ZNR

R 2114ØØZ

FM CGUSAORDTANKAUTMVCOMD DET

TO CGABERDEENPG MD

DA GRNC

BT

DATE: 21 Mar 62
ACTION: D&PS

INFO: CONARC

UNCLAS TT23969 FOR ORDBG-DPS-A PFC VARHOLA FROM ORDMC-REC.2 E KAWA SGD/ MERRITT

REFERENCE TELEPHONE CONVERSATION HELD ON 2Ø MARCH 1962 BETWEEN VARHOLA, YOUR INSTALLATION AND KAWA, THIS OFFICE RELATIVE TO TEST OF MACHINE GUN MOUNT ON M151 VEHICLE. HEAVIER GAGE BRIDGE FOR PEDESTAL MOUNT ON M151 VEHICLE SHIPPED TO YOUR FACILITY ON 13 MAR 1962. REQUEST THAT NEW BRIDGE BE INSTALLED IN M151 VEHICLE AS SOON AS POSSIBLE AND THAT REMAINDER OF DURABILITY AND FIRING TESTS BE CONDUCTED WITH THE HEAVY GAGE BRIDGE.

BT

CFN TT23969 ORDBG-DPS-A ORDMC-REC.2 2Ø 1962 M151 M151 13 1962 M151

21/1519Z RUWMEE

NNNNEUA131CMB489

DATE: 22 AUG 62
ACTION: D&PS

RR RUEPAP

DE RUCMEE 63B

ZNR

R 212Ø5ØZ

FM COUSATANKAUTMCVOMD COUSARSENAL DET CENTERLINE MICH

TO CGABERDEENPG MD

DA GRNC

BT

UNCLAS TT29Ø17 FOR ORDBG-DPS-A E ROBERTS FROM SMOTA-REC.2 KAWA SGD/CICALA

REFERENCE DISCUSSION HELD AT APG ON 17 AUG 62. CANCEL THE 7.62MM M73C MACHINE GUN FIRING PORTION OF PEDESTAL MOUNT TEST ON M151 VEHICLE. REQUIREMENT FOR M73C MACHINE GUN NO LONGER EXISTS.

BT

CFN TT29Ø17 ORDBG-DPS-A SMOTA-REC.2 APG 17 62 7YWMM M73C M151 M73C

21/2121Z RUCMEE

APPENDIX B

Defect Records

DEFECT RECORD

DATE: 19 March 1962

DEFECT NO.: APG-1 ENGINEER: Pfc Varhola

ITEM UNDER TEST: Machine Gun Pedestal Mount on M151, ¼-ton, 4x4, Utility Truc

VEHICLE TYPE: M151, ¼-ton, 4x4, Utility Truck REG. NO.: 2C4717

DATE OF INCIDENT: 21 Feb 1962 ODOMETER: 5403 PART MILEAGE: 1200

DEFICIENCY: [ ] SHORTCOMING: [X] SUGGESTED IMPROVEMENTS: [ ] DESIGN: [X] MANUFACTURING: [ ]

SNL GROUP	NOMENCLATURE	PART NO.
	Pintle Lock Assembly	

DISCUSSION: Pintle lock assembly developed a degree of free play where the pintle lock shaft inserts into the pedestal column.

IMMEDIATE CORRECTIVE ACTION: Replaced pintle lock assembly shaft pin with a SAE one-half inch bolt and lock nut.

SUGGESTED LONG RANGE CORRECTION: Develop a heavy duty locking pin for the pintle lock shaft.

ORDBG Form 1415-(R), REV 27 Apr 61

DEFECT RECORD

DATE: 23 Aug 1962

DEFECT NO.: APG-2 ENGINEER: Sp4 Varhola

ITEM UNDER TEST: Machine Gun Pedestal Mount

VEHICLE TYPE: M151, 4x4, ¼-Ton, Utility Truck REG. NO.: 204717

DATE OF INCIDENT: 3 Apr 1962 ODOMETER: 7564 PART MILEAGE: 3000

DEFICIENCY: [X] SHORTCOMING: [ ] SUGGESTED IMPROVEMENTS: [ ] DESIGN: [X] MANUFACTURING: [ ]

SNL GROUP	NOMENCLATURE	PART NO.
	Reinforcement gussets for tubular support assembly	

Discussion: The left and right reinforcement gussets (XG 8389624) cracked at the center seams.

Immediate Corrective Action: Replaced with new gussets received from Ford Motor Company.

Suggested Long Range Correction: Provide reinforcement gussets with greater strength.

AMCRD Form 1415-(R), REV 27 Apr 64

DEFECT RECORD

DATE: 23 Aug 1962

DEFECT NO.: APG-3 ENGINEER: Sp4 Varhola

ITEM UNDER TEST: Machine Gun Pedestal Mount

VEHICLE TYPE: M151, 4x4, ¼-Ton, Utility Truck REG. NO.: 204717

DATE OF INCIDENT: 11 Jul 1962 ODOMETER: 11599 PART MILEAGE:

DEFICIENCY: [X] SHORTCOMING: [ ] SUGGESTED IMPROVEMENTS: [ ] DESIGN: [X] MANUFACTURING: [ ]

SNL GROUP	NOMENCLATURE	PART NO.
	Pintle Assembly	

Discussion: At full elevation the 7.62-mm M60 machine gun trigger arm guard will come in contact with the travel lock nut.

Immediate Corrective Action: None.

Suggested Long Range Correction: Develop an elevation stop to prevent the contact of the trigger arm guard and the travel lock nut.

AMSSO Form 1415-(R), REV 27 Apr 61

APPENDIX C

Distribution

NAME AND ADDRESS	NO. COPIES
Commander Armed Svcs Tech Inf Agency Arlington Hall Station Arlington 12, Virginia	10
Commanding General Test and Evaluation Command Aberdeen Proving Ground, Md.	5
Commanding General U. S. Army Tank-Auto. Center Detroit Arsenal Center Line, Michigan	
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SMOTA-AL	1
SMOTA-RES	1
SMOTA-RRD.2	1
SMOTA-REM	1
SMOTA-IQK.3	2
SMOTA-FMO	2
SMOTA-REW	1
SMOTA-REW.2	1
SMOTA-REC	1
SMOTA-REC.1	2
SMOTA-REC.2	2
SMOTA-REV	1
Commanding General U. S. Army Weapons Command Rock Island, Illinois	
ATTN: AMSWE-PW	3
AMSWE-FM	2
Commanding General U. S. Army Tank-Auto. Center 1501 Beard Street Detroit 9, Michigan	
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STEYT-TA-ET-AU	1
Commander Aberdeen Proving Ground, Md.	
ATTN: STEAP-DS-D	1
Technical Services Liaison Officer Arctic Test Board Fort Greely, Alaska	1
Technical Library Aberdeen Proving Ground, Maryland	Master 1 Reference 1 Record

AD _____ Accession No. _____
D&PS, Aberdeen Proving Ground, Maryland
ENGINEERING TEST OF MODIFICATION OF MACHINE GUN PEDESTAL MOUNT ON M151, 1/4-TON, 4X4, UTILITY TRUCK
SP/4 M. S. Varhola

Report No. DPS-761, December 1962
OMS Code No. 5510.12.242
D. A. Project No. 548-19-005
Unclassified Report

Endurance and firing tests were conducted on the M31 and XM4 pedestal mounts. The XM4 mount was generally satisfactory. Dispersion in the mounted M60 machine gun was satisfactory.

AD _____ Accession No. _____
D&PS, Aberdeen Proving Ground, Maryland
ENGINEERING TEST OF MODIFICATION OF MACHINE GUN PEDESTAL MOUNT ON M151, 1/4-TON, 4X4, UTILITY TRUCK
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