UNCLASSIFIED

AD NUMBER
ADB965290
CLASSIFICATION CHANGES
TO: **UNCLASSIFIED**
FROM: **RESTRICTED**
LIMITATION CHANGES
TO: **Approved for public release; distribution is unlimited. Document partially illegible.**
FROM: **Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; 28 FEB 1944. Other requests shall be referred to Army Ordnace Research Center, Automotive Division, Aberdeen Proving Ground, MD 21005. Document partially illegible.**
AUTHORITY
EO 10501, 5 Nov 1953; APG, 5 Nov 1953

THIS PAGE IS UNCLASSIFIED

UNANNOUNCED RESTRICTED
UNCLASSIFIED
ORDTX-AR FILE COPY
F. A. CONTROL 114
DTIC FILE COPY

ABERDEEN PROVING GROUND
MARYLAND

REPORT 10-139 SET 00-4

REPORT

AD-B965 290
DTIC ELECTE JAN 25 1988 S D

FIRST REPORT ON ASSAULT TANK T14

AND

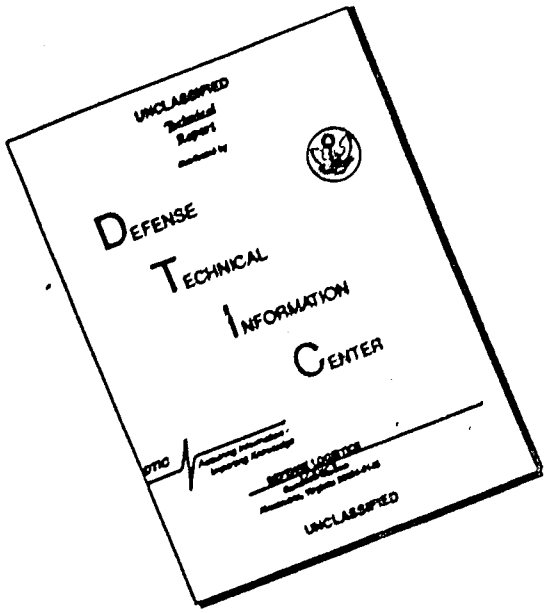
FIRST REPORT ON ORDNANCE PROGRAM NO. 5621

RETURN TO TECHNICAL DIVISION FIRING RECORD UNIT
APR 15 1944
DECLASSIFIED DOD DIR 5200.9

ORDNANCE RESEARCH CENTER
PROJECT NO. 1810

RECORDED
88 1 22 062
UNCLASSIFIED RESTRICTED

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

UNCLASSIFIED

~~RESTRICTED~~

AUTOMOTIVE DIVISION

ORDNANCE RESEARCH CENTER

ABERDEEN PROVING GROUND, MD.

PROJECTS #1810/3-14-1
#1810/3-14-1.1

FIRST REPORT ON ASSAULT TANK T14 AND FIRST REPORT ON ORDNANCE PROGRAM #5621

Accession For	
NTIS CRA&I	☐
DTIC TAB	☐
Unannounced	☑
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
12	23

DTIC COPY INSPECTED 6

REPORT DATE 28 February 1944

INCLUSIVE DATES OF TEST 29 July - 4 December 1943

AUTHORITY FOR TESTS

LETTER DIRECTIVE TAC 451.25/4941
APG 451.21/374-289Z[107]

LETTER DIRECTIVE TAC 451.25/4951.1
APG 451.21/374-289Z[113]

REPORT NUMBER ONE ON ORDNANCE PROGRAM NO. 5621

RETURN TO
TECHNICAL DIVISION
FIRING RECORD UNIT

RECORDED

APR 15 1944

UNCLASSIFIED

~~RESTRICTED~~

CONTENTS

	Page
TITLE AND IDENTIFICATION	1
TABLE OF CONTENTS	2
SEC. I - INTRODUCTION	3
SEC. II - CONCLUSIONS	4
SEC. III - RECOMMENDATIONS	10
SEC. IV - PRIOR DATA SURVEY	10
SEC. V - DISCUSSION	11
AUTHENTICATION	27
DISTRIBUTION	27

APPENDICES

PHOTOGRAPHS	A
MEMORANDUM REPORTS	B
CHARTS AND CURVE SHEETS	C
AUTOMOTIVE LABORATORY REPORT	D
CORRESPONDENCE	E

UNCLASSIFIED

AUTOMOTIVE DIVISION

ORDNANCE RESEARCH CENTER

ABERDEEN PROVING GROUND, MD.

PROJECTS #1810/3-14-1
#1810/3-14-1-1
SPINNER/ea

SECTION I - INTRODUCTION:

1. The Assault Tank T14 is a heavily armored vehicle weighing approximately 47 tons and having an armor basis of 4 inches on the front and rear and from 3 inches to 3½ inches on the sides. The vehicle has a relatively low hull with a steeply sloped front plate and skirting plates covering the suspensions. The tracks and suspension are similar to those on the Heavy Tank M6 with three bogie assemblies on each side. It is powered by a liquid-cooled Ford 60° V-8 engine, model GAZ, rated at 500 h.p. at 2600 r.p.m, which drives through a power train identical to that in the Medium Tank M4, with the exception of the final drive gear ratios. The maximum speed is approximately 24 m.p.h. The vehicle is equipped with a 75mm gun, a .30 cal. machine gun mounted in the turret co-axially with the 75mm gun, a .30 cal. machine gun mounted in the bow of the vehicle, and a .50 cal. machine gun mounted on top of the turret. It is, however, contemplated that the 75mm gun would be replaced by a 76mm or 90mm gun should the vehicle be issued to the using services. APG photographs, numbers 89225 and 89226 in Appendix "A", show general views of the vehicle, and the first two pages of the initial memorandum report in Appendix "B" present the general characteristics of the vehicle.

2. The first pilot vehicle arrived at Aberdeen Proving Ground 29 July 1943, odometer 107 miles, following receipt of teletypes, numbers TT74, dated 22 July 1943, and TT12616, dated 26 July 1943, which are inclosed in Appendix "E", and was tested in accordance with letter directive TAC 451.25/4941, APG 451.21/374-289Z[107], dated 13 July 1943, supplemented by letter O.O. 470.8/228, APG 451.21/374-289Z[108], dated 30 July 1943, from the Office of the Chief of Ordnance and the memorandum attached thereto, which is inclosed in Appendix "E". Then, the second pilot vehicle arrived 26 August 1943, odometer 83 miles, following receipt of teletype number 236, dated 19 August 1943. A copy of this latter teletype may also be found in Appendix "E". The second pilot was then tested according to letter directive, TAC 451.25/495.1, APG 451.21/374-289Z[113], dated 10 August 1943. This correspondence can be found in Appendix "E". The purpose of the test of the first pilot was to determine the adequacy of the Assault Tank as a combat vehicle, while the purpose of the test of the second pilot was to determine whether it was a reliable vehicle, before shipping it to Great Britain. The engineering and functional tests, as discussed in this report, were performed with the first pilot, excepting as specifically indicated in the "Discussion". The test of both vehicles was completed 4 December 1943, and then, on 11 December 1943, the second pilot was shipped to the Chester Tank Depot and, on 16 December 1943, the first pilot was shipped to the Armored Board, Fort Knox, Kentucky, as stated in the teletypes dated 11 December 1943 and 16 December 1943, inclosed in Appendix "E".

UNCLASSIFIED

3. The first pilot vehicle was tested according to T.S.T.P. 1935-709, features numbers 2,5,6,13,16,17,19,20,21,22,23,24, and 27 as prescribed in letter directive, TAC 451.25/4941, APG 451.21/374-289Z[107], dated 13 July 1943. It was, however, necessary to terminate the test of this vehicle sooner than was desirable because, toward the end of the test, the project lacked sufficient priority to proceed normally, and the vehicle was to be shipped to the Armored Board without undue delay. See above mentioned letter directive and letter O.O. 470.8/228 Tank (R), APG 451.21/374-289Z[108] in Appendix "E". Therefore, it was deemed advisable to bring the test to completion without thoroughly testing several components, particularly the suspension, and without completing the endurance operation. Otherwise, the test would have been prolonged considerably, and the date of shipment would have been quite indefinite. During the course of the test, a number of modifications were incorporated into the vehicle, as discussed in detail later in this report, in order to improve its operation and maintenance characteristics. At the completion of the test, the odometer reading was 458 miles.

4. The test of the second pilot vehicle consisted of operating the vehicle approximately 500 miles to determine its reliability. Also, during the test, several modifications were incorporated into the vehicle based upon experience obtained during the test of the first pilot vehicle. These modifications chiefly concerned accessibility of parts and accessories within the engine compartment, as well as the location of the air cleaner intake openings. The odometer reading was 564 miles at the completion of the test.

SECTION II - CONCLUSIONS:

1. Vehicle, General - Based upon the tests performed at Aberdeen Proving Ground, it is concluded that the Assault Tank T14, in its present state of development, is unsatisfactory because of the deficiencies included in the following conclusions.

a. Air Cleaners:

(1) Both of the air cleaners as installed in the engine compartment are inaccessible for servicing, especially with the engine hot.

(2) The accessibility of the air cleaners, as well as the other items in the front of the engine compartment, is somewhat improved after modifying the top of the engine compartment so that the air intake grill and the splash shield immediately below the grill can be hinged upward into a vertical position.

(3) With the air cleaner intake openings in their original location in the engine compartment, excessive dirt and dust enter the cleaners.

(4) With the air cleaner intake openings located in the fighting compartment, the amount of dirt and dust which enters the cleaners is considerably less than with the openings in the original location.

b. Auxiliary Generator:

(1) It is impossible to check the oil or add oil to the auxiliary generator set as installed.

c. Brakes, Steering:

(1) The pull on the steering levers required to steer the vehicle is excessive, thus making it difficult to maneuver the vehicle.

(2) The effort required to steer the vehicle is not appreciably decreased by modifying the cams in the brake linkage according to drawing T.A.D.B. 12345, which is inclosed in Appendix "C".

(3) Grooved brake linings (grooves 3 inches apart) do not appreciably improve the steering characteristics of the vehicle, as compared to standard linings. U.S. 98 linings are used on this vehicle.

d. Comfort and Safety of Crew:

(1) With the vehicle "buttoned up", the crew cannot remain in the vehicle when the 75mm gun is being fired because of fumes.

(2) The assistant driver must be extremely careful in order to avoid being injured by the flexible .30 cal. bow machine gun while the vehicle is operating over rough terrain because of the proximity of the rear portion of this gun to his body when the gun is locked in traveling position.

(3) The vertical extensions that were installed on the inside of the front fenders, as shown in APG photograph number 91539, eliminate a portion of the dust which blows from the tracks into the faces of the driver and assistant driver when operating with the hatches open, or into the periscopes when operating "buttoned up".

(4) The comfort of the men in the turret would be appreciably increased and the stowage of ammunition would be facilitated if the turret basket were removed.

e. Cooling System (Engine):

(1) The outlet of the overflow pipe of the expansion tank, as originally installed, was improperly located since it pointed directly at the left air cleaner intake opening. Relocation of the air cleaner intake openings, however, eliminated this condition. (See conclusions, paragraph 1,e,(4) of this report).

(2) As tested, with ambient temperature of 94 to 96 degrees Fahrenheit, the engine cooling characteristics of this vehicle are satisfactory, the lowest ambient temperature for boiling being 143 degrees Fahrenheit at 2000 to 2400 r.p.m.

f. Drawbar Characteristics:

(1) The drawbar horsepower of 326 in second gear at 4.75 m.p.h. (2300 r.p.m.), which is below the speed of governor interference, is below the normal power of M4A3 Medium Tanks, 350 at 2300 r.p.m., indicating that the engine was not in proper condition or that the installation losses are greater in the Assault Tank T14.

(2) The maximum drawbar pull in second gear, 26,500 pounds, is not as much higher than the normal drawbar pull of the M4A3 Medium Tanks as would be indicated by the greater gear reduction of the Assault Tank T14, a further indication of the lower power of the engine of this vehicle.

(3) The maximum drawbar pull in first gear, computed from the observed drawbar pull in second gear and disregarding track slippage, i.e. tractive effort in first gear, is 68,500 pounds. This is a tractive effort to weight ratio of 0.72.

g. Engine:

(1) The engine oil dip-stick was inaccessible as originally installed at the rear of the engine and near the bottom of the engine compartment.

(2) Installation of a new dip-stick that entered the oil pan on the left side and was sufficiently long to reach the top of the engine, made it relatively easy to check the engine oil level. See APG photograph 92690 in Appendix "A".

(3) The engine oil filler opening was inaccessible as originally installed.

(4) As originally installed, the engine oil breather filter was almost inaccessible for servicing.

(5) Extending the breather pipe upward so that the filter is located just above the left block of the engine, and also redesigning the breather opening to accommodate both the filter and a filler cap, renders it relatively easy both to service the filter and to put oil into the engine. See APG photograph number 92690 inclosed in Appendix "A".

(6) The tachometer cable, as originally installed in the engine compartment, was in danger of being stepped upon and broken by maintenance personnel.

(7) Rerouting the tachometer cable near the bottom of the engine compartment removed the danger of the cable being broken by maintenance personnel.

(8) The original Autolite Distributor is not dust-proof, and malfunctioning occurs when dust enters the unit.

(9) The Dust-proof Autolite Distributor is not entirely dust-proof, but at no time during the test did sufficient dust enter the unit to cause malfunctioning.

(10) Because of its relatively inaccessible location in the engine compartment, the distributor is very difficult to service.

(11) When operating against the governor, the engine surges, resulting in uneven vehicle operation.

(12) The front engine support bolts are practically inaccessible.

(13) The throttle linkage binds frequently because of the off-center force applied at the wish-bone type linkages above the carburetors.

(14) The accessibility of the starter is very poor because of the small clearance between the oil pan and the floor of the engine compartment.

h. Fuel System:

(1) The fuel cut-off valves at the rear of the fighting compartment become sticky and inoperative unless a heavy tool is used to turn them.

(2) The number of fuel cut-off valves should be reduced if possible in order to avoid confusion.

i. Guns and Mounts:

(1) 75mm gun and mount:

(a) A spring of approximately 15 pounds pull at 0 degrees elevation installed with one end on the lower center of the periscopic sight bracket and the other end on the front inside of the turret in order to cause the sight linkage to return to its original position after each round fired, definitely improves the accuracy of fire, both with the vehicle stationary and moving. See APG photograph number 90217 in Appendix "A".

(b) There is not sufficient adjustment range in the sight linkage, as originally installed, to permit proper adjustment when boresighting.

(c) There is not sufficient horizontal adjustment in the direct telescopic sight support bracket, as originally installed, to permit proper adjustment when boresighting.

(d) The expandable metal case, which holds the cam operating spring, was fouled with paint which prevented proper operation of the spring.

(e) The openings in the turret basket floor, as originally designed, through which the foot firing switches pass, are not sufficiently large to permit free vertical movement of the switches, and therefore, the switches become stuck in the down position. Therefore, these openings should be larger.

(2) .30 cal. Co-axial Machine Gun and Mount:

(a) This gun and mount functioned satisfactorily.

(3) .30 cal. Bow Machine Gun and Mount:

(a) The bow machine gun mount should be modified so that the machine gun can be installed without removing the front sight.

(b) This gun is awkward to handle because of the position in which the gunner must place himself to use the direct sight.

(c) Paint on the ball joint and too little clearance between the mounting plates causes the mount to be very sticky and difficult to operate.

(d) The travel lock on the mount interferes with the belt feed.

j. Hull:

(1) Since the only irregularity on the front of the hull which would trap a projectile and aid penetration of the hull is the bow machine gun port, consideration should be given to its modification or elimination.

k. Maneuverability and Operation:

(1) The cross-country maneuverability and operation of the vehicle over both flat and hilly cross-country terrain and in sand is satisfactory, with the exception of the suspension difficulties.

(2) The vehicle is capable of successfully negotiating slopes up to and including 60%.

(3) The grade ability of the vehicle in second gear is limited to a maximum of approximately 28%, based upon computations from the dynamometer test results.

(4) The mobility of this vehicle is satisfactory for a vehicle of this class.

l. Propeller Shaft:

(1) It is difficult to service the universal joint in the center of the propeller shaft, since the joint is not readily accessible through the opening in the turret basket floor.

m. Stowage:

(1) There is no ammunition box provided to carry .30 cal. ammunition belts for the bow machine gun while firing.

(2) There is no ammunition box provided to carry .30 cal. ammunition belts for the co-axial machine gun while firing.

(3) The 75mm ammunition sticks in the racks below the gun.

(4) For better protection, the ammunition stowage should be removed from the sponsons and placed below the sponson level.

(5) It is difficult to remove the propeller shaft cover since the catch holding the cover in place cannot be manipulated due to its proximity to the tool box also mounted below the turret basket floor.

(6) When the driver's hatch is open, the top head of the front periscope in the hatch strikes the tow cable when the cable is properly stowed.

n. Suspension:

(1) It is difficult to adjust the tracks on this vehicle because of the weight of the tracks and the location of the inside adjusting mechanisms.

(2) The bogie wheels, especially the outside ones on the center suspensions, are consistently badly damaged by the tracks when operating over cross-country terrain. In turn, the track guides are then broken and wedges and nuts are lost.

(3) When operating over hilly cross-country terrain, the tracks are thrown frequently, especially on side slopes.

(4) With only the center guides installed, the tracks function in the same manner as with the outside and center guides installed. That is, the tracks are thrown, and the bogie wheels are damaged frequently, excepting that the inside wheels are damaged instead of the outside wheels. It is believed, however, that higher center guides would improve this condition.

(5) Although the Assault Tank T14 #2, equipped with tracks having outside guides but no center guides, did not operate over hilly cross-country terrain, the limited operation over relatively flat cross-country terrain indicated that the results would be the same as with center and outside guided tracks and with center guided tracks.

(6) Dirt and stones lodge between the tracks and the rear idlers and thus aid track throwing.

(7) The entire suspension system is not satisfactory and should be improved if possible or replaced.

(8) Although the skirting plates on the sides of the vehicle somewhat reduce the accessibility of the suspensions for repair and maintenance purposes, they do provide additional protection for the hull and suspension against H.E. shells which detonate against the skirting plates and are therefore of value to the vehicle.

o. Tractive Resistance:

(1) The tractive resistance characteristics of this vehicle are satisfactory for a vehicle of this type, being better than the Assault Tank T1E1 (M6A2) or M4 Medium Tanks with either rubber block or steel [illegible].

SECTION III - RECOMMENDATIONS:

1. Based upon the above conclusions, it is recommended that:

a. The Assault Tank T14 be given no further consideration in its present stage of development.

b. If further consideration is given this vehicle, the [illegible] indicated in the above conclusions be incorporated and the vehicle be subjected to another test.

SECTION IV - PRIOR DATA SURVEY:

1. No previous tests have been conducted on the Assault Tank T14 and therefore no previous reports concerning this vehicle exist.

2. First Report on Heavy Tank T1E2 and First Report on Ordnance Program #5535, dated 25 August 1942. This report discusses the details of the test of the Heavy Tank T1E2 at Aberdeen Proving Ground during the period 10 February to 14 April 1942. This vehicle is considerably larger than the Assault Tank T14, weighing 55 tons and having an overall length of 23 feet 1 inch and overall width of 10 feet 2-3/8 inches, but the suspension systems of the two vehicles are identical, excepting that the Heavy Tank has four bogie assemblies on each side while the Assault Tank has only three bogie assemblies on each side. This report states that the suspension system and track were satisfactory, based on the limited test work performed, which differs with the results of the test of the Assault Tank since the latter results show the suspension to be unsatisfactory.

3. First Report on Heavy Tank T1E1 and Third Report on O.P. 5535 dated 17 November 1943. This report discusses in detail the results of the test of the Heavy Tank T1E1 which is also equipped with a suspension identical to that on the Assault Tank T14, excepting that this Heavy Tank also has four bogie suspensions on each side. This report states that the suspension system is unsatisfactory because of excessive track throwing and bogie wheel damage which is in agreement with the results of the test of the Assault Tank T14.

4. Second Memorandum Report on Proving Center Project #1919/AD810, dated 4 September 1943. This report presents data obtained in a firing test in which a Medium Tank M4 equipped with skirting plates similar to those used on the Assault Tank T14 was fired upon. The results indicate that the skirting plates are of dubious value in detonating A.P. H.E. type shells, but that they will reduce track damage due to explosions of H.E. shells where these shells detonate against the skirting plates.

SECTION V - DISCUSSION:

1. Feature 2 - Mechanical Inspection:

a. Upon arrival at Aberdeen Proving Ground, both vehicles were subjected to mechanical inspection. On Assault Tank T14 #1, one bolt, which holds the cam cover and cam shaft bearing cap in place on the left bank of the engine, was broken, and therefore, it was replaced. Then, on Assault Tank T14 #2, the right exhaust manifold of the engine was found to be cracked. This was also replaced. Otherwise, both vehicles were found to be in good mechanical condition. The mechanical inspection charts, forms TA-37 and TA-37a, for both vehicles are inclosed in Appendix "C".

2. Feature 5 - Determination of the Center of Gravity:

a. The center of gravity of the first pilot vehicle was determined by the suspension method and was found to be as follows:

Horizontally, to rear of center of front sprocket - 107-7/8 inches.

Vertically
Above Ground ---------- 35-3/8 inches.
Above bottom of hull ------- 18-1/8 inches.
This test was performed with the vehicle unstowed.

b. Since the two vehicles are identical, this test was not performed on the second pilot vehicle.

3. Feature 6 - Determination of Load Distribution and Ground Pressure:

a. Load Distribution: The load distribution of the Assault Tank T14 #1, with a full load of fuel and lubricants but without crew or stowage, was determined by weighing on a platform scale with the following results:

	LEFT SIDE:	RIGHT SIDE:
Front bogie assembly	11,840 lbs.	12,725 lbs.
Center bogie assembly	15,495 lbs.	15,360 lbs.
Rear bogie assembly	17,555 lbs.	17,390 lbs.
	44,890 lbs.	45,475 lbs.

Total weight of vehicle 90,365 pounds.

b. Ground Pressure: Also the ground pressure characteristics of the first pilot vehicle were determined, based upon the projected area of the tracks at various depths of penetration and the weight of the vehicle when stowed with a complete crew. The ground pressure at zero penetration was found to be 11.3 pounds per square inch, and at 12 inches penetration 8.1 pounds per square inch. The ground pressure characteristics between these two points are shown on the curve sheet and data sheet inclosed in Appendix "C".

c. Since the two vehicles are alike, this data was not computed for the second pilot.

4. Feature 13 - Determination of Obstacle Crossing Ability:

a. Trench Crossing: The vehicle operated through the wooden and dirt trenches very satisfactorily in second gear and in reverse, and with only a little difficulty in third gear. Since the vehicle was equipped with steel tracks, no attempt was made to operate it through the concrete trench since it obviously would have encountered considerable difficulty.

b. Bridging: It was found that the vehicle is capable of bridging a maximum gap of 110 inches forward and 96 inches in reverse.

c. Vertical Walls: Due to the fact that no vertical walls were available for test operation at the time this vehicle was undergoing test, the ability of the vehicle to cross the standard vertical obstacles was not determined.

d. These tests were performed with only the Assault Tank T14 #1, and the operation is shown in detail in APG film number 621.

5. Feature 16 - Slope Operation:

a. The vehicle successfully negotiated slopes up to and including 60%. On the 30% and 40% slopes, the engine operated against the governor in first gear, but it was not capable of climbing the 30% slope in second gear. Also, the engine was shut off, started, and idled for approximately four minutes satisfactorily while the vehicle was at rest on the 60% slope, facing both up and down the slope. This slope operation is shown in APG film number 621 . On this slope, the brakes were very difficult to set, but once set, they held the vehicle at rest.

b. In conjunction with the slope operation of the vehicle, the turret traversing operation was checked both on level ground and on the 30% slope.

(1) On level ground, using the power traversing system, the speed of traversing was four revolutions in 59 seconds. The power required to start rotation was 2585 watts (23.5 volts, 110 amperes), and the power required to maintain rotation was 1560 watts (24 volts, 65 amperes). The maximum hydraulic pressure when starting rotation was 1500 pounds per square inch, and to maintain rotation 250 pounds per square inch. The hand traversing effort was two pounds to rotate the turret on level ground, and the traverse brake held satisfactorily.

(2) On the 30% slope, the traverse speed was 3 revolutions in 46 seconds. The power required to start rotation of the turret with the gun pointed down grade was 1840 watts (23.0 volts, 80 amperes), and with the gun pointed 90% to the side of the vehicle, 2640 watts (22.0 volts, 120 amperes). The maximum power required to maintain constant rotation was 1212.5 watts (24.25 volts, 50 amperes) with the gun moving up grade. The hydraulic pressure when starting rotation with the gun moving up grade or down grade was 1500 pounds per square inch, and when maintaining constant rotation, this pressure varied from a minimum of 200 pounds per square inch with the gun moving down grade, to a maximum of 500 pounds per square inch with the gun moving up grade. The maximum hand traversing effort with the gun moving up grade was 8 pounds, and, with the gun moving down grade, 4 pounds was required to prevent rotation of the turret. The traverse brake held satisfactorily when the vehicle was on the 30% slope.

(3) The torque required to start rotation of the turret on level ground was 608.8 inch-pounds and to maintain rotation was 350.6 inch-pounds.

6. Feature 17 - Determination of Maximum and Minimum Speeds and Braking Characteristics:

a. The maximum attainable road speed of the vehicle is 22.5 m.p.h.

This information was obtained in conjunction with the acceleration test.

b. The minimum road speed at which the vehicle can travel is approximately 1.0 miles per hour, but this, of course, can vary considerably depending upon the idling condition of the engine and the carburetor adjustment.

c. To bring the vehicle to rest in neutral gear from a road speed of 20 m.p.h. approximately 71.0 feet is required with full application of the brakes. It was noted, throughout the entire test of this vehicle, however, that the vehicle was difficult to steer and to brake, since excessive effort was required of the driver and the brakes did not respond immediately.

d. These tests are discussed in detail in Automotive Laboratory Report number 43-135, dated 15 September 1943, which is inclosed in Appendix "D".

7. Feature 19 - Determination of Drawbar Pull, Acceleration, Fuel Consumption, and Resistance to Traction.

a. The maximum drawbar pull in second gear is 26,500 pounds as determined by actual test, and the maximum drawbar pull in first gear, computed from the observed drawbar pull in second gear and disregarding track slippage, i.e. tractive effort in first gear, is 68,500 pounds. This is a tractive effort to weight ratio of 0.72.

b. The maximum drawbar horsepower attainable in second gear was 328.6 at 2465 r.p.m. (5.1 m.p.h.).

c. The vehicle accelerated from rest to maximum speed (22.5 m.p.h.), shifting through second, third, fourth, and fifth gears with full throttle, in 34 seconds.

d. While operating with full throttle in second gear, the fuel consumption ranges from 0.611 pounds per drawbar horsepower hour at 1895 r.p.m. to 1.100 pounds per drawbar horsepower hour at 925 r.p.m. This information was obtained in conjunction with the drawbar pull test in second gear.

e. The average minimum tractive resistance obtained on level concrete in neutral gear was 50 pounds per ton at 2.2 m.p.h. and the average maximum tractive resistance was 72 pounds per ton at 12.5 m.p.h.

f. The results of these field dynamometer tests are presented and discussed in detail, with curve sheets, in Automotive Laboratory Report number 43-135, dated 15 September 1943, which is inclosed in Appendix "D".

8. Feature 20 - Studies of Cooling:

a. As tested, with ambient temperature of 94 to 96 degrees Fahrenheit, the engine cooling temperatures of the Assault Tank T14 are satisfactory, the lowest ambient temperature for boiling being 143 degrees Fahrenheit at 2000 to 2400 r.p.m. This test is thoroughly discussed in Automotive Laboratory Report number 43-125, dated 15 September 1943, which is inclosed in Appendix "D".

9. Feature 21 - Operation in Sand, Mud, and Snow:

a. In sand, the vehicle operated satisfactorily. The flotation characteristics are worthy of note since the vehicle did not penetrate deeply into the sand, excepting when negotiating turns. The turning characteristics in the sand were all that could be expected considering the steering difficulties which were experienced with the vehicle. This operation is shown in detail in APG film number 621.

b. No opportunity for operation in mud or snow presented itself during the course of the test of either of the Assault Tanks T14.

10. Feature 22 - Firing Tests:

a. The guns on the Assault Tank T14 #1 were proof fired, following which the firing test was performed with inert loaded ammunition. Sixty rounds were fired with the 75mm gun, and approximately 600 rounds were fired with each of the two .30 cal. machine guns. With the 75mm gun, using the direct telescopic sight, horizontal dispersion of 16 inches (0.74 mils) and vertical dispersion of 14 inches (0.65 mils) was obtained with 10 rounds. Using the periscopic sight, 5 rounds were fired, resulting in a dispersion of 42 inches (1.94 mils) vertically and 16 inches (0.74 mils) horizontally. A spring of approximately 15 pounds pull at 0 degrees elevation was then installed with one end on the lower center of the sight bracket and the other end on the front inside of the turret in order to cause the sight linkage to return to its original position after each round fired. This, in other words, eliminated the effect of lost motion in the sight linkage. Five rounds were then fired and a dispersion of 12 inches (0.55 mils) vertically and 6 inches (0.28 mils) horizontally was obtained. Thus, it can be seen that the installation of the above mentioned spring noticeably improved the accuracy of firing. All of the above firing was performed at a range of 600 yards.

b. Following the above accuracy firing, 5 rounds were fired with the vehicle entirely closed and the engine operating at idling speed. After 5 rounds, the fumes were so bad that it was necessary for the crew to vacate the vehicle. It is, therefore, obvious that a means of eliminating the fumes from the vehicle during firing must be incorporated.

c. During the above firing tests, both .30 cal. machine guns were fired and found to be satisfactory with the exception of the flexible mount of the bow machine gun, which was sticky because of an excess of paint on the moving parts.

d. Ten rounds were fired with the vehicle starting at 1000 yards, and moving toward the 8' x 8' stationary target. The vehicle was operated in 2nd gear at approximately 2600 r.p.m., and the power traverse and stabilizer were used. Nine of the ten rounds struck the target. Then, since 2nd gear appeared rather slow for such operation, the test was repeated with the vehicle operating in 3rd gear at approximately 2600 r.p.m. Again, nine of ten rounds struck the target. During both runs, the co-axial and bow machine guns functioned satisfactorily. All rounds were fired between 1000 yards and 400 yards from the target.

e. During the above mentioned firing test, and when the vehicle was being prepared for the test, the following difficulties were encountered:

(1) It was necessary to shorten the sight linkage rod 3/4" to provide sufficient adjustment when bore sighting the 75mm gun.

(2) It was necessary to elongate the bolt holes in the direct telescopic sight support bracket to allow sufficient horizontal adjustment of the sight.

(3) There was no ammunition box provided for the .30 cal. co-axial machine gun.

(4) There was no ammunition box provided for the .30 cal. bow machine gun.

(5) The expanded metal case which houses the cam operating spring of the 75mm gun was fouled with paint and prevented proper operation of the spring.

(6) There was a slight looseness in the elevating mechanism which allowed the gun to move slightly after each round. This, however, did not appreciably affect the accuracy of the gun.

(7) The 75mm ammunition stuck in the racks below the gun.

(8) When the driver's hatch was open, the top head of the front periscope strikes the tow cable. This can be eliminated by moving the cable clamp on the front of the vehicle approximately 8" to the right. See APG Photograph number 90218 inclosed in Appendix"A".

(9) The travel lock interfered with the belt feed of the bow machine gun.

(10) The bushings which support the periscopic sight holder were inspected and found to be worn and out-of-round. Therefore, new bushings were installed.

f. According to letter TAC 451.25/495.1, APG 451.21/374-289Z[113], dated August 1943, which is inclosed in Appendix "E", the firing program was to have been eliminated from this test. The test, however, had been completed previous to receipt of the letter.

g. In order to ascertain that the guns and gun mounts of the Assault Tank T14 #2 functioned satisfactorily, a brief firing program was conducted, similar to the firing program of the Assault Tank T14 #1. After bore-sighting the 75mm gun, five rounds were fired at a range of 600 yards, the vertical dispersion 17" (.94 mils) and the horizontal dispersion 7" (.39 mils). A spring was then added to the rear of the periscopic sight bracket with one end of the spring attached to the bottom of the sight bracket and the other end to the front inside of the turret in order to apply tension to remove slack from the sight linkage. After this installation, approximately the same results were obtained with five rounds fired. It is believed, however, that this spring should be permanently installed since it definitely improved the accuracy of the firing of the Assault Tank T14 #1, and, although it did not improve firing on the Assault Tank T14 #2 at the time, it might definitely improve the results after the sight linkage has become loosened. A total of 15 rounds was fired from the 75mm gun. While the 75mm gun was being fired, approximately 100 rounds were fired from each of the .30 cal. machine guns, and they functioned satisfactorily. During this firing program, the same difficulties were experienced and the same modifications were necessary as during the firing test of the Assault Tank T14 #1, as discussed previously.

11. Feature 23 - Continuous Operation Tests:

a. The 14-hour continuous operation of the Assault Tank T14 #1 was begun on the cross-country course in the Palmer Area, but after approximately five hours of operation, it was necessary to discontinue the test because of excessive dust in the air cleaners. The course was dry and extremely dusty, and, with the air cleaner openings in the original position, as they were when this test was attempted, a large portion of the dust passing through the air intake grill went directly into the air cleaners. The cleaners were inspected after approximately five hours of operation and were found in very bad condition, and it was extimated that the cleaners would have to be serviced approximately every hour for the remainder of the 14-hour test operation. This would have been impracticable because of the extreme difficulty experienced and excessive time required to service the cleaners when the engine was hot. Therefore, the test was halted.

b. It was intended to re-run the test at a later date after relocating the air cleaner intake openings and/or after the dust on the course had subsided, but it was later deemed advisable to bring the test of the vehicle to completion without re-running the 14-hour continuous operating test.

c. A strategic run was not made with either of the vehicles since both were equipped with steel tracks and would damage public highways.

12. Feature 24 - Operating Test:

a. Although the directive for the test of the Assault Tank T14 #1 stated that an operating test of 2000 miles was to be performed, this feature was eliminated from the test by letter directive TAC 451.25/4951.1, APG 451.21/374-289Z[113], dated 10 August 1943, and letter O.O. 470.8/228 Tank (R), APG 451.21/374-289Z[108], dated 20 July, with attached memorandum. In turn, however, it was directed that the vehicle be operated sufficiently to ascertain its reliability, in the neighborhood of 500 miles.

b. Therefore, practically all of the mileage accumulated on the Assault Tank T14 #1 was put on the vehicle while the engineering tests were being performed. During this operation, it was found that the suspension was not satisfactory, that it was very difficult to steer the vehicle, and that, for the most part, many of the accessories within the engine compartment were inaccessible for servicing, especially the air cleaners. Also, it was found that the air cleaner intake openings were improperly located, and that it was very difficult to adjust the tracks. These deficiencies, along with the minor deficiencies and the modifications that were incorporated, are discussed in detail later in this report.

c. The vehicle was operated 16 miles over the hilly cross-country course in the Churchville Area, but this operation was constantly interrupted by suspension difficulties. Therefore, further operation on this course would have been impractical. The course was very dusty.

d. During the 16 miles operation over the hilly cross-country course in the Churchville area and 118 miles operation over the flat cross-country course in the Palmer Area, the vehicle demonstrated ample mobility and maneuverability with the exception of suspension deficiencies. Also, with the exception of the suspension, no mechanical failures occurred.

e. The test of the Assault Tank T14 #2 was concerned chiefly with operating the vehicle approximately 500 miles to determine whether or not it was a reliable vehicle, as previously explained. Therefore, this vehicle operated 172 miles on concrete, 45 miles on gravel, and 264 miles over the cross-country course in the Palmer Area, a total of 478 miles. During this operation, the same difficulties were experienced as during the test of the Assault Tank T14 #1, that is, suspension, steering, and dust in the air cleaners. This vehicle, as the Assault Tank T14 #1, was found to be fairly reliable, with the exception of the suspension. At the completion of the test, the odometer reading of this vehicle was 564 miles.

13. Feature 27 - Preparation of Motion Picture Films:

a. When practicable, motion pictures were taken of the above tests. See APG film number 621.

14. Air Cleaners:

a. When the vehicles were received, the air cleaner intake openings were located immediately below the air intake grill of the engine compartment, as shown in APG Photograph number 91537 in Appendix "A". As would be expected of such an arrangement, dust and dirt entered the air cleaners during cross-country operation. This required very frequent servicing of the air cleaners, which in itself is a difficult operation in this vehicle. Therefore, to alleviate this condition temporarily, metal hoods were installed over the air cleaner intakes, as shown in APG Photograph number 91533 in Appendix "A", and thus the air entering the cleaners was taken from below the splash shield, rather than above the shield as previously. Later operation proved that this hood prevented much dust and dirt from entering the cleaners, and servicing was necessary much less frequently, about one fourth as often as originally. Then, later when the engine compartment was disassembled for other modifications, the air cleaner intake pipes were passed through the bulkhead with the openings in the fighting compartment, as shown in APG Photograph number 94612 in Appendix "A". The condition of the air cleaners was found quite satisfactory during operation which followed this latter modification. Since this change necessitated some alteration of the top section of the air cleaners, it is possible that the efficiency of the cleaners was affected, and the manufacturer of the cleaner might recommend reconstruction of the cleaner for a permanent installation.

b. The above work was first performed on the Assault Tank T14 #1, and later the final installation was incorporated in the Assault Tank T14 #2.

c. In both Assault Tanks, the air cleaners are very difficult to service, especially when the engine is hot. The condition was somewhat improved by arranging the air intake grill and splash shield on top of the engine compartment so that they hinged upward. This modification was incorporated in both vehicles, but the accessibility of the air cleaners for servicing still is not satisfactory. The accessibility of the cleaners could be definitely improved if the cleaners could be mounted inside the fighting compartment, but there is not sufficient space for them as the vehicle is now designed.

15. Auxiliary Generator:

a. The auxiliary generator is mounted in the left sponson of the vehicle at the rear of the fighting compartment. The oil dip-stick and oil filler opening are on the side of the unit next to the bulkhead, but the unit is mounted so close to the bulkhead that they are both

inaccessible. This can be corrected by mounting the unit further away from the bulkhead or by relocating the unit in the vehicle. Since, however, it is believed that the fighting compartment will be rearranged should the vehicle be released for production, no attempt was made to correct the condition at the time.

16. Brakes:

a. The brakes of this vehicle are the same as those used in the Medium Tank M4, with the exception that the steering levers are mounted from the roof of the driver's compartment with a toggle arrangement in the linkage between the levers and the brake actuating shaft. It is very difficult to steer the vehicle and to stop the vehicle, excessive effort being required of the driver. Also, excessive wear of the brake linings occurred consistently throughout the test of both vehicles. In order to improve the brakes, the brake cams in both Assault Tanks were modified in accordance with letter directive APG 451.21/878, SPOMD-CC (XG-12-3), dated 28 July 1943, in Appendix "E" and drawing T.A.D.B. number 12345, which is inclosed in Appendix "C". This modification, however, did not appreciably improve the steering characteristics of the vehicle. Therefore, although these brakes provide adequate steering characteristics in Medium Tanks M4, weighing approximately 32 tons, they obviously are not satisfactory in the Assault Tanks T14, weighing approximately 47 tons. Also, the steering levers as mounted from the roof are not as easily manipulated by the driver as those mounted on the floor in other vehicles, and too there is the possibility, which must be considered, of a shell striking the front plate and jarring the levers loose.

17. Engine (Ford V-8, Model GAZ)

a. General:

(1) The Ford engine GAZ #2 in Assault Tank T14 #1 performed satisfactorily for fifty-four hours and 15 minutes. Then, #4 connecting rod bearing failed. The bearing seat was found to be out-of-round, the back of the bearing indicated signs of excessive heat, and the face of the bearing was in bad condition, some metal having been displaced. The bearing evidently had not been floating but had seized the bearing cap. Also, the mating crankshaft journal was burned and scored, but none of the other journals or bearings were damaged. This engine was therefore removed, and it was replaced with engine GAZ #1-R which operated satisfactorily for the remainder of the test, fourteen hours and twenty minutes operation.

(2) Ford engine GAZ #1-R had been equipped with the latest modifications, that is, a one-piece cylinder head gasket and increased clearance between rod bearings and caps. The new type oil pan (with the center partition) which is discussed later, however, was not on this engine. Therefore, the oil pan with the modified dip-stick,

modified at Aberdeen as discussed later, was removed from the engine GAZ #2 and installed on engine GAZ #1-R previous to installation of the latter in the tank.

(3) When the starter support flange of the flywheel housing failed on Engine GAZ #3 in Assault Tank T14 #2, the flywheel housing was taken from engine GAZ #2 to replace the broken housing. Also, at this time, the new type oil pan, with center partition, which is discussed later in this report, was installed on engine GAZ #3. With the exception of this incident, the engine in Assault Tank T14 #2, operated satisfactorily.

(4) The Ford engine, see APG Photographs numbers 92920, 92921, 92922, and 92923 in Appendix "A", model GAZ, rated at 500 H.P. at 2600 r.p.m., demonstrated sufficient power to propel the vehicle on both flat and hilly cross-country terrain. The gear ratios used in this vehicle are as follows:

Bevel - 3.53
Final drive - 3.56

	Transmission	Overall
1st-------	7.55	95.3
2nd-------	3.10	39.1
3rd-------	1.79	26.6
4th-------	1.11	14.0
5th-------	.734	9.24
Reverse--------	5.64	71.40

b. Dip-stick Oil Gauge:

(1) The location of the original dip-stick oil level gauge on this engine is shown in APG Photograph number 92921. This obviously was quite inaccessible since the vehicle is not equipped with rear doors in the engine compartment. Therefore, a new dip-stick long enough to extend to the top of the engine was installed. This latter dip-stick is very accessible, as shown in APG Photographs numbers 92922 and 92690 inclosed in Appendix "A".

c. Distributor:

(1) When received, both Assault Tanks were equipped with the Autolite distributors shown in APG Photograph #93209. After brief operation of Assault Tank T14 #1 on the dusty course in the Palmer Area, however, it was found that this distributor became filled with dust in a very short time, which resulted in burned points and general malfunctioning of the distributor. See APG Photograph number 91234 in Appendix "A". The Autolite dust-proof distributor (see APG Photograph number 93208) was then installed. This latter distributor functioned quite satisfactorily for the remainder of the test operation, although it was not 100% dust-proof, as shown in APG Photograph number 92919.

The dust-proof distributor might malfunction due to dust after a long period of operation, and therefore previous to production of the unit, it should be subjected to further test.

(2) APG Photograph number 92921 shows the location of the distributor on the engine. When the engine is installed in the vehicle, the distributor is difficult to service because of its location in the rear of the engine compartment which makes it difficult to reach. Also, the dust-proof distributor is more difficult to service because it is a larger unit than the original distributor and the larger cap is more difficult to remove.

(3) The Assault Tank T14 #2 was equipped with a dust-proof distributor previous to its shipment from Aberdeen Proving Ground.

(4) The GAZ Ford engine differs from the other Ford engines in that it is equipped with a distributor and battery ignition while the others use magneto ignition. This engine is also equipped with a shallow oil pan and low silhouette carburetors. However, due to the servicing required and difficulty experienced in mounting the distributor in an accessible location, it is believed that consideration should be given to equipping the Assault Tank with an engine that uses a magneto. Also, it must be remembered that magneto ignition systems are standard production items in most tanks while battery ignition systems with distributors are not.

d. Governor:

(1) Throughout the test operation of both vehicles, it was noticed that the engine surged when operating against the governor. No concentrated effort was made to correct this condition, however, since it was understood that the Ford Motor Company was trying to correct it, and such experimentation at Aberdeen would have extended the test operation considerably.

e. Oil Filler Opening and Breather:

(1) APG Photograph number 92920 in Appendix "A" shows the location of the oil filler openings on the engine of the Assault Tank T14. Also, in this photograph, the original position of the breather filter is indicated by the lower horizontal seam of the vertical pipe. Since these items were practically inaccessible from the top of the engine compartment and the vehicle is not equipped with rear doors in the engine compartment, a modification was incorporated to improve the accessibility of both. The breather pipe was extended upward, as shown in the photograph, to the top of the engine, and both the filler opening and filter were located at the top of the pipe. APG Photographs numbers 92921 and 92690 in Appendix "A" also show this installation, the filler opening directly at the top of the pipe and the breather filter mounted to one side so that oil would not pass into the filter when engine oil was being added. Also, a metal shield

was placed around the filter, leaving the bottom open, to prevent oil and dirt drawn by the fan from lodging in the filter. This modification was first tried on Assault Tank T14 #1 and proved successful with the exception of a slight condensation, and resulting rust, at the top of the pipe. The Assault Tank T14 #2 was therefore equipped similarly. This modification very definitely reduced the time required to service and made the operation much easier.

f. Oil Pan:

(1) The original oil pan that was on the engines of these vehicles is shown in APG Photograph number 93661 in Appendix "A". Later in the test, however, the pan shown in APG Photograph number 93482, was installed at the request of the Ford Motor Company in Assault Tank T14 #2. The latter pan differs from the former in that it has a partition in the center and an oil pick-up arrangement in both compartments, as shown in the photograph. The purpose is to prevent starvation of the oil pump when operating on hills. The only difficulty experienced with the new pan was that the oil level could not be checked correctly until a small orifice was drilled in the partition so that the oil level would be the same in both compartments when the vehicle is at rest on level ground. No difficulty was experienced with the original pans on these vehicles. It was intended to install the new type oil pan in Assault Tank T14 #1, but the vehicle was shipped to Fort Knox, Kentucky, before the new pan arrived at Aberdeen.

g. Starter:

(1) The clearance between the shallow oil pan and the floor of the engine compartment is small, and therefore the starter in this vehicle cannot be efficiently serviced. Also, it is impossible to remove the starter without first removing the oil pan. The location of the starter in relation to the oil pan is shown in APG Photograph number 92920 in Appendix "A".

(2) No difficulty was experienced with the starter in Assault Tank T14 #1, but on Assault Tank T14 #2 the boss on the flywheel housing and flange on the oil pan which support the starter failed. The flywheel housing failure is shown in APG Photograph number 93058 in Appendix "A". Upon investigation, it was found that the top support of the starter mounting was loose and allowed movement of the starter in relation to the flywheel. It is quite possible that this stud was not properly tightened when the starter was installed due to its inaccessibility when the engine is installed in the vehicle.

h. Throttle Linkage:

(1) During the test operation of both of the vehicles, it was necessary frequently to free up the throttle linkages. Investigation showed that the sticking was taking place at the wish-bone sections of linkage above the carburetors, probably because of the off-center

force applied, which, in turn, was causing side thrust on the vertical shafts. This section of the throttle linkage is shown in APG Photograph number 92293 in Appendix "A".

18. Engine Compartment:

a. APG Photographs numbered 91536 and 91233 in Appendix "A", present general views of the engine compartment as originally designed. It was extremely difficult to remove the air cleaners or make repairs on the front portion of the engine without first removing the air intake grill and the splash shield behind the grill. This was especially so when the engine was hot. Also, removing the splash shield entailed considerable work since it was necessary to remove the expansion tank, water lines, and fire extinguisher connections, as can be seen in APG Photograph number 91233. Therefore, the air intake grill and splash were modified by mounting hinges on the front edge of each and coupling them together so that they could be hinged upward into a vertical position at the front edge of the engine compartment. This required removal of all stationary items from the splash shield. The expansion tank was mounted on top of the carburetor intake air pipes where they meet above the center of the engine, see APG Photographs numbers 92690 and 94613 in Appendix "A", by brazing a horizontal plate on the pipes and fastening the expansion tank to the plate with a piece of felt, one inch thick, between the plate and the tank to dampen vibration. Then, the water lines from the radiators to the tank were removed from the splash plate and side walls of the engine compartment and were rerouted over the fan shrouds where they met and emptied into a larger line which ran from between the radiators forward to the expansion tank. See APG Photograph number 94613 in Appendix "A". Then, the fire extinguisher equipment was removed from the splash plate and mounted on the side walls of the engine compartment just below the splash plate. This modification did not hinder the functioning of any of this equipment, and the new mountings withstood vibration satisfactorily, as was proven during considerable cross-country operation after the installation was completed. Due to the weight of the air intake grill and the splash plate, three men were required to swing the unit into a vertical position. Therefore, a chain lift was furnished to accomplish the job, one end of the lift being attached to a loop on the top of the turret and the other to a loop on the rear edge of the grill. This work was first completed on the Assault Tank T14 #1, and then, after the details were better understood, the top of the engine compartment of the Assault Tank T14 #2 was modified in a similar manner. Even after this modification, however, which appeared to be the only alternative without completely redesigning the engine compartment, the accessibility of the air cleaners is far from satisfactory.

19. Fenders:

a. Rear fenders were fabricated and installed on both pilot vehicles as directed in letter APG 451.21/374-289Z[113], TAC 451.25/4951.1, dated 10 August 1943, which can be found in Appendix "E" of this report.

These fenders are shown in APG general view photograph number 89225 in Appendix "A".

b. After operating for a short period in dust, small extensions were installed on the inside of the front fenders on the Assault Tank T14 #1 to eliminate some of the dust that blows in the faces of the driver and assistant driver. See APG Photograph number 91539 in Appendix "A". These extensions succeeded in eliminating a portion of the dust, but it is believed that fenders extending over the front of the tracks as far as the center line of the sprockets will be necessary to satisfactorily stop the dust from blowing in the driver's face. Previous to its shipment from Aberdeen Proving Ground, the small extensions were installed on the front fenders of the Assault Tank T14 #2.

20. Fuel Valves:

a. There are six fuel tanks in the vehicle, and each tank has a separate line emptying into a manifold near the bulkhead. From the manifold then the fuel goes to the carburetors. In this system, there are twelve fuel cut-off valves, located in such a manner that each tank can be independently isolated from the fuel system. These valves became very difficult to operate due to stickiness in the long linkage to the operating handles which are on the bulkhead in the fighting compartment. Also, so many valves, it is believed, would be confusing to the average soldier. Therefore, consideration should be given to installing fewer valves with freely operating mechanisms.

21. Suspension:

a. APG Photograph number 90215 shows the typical condition of the bogie wheels of the center bogie assemblies of this vehicle after operating from four to six hours over moderately rough cross-country terrain. The wheels of the center bogie assemblies were always in worse condition than those of the front and rear assemblies, but the wheels of the latter two assemblies were usually in far from satisfactory condition.

b. While operating over the flat but rough cross-country terrain in the Palmer Area, the bogie wheels were damaged and track guides were bent or broken consistently, but the tracks stayed on the vehicle. On the hilly cross-country terrain in the Churchville Area, however, the tracks were thrown very consistently on side slopes, in addition to damaged guides and bogie wheels. See APG Photographs numbers 91630, 91631 and 91632 in Appendix "A". First, Assault Tank T14 #1 was equipped with both center and outside track guides, and, after so much bogie wheel damage and track throwing occurred, the outside guides were removed with a cutting torch. Following removal of these guides, however, the operation was no better or no worse. Then, later, Assault Tank T14 #2 was operated with outside guides but no center guides, and again the operation was approximately the same. It was noted that the outside wheels were damaged most when the outside guides were used, and the inside ones when only the center guides were used.

c. To approach satisfactory functioning of the suspension, it was necessary to maintain the tracks relatively tight. This was difficult because of the weight of the tracks and the trouble experienced in operating the track adjusting mechanisms. The outside adjustments are accessible but require two men to operate, while the inside adjustments are inaccessible and require two men also. See APG Photograph number 90216 in Appendix "A". Usually a jack between the rear bogie wheel and the idler was used to tighten the tracks.

d. One track block was broken during the test of the first pilot vehicle. See APG Photograph number 92096 in Appendix "A". It is believed that the failure was caused by a combination of tight tracks and hard road operation.

e. During the cross-country operation of the first pilot vehicle, it was noticed that considerable debris, rocks, and dirt lodged between the rear idlers and the tracks, thus aiding the track throwing difficulties. Therefore, consideration should be given to installation of an open idler design.

f. In an attempt to reduce or eliminate the damage to the guides and bogie wheels on the Assault Tank T14 #1, it was planned to tie the adjacent wheels, the inside and outside wheels, together so that they could not move vertically independently of one another. The structure is shown in APG Photographs numbers 92509 and 92510 in Appendix "A". Only one bogie assembly, left rear, was so modified previous to shipping the vehicle to Fort Knox, Kentucky, and therefore, the value of the modification was not determined. No attempt was made to improve the suspension on the second pilot vehicle, since it is probable that a major redesign will be necessary before an appreciable improvement will be made.

22. Transmission:

a. During the test operation of the two vehicles, only one transmission failure occurred. The nut on the output shaft of the transmission in the first pilot vehicle worked forward when the cotter pin broke, and the nut struck the differential compensating case. Operation was stopped when the noise was noticed, and no serious damage occurred. The compensating case is shown in APG Photograph number 94019 in Appendix "A".

Authentication:

APPROVED:

Leslie E. Simon
Colonel, Ord. Dept.,
Acting Director, The Research Center

R. W. Spinner
1st Lt., Ord. Dept.

E. Gray
Lt. Colonel, Ord. Dept.
Chief, Automotive Division

DISTRIBUTION:

Ordnance Office Tank & Motor Trans. Dev. Branch Technical Division	4 copies
Office Chief of Ordnance-Detroit Engineering Manufacturing Branch Proving Ground Section	2 copies
Office Chief of Ordnance-Detroit Development Branch	1 copy
Rock Island Arsenal	1 copy
Army Ground Forces	2 copies (Thru Office, Chief of Ordnance).
Aberdeen Proving Ground Automotive Division File	1 copy
Aberdeen Proving Ground Record Section Proof Administrative Branch	Original
British Army Staff	3 copies (Thru Office, Chief of Ordnance).

APPENDIX "A"
PHOTOGRAPHS

Armament: 1-75mm. gun; 1-cal. .30 MG mounted co-axially with 75 mm. gun; 1-cal. .30 at right front of vehicle

Armor: front - 4" (lower), 2" at 60° (upper); sides - 2½" + ½" skirts (lower), 2" at 30° (upper); rear - 2"; turret - 4" (sides), 3" at 30° (front), 4" (rear); top - 1"

Crew: 5

Cruising range: 125 miles

Engine: Ford V-8, model GAZ, liquid cooled, 500 HP at 2600 RPM

Fuel capacity: 198 gallons

Ground clearance: 15-3/4"

Height: 109"

HP to weight ratio: 10.6 HP per ton

Length: 252"

Power train: same as Medium Tank M4A3

Speed: 23 MPH on concrete

Suspension: horizontal volute springs, 3 bogie assemblies on each side

Track: steel, 26" wide, outside and center guided

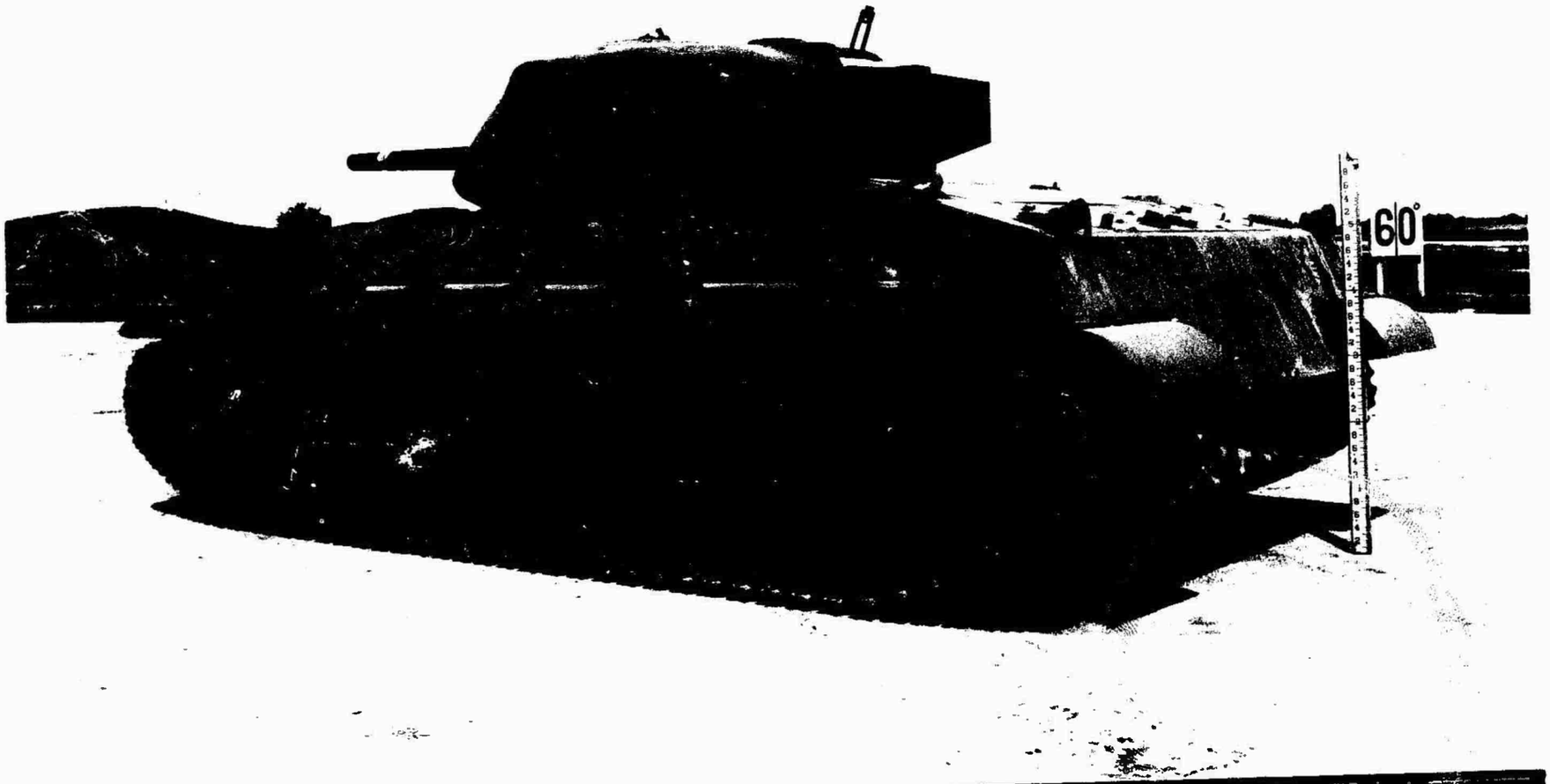
Weight: 93930# (loaded); 89930# (unloaded)

Width: 121-3/8"

RESTRICTED

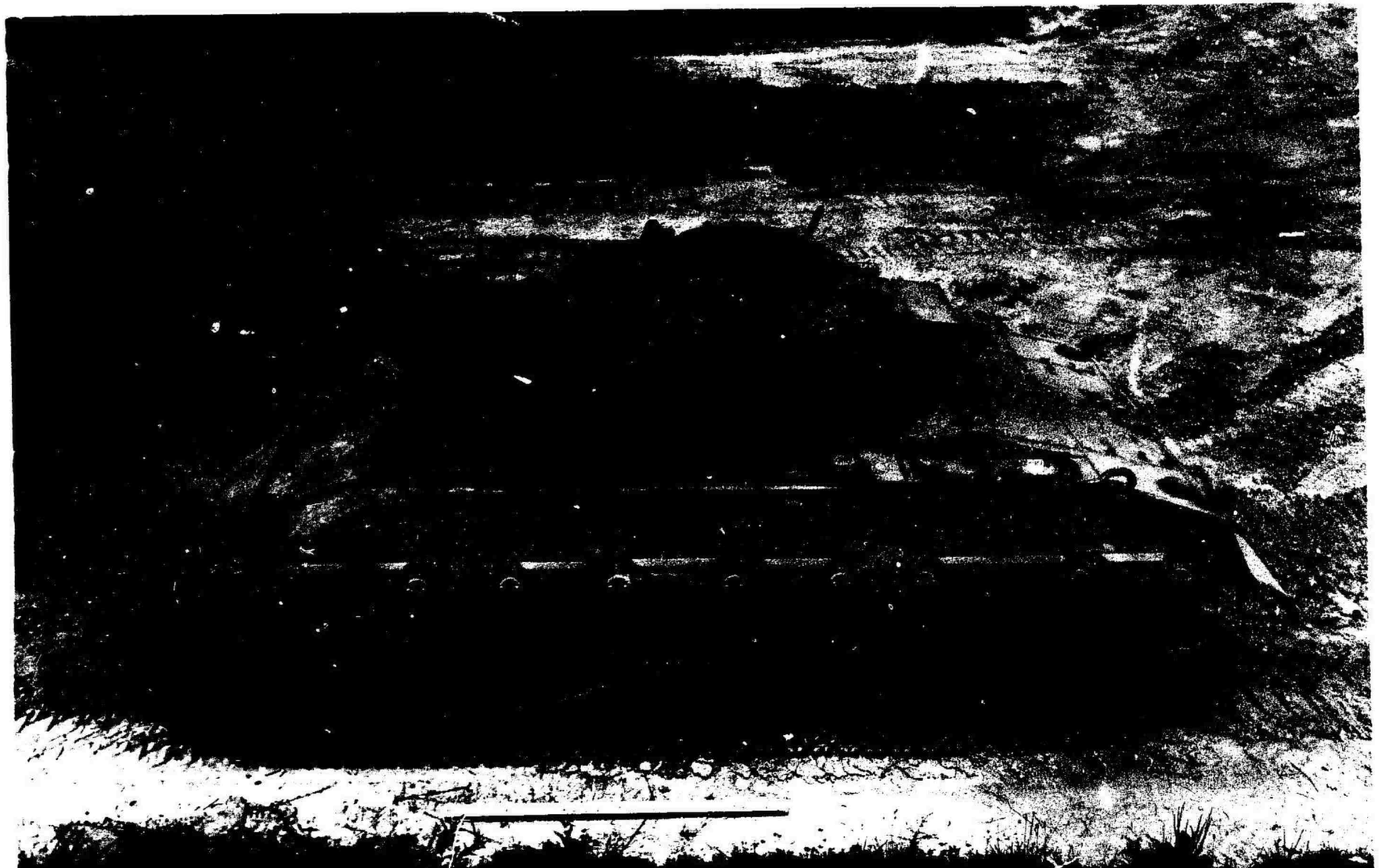
RESTRICTED - Project 1810/3-14-1. Assult Tank, T14 (Pilot). Three-quarter right front view.

RESTRICTED



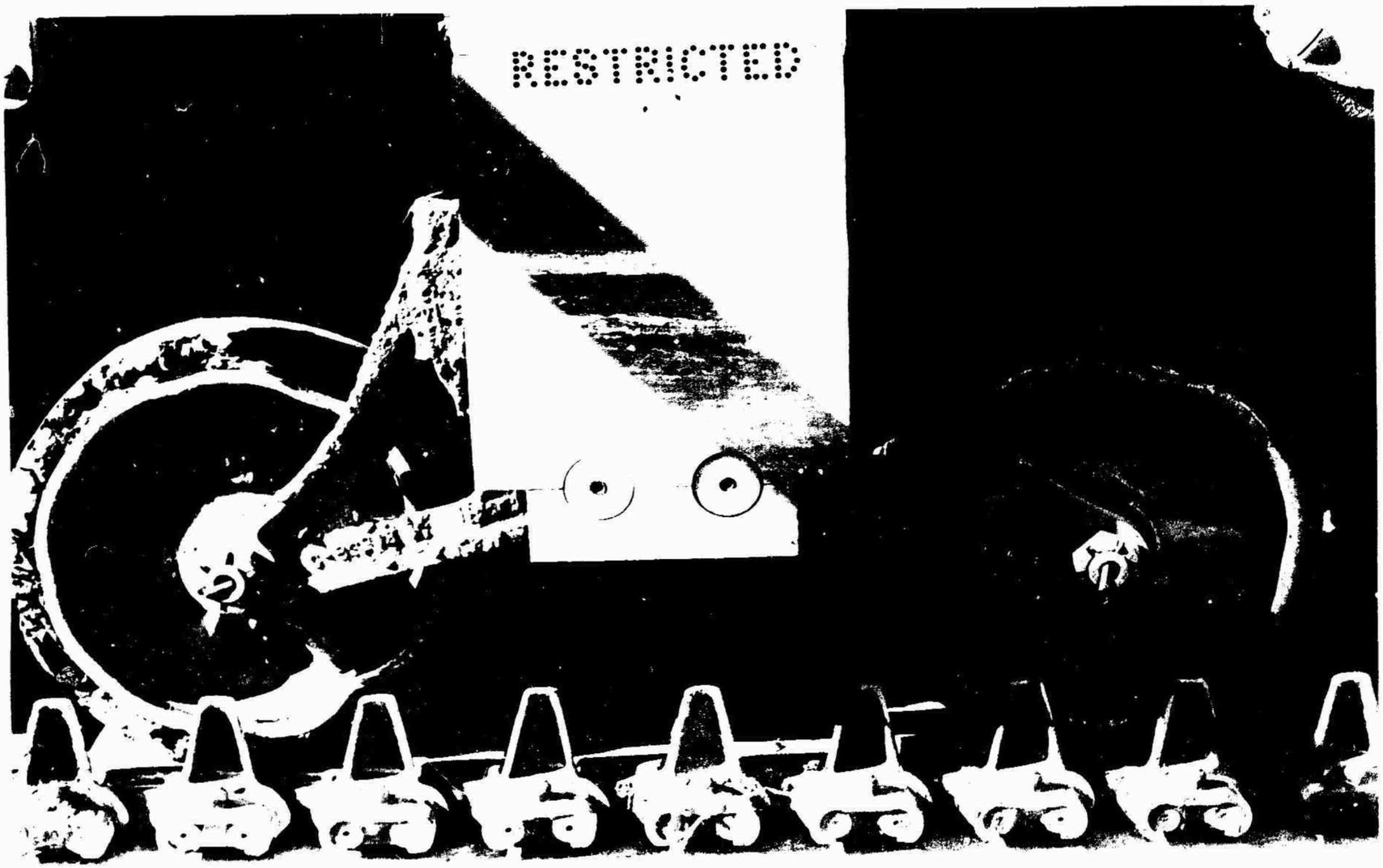
APGROUND PROVING GROUND

RESTRICTED Project 1810/3-14-1. Assault Tank, T14 (Pilot). Three-quarter left rear view.



ABERDEEN PROVING GROUND ORDNANCE DEPT.

RESTRICTED - Project 1010/3-1 -I. Assault Tank, T14 (Pilot). Top view.



PROVING GROUND ORDNANCE DEPT.

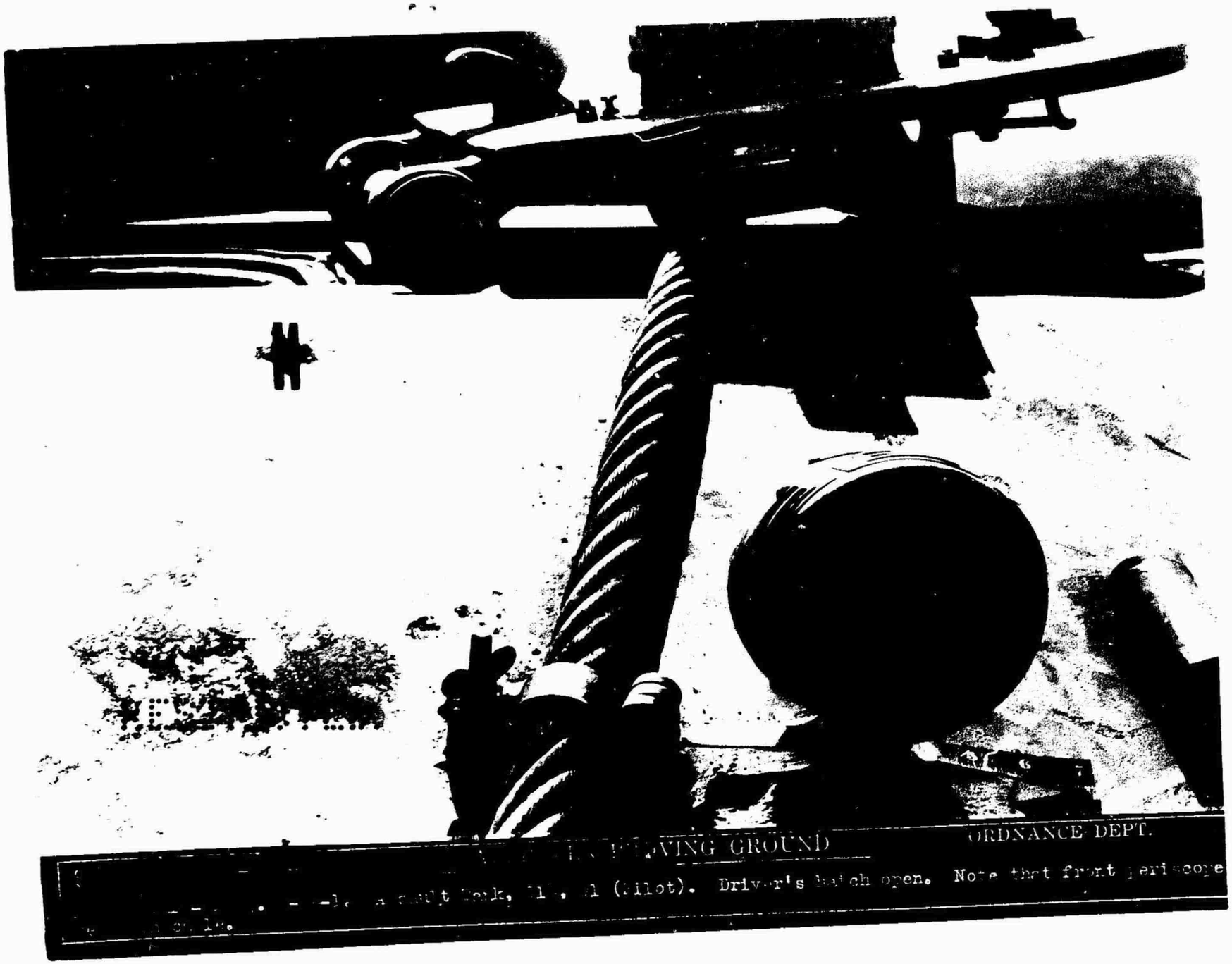
l (Pilot). Bogie wh[illegible] by track [illegible]

ABERDEEN PROVING GROUND ORDNANCE DEPT.

1 [illegible] Tank, T[illegible], [illegible]1 (Pilot). Track adjusting mechanism inside.

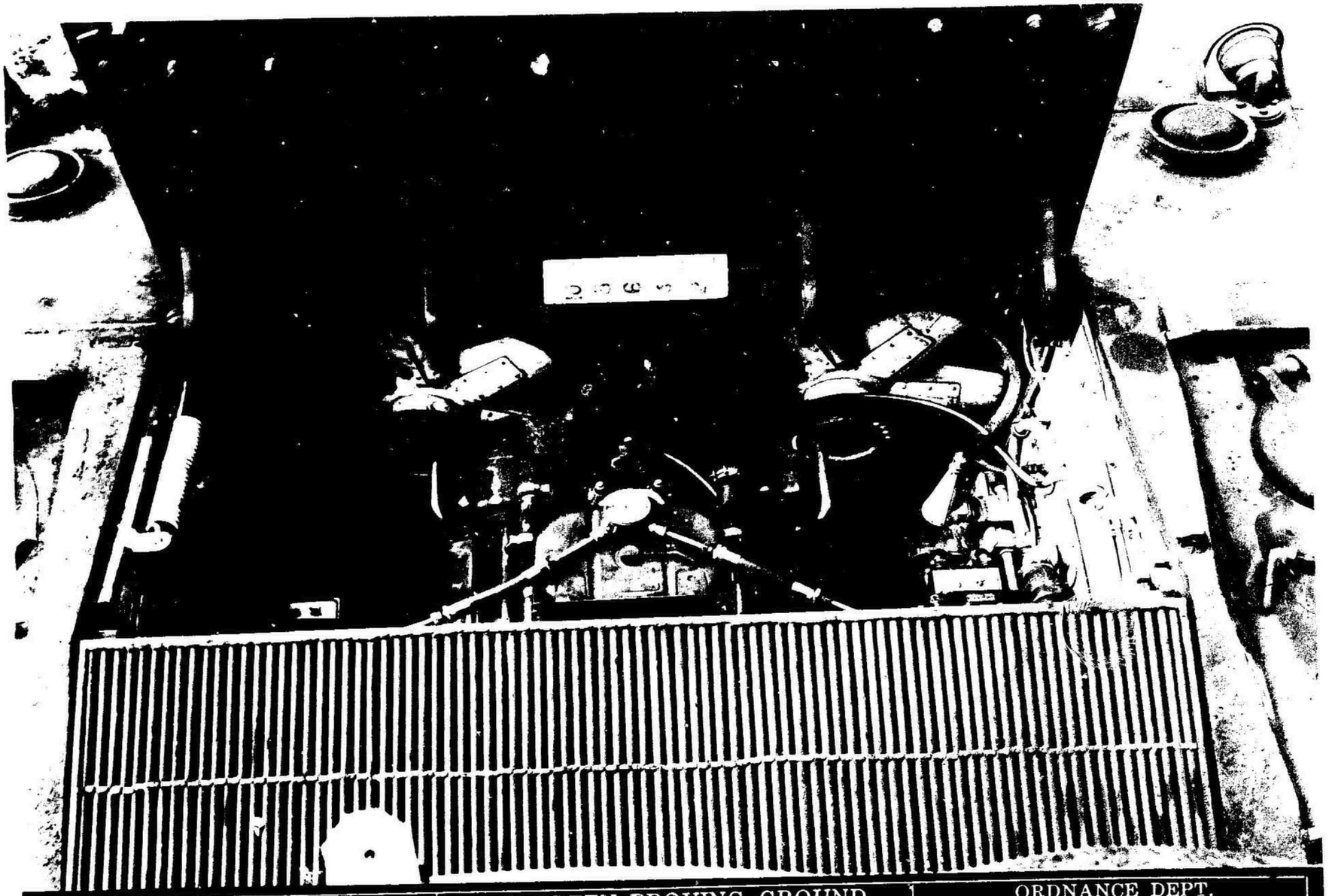
ABERDEEN PROVING GROUND ORDNANCE DEPT.

[illegible] A[illegible] Tank, [illegible], #1 (Pilot). S[illegible]rin[illegible] at[illegible] [illegible] of [illegible]
[illegible]



[illegible] PROVING GROUND ORDNANCE DEPT.

[illegible] Driver's hatch open. Note that front periscope [illegible]



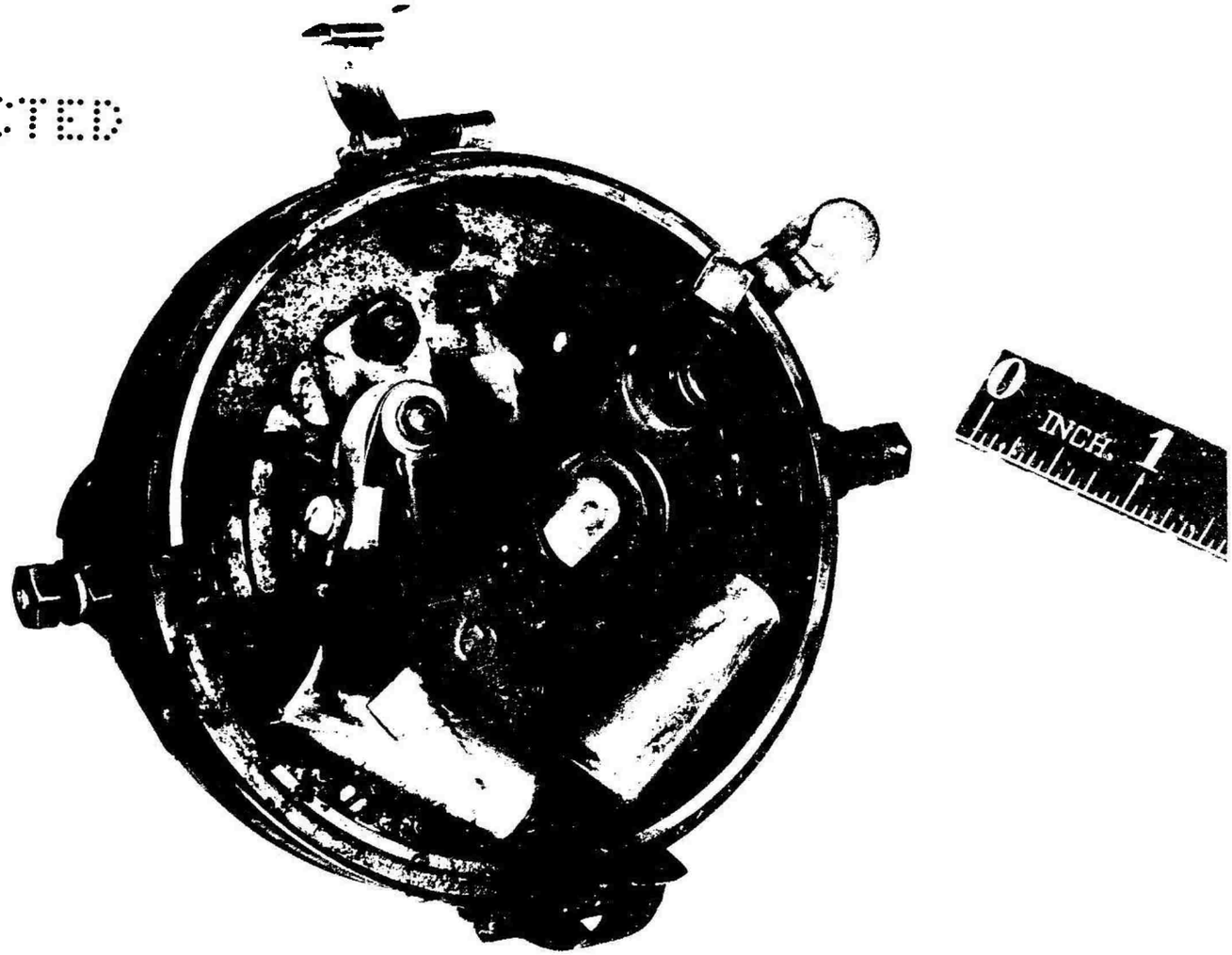
ABERDEEN PROVING GROUND

ORDNANCE DEPT.

91183 - -

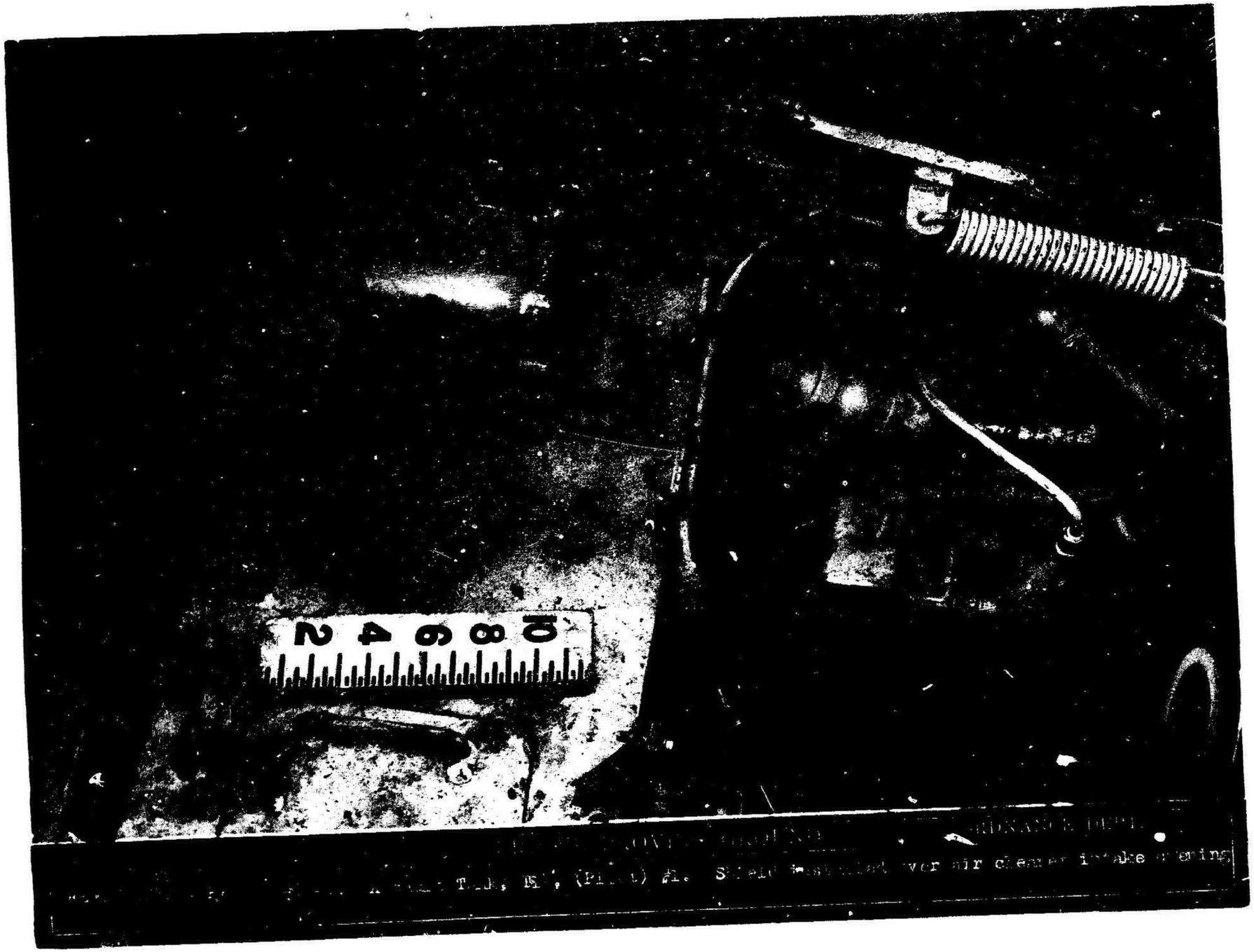
RESTRICTED - Proj. 2-1441. Assault Tank, T14, #1 (Pilot). View of engine compartment.

RESTRICTED



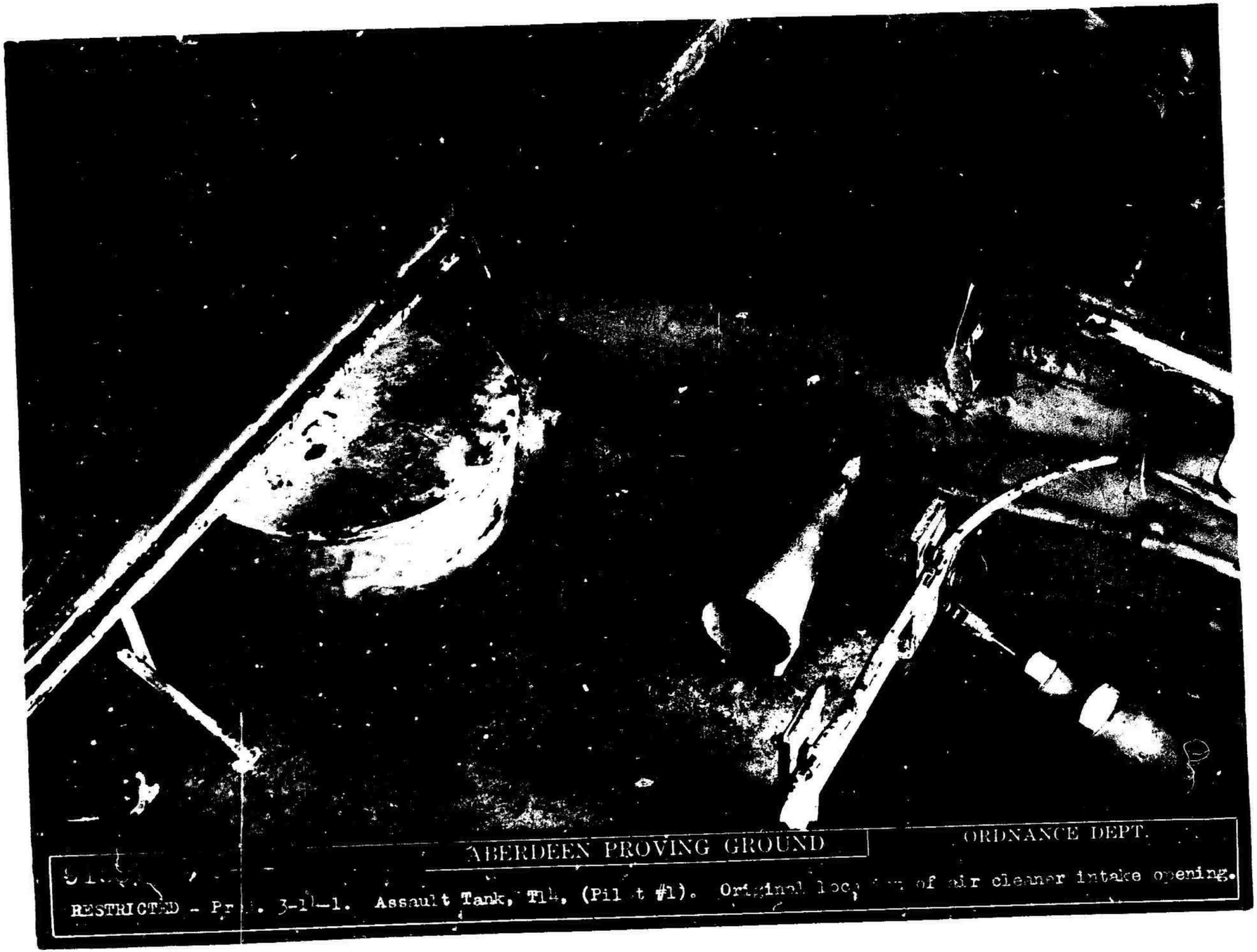
91 ABERDEEN PROVING GROUND ORDNANCE DEPT.

[illegible] Assault Tank, T14. Dirt in distributor, 46 miles after cleaning.

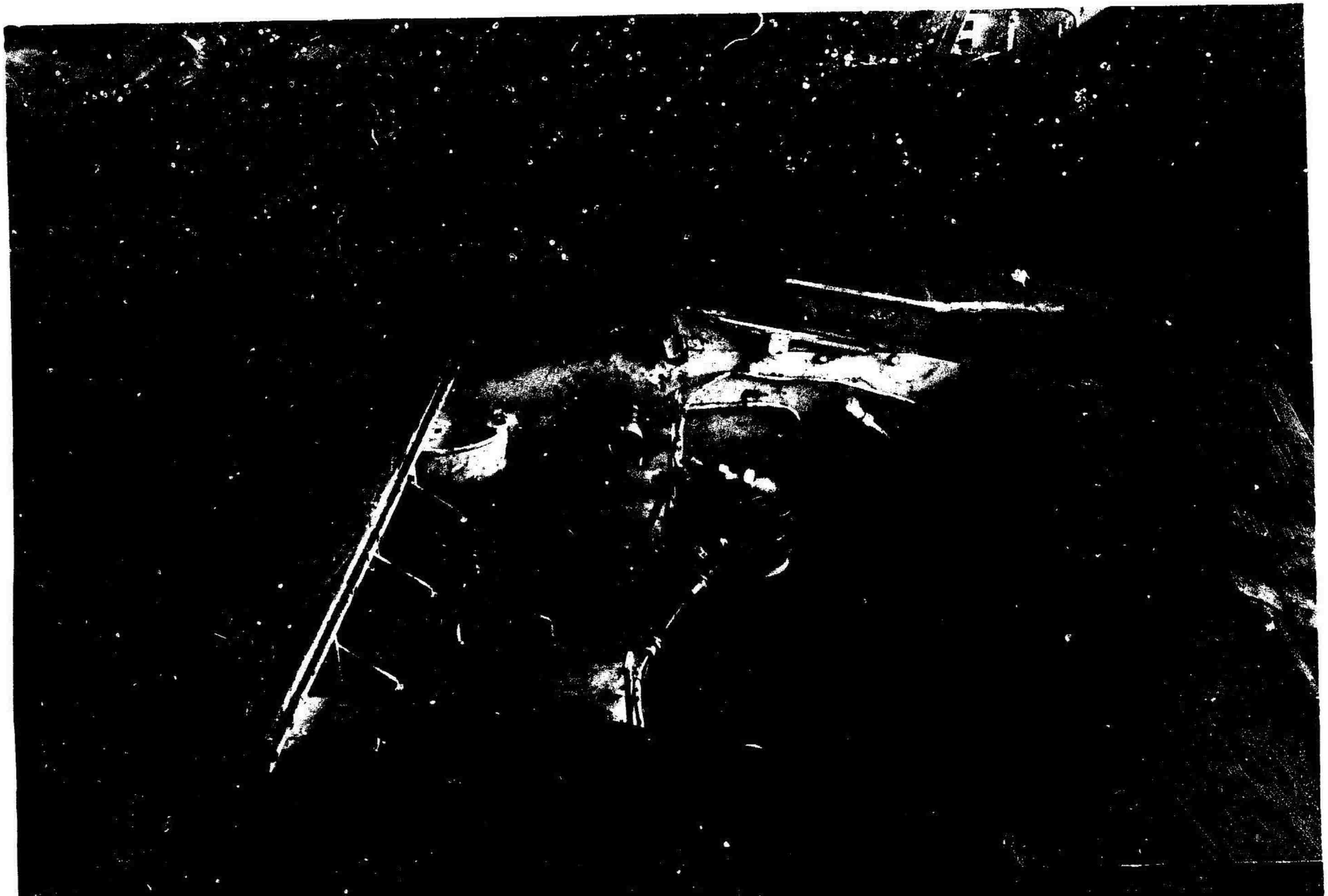


[illegible] ORDNANCE DEPT.

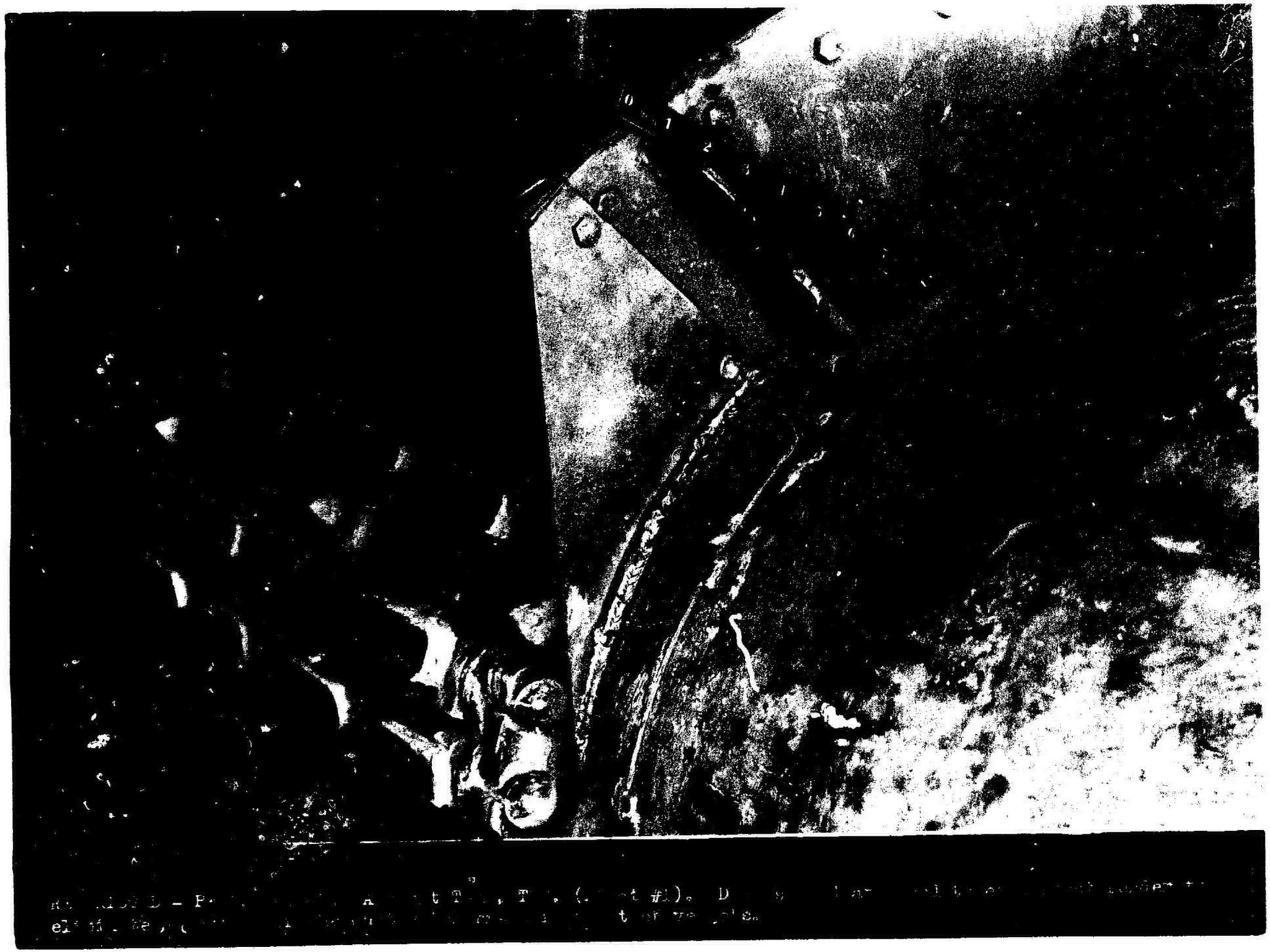
[illegible] Tab, [illegible], (Pilot) #1. Stand mounted ver air cleaner intake [illegible]ring

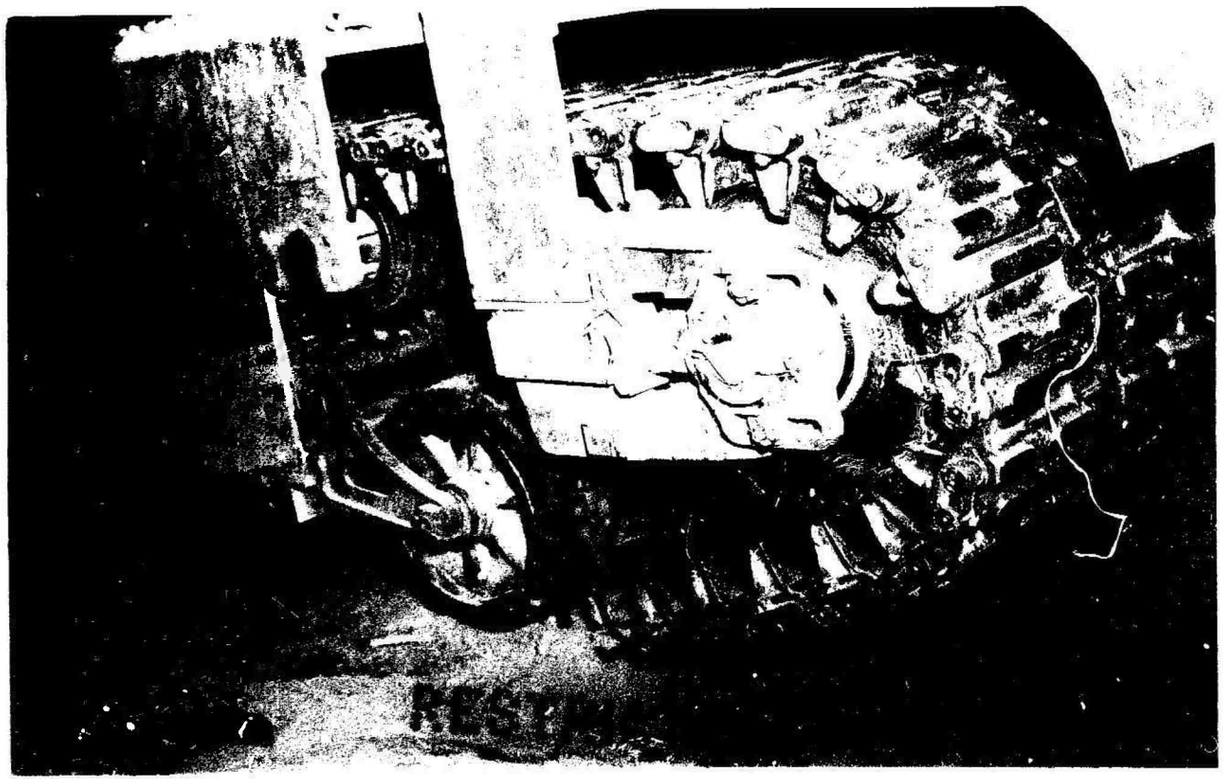


RESTRICTED - Pr . 3-1 -1. Assault Tank, T14, (Pil t #1). Original loc of air cleaner intake opening.



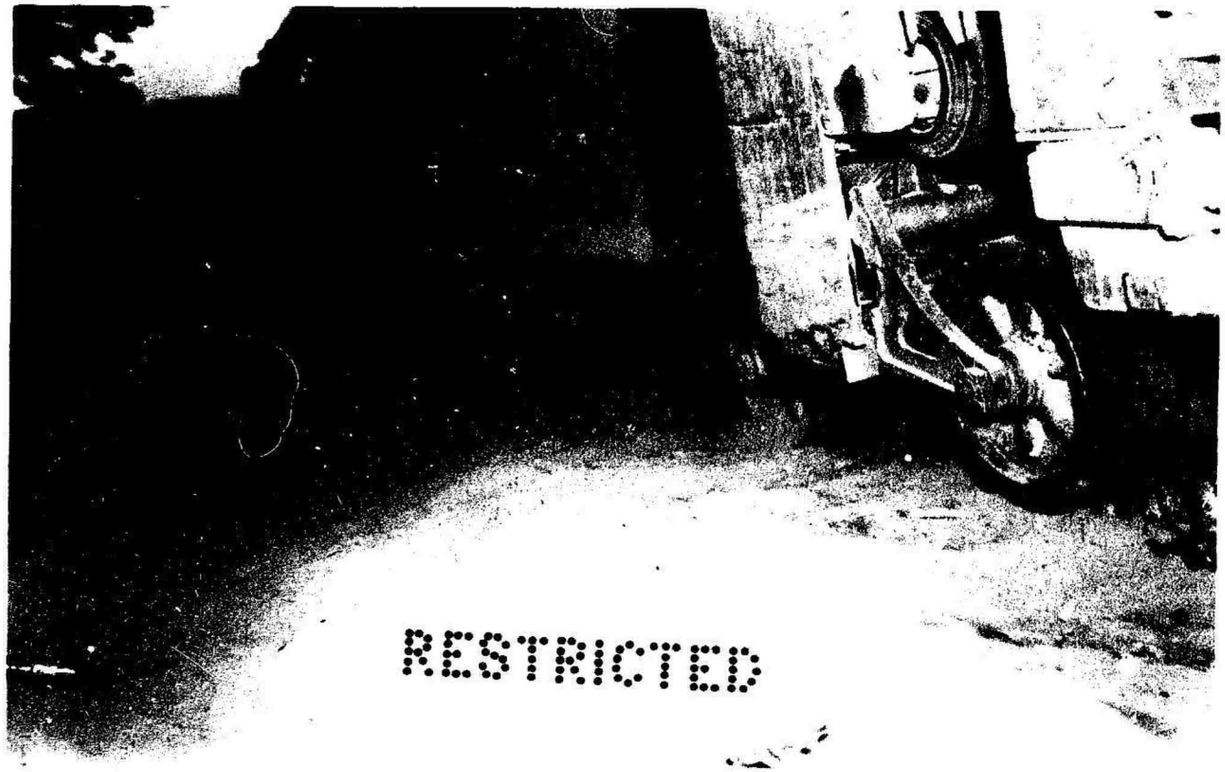
RESTRICTED - [illegible] A [illegible] Tank, T[illegible] (Pilot #1). Engine compartment; general view with the door and air [illegible] removed, taken from left side of vehicle.





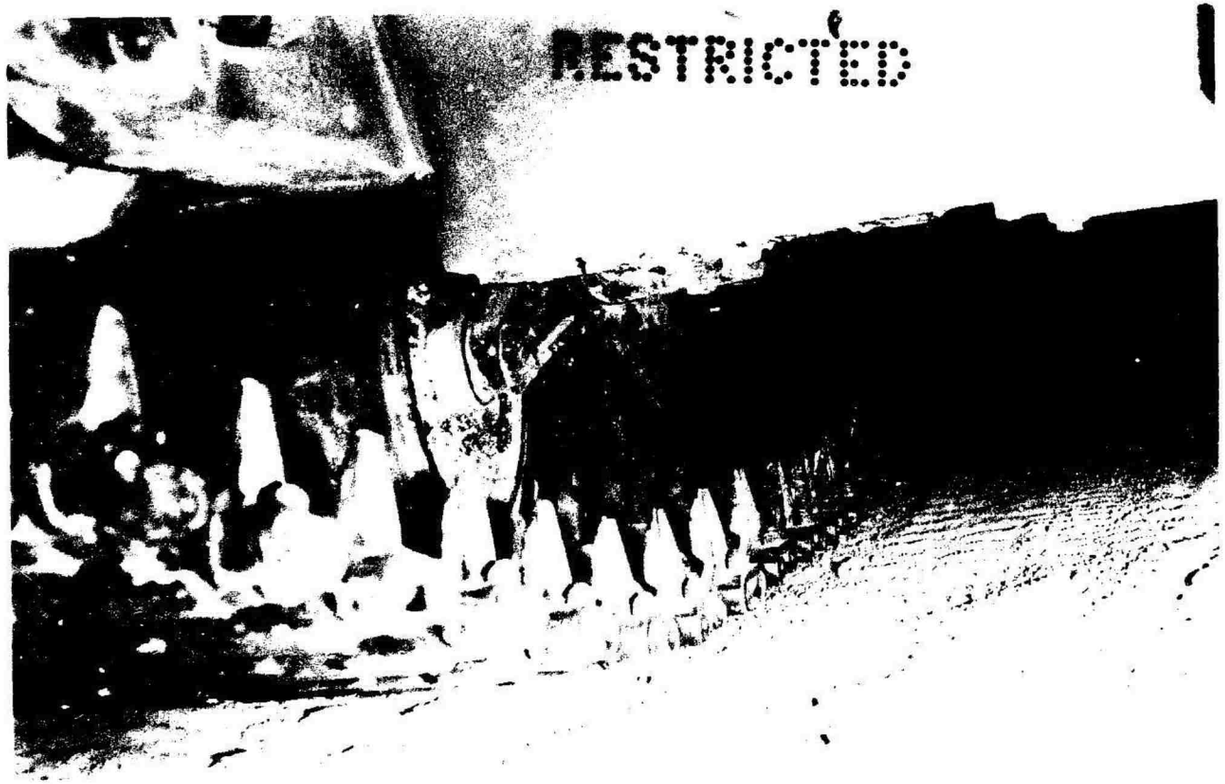
[illegible] - [illegible] [illegible] (GROUND) [illegible]

[illegible] LTD - Proj. [illegible]-1, Assault Tank, Tiger (Pilot #1). Left track thrown off on side slope while making left turn. Rear view.

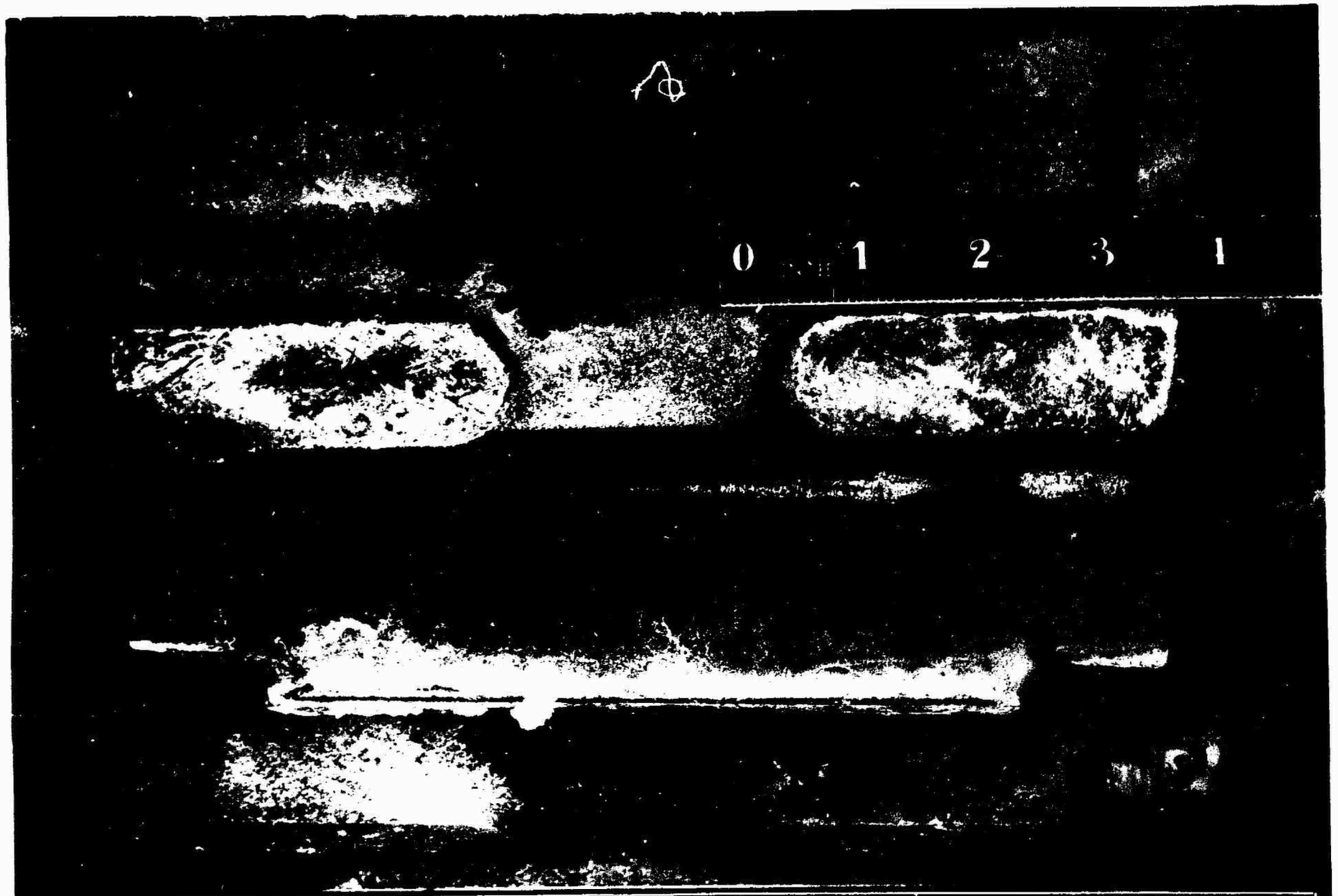


91631 [illegible] ABERDEEN PROVING GROUND ORDNANCE DEPT.

RESTRICTED - Proj. [illegible] Assault Tank, T[illegible] (Pilot #1). Left track thrown off on side slope while making left turn. Whole-length view.



RESTRICTED - Proj. 3-14-1. A sault Tank, T14 (Pilot #1). Left track thrown off on side slope while making a left turn. View of under side of track.



92000 - 3 -

ABERDEEN PROVING GROUND

ORDNANCE DEPT.

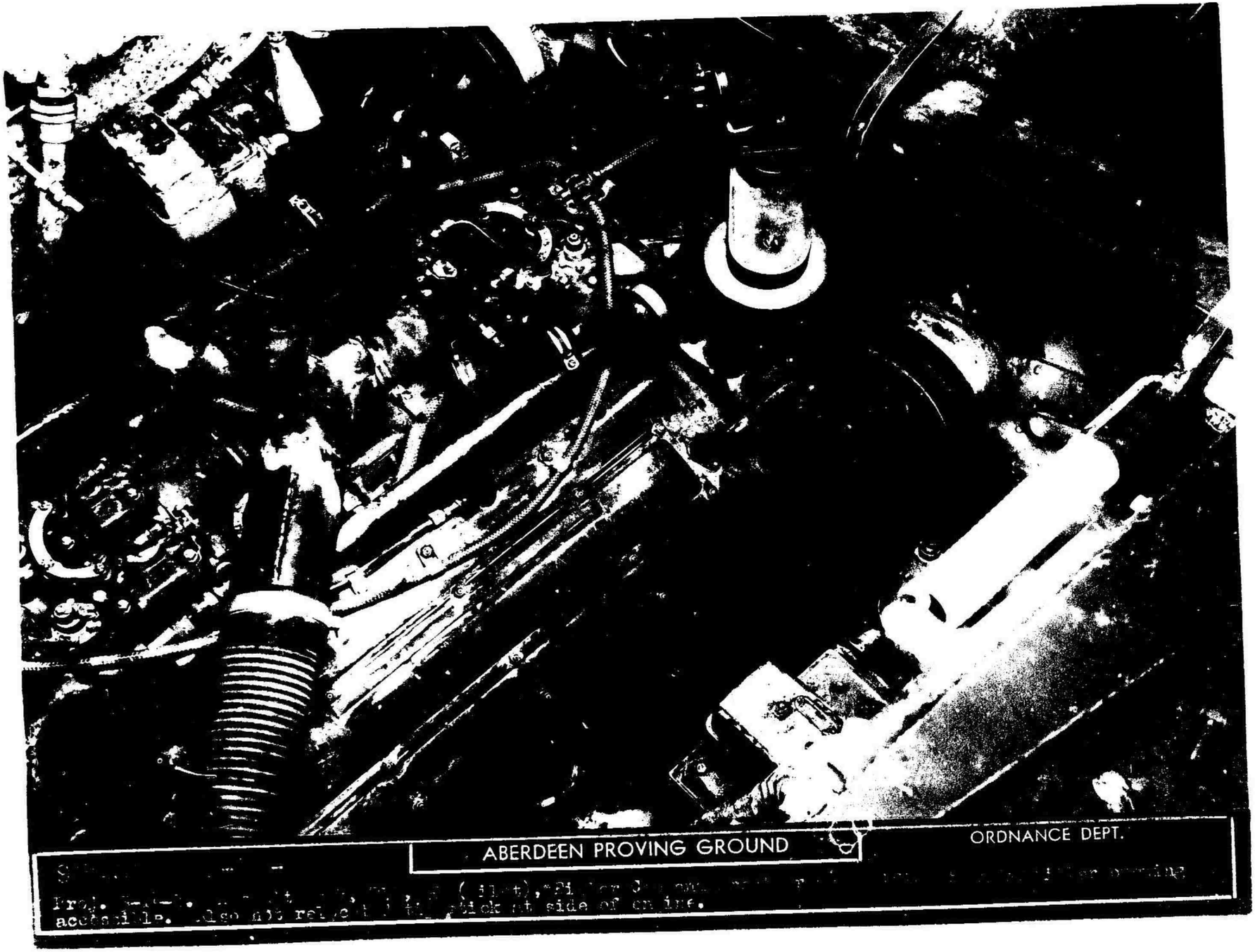
RESTRICTED - Proj. 3-14-1. Assault Tank, T14, #1. Broken track block, left track.

S [illegible] ABERDEEN PROVING GROUND ORDNANCE DEPT.

R [illegible] Arsenal + [illegible], T[illegible], [illegible] (Pilot). Left rear [illegible] only with [illegible] wheels [illegible] so that they will move [illegible] vertically.

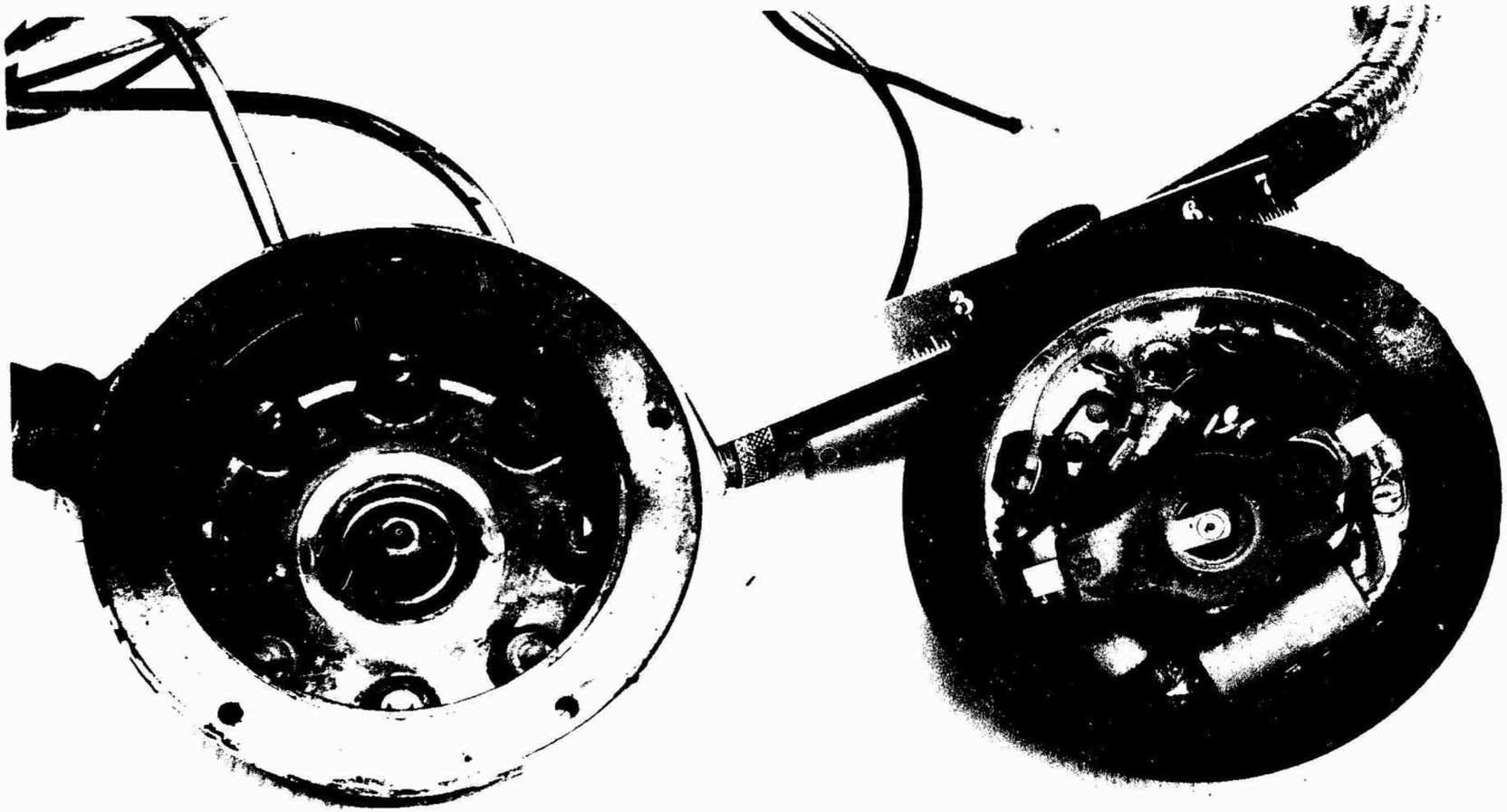
9[illegible] | ABERDEEN PROVING GROUND | ORDNANCE DEPT.

RESTRICTED - Proj. 3-14-1. Assault Tank, T1[illegible], #1 (Pilot). Left rear bogie assembly with adjacent bogie wheels fastened together so that they will move together vertically.



S[illegible]

Proj. [illegible] (right), [illegible] engine
accessible. Also not reflect [illegible] thick at side of engine.



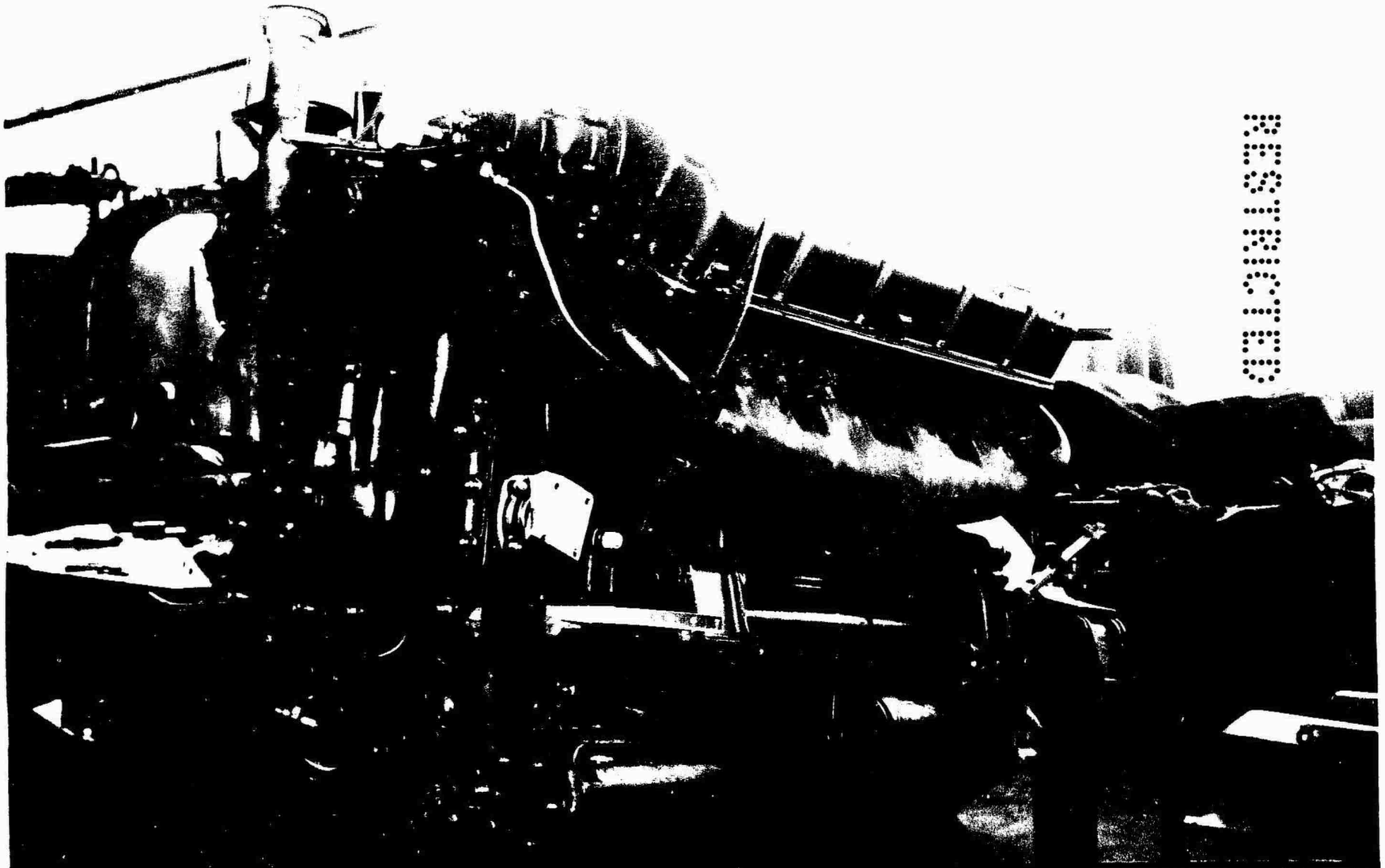
RESTRICTED

92919 9-2 -4

ABERDEEN PROVING GROUND

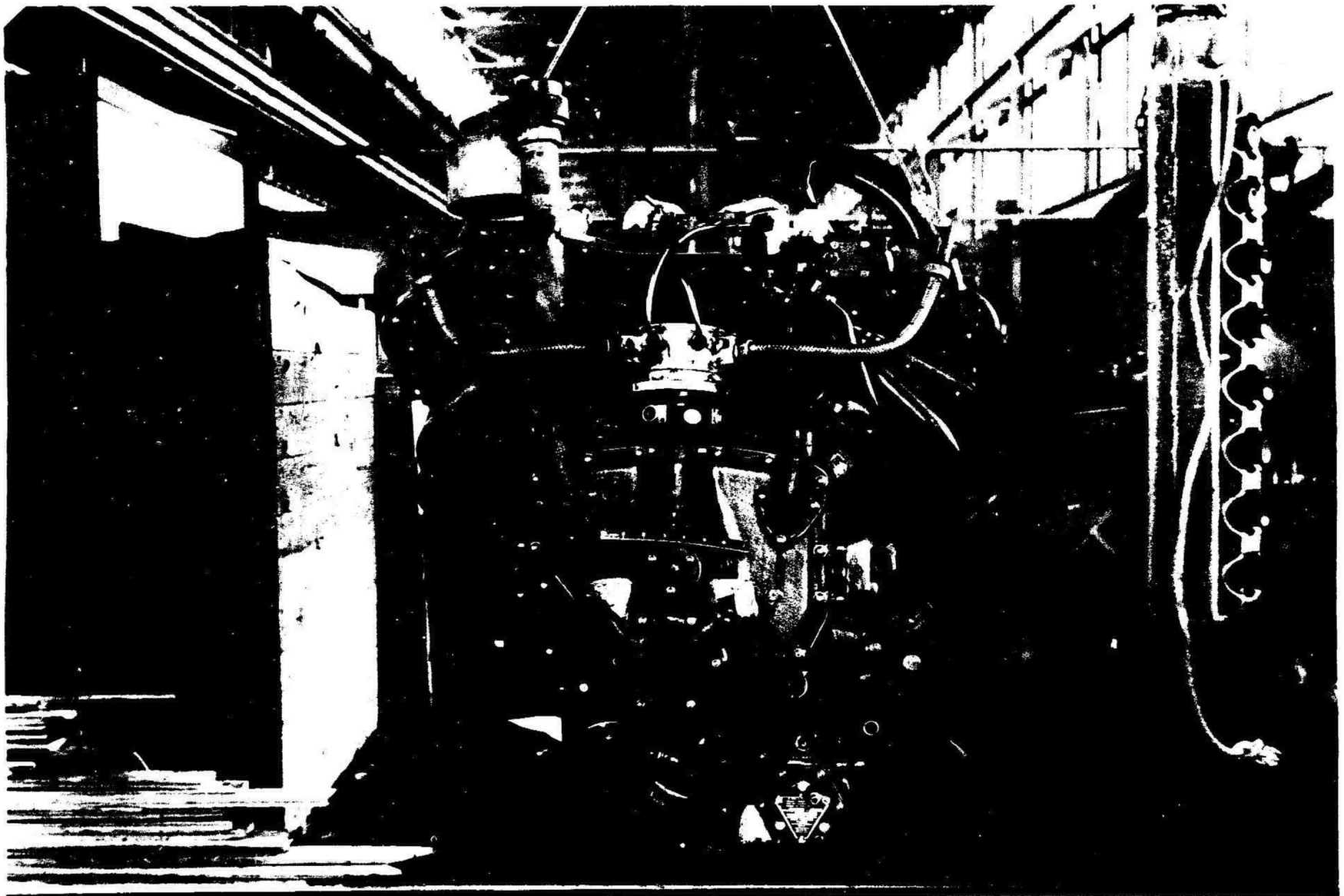
ORDNANCE DEPT.

Proj. 9-1-1. Assault Tank, T.4, #1 (Pilot). Dust proof distributor removed after approximately 65 miles of cross-country operations. Distributor mfg'd. by Autolite.



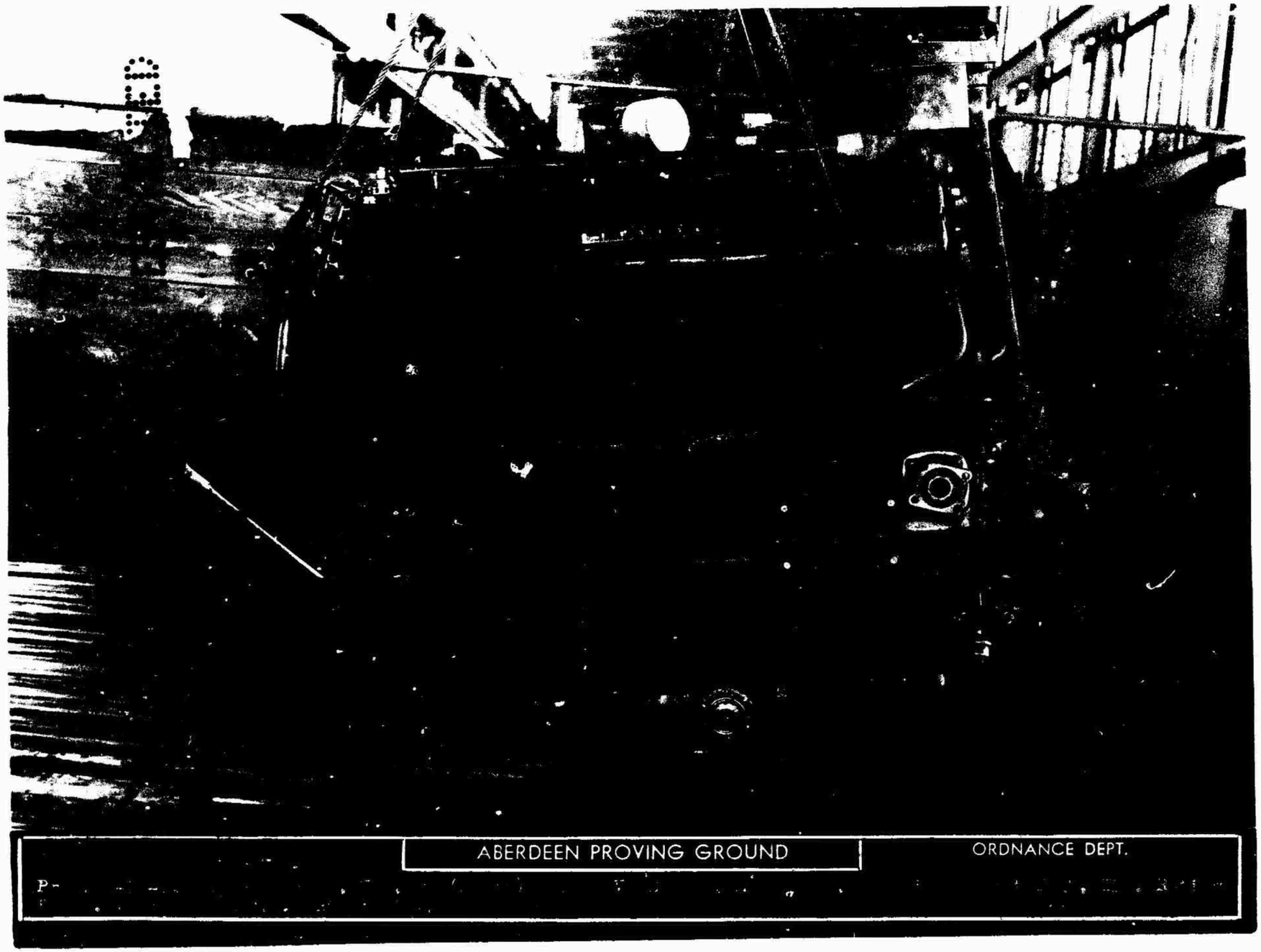
ABERDEEN PROVING GROUND

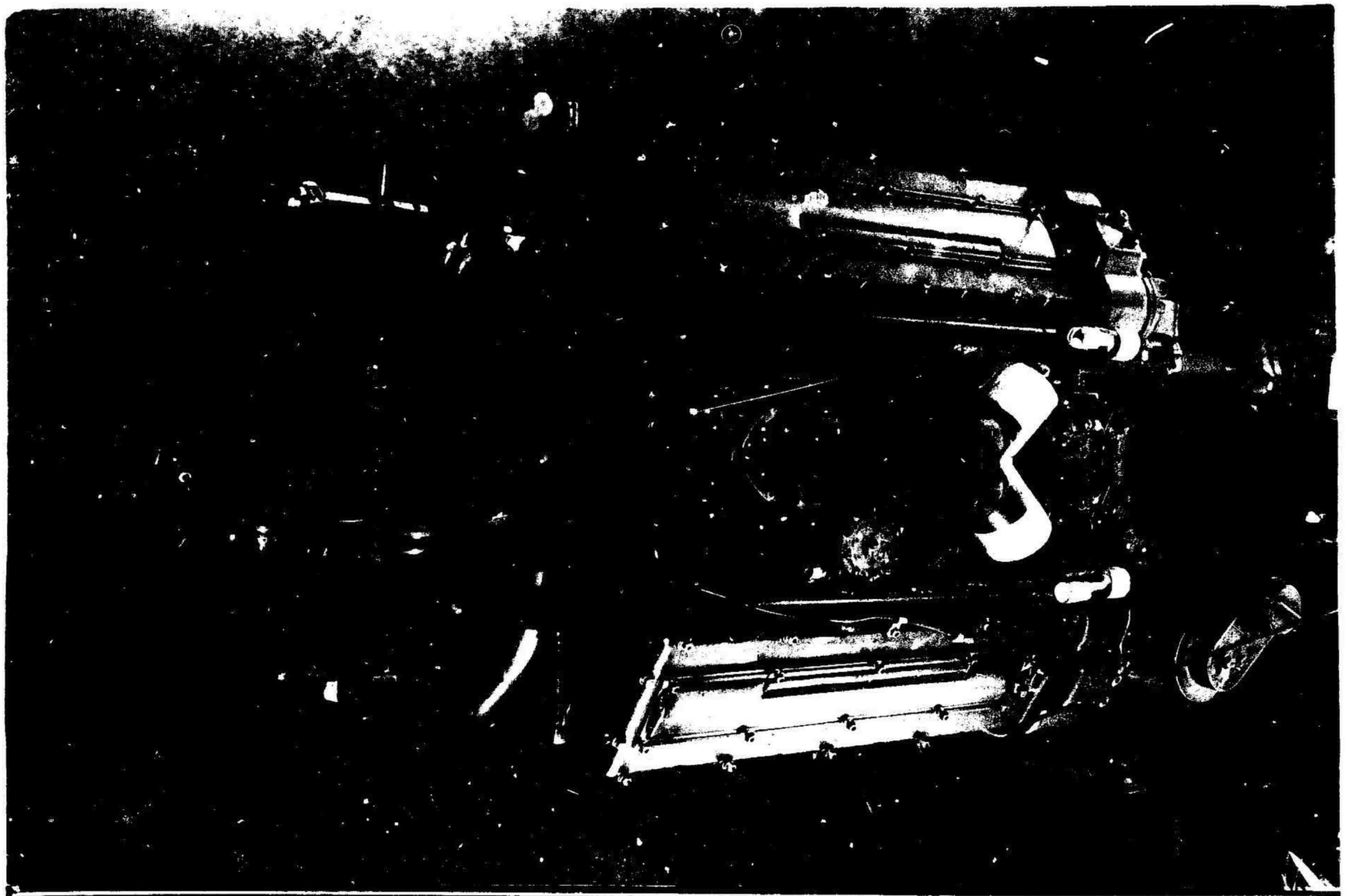
ORDNANCE DEPT.



ABERDEEN PROVING GROUND

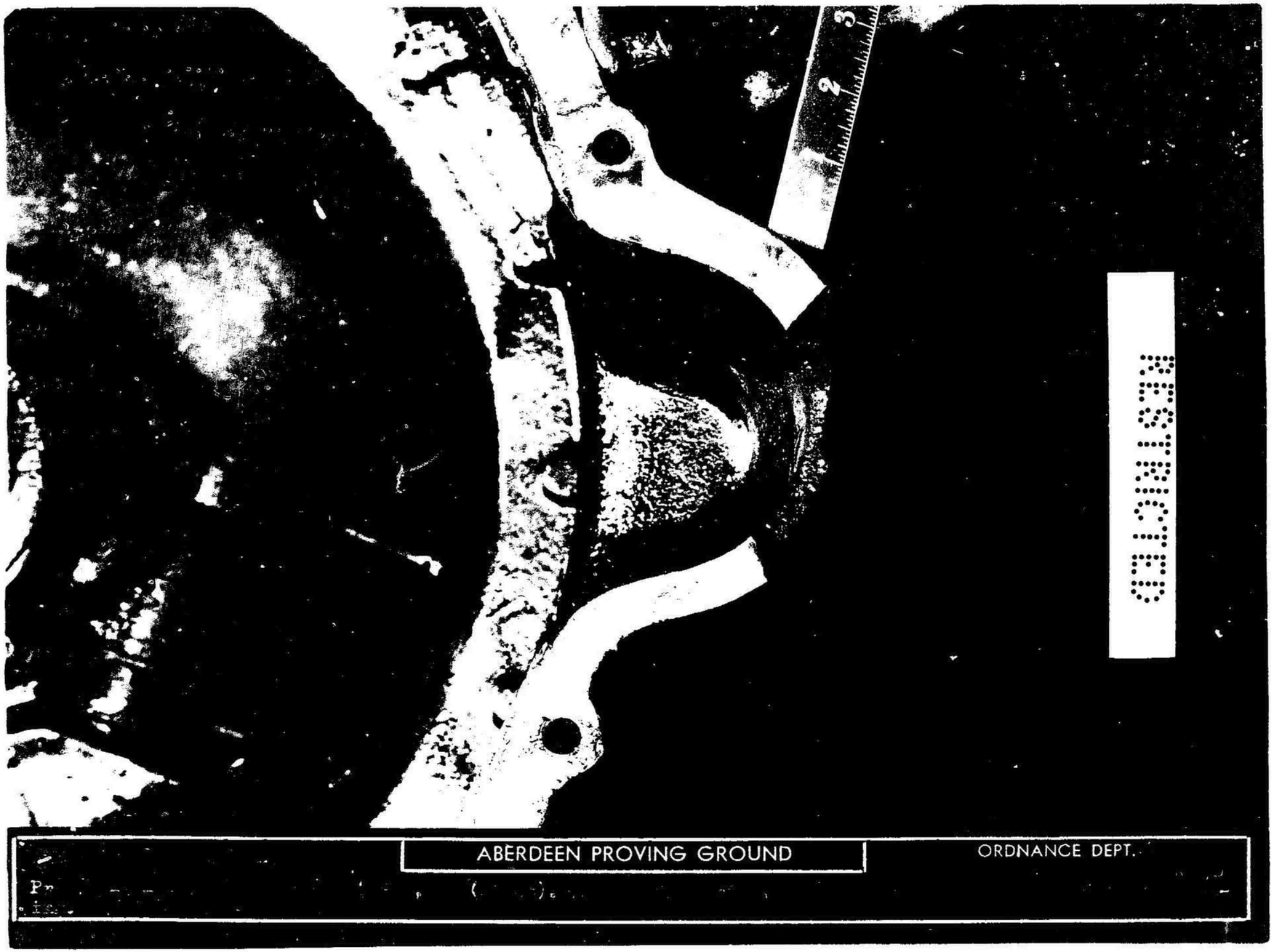
ORDNANCE DEPT.


ABERDEEN PROVING GROUND
ORDNANCE DEPT.



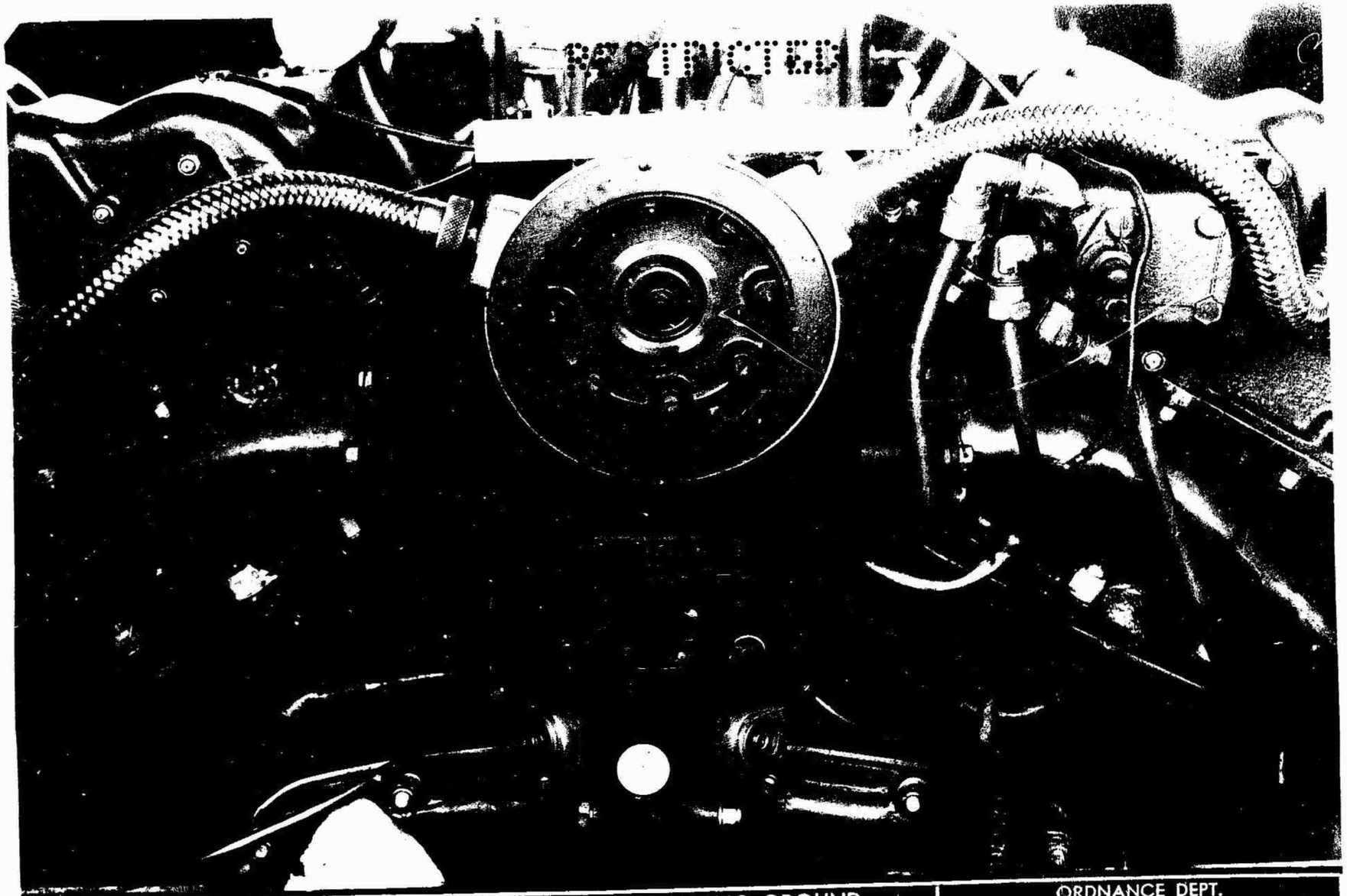
ABERDEEN PROVING GROUND

ORDNANCE DEPT.



ABERDEEN PROVING GROUND

ORDNANCE DEPT.

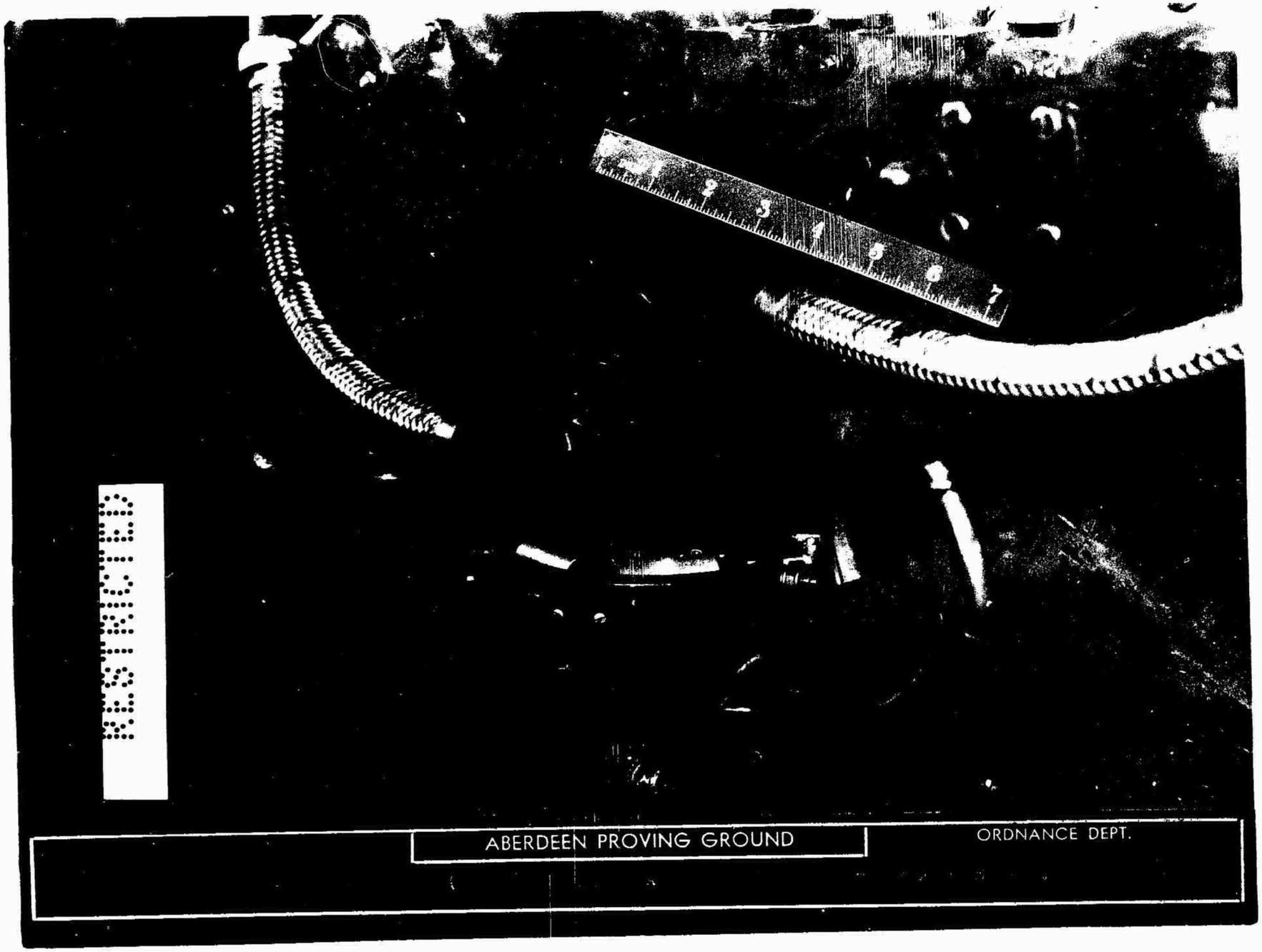


ABERDEEN PROVING GROUND

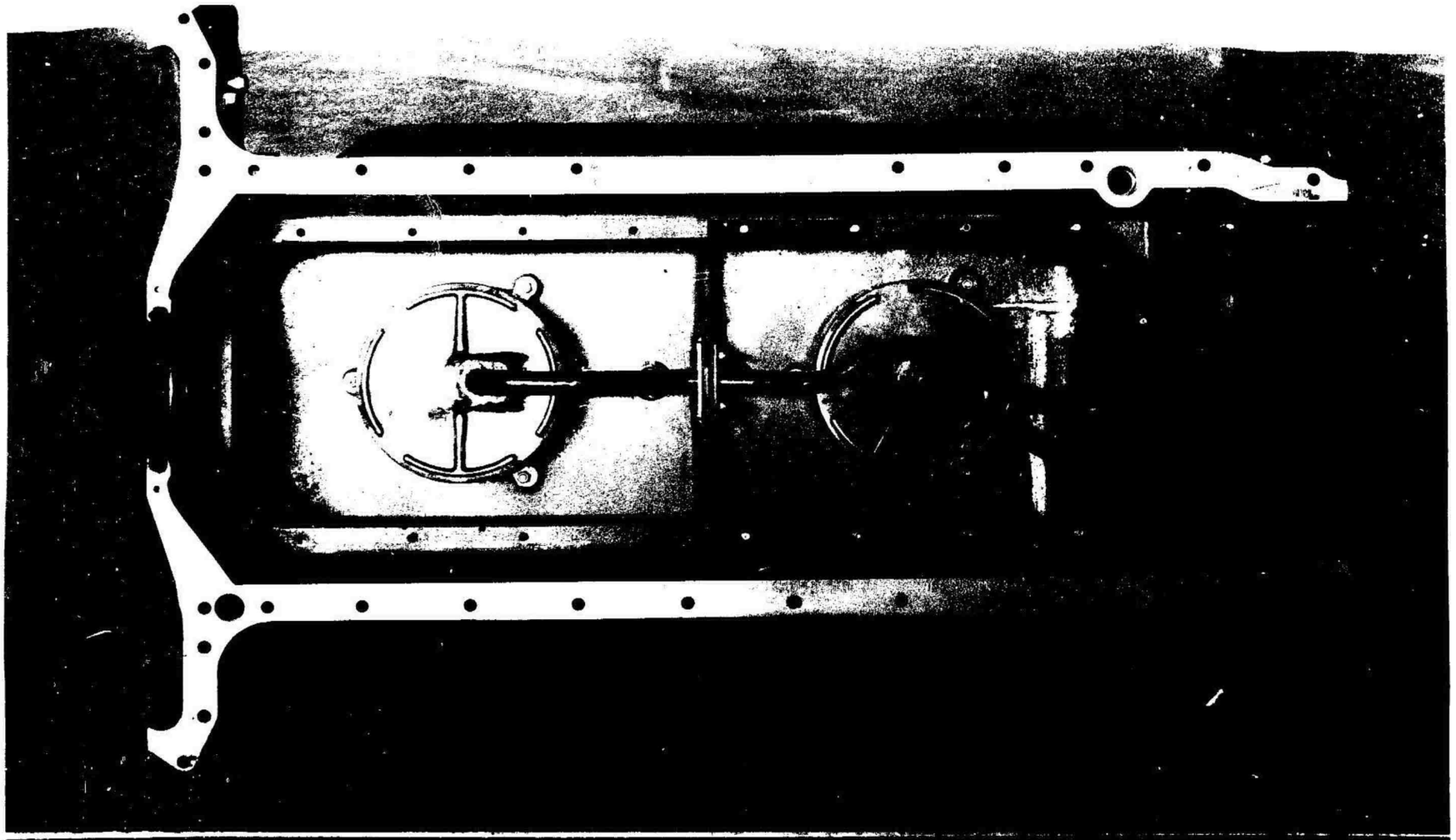
ORDNANCE DEPT.

93298 9-24-43

Proj. 3-14-1. Assault Tank, T1[illegible], #1 (Pilot). Autolite Dust Proof Distributor for Ford Engine, Model GAZ.


ABERDEEN PROVING GROUND
ORDNANCE DEPT.

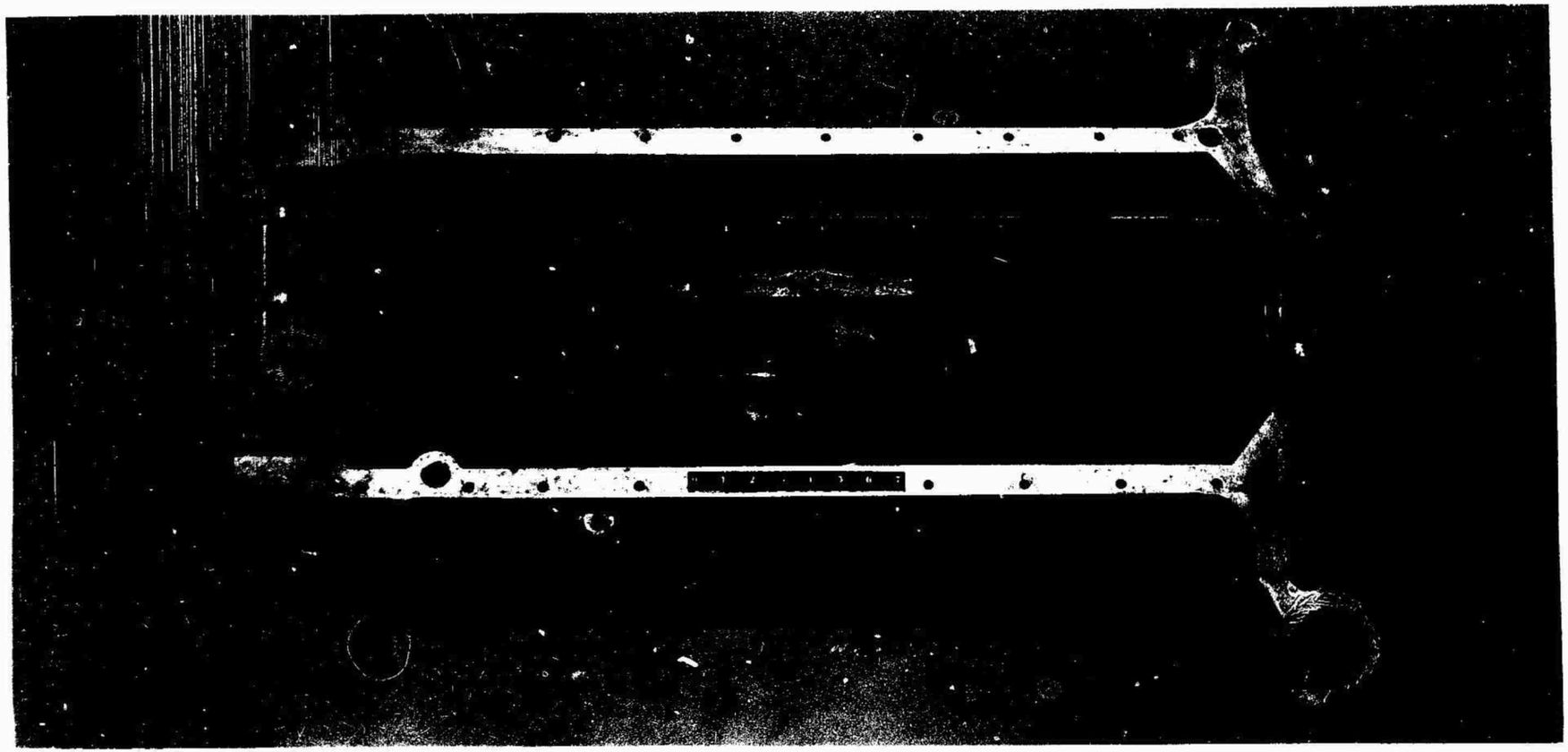
RESTRICTED



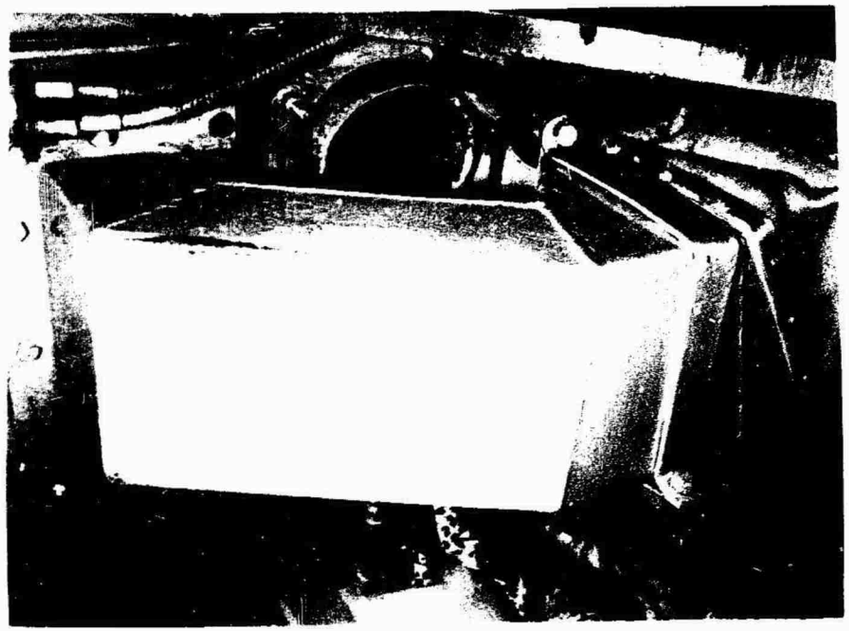
ABERDEEN PROVING GROUND

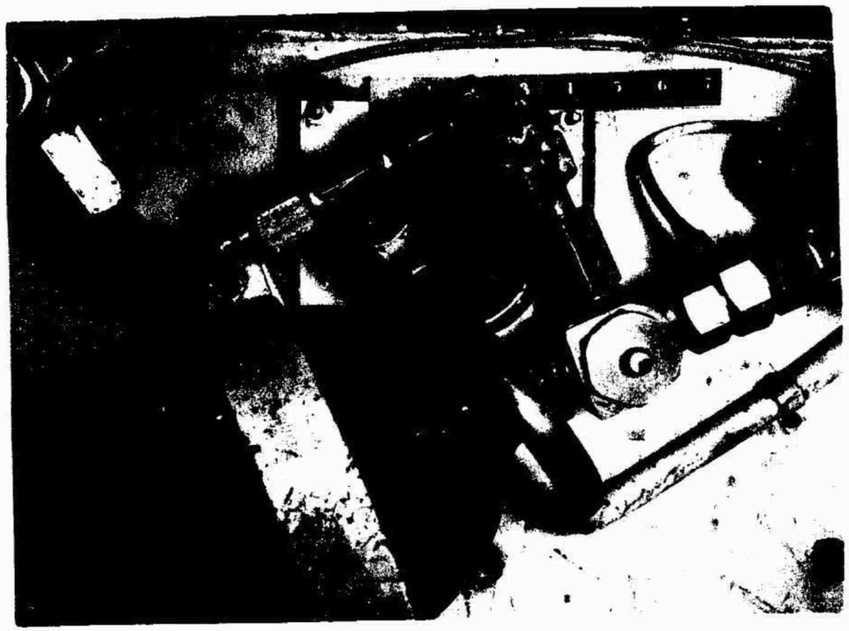
ORDNANCE DEPT.

RESTRICTED



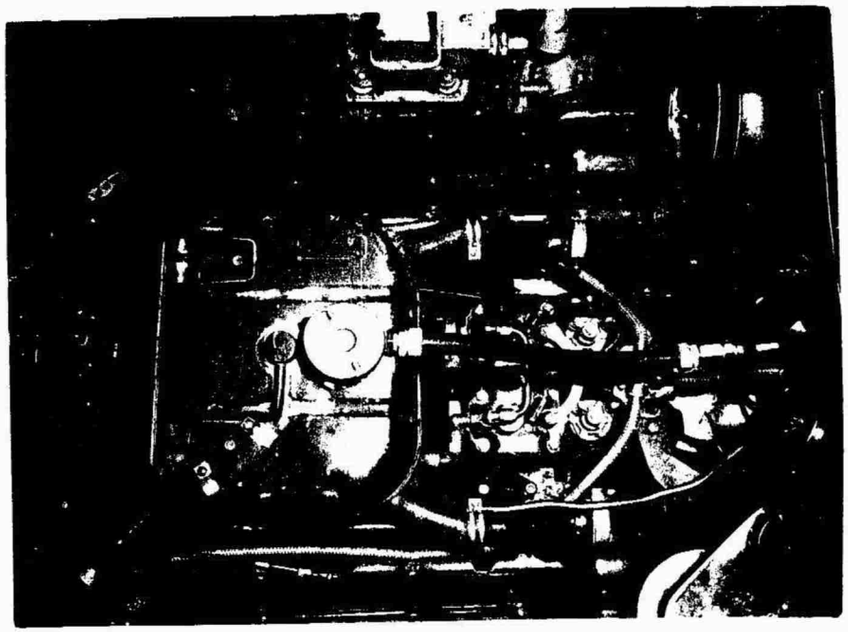
ABERDEEN PROVING GROUND ORDNANCE DEPT





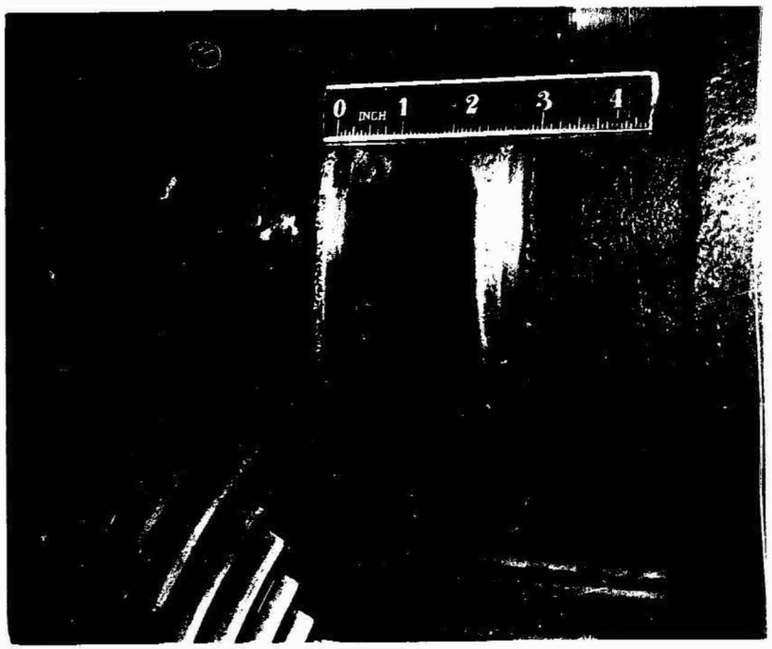
ABERDEEN PROVING GROUND

ORDNANCE DEPT.



ABERDEEN PROVING GROUND

ORDNANCE DEPT.



PRESERVED

9[illegible] 11-8-[illegible]	ABERDEEN PROVING GROUND	ORDNANCE DEPT.

Proj. [illegible]. Assault Tank, T[illegible], #[illegible] (Pilot). Differential commutator [illegible] damaged by bevel pinion nut when cotter in brake and [illegible] nut to work loose on shaft. Odometer [illegible] miles.

APPENDIX "B"
MEMORANDUM REPORTS

Form TA-2

RESTRICTED

Project #1810/3-14-1
Spinner/fmb

Daily log for 29 July - 5 August 1943	Last log dated INITIAL
Test of Assault Tank T14 - Pilot (KG-201)	
O.P. 5621 / T.S.T.P. -- / Vehicle No. 1	Sheet No. 1

VEHICLE CHARACTERISTICS

I. WEIGHT
A. Loaded (Fuel, Ammunition, Crew) - 93,930#
B. Unloaded - 89,930#

II. OVERALL DIMENSIONS
A. Length - 252"
B. Width -- 121-3/8"
C. Height - 109"

III. GROUND CLEARANCE - 15-3/4"

IV. WHEELED OR TRACK LAYING

A. Number of Wheels -
B. Type & Width of Track - steel, outside and center guide, 26" wide

V. TYPE OF SUSPENSION - horizontal volute spring, 3 bogie assemblies on each side of vehicle

VI. UNIT GROUND PRESSURE

A. Zero Penetration (Track) - 11.3#/sq.in.
B. 4" Penetration (Wheel) -

VII. POWER PLANT -

A. Manufacturer - Ford
B. Type - 60° V-8, Model GAZ
C. H. P. - 500
D. Rated Speed (R.P.M.) 2600
E. Number of Cylinders - 8
F. Cooling -

(1) Air - (3) Dual System? no
(2) Water - yes

VIII. FUEL CAPACITY - 198 gallons

IX. AVERAGE CRUISING DISTANCE - 125 miles

63

X. TRANSMISSION

A. Type - manual control
B. Number of Speeds - 5 forward, 1 reverse

RESTRICTED

Proof Officer. | Approved:

30

U.S. GOVERNMENT PRINTING OFFICE: 1943 - 61883

Form TA-2

RESTRICTED

Project #1810/3-14-1
Spinner/Feb

Daily log for 29 July - 5 August 1943	~~Final~~ INITIAL
Test of Assault Tank T14 - Pilot (KG-201)	

O.P. 5621	T.S.F.P. --	Vehicle No. 1	Sheet No. 2

XI STEERING - controlled differential

XII ESTIMATED MAXIMUM SPEED

A. Improved Roads - 24 mph
B. Cross Country - 15 mph

XIII ARMOR PLATE THICKNESS

A. Front (1) Lower 4"
(2) Upper 2" at 60°
B. Sides (1) Lower 2½" + ½" Skirts
(2) Upper 2" at 30°
C. Rear 2"
D. Turret (1) Sides 4" (3) rear /4"
(2) Front 3" at 30°
E. Top 1"

XIV. ARMAMENT -

		Co-axial	Bow
A. Quantity and Type --	A. 75mm	A. 30 cal.	A. 30 cal.
B. Elevation - - - - - -	B. 24°12'	B. 24°12'	B. 21°
(1) C. Depression - - - - -	(2) C. -10°10'	(3) C. -10°10'	(4) C. -7°
D. Traverse - - - - - -	D. 360°	D. 360°	D. R-11° L-11°

XV. AMOUNT OF AMMUNITION (Number of Rounds Per Gun)

75MM - 72 rounds

30 cal. - 3000 rounds

XVI NUMBER IN CREW - 5

XVII REMARKS

RESTRICTED

Proof Officer. | Approved:

31

Form TA-1

RESTRICTED

Project #1810/3-14-1
Spinner/Tmb

Daily log for 29 July - 5 August 1943		~~Last log dated~~	INITIAL
Test of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 3
Total wt. as tested 90,230#	Load carried	Towed load	
Temperature 8:00 a. m.		Temperature 4:00 p. m.	
Weather conditions		Road conditions	

MILEAGE	Concrete	Gravel	Total		
Previously recorded	-	-	estimate 107		
This date	5	11	16		
Total to date	5	11	123		

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	estimate 6:00	estimate 6:20
This date	2:20	3:00
Total to date	8:20	9:20

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANSMISSION	DIFFERENTIAL			
Previously recorded	-	-	-	-			
Added this date	198	0	0	0			
Total to date	198	0	0	0			

Operation supervised by W. G. McLean, Captain, Ord. Dept.

Remarks:

I - Authority:

1. The authority for this test is letter directive TAG 451.25/4941, APG 451.2/374-289#107, dated 13 July 1943, which is attached.

II - Description:

1. The Assault Tank T14 is a heavily armored vehicle weighing approximately 47-ton (the thicknesses of the armor are given on the 2nd characteristics sheet of this log). The vehicle has a relative

RESTRICTED

Proof Office: Approved:

32

ly low hull with a steeply sloped front plate and skirting plates covering the suspension. The tracks and suspension are similar to those on the Heavy Tank M6 with three bogie assemblies on each. It is powered by a liquid-cooled Ford 60° V-8 engine, model GAF, rated at 500 HP at 2600 rpm, which drives through a power train identical to that in the Medium Tank M4, with the exception of the final drive gear ratios. The maximum speed is approximately 24 mph. The vehicle is now equipped with a 75mm gun, a 30 cal. machine gun mounted in the turret co-axially with the 75mm gun, and a 30 cal. machine gun mounted in the bow of the vehicle. It is, however, contemplated that the 75mm gun will be replaced by a 76mm or 90mm gun. The general view photographs of this vehicle are attached.

III - Summary of Activities:

1. Following receipt of teletype number TT2219, dated 22 July 1943, which is attached, the vehicle arrived at Aberdeen Proving Ground 29 July 1943, with an odometer reading of 107 miles. The vehicle was immediately subjected to mechanical inspection, and all parts were found to be in satisfactory operating condition, with the exception of the fact that the .30 cal. bow machine gun cannot be installed in the mount without removing the front site from the gun. Inspection form #TA-37 is attached. Following this inspection, the vehicle was completely serviced and the servic-recorder installed. One bolt which holds the cover and the bearing cap of the cam shaft in the left bank of the engine was broken and was replaced. This required partial disassembly of the engine compartment, and, since it was convenient at this time, the timing of the engine was checked and adjusted to -5° TDC.

2. Since the oil dip-stick is located at the rear of the engine in a position such that it is practically inaccessible, an attempt was made to install a long dip-stick in order that the oil level could be checked from the top deck of the vehicle. This long dip-stick, however, was not successfully installed. Therefore, a small hole was cut in the bottom removable plate of the engine compartment, and the oil level will be checked with the original short dip-stick through this hole. This is inconvenient, but it is the only satisfactory remedy at the present time. The engine oil filler n is also in an undesirable location which makes it very inconvenient to oil.

3. The air cleaners are located in the engine compartment near the bulkhead and are very difficult to reach when the engine is cold and are inaccessible when the engine is hot.

4. The over-flow pipe at the expansion tank of the liquid-cooling system pointed directly at the left air cleaner in-take. Therefore, an extension was added to the pipe to direct the water downward instead of into the air in-take.

Daily log for 29 July-5 Aug. 1943	~~Last-leg-dated~~ INITIAL		
Test of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 5

5. The tachometer cable was so located in the engine compartment that it was in danger of being stepped upon and broken by a person working on the engine. A cable was therefore re-routed below the generator on the left side of the vehicle.

6. General view right front, left rear, and top photographs were taken and are attached.

7. The vehicle was weighed on a platform scale, first by weighing one side of the vehicle and then the other, and the total weight with a full load of fuel but without crew, ammunition, or stowage was found to be 90,230#. The attached curve sheet and data sheet show the ground pressure characteristics of the vehicle. Also the fuel capacity of the vehicle was measured and found to be 198 gallons.

8. During the armament inspection, it was found that there is no ammunition box provided to carry the ammunition for the .30 cal. coaxially mounted machine gun.

9. The final drives were removed from the vehicle and the steering cams were modified according to letter directive TAC 451.25/5084, APG 451.21/878, dated 28 July 1943, and the accompanying sketch which are attached. In addition, 1/8" was removed from the steering lever stops in order to provide additional adjustment. Originally the vehicle was very difficult to steer and, although these modifications improved the steering considerably, it is still not satisfactory. While the final drives were removed, the brake drums and linings were inspected and both were found to be in very good condition. Also, the final drive gear ratio was found to be 3.57, while that of the standard M4 Medium Tank is 2.84.

10. The center of gravity of the vehicle was determined by the suspension method.

Horizontally, to rear of center of front sprocket	-	107-7/8"
Vertically, above ground	-	35-5/8"
, above bottom of hull	-	18-1/8"

11. Letter O.O. 470.8/228 Tank (R), APG 451.21/374-2892 dated 30 July 1943, which is attached, explains the status of the test of this vehicle at Aberdeen Proving Ground. The letter states, quote "This tank should be tested at Aberdeen Proving Ground sufficiently to determine whether it is a reliable tank before shipment to Fort Knox."

IV - Detailed Record of Activities:

1. 29 July 1943:

a. The vehicle arrived at Aberdeen Proving Ground with an odometer reading of 107 miles.

Daily log for 29 July-5 Aug. 1943	Last-log-dated	INITIAL
Test of	Assault Tank T14 - Pilot (RG-201)	
O.P. 5612	T.S.T.P. --	Vehicle No. 1 Sheet No. 6

2. 30 July 1943:

a. Mechanical inspection of this vehicle began. One bolt which holds the cover and cam shaft bearing cap of the left bank of the engine was broken. It was necessary to partially disassemble the engine compartment for this repair. The timing was also checked and adjusted to -5° TDC.

b. Since the engine oil dip-stick is located in such a position that it is very difficult to reach in order to check the oil level, an attempt was made to install a long dip-stick that would be accessible from the top deck of the engine compartment. This was unsuccessful, however, and, therefore a small hole was cut in the bottom removable plate in the engine compartment and a cover was made for the hole. The level of the oil is now being checked through this hole using the original dip-stick. Also the filler neck for the engine oil is located in a difficult position, but can be reached through the opening provided in the rear of the engine compartment.

c. It was found that it is difficult to service the air cleaners since they are located in the forward portion of the engine compartment below the air in-take louvre and splash shield. When the engine is hot, it is impossible to service the cleaners in this location.

d. The over-flow pipe from the expansion tank of the liquid-cooling system points directly at the in-take of the left air cleaner. Therefore, an extension was added to the over-flow pipe to direct any over-flow liquid downward and away from the air in-take.

e. The tachometer cable was re-routed below the generator on the left side of the engine compartment because, in its original position, it was very apt to be stepped on and broken by a person working on the engine.

f. The vehicle was serviced thoroughly and servis-recorder was installed.

g. The operation on this date was as follows:

Mileage	
Concrete	- 2
Running time	
Vehicle	- 0:10
Engine	- 0:20

3. 31 July 1943:

Daily log for 29 July - 5 Aug. 1943 ~~Last log dated~~ INITIAL

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5612 T.S.T.P. -- Vehicle No. 1 Sheet No. 7

a. Mechanical inspection of the vehicle was completed, and the engine governor was adjusted to 2900 rpm.

b. There was no operation on this date.

4. 1 August 1943:

a. There was no activity on this date.

5. 2 August 1943:

a. General view photographs of the vehicle were taken, printsof which are attached to this log.

b. The vehicle was weighed on a platform scale. Since the vehicle would not fit on the scales, it was necessary to weigh first one side and then the other. The total weight of the vehicle is 90,230# with a full load of fuel and without crew, ammunition, or stowage. The attached curve sheet and data sheet show the ground pressure characteristics of the vehicle.

c. The operation on this date was as follows:

Mileage
Concrete - 2
Running time
Vehicle - 0:50
Engine - 1:00

6. 3 August 1943:

a. The fuel capacity of the vehicle was measured and found to be 198 gallons.

b. Since it was very difficult to steer the vehicle both final drives were removed, in order to modify the steering linkage according to the letter directive TAC 451.25/5084, APG 451.21/1878, dated 28 July 1943, and the attached sketch which are attached.

c. The operations on this date was as follows:

Mileage
Concrete - 1
Running time
Vehicle - 0:05
Engine - 0:10

7. 4 August 1943:

Daily log for 29 July-5 Aug. 1943	~~Last log dated~~	INITIAL
Test of Assault Tank T14 - Pilot (KC-201)		
O.P. 5612 T.S.T.P. --	Vehicle No. 1	Sheet No. 8

a. The modifications of the steering linkage was completed and 1/8" was removed from the steering linkage stops in order to provide additional adjustment. The brake drums and linings were in very good condition.

b. The final drive ratio was determined and found to be 3.57, as compared to that of the standard Medium Tank #4 which is 2.84.

c. The vehicle did not operate on this date.

8. 5 August 1943:

a. The final drive assembly was reinstalled, and the vehicle was operated to determine whether or not the modifications that were installed had improved the steering characteristics. It was found that the steering had been improved, but there is still room for further improvement.

b. The center of gravity of the vehicle was determined by the suspension method and found to be as follows:

Horizontally, to rear of center of front sprocket	- 107-1/4"
Vertically, above bottom of hull	- 18-1/8"
, above ground	- 35-5/8"

c. The operation on this date was as follows:

Mileage	
Gravel	- 11
Running time	
Vehicle	- 1:15
Engine	- 1:30

9 Incls.
" 1 - 3 : APG Photographs Nos. [illegible]
" 4 : Teletype number TT2219, dated 22 July 1943
" 5 : Form #TA-37
" 6 : Curve & data sheet
" 7 : Letter directive TAC 451.25/5084, APG 451.21/376 and accompanying sketch
" 8 : Letter O.O. 470.8/228 Tank (R), APG 451.21/374-2892100
" 9 : Letter directive TAC 451.25/4941, APG 451.21/374-2892107

R. W. Spinner
1st Lt., Ord. Dept. Proof Officer Approved Wm. E. Johnson
Colonel, Ord. Dept.

37

Form TA-1

RESTRICTED

Project #1810/3-14-1
Spinner/fmb

Daily log for 6 - 16 August 1943		Last log dated 29 July-5 Aug. 1943	
Test of Assault Tank T14 - Pilot (KG-201)			
O.P. 5621	T.S.T.P. --	Vehicle No. 1	Sheet No. 1
Total wt. as tested 90,230#	Load carried	Towed load	
Temperature 8:00 a. m.		Temperature 4:00 p. m.	
Weather conditions		Road conditions	

MILEAGE	Concrete	Gravel	Cross Country	Total
Previously recorded	112	11	0	123
This date	8	34	59	101
Total to date	120	45	59	224

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	8:20	9:20
This date	12:40	15:50
Total to date	21:00	25:10

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously recorded	198	0	0	0			
Added this date	239	2.5	0	0			
Total to date	437	2.5	0	0			

Operation supervised by N. G. McLean, Captain, Ord. Dept.

Remarks: I - Summary of Activities:

1. The vehicle successfully operated over the various obstacles. It operated through the wooden and dirt shell holes very satisfactorily in 2nd gear, and it also operated through these shell holes in 3rd gear with only a little difficulty. It was found that the maximum bridging ability of the vehicle is 110" forward and 96" in reverse. The vertical walls were not available for test operation.

2. In sand, the vehicle operated satisfactorily. The flotation characteristics are worthy of note since the vehicle did not

RESTRICTED

, Proof Officer. Approved:

33

penetrate deeply into the sand, excepting when negotiating turns. The turning characteristics in the sand were all that could be expected considering the steering difficulties which are now being experienced with the vehicle.

3. On level ground, the torque required to rotate the turret with the traversing mechanism disconnected was determined and found to be 608.8in.-lbs. to start and 350.6in.-lbs. to maintain rotation.

4. The vehicle successfully negotiate the slopes up to and including 60%. On the 30% & 40% slopes, the engine operated against the governor in 1st gear, but the vehicle was not capable of ascending the 30% slope in 2nd gear.

5. The 75mm gun was proof fired, and the firing test was begun with inert loaded ammunition. 60 rounds were fired with the 75mm gun and approximately 600 rounds were fired each of the 2 .30 cal. machine guns. With the 75mm gun, using the direct telescopic sight, a horizontal dispersion was 16" (0.74 mils) and vertical dispersion of 14" (0.65 mils) was obtained with 10 rounds. Using the periscopic sight, 5 rounds were fired resulting in a dispersion of 42" (1.94 mils) vertically and 16" (0.74 mils) horizontally. A spring of approximately 15# pull was then installed with one end on the lower center of the sight bracket and the other end on the front inside of the turret, in order to cause the sight linkage to return to its original position after each round fired. This, in other words, eliminated the effect of lost motion in the sight linkage. Five rounds were then fired and a dispersion of 12" (0.55 mils) vertically and 6" (0.28 mils) horizontally was obtained. Thus, it can be seen that the installation of the above mentioned spring noticeably improved the accuracy of firing. All of the above firing was performed at a range of 600 yds.

6. Following the above accuracy firing, 5 rounds were fired with the vehicle entirely closed and the engine operating at idling speed. After 5 rounds of rapid fire, the fumes were so bad that they drove the crew from the vehicle. It was impossible to remain in the vehicle any longer. It is, therefore, obvious that a means of eliminating the fumes from the vehicle during firing must be incorporated.

7. During the above firing tests, both .30 cal. machine guns were fired and found to be satisfactory, with the exception of the flexible mount of the bow machine gun which was sticky because of an excess of paint on the moving parts.

8. 10 rounds were fired with the vehicle starting at 1000 yds. and moving toward the 8x8' stationary target. The vehicle was operated in 2nd gear at approximately 2600 rpm and the power traverse

and stabilizer were used. 9 of the 10 rounds struck the target. Then, since 2nd gear appeared rather slow for such operation, the test was repeated with the vehicle operating in 3rd gear at approximately 2600 rpm. Again, 9 of 10 rounds struck the target. During both runs, the co-axial and bow machine guns functioned satisfactorily. All rounds were fired between 1000 yds. and 400 yds. from the target.

9. During the above firing tests, and when the vehicle was being prepared for the test, the following difficulties were encountered:

a. It was necessary to shorten the sight linkage rod 3/4" to provide sufficient adjustment when bore sighting the 75mm gun.

b. It was necessary to elongate the bolt holes in the direct telescopic sight support bracket to allow sufficient horizontal adjustment of the sight.

c. There is no ammunition box provided for the .30 cal. co-axial machine gun.

d. There is no ammunition box provided for the .30 cal. bow machine gun.

e. The metal case which holds the cam operated spring of the 75mm gun was fouled with paint and prevented proper operation of the spring. The paint was scraped off.

f. There was a slight looseness in the elevating mechanism which allowed the gun to move slightly after each round. This, however, did no appreciably effect the accuracy of the gun.

g. The 75mm ammunition sticks in the racks below the gun.

h. When the driver's hatch is open, the top head of the front periscope strikes the tow cable. This can be eliminated by moving the cable clamp on the front of the vehicle approximately 8" to the right.

i. Travel lock interferes with the belt feed of the bow machine gun.

j. The bushings which support the periscopic sight holder were checked and found to be worn and out-of-round. Therefore, new bushings were installed.

10. In the near future, the firing program will be conducted with firing being performed at a moving target with both stationary and moving vehicle. In the meantime, preparations were begun for the 14-

hour continuous run.

11. The vehicle was stowed and loaded to 93,930#, the tracks were tightened, (approx. 40 guides were loose), the steering was checked but adjustment was not necessary, and the 14-hour continuous operation was begun. The Cross Country Course in the Palmer Area was extremely dry and dusty, and, after approximately five hours of operation, it was necessary to halt the test because of the excessive dust in the air cleaners. The cleaners in this vehicle cannot be serviced during continuous operation since they are not accessible when the engine is hot. After the engine cooled, the air cleaners were serviced, and there were no signs that oil had been pulled over. The intake lead to the carburetors were relatively clean. During this short operation, the outside track guides damaged several bogie wheels. These wheels were photographed and prints will be attached to a later log. Incidently, the Medium Tank M4A3 #12099 operated for 14-hours continuously over the same course recently without air cleaner difficulty. The cleaners were checked twice, but the condition of the cleaners did not approach that in the Assault Tank T14.

12. It is difficult to adjust the tracks on this vehicle because of the location of the inside adjustments. Also, it was necessary to use hydraulic jacks to obtain sufficient force to operate the adjusting mechanism.

13. Attached is the first indorsement to the letter directive TAC 451.25/4941, APG 451.21/374-289[illegible]07, in which it is requested that Aberdeen Proving Ground be authorized to remove the basket from this vehicle, stow the 75mm ammunition below the sponson level, and rework the arrangement of the engine compartment and/or the doors over the engine compartment in order to improve the accessibility of the various components in the engine compartment. Major General A. H. Gatehouse of the British Army Staff who inspected the vehicle 7 August 1943 is in agreement with the above modifications.

14. Captain Tauss, Tank-Automotive Center, was informed 10 August 1943 by telephone of the progress of the test of this vehicle. Captain Tauss called to obtain this information.

II - Detailed Record of Activities:

1. 6 August 1943:

a. The vehicle was operated over various obstacles. It negotiated the wooden and dirt shell holes very successfully in 2nd gear and it was just possible to operate through them in 3rd gear. Also, it was found that the vehicle is capable of bridging a maximum gap of 110" forward and 96" in reverse. The vertical walls were not

available for test operation.

b. In sand, the vehicle operated very well. The flotation characteristics were worthy of note since the vehicle did not penetrate deeply into the sand excepting when negotiating turns.

c. Motion pictures were taken of the above operation.

d. During the operation on this date, one center guide was thrown from the left track.

e. The operation on this date was as follows:

Mileage		
Gravel	-	11
Running time		
Vehicle	-	2:15
Engine	-	2:35
Fuel added	-	60 gal.

2. 7 August 1943:

a. Pressure gauges were installed in the power traverse system in preparation for the test of the turret traversing mechanism.

b. The center guide which was thrown from the left track of the vehicle on the previous day was photographed, and a print is attached. The vehicle was cleaned thoroughly inside and outside.

c. General A. H. Gatehouse of the British Army Staff inspected the vehicle.

3. 8 August 1943:

a. There was no activity on this date.

4. 9 August 1943:

a. The vehicle successfully negotiated the slopes up to and including 60%. On the 30% & 40% slopes, the engine operated against the governor in 1st gear, but the vehicle was not capable of climbing the 30% slope in 2nd gear.

b. The operation on this date was as follows:

Mileage		
Concrete	-	4

Daily log for 6 - 16 August 1943 | Last log dated 29 July-5 Aug. 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5612 | T.S.T.P. -- | Vehicle No. 1 | Sheet No. 6

Running time
Vehicle - 1:30
Engine - 2:50

5. 10 August 1943:

a. The gun was cleaned, and the recoil mechanism was checked in preparation for the firing program.

b. The operation on this date was as follows:

Mileage
Concrete - 1
Running time
Vehicle - 0:35
Engine - 0:55
Oil added
Engine - 4 qts.

6. 11 August 1943:

a. The 75mm gun was proof fired and bore sighted. It was necessary to shorten the sight linkage rod 3/4" to provide sufficient adjustment between the gun and the periscopic sight. Also, it was necessary to elongate the holes in the direct sight support bracket to allow sufficient horizontal adjustment of the sight.

b. The vehicle was taken to Edgewood.

c. The operation on this date was as follows:

Mileage
Concrete - 2
Running time
Vehicle - 0:55
Engine - 1:10

7. 12 August 1943:

a. The firing program was begun with inert loaded ammunition. 60 rounds were fired with the 75mm gun. Using the telescopic sight, 10 rounds were fired with a horizontal dispersion of 16" (0.74 mils) and a vertical dispersion of 14" (0.65 mils). Using the periscopic sight, 5 rounds were fired with a vertical dispersion of 42" (1.94 mils) and a horizontal dispersion of 16" (0.74 mils). A spring was then added with one end attached to the lower rear of the sight holder and the other end to the front inside of the turret, so that it pulled the bottom of

the sight bracket forward. In this manner, the effect of looseness in the sight linkage was eliminated. 5 rounds were fired with a vertical dispersion of 12" (0.55 mils) and a horizontal dispersion of 6" (0.28 mils).

b. 5 Rounds were fired with the vehicle closed up. After these 5 rounds of rapid fire, the crew was driven out of the vehicle by fumes.

c. The .30 cal. co-axial and the bow machine guns operated satisfactorily. The effectiveness of the direct sight on the bow machine gun depends upon the size of the man operating the weapon, it being very difficult for a tall man.

d. 10 rounds were fired with the vehicle moving toward the 8x8' target, starting from 1000 yds. in 2nd gear approximately 2600 rpm. 9 of the 10 shots passed through the target. Then, since the speed of the vehicle appeared rather slow, another run was made in 3rd gear at approximately 2600 rpm. Again, 9 of the 10 shots fired passed through the target. When firing in this manner, it is impossible to operate the engine against the governor since the governor surges and results in irregular operation of the vehicle.

e. During the firing program thus far, the following discrepancies have appeared:

1) It was necessary to shorten the sight linkage rod 3/4" to provide sufficient adjustment when bore sighting the 75mm gun.

2) It was necessary to elongate the bolt holes in the direct telescopic sight support bracket to allow sufficient horizontal adjustment of the sight.

3) There is no ammunition box provided for the .30 cal. co-axial machine gun.

4) There is no ammunition box provided for the .30 cal. bow machine gun.

5) The metal case which holds the cam operated spring of the 75mm gun was fouled with paint and prevented proper operation of the spring. The paint was scraped off.

6) There was a slight looseness in the elevating mechanism which allowed the gun move slightly after each round. This, however, did not appreciably effect the accuracy of the gun.

7) The 75mm ammunition sticks in the racks below the gun.

8) When the driver's hatch is open, the top head of the front periscope strikes the tow cable. This can be eliminated by moving the cable clamp on the front of the vehicle approximately 8" to the right.

9) Travel lock interferes with the belt feed of the bow machine gun.

10) The bushings which support the periscopic sight holder were checked and found to be worn and out-of-round. Therefore, new bushings were installed.

f. The operation on this date was as follows:

Mileage		
Gravel	-	12
Running time		
Vehicle	-	0:50
Engine	-	1:10

c. 13 August 1943:

a. The guns were cleaned following the firing tests.

b. Began preparing vehicle for 14-hour continuous operation. The stowage was installed.

c. The vehicle did not operate on this date.

d. 14 August 1943:

a. Preparations for the 14-hour continuous operation were completed. The vehicle was loaded to 93,930# total weight, the tracks were tightened, (approximately 40 guides were tightened), and the steering was checked but adjustment was not necessary.

b. The track adjustment is difficult since the inner adjusting mechanism is difficult to operate due to its location. Also, hydraulic jacks were needed to accomplish the adjustment.

c. A permanent spring of approximately 15# load was installed on the rear of the periscopic sight to eliminate the effect of slight looseness in the sight linkage.

d. The bushings which support the periscopic sight holder were checked and found to be worn and out-of-round. Therefore, new bushings were installed.

e. The vehicle was taken to the Palmer Area.

f. The operations on this date were as follows:

Mileage		
Gravel	-	8
Running time		
Vehicle	-	0:45
Engine	-	0:50

10. 15 August 1943:

a. There was no activity on this date.

11. 16 August 1943:

a. The 14-hour continuous operation over the Cross Country Course in the Palmer Area was begun, but after approximately five hours of operation the test was halted because of the extremely bad condition of the air cleaners. The course was dry and extremely dusty, and, in this vehicle, the air cleaners cannot be serviced while the engine is not due to the location of the cleaners in the engine compartment. In this instance the cups were removed from the air cleaners for inspection, but could not be replaced. It was feared that further operation would result in damage to the engine. Therefore, it will be impossible to perform the 14-hour continuous operation test until the dust subsides.

b. During this operation, the outside track guides damaged several bogie wheels and tires considerably.

c. After allowing the engine to cool, the air cleaners were serviced and thoroughly inspected. Although the cleaners were well filled with dirt, there were no signs of appreciable oil pull-over or dirt in the leads to the carburetors.

d. The operation on this date was as follows:

Mileage		
Concrete	-	1
Gravel	-	3
Cross country	-	59
Running time		
Vehicle	-	5:50
Engine	-	6:20

Project #1810/3-14-1
Spinner/fmb

Daily log for 6 - 16 August 1943	Last log dated 29 July-5 Aug. 1943	
Test of	Assault Tank T14 - Pilot (KG-201)	
O.P. 5612	T.S.T.P. --	Vehicle No. 1 Sheet No. 10

Fuel added	- 159 gals.
Oil added	
Engine	- 6 qts.

3 Incls.
Incl. - 1 : APG Photograph #89916
" - 2 : Report of Telephone Call, dated 10 August 1943
" - 3 : First Indorsement, dated 10 August 1943
(TAC 451.20/4941, APG. 451.21/374 - 2892 (27))

R. W. Spinner
1st Lt., Ord. Dept. Proof Officer

Approved Wm. B. Johnson
Colonel, Ord. Dept.

47

Form TA-1

RESTRICTED

Project #1810/3-14-1
Spinner/fmb

Daily log for	17 - 20 August 1943	Last log dated	6 - 16 August 1943
Test of	Assault Tank M4 - Pilot (KG-201)		
O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 1
Total wt. as tested 90,230#	Load carried	Towed load	
Temperature 8:00 a.m.		Temperature 4:00 p.m.	
Weather conditions		Road conditions	

MILEAGE	Concrete	Gravel	Cross Country	Total	
Previously recorded	120	45	59	224	
This date	16	10	8	34	
Total to date	136	55	67	258	

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	21:00	25:10
This date	3:50	5:55
Total to date	24:50	31:05

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously recorded	437	2.5	0	0			
Added this date	0	0	0	0			
Total to date	437	2.5	0	0			

Operation supervised by N. G. McLean, Captain, Ord. Dept.

Remarks. NOTE: The characteristic sheet in the Daily Log for 29 July - 5 August 1943, stated that there is stowage space for 72 rounds of 75mm ammunition. It is hereby corrected to 90 rounds of 75mm ammunition.

I - Summary of Activities:

1. During this period, the field dynamometer tests were begun. Previous to performing the tests, however, the engine did not function properly, and investigation revealed that the distributor was filled with dust and several spark plugs were not firing. Cleaning

RESTRICTED

Proof Officer. Approved:

Daily log for 17 - 20 August 1943	Last log dated 6 - 16 August 1943

Test of Assault Tank - Pilot (KG-201)

O.P. 5612 T.S.T.P. -- Vehicle No. 1 Sheet No. 2

the distributor, adjusting the gap, and installation of new spark plugs remedied the difficulty. In its present location, the distributor is very difficult to service. Thus far, the drawbar pull tests in 2nd and 3rd gear on concrete have been completed, the results of which will be discussed in detail in an Automotive Laboratory Report which will be attached to a later log.

2. In order to eliminate some of the dust which blows into the faces of the driver and assistant driver, a small vertical dust shield was attached to the inside edge of each front fender. In order to show the exact location of these shields, they will be photographed as installed in the near future. They do successfully prevent a portion of the dust from the tracks from obscuring the vision of the driver and assistant driver.

3. The following photographs were taken, prints of which are attached:

a. Damaged bogie wheels

b. Track adjusting mechanism

c. Spring installed on rear of sight holder

d. Open driver's hatch, showing front periscope resting on towing cable, see Daily Log for 6 - 16 August 1943

4. The engine was subjected to a 25-hour check, during which the oil was changed and spark plug terminal elbows and sleeves were installed. Engine check for #4230 is attached.

5. The fuel tank shut-off control valves located on the bulkhead between the engine and fighting compartments are very difficult to operate. Also, the doors of the shell stowage compartments cannot be operated without striking with a heavy instrument.

6. Colonel Boucher, British Army Staff, inspected the vehicle 19 August 1943.

II - Detailed Record of Activities:

1. 17 August 1943:

a. The vehicle was cleaned inside and outside, after which the following photographs were taken, prints of which are attached:

1) Damaged bogie wheels

2) Track adjusting mechanism

Daily log for 17 - 20 August 1943 Last log dated 6 - 16 August 1943

Test of Assault Tank T14 - Pilot (KC-201)

O.P. 5612 T.S.T.P. -- Vehicle No. 1 Sheet No. 3

3) Spring in sight linkage

4) Open driver's hatch, showing front periscope resting on towing cable

These items are discussed in the Daily log for 6 - 16 August 1943.

b. Two small dust shields were manufactured, and one was mounted vertically on the inside edge of each of the front fenders to eliminate a portion of the dust which blows in the faces of the driver and assistant driver. The shields do successfully eliminate part of the dust, as observed by operation over Cross country terrain following their installation. In order to more clearly describe these shields, they will be photographed in the near future, and a print will be attached to a later log.

c. The engine was subjected to a 25-hour check previous to performing the field dynamometer tests. Check form #4230 is attached. Because of the amount of dust found in the air cleaners on the previous date following the Cross country operation, it was deemed advisable to change the engine oil at this time to prevent possible engine damage. Also, new spark plug terminal elbows and sleeves were installed.

d. The operation on this date was as follows:

Mileage		
Concrete	-	1
Running time		
Vehicle	-	0:15
Engine	-	1:10

2. 18 August 1943:

a. The field dynamometer tests were begun, but the engine failed to function properly. Investigation revealed that the distributor was filled with dust.

b. The operation on this date was as follows:

Mileage		
Gravel	-	10
Running time		
Vehicle	-	1:00
Engine	-	1:30

3. 19 August 1943:

a. The dust was cleaned from the distributor which is difficult to service in its present location and the points were cleaned

and adjusted to 0.018" gap. This only partially improved the operation of the engine. Therefore, new spark plugs were installed, following which the engine functioned properly.

b. Colonel Boucher, British Army Staff, inspected and drove the vehicle.

c. The operation on this date was as follows:

Mileage		
Cross country	-	8
Running time		
Vehicle	-	1:00
Engine	-	1:20

4. 20 August 1943:

a. The field dynamometer tests were continued, the drawbar pull tests in 2nd and 3rd gears on concrete being completed. The vehicle functioned very satisfactorily.

b. The operation was as follows:

Mileage		
Concrete	-	15
Running time		
Vehicle	-	1:35
Engine	-	1:55

5 Incls.
Incls. 1 - 4 : APG Photographs Nos. 90215, 90216, 90217 & 90218
" 5 : 25-Hour Engine Check Chart

R. W. Spinner
1st Lt., Ord. Dept. Proof Officer Approved Wm. B. Johnson
Colonel, Ord. Dept.

51

Form T a-1

RESTRICTED

Project #1810/3-14-1
Spinner/vmc

Daily log for 17 - 20 August 1943		Last log dated 17 - 20 August 1943	
Test of Assault Tank T14 - Pilot (KB-201)			
O. P. 5612	T. S. T. P. --	Vehicle No. 1	Sheet No. 1
Total wt. as tested 93,930#	Load carried	Towed load	
Temperature 8:00 a. m.		Temperature 4:00 p. m.	
Weather conditions		Road conditions	

MILEAGE	Concrete	Gravel	Cross Country	Total
Previously recorded	136	55	67	258
This date	66	25	2	93
Total to date	202	80	69	351

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	24:50	31:05
This date	9:35	11:50
Total to date	34:25	42:55

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL
Previously recorded	437	2.5	0	0
Added this date	75	2.0	0	0
Total to date	512	4.5	0	0

Operation supervised by N. O. McLean, Capt., Ord. Dept.

Remarks: I. SUMMARY OF ACTIVITIES

1. During this period, the field dynamometer tests were completed. Tractive resistance was measured at various road speeds up to and including 24 m.p.h., the distance required to bring the vehicle to rest by full application of the brakes from a road speed of 20 m.p.h. was measured, and the acceleration characteristics from rest to maximum road speed, shifting through 2nd, 3rd, 4th, and 5th gears, were obtained. The detailed results of the above tests, along with the results of the field dynamometer tests previously performed, will be presented in an Automotive Laboratory Report which will be attached to a later log.

RESTRICTED

, Proof Officer. Approved:

52

Daily log for 21 - 30 August 1943 Last log dated 17 - 20 August 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5612 T.O.T.P. -- Vehicle No. 1 Sheet No. 2

2. Following the above field dynamometertests, the cooling test was performed, the results of which will be discussed in detail in an Automotive Laboratory Report which will be attached to a later log.

3. The vehicle was then cleaned and the top door, air intake grill, and splash shield were removed from the engine compartment so that a dust-proof distributor can be installed and the air cleaner intake openings can be modified in order to prevent dust from entering the cleaners as readily as it now does. Thus far, the dust-proof Auto-lite distributor has been partially installed. This distributor case is constructed to accommodate shielding for the wires to the coils, but at present, these wires are not equipped with shields. An attempt will be made to eliminate these large openings in the case by using grommets and passing the wires through the grommets. This dust-proof distributor was taken from the spare engine for this vehicle.

4. Since the outer bogie wheels #3 and #4 on the right side and #4 on the left side of the vehicle were in bad condition, they were replaced. See ARG. Photograph #90215 which is attached to the daily log for 17 - 20 August 1943.

5. The air cleaners were removed and thoroughly cleaned.

6. The following photographs were taken, and prints will be attached to a later log.

a. Engine compartment, general view.

b. Original distributor in dirty condition.

7. As stated in the daily log for 6 - 16 August 1943, the gun mount in this vehicle was proof-fired previous to the firing tests. The attached indorsement states that the mount functioned satisfactorily.

II. DETAILED RECORD OF ACTIVITIES

1. 21 August 1943

a. The field dynamometer tests were continued. The tractive resistance at various road speeds up to and including 24 m.p.h. was obtained.

b. The operation on this date was as follows:

Mileage	
Concrete	- 24
Running time	
Vehicle	- 2:15
Engine	- 2:35

Period Covered 21 - 30 August 1943 Report Issued 17 - 20 August 1943

Test of Assault Tank T14 - Pilot (XG-201)

W.O. 5612 Subject -- Vehicle No. 1 Sheet No. 3

2. 22 August 1943

a. There was no activity on this date.

3. 23 August 1943

a. The field dynamometer tests were completed. The distance required to bring the vehicle to rest by full application of the brakes from a road speed of 20 m.p.h. was measured, and the acceleration characteristics from rest to maximum road speed, using 2nd, 3rd, 4th, and 5th gears, were obtained.

b. Installation of the thermocouples for the cooling test was begun in the following locations:

(1) Water into the radiator

(2) Water out of the radiator

(3) Transmission oil

(4) Final drive oil

(5) Air into engine compartment

(6) Air out of engine compartment

(7) Ambient air

c. The air cleaners were serviced.

d. The operation on this date was as follows:

Mileage

Gravel	- 4
Concrete	- 19
Cross-country	- 2
Running time	
Vehicle	- 2:30
Engine	- 3:15
Engine oil added	- 8 qts.
Fuel added	- 75 gal.

4. 24 August 1943

a. Installation of the thermocouples for the cooling test was completed.

Daily log for 21 - 30 August 1943 Last log dated 17-20 August 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5612 T.S.T.P. -- Vehicle No. 1 Sheet No. 4

b. The dust was cleaned from the distributor, and the points were adjusted to 0.018" clearance.

c. The vehicle was operated for observation by Capt. Tauss, Tank-Automotive Center. During this operation, the turret lock failed allowing the turret to rotate freely. No damage was done.

d. The operation on this date was as follows:

Mileage	
Gravel	- 14
Running time	
Vehicle	- 1:15
Engine	- 1:45

5. 25 August 1943

a. The cooling test was performed, the detailed results of which will be presented in an Automotive Laboratory Report which will be attached to a later log.

b. Since the results of the tractive resistance test performed 21 August 1943 were questionable, the test was re-run on this date.

c. The operation on this date was as follows:

Mileage	
Concrete	- 23
Running time	
Vehicle	- 2:35
Engine	- 2:55

6. 26 August 1943

a. The vehicle was cleaned, and the top door, air intake grill, and splash shield were removed from the engine compartment in order to install a dust-proof distributor and modify the air cleaner intake openings. In their present location, the air cleaner intake openings are in the path of the air entering the engine compartment through the intake grill, and therefore considerable dust enters the cleaners.

b. The dust-proof Autolite distributor was removed from the spare engine for this vehicle, and will be installed on the engine now in the vehicle.

c. The operation on this date was as follows:

Mileage	
Gravel	- 7

Daily log for 21 - 30 August 1943 Last log dated 17 - 20 August 1943

Test of Assault Tank T14 - Pilot (XG-201)

O.P. 5612 T.S.S.P. -- Vehicle No. 1 Sheet No. 5

Running time
Vehicle - 1:00
Engine - 1:20

7. 27 August 1943

a. Disassembly of the upper portion of the engine compartment was completed, and the original distributor was removed from the engine.

b. Since the outer bogie wheels #3 and #4 on the right and #4 on the left side of the vehicle were damaged during previous operation (see APG. Photograph #90215 attached to the daily log for 17 - 20 August 1943), they were replaced.

c. The vehicle did not operate on this date.

8. 28 August 1943

a. Installation of the dust-proof distributor was begun. The case of this distributor is larger than that of the original distributor, and, since the distributor is mounted in a very confined location, installation was difficult and future maintenance will also be difficult.

b. The vehicle did not operate on this date.

9. 29 August 1943

a. There was no activity on this date.

10. 30 August 1943

a. Installation of the dust-proof distributor was continued. The case of this distributor is constructed to accommodate shielding for the wires to the coils, but these wires are not equipped with shielding. Therefore, an attempt to close these large openings in the distributor will be made by using grommets and running the wires through the grommets.

b. The air cleaners were removed and thoroughly cleaned.

c. The following photographs were taken prints of which will be attached to a later log.

(1) Engine Compartment, general view

(2) Original distributor, dirty condition

Proof Officer Approved:

56

Daily log for 21 - 30 August 1943 Last log dated 17 - 20 August 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5612 T.C.T.N. -- Vehicle No. 1 Test No. 6

d. The vehicle did not operate on this date.

1 Incl.
Incl. 1 - Cy. 1st Ind. on Memo dated 16 August 1943

R. W. Spinner
1st Lt., Ord. Dept.

Wm. D. Johnson
Col., Ord. Dept.

67

Form TA-1

RESTRICTED

Project #1810/3-14-I
Spinner/fmb

Daily log for 31 August - 6 September 1943	Last log dated 21 - 30 August 1943

Test of Assault Tank T14 - Pilot (KO-201)

O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 1

Total wt. as tested 93,930#	Load carried	Towed load

Temperature 8:00 a. m.	Temperature 4:00 p. m.
Weather conditions	Road conditions

MILEAGE	Concrete	Gravel	Cross Country	Total	
Previously recorded	202	80	69	351	
This date	6	0	50	56	
Total to date	208	80	119	407	

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	34:25	42:55
This date	5:50	6:50
Total to date	40:15	49:45

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously recorded	512	4.5	0	0			
Added this date	103	2.0	0	0			
Total to date	615	6.5	0	0			

Operation supervised by N. G. McLean, Captain, Ord. Dept.

Remarks: I - Summary of Activities:

1. Installation of the dust-proof distributor was completed, and the air cleaner intake openings were modified by installation of a shield to prevent the intake air from entering the air cleaners directly below the intake grill at the top of the engine compartment. APG Photograph #91537, which is attached, shows the original air cleaner intake opening, and APG Photograph #91533, which is also attached, shows the modifications. The vehicle was then operated approximately 50 miles over the Cross Country Course in the Palmer Area. The course was extremely dusty. The air cleaners were checked frequently, but servicing

RESTRICTED

, Proof Officer.	Approved:

Daily log for 31 Aug. - 6 Sept. 1943		Last log dated 21-30 Aug. 1943	
Test of	Assault Tank T14 - Pilot (KO-201)		
O.P. 5612	I.S.T.P. --	Vehicle No. --	Sheet No. 2

was not necessary at any time during this operation. This is a decided improvement over the condition of the air cleaners during previous operation over the same course with the air cleaner intake opening as originally installed. No difficulty was experienced with the distributor which also indicates that the dust-proof distributor recently installed is a definite improvement over the original distributor which became fouled with dust during previous operation. See APG Photograph #91234 which is attached.

2. The test of the turret operation on level ground and on the 30% slope was repeated in order to check the results obtained on 9 August 1943. The combined results of the test on these dates showed that, on level ground, using the power traversing system, the speed of traversing was 4 rev. in 59 sec., and the power required to start rotation was 2585 watts (23.5 volts, 110 amps), and the power required to maintain rotation was 1560 watts (24 volts, 65 amps). The hydraulic pressure to start rotation was 1500#/sq.in. and to maintain rotation 250#/sq.in. The hand traversing effort was 2# to rotate the turret on level ground, and the brake held satisfactorily.

3. On the 30% slope, the traverse speed was 3 rev. in 46 sec. and the power required to start rotation of the turret with the gun pointed down grade was 1840 watts (23.0 volts, 80 amps) and with the gun pointing 90° to the side of the vehicle 2640 watts (22.0 volts, 120 amps). The maximum power required to maintain constant rotation was 1212.5 watts (24.25 volts, 50 amps) with the gun moving down grade and 1645.0 watts (23.50 volts, 70 amps) with the gun moving up grade. The hydraulic pressure to start rotation with the gun moving up grade or down grade was 1500#/sq.in. and to maintain constant rotation this pressure varied from a minimum of 200#/sq.in. with the gun moving down grade to a maximum of 500#/sq.in. with the gun moving up grade. The maximum hand traversing effort with the gun moving up grade was 6#, and with the gun moving down grade 4# pull was required to prevent rotation of the turret. The traverse brake held satisfactorily when the vehicle was on the 30% slope.

4. The torque required to start rotation of the turret on level ground was 608.6 in.-lbs. and to maintain rotation was 350.6 in.-lbs.

5. The vehicle operated approximately 7 miles over the hilly Cross Country Course in the Deer Creek Area. The operation was satisfactory with the exception of the suspension system. The left track was thrown while the vehicle was negotiating a left turn on a left side slope, and, when the track was thrown, the outer bogie wheels

on the left side of the vehicle were badly damaged. Eight outside guides, one center guide, and 15 wedges were broken. On the right side of the vehicle, the rubber on the outside of the outer bogie wheels, especially the center bogie assembly, was damaged by the outer track guides. Thus far, nos. 2, 3, 4, & 5 outer bogie wheels on the left side of the vehicle have been replaced, and the left track has been tightened. Before continuing operation, it is intended to tighten the right track. The track adjustments are difficult to manipulate due to the location of the inner adjusting mechanism and the force which is necessary to operate the mechanism.

6. Attached is letter TAC 451.25/431.1, APG 451.21/374-2892113 which states that the firing test and 2000 mile operation test on this vehicle will be eliminated at Aberdeen Proving Ground and conducted later at Fort Knox. The firing tests, however, have been completed.

7. The small dust shields attached to the inside edge of the front fenders to prevent dust from rising in the faces of the driver and assistant driver are shown in APG Photograph #91539 which is attached. These shields are partially effective, that is, eliminating some of the dust. Extending the fenders further over the front of the tracks would be much more effective. This, however, would make the fenders protrude to the front of the vehicle, and probably would result in the fenders being damaged in a very short time.

8. Also inclosed are APG Photograph Nos. 91233, 91538 which show general views of the engine compartment of this vehicle.

II - Detailed Record of Activities:

1. 31 August 1943:

a. Installation of the dust-proof distributor was completed, and the air cleaners and splash shield were installed in the engine compartment.

b. The vehicle did not operate on this date.

2. 1 September 1943:

a. Small shields were installed just above the air cleaner intake openings, as shown in APG Photograph #91533. This prevents the intake air from entering the air cleaner directly below the intake grill, as it did in the original installation shown in APG Photograph #91537. With the new installation, the air entering the air cleaners is taken below the splash shield. Both of the above

Daily log for 31 Aug. - 6 Sept. 1943	Last log dated 21-30 Aug. 1943

Test of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 4

mentioned photographs are attached to this log. Following the above modifications, the top door and air intake grill were installed over the engine compartment.

b. The vehicle did not operate on this date.

3. 2 September 1943:

a. The vehicle was operated approximately 40 miles over the Cross Country Course in the Palmer Area. The course was extremely dusty. The air cleaners were inspected frequently but did not required servicing at any time during this operation which is a decided improvement over the air cleaner condition when the vehicle was previously operated over this course. See Daily Log dated 6 -16 August 1943, para. 11. Also, the dust-proof distributor functioned satisfactorily. Following the operation, it was noted that considerably more dust had been deposited in the bottom of the engine compartment than during previous operation prior to the modifications of the air cleaner intakes.

b. The operation on this date was as follows:

Mileage	
Concrete	- 6
Cross Country	- 43
Running time	
Vehicle	- 4:30
Engine	- 5:10
Fuel added	- 103 gal.
Engine oil added	- 8 qt.

4. 3 September 1943:

a. The turret traversing mechanism was retested on level ground and on the 30% slope to verify the results obtained 2 September 1943. It was found that on level ground, using the power traversing system, the speed of traversing was 4 rev. in 59 sec., and the power required to start rotation was 2585 watts (23.5 volts, 110 amps), and the power required to maintain rotation was 1560 watts (24 volts, 65 amps). The hydraulic pressure to start rotation was 1500#/sq.in. and to maintain rotation 250#/sq.in. The hand traversing effort was 2# to rotate the turret on level ground, and the brake held satisfactorily.

b. On the 30% slope, the traverse speed was 3 rev. in 46 sec., and the power required to start rotation of the turret with the gun pointing down grade was 1540 watts (23.0 volts, 80 amps) and with the gun pointing 90° to the side of the vehicle 2640 watts (22.0 volts, 120 amps). The maximum power required to maintain rotation was 1212.5 watts (24.25 volts,

Daily log for 31 Aug. - 6 Sept. 1943			Last log dated 21-30 Aug. 1943
Test of	Assault Tank M4 - Pilot (RG-201)		
O.P. 5612	T.S.T.P. --	Vehicle No. 1	Sheet No. 5

50 amps) with the gun moving down grade and 1645.0 watts (23.50 volts, 70 amps) with the gun moving up grade. The hydraulic pressure to start rotation with the gun up grade or down grade was 1500#/sq.in. and to maintain constant rotation this pressure varied from a minimum of 200#/sq.in. with the gun moving down grade to a maximum of 500#/sq.in. with the gun moving up grade. The maximum hand traversing effort with the gun moving up grade was 8# and with the gun down grade 4# pull was required to prevent rotation of the turret. The traverse brake held satisfactorily when the vehicle was on the 30% slope.

c. The torque required to start rotation of the turret on level ground was 608.8 in.-lbs. and to maintain rotation was 350.6 in.-lbs.

d. The center guides on the tracks were checked and several required tightening.

e. The vehicle operated approximately 6 miles over the Hilly Cross Country Course in the Deer Creek Area. The operation of the vehicle was satisfactory, with the exception of the suspension system. The outer bogie wheels on both sides of the vehicle were damaged, especially nos. 3 & 4 by the outside track guides. Eight outside guides, one center guide, and 15 wedges were broken. The operation ceased when the left track was thrown while negotiating a left turn on a left side slope. In order not to over speed the engine, the vehicle descended most of the hills in 3rd & 4th gears. The vehicle steered as well on the course during thissoperation as it ordinarily does on level ground.

f. The operation on this date was as follows:

Mileage	
Cross Country	- 7
Running time	
Vehicle	- 1:20
Engine	- 1:20

5. 4 September 1943:

a. The left track was reinstalled on the vehicle and the broken wedges and guides were replaced.

b. The vehicle did not operate on this date.

6. 5 September 1943:

a. There was no activity on this date.

FORM TA-2

RESTRICTED

Project #1810/3-14-1
Spinner/fmb

Daily log for 31 Aug. - 6 Sept. 1943			Last log dated 21-30 Aug. 1943
Test of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5612	T.O.T.P. --	Vehicle No. 1	Sheet No. 6

7. 6 September 1943:

a. Outer bogie wheels nos. 2, 3, 4, & 5 on the left side of the vehicle were replaced, and the left track was tightened. As noted previously, the track adjusting mechanism was very difficult to operate since sufficient force cannot be applied to move the idler. Therefore, it was necessary to use two jacks between the rear idler and the rear bogie wheels to accomplish the adjustment. Also, the inside adjustment is so located that even though sufficient force could be applied by one or two men, there is not sufficient room to use the proper tools.

b. The vehicle did not operate on this date.

7 Incls.
Incls. 1 - 6 : APG Photographs Nos. 91233, 91234, 91533, 91537, 91538 & 91539
" 7 : Letter TAC 451.25/4[illegible].1, APG 451.21/374-289Z113

RESTRICTED

R. W. Spinner 1st Lt., Ord. Dept. Proof Officer	Approved	E. Gray Lt. Col., Ord. Dept.

63

Form TA-1

RESTRICTED

Project #1810/3-14-1
Spinner/fmb

Daily log for 7 - 13 September 1943	Last log dated 31 Aug.-6 Sept. 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5621	T.S.T.P. --	Vehicle No. 1	Sheet No. 1

Total wt. as tested 93,930#	Load carried	Towed load

Temperature 8:00 a. m.	Temperature 4:00 p. m.
Weather conditions	Road conditions

MILEAGE	Concrete	Gravel	Cross Country	Total
Previously recorded	208	80	119	407
This date	0	0	9	9
Total to date	208	80	128	416

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	40:15	49:45
This date	2:25	2:45
Total to date	42:40	52:30

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously recorded	615	6.5	0	0			
Added this date	0	0	0	0			
Total to date	615	6.5	0	0			

Operation supervised by N. G. McLean, Captain, Ord. Dept.

Remarks: I - Summary of Activities:

1. The right track was tightened and one end connector was replaced. It was again noticed that the track adjusting mechanisms are difficult to operate. The operation over the hilly Cross Country Course in the Deer Creek Area was then continued, but after approximately 4 miles operation, the outside bogie wheels were badly damaged especially nos. 3 & 4 on each side of the vehicle. The operation was therefore stopped, and all of the outside and inside track guides were removed from the left track, leaving only the center guides and outside, center, and inside track connectors. The guides were removed

RESTRICTED

, Proof Officer. Approved:

64

Daily log for 7 - 13 September 1943 Last log dated 31 Aug.-6 Sept. 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5621 T.S.T.P. -- Vehicle No. 1 Sheet No. 2

from the end connectors by means of a cutting torch. The operation in the Deer Creek Area was then resumed, but only resulted in damage to the inner bogie wheels on the left side of the vehicle rather than the outer bogie wheels. The tendency to throw the track with the outer and inner guides removed was no different than with these guides in place; that is, there is a strong tendency to throw tracks on side slopes. It appeared, however, that longer center guides would be a definite advantage and might provide satisfactory functioning of the suspension system. Therefore, this operation showed that the present tracks function as well without outside and inside guides as with them, and it indicates that the installation of longer center guides may improve the operation and possibly solve the track difficulty.

2. During the above operation, it was noted that dirt and stones lodged between the tracks and the rear idlers, and this was definitely instrumental in causing track throwing. The installation of an open type idler should eliminate this difficulty.

3. Also during the above operation, when the edge of the track without outside guides moved across the rear idler many nuts which hold the track wedges in place were broken. Therefore, if these guides should be permanently removed from the track, it will be necessary to modify the end connectors to eliminate this difficulty.

4. Another method will be attempted to eliminate the track throwing difficulties, tieing the inside and outside bogie wheels together so that they will move together vertically. That is, the two wheels will be in the same vertical position at all times. Thus far, the rear left bogie assembly has been removed and at present the wheels are being fastened together by welding strips across the bogie wheel support arms. A photograph will be taken and attached to a later log to clearly show the method used. Also, the damage bogie wheels have been replaced.

5. Since the vehicle operation is being curtailed by work on the suspension system, the oil filler opening of the engine and the dipstick oil gauge are being relocated in order to make them more accessible. The breather pipe is being extended upward to the top of the engine compartment, and the filler opening and the breather filter will be attached at the top of this pipe. A new dipstick opening is being made in the left side of the oil pan, at approximately the center, and a long dipstick, extending to the top of the engine compartment, will be used.

6. Captain Fauss stated in a telephone conversation, 11 September 1943, that new brake drums wider than those now used in the

vehicle, are being made and will be shipped to Aberdeen Proving Ground for test, and that it is probable that the steering levers will be removed from their present location and installed so that they will extend upward from the floor of the driver's compartment. Both of these modifications should improve the steering characteristics of the vehicle. A record of this telephone conversation is attached.

7. Also attached are APG Photographs Nos. 91630, 91631 & 91632 which show the left track of the vehicle as it was thrown while operating over the course in the Deer Creek Area. See Daily Log for 31 Aug.-6 Sept. 1943, para. I 5.

II - Detailed Record of Activities:

1. 7 September 1943:

a. The right track was tightened, and one end connector on this track was replaced. The track adjusting mechanism was difficult to operate, and two hydraulic jacks between the rear bogie wheels and the idler were used to accomplish this work.

b. The vehicle operated approximately 4 miles over the Cross Country Course in the Deer Creek Area. Again, the outside bogie wheels were badly damaged, especially those on the center bogie assembly.

c. The operation on this date was as follows:

Mileage	
Cross country	- 4
Running time	
Vehicle	- 0:40
Engine	- 0:40

2. 8 September 1943:

a. All of the outside and inside track guides were removed from the left track. A cutting torch was used to remove the guides from the end connectors.

b. The operation on this date was as follows:

Mileage	
Cross country	- 1
Running time	
Vehicle	- 0:15
Engine	- 0:15

Daily log for 7 - 13 Sept. 1943 Last log dated 31Aug.-6Sept. 1943

Test of Assault Tank T14 - Pilot (KG-201)

O.P. 5621 T.S.T.P. -- Vehicle No. 1 Sheet NO. 4

3. 9 September 1943:

a. The vehicle was operated over the Cross Country Course in the Deer Creek Area. After approximately 4 miles, the inside guides on the left track had cut the outside edge of the inner bogie wheels badly. This damage was very similar to that done to the outer edge of the outer bogie wheels, on the right side of the vehicle during this operation and on both sides of the vehicle during previous operation. Also, there was the same tendency to throw the tracks on side slopes as before the outer track guides were removed. 10 wedges were broken from the left track when the track connectors without guides rolled on the idler and broke the nuts which hold the wedges in place. The operation indicated that the removal of outside and inside guides did not improve or hinder the operation as compared to the operation previous to the removal of the guides.

b. During this operation, it was noted that dirt and stones lodged between the tracks and the rear idlers which definitely was instrumental in causing track throwing both with and without inner and outer guides.

c. The operation on this date was as follows:

Mileage	
Cross country	- 4
Running time	
Vehicle	- 1:30
Engine	- 1:50

4. 10 September 1943:

a. The vehicle was thoroughly cleaned, and replacement of the damaged bogie wheels was begun. One broken track block was found in the left track. The crack occurred close to the track pin. A photograph was taken and will be attached to a later log.

b. The vehicle did not operate on this date.

5. 11 September 1943:

a. Replacement of the damaged bogie wheels was continued.

b. The left rear bogie assembly was removed from the vehicle for modification. The adjacent inner and outer bogie wheels will be tied together in such a manner that they will move together vertically.

Daily log for 7 - 13 September 1943	Last log dated 31 Aug.-6 Sept. 1943
Test of Assault Tank T14 - Pilot (KG-201)	
O.P. 5621	T.S.T.P. --	Vehicle No. 1	Sheet No. 5

c. The vehicle did not operate on this date.

6. 12 September 1943:

a. Relocation of the oil filler opening and the dipstick on the engine was begun. The breather pipe was extended upward near the top of the engine compartment, and the breather filter and a filler opening will be located at the top of the new pipe. Also, a new opening was made in the left side of the oil pan, at approximately the center, and a dipstick will be installed at this point. The stick will be sufficiently long so that it will extend to the top of the engine compartment and will be much more accessible than the present dipstick. Also, in this location, when checking the oil level a better average reading will be obtained than previously, since the new stick will be located near the center of the pan while the original stick is at the extreme rear of the pan.

b. The vehicle did not operate on this date.

7. 13 September 1943:

a. Relocation of the oil filter opening and dipstick was continued.

b. Replacement of the damaged bogie wheels was completed and modifications of the left rear bogie assemblies was begun.

c. The vehicle did not operate on this date.

3 Incls.:
Incl. 1 - Report of Telephone Conversation, dated 11 September 1943
" 2-4 - APG Photographs Nos. 91630, 91631 & 91632

R. W. Spinner 1st Lt., Ord. Dept. Proof Officer	Approved	F. Gray Lt.Col., Ord.Dept.

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT

RESTRICTED

Spinner/Feb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941		APG 451.21/374-2892107
Report For	14 - 24 September 1943	Last Report Date:	7 - 13 Sept. 1943
Test Of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested	93930#	Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total
Previously Rec'd	208	80	128	416
This Date	1	0	0	1
Total To Date	209	80	128	417

Running Time	Vehicle	Engine
Previously Rec'd.	42:40	52:30
This Date	1:25	1:45
Total To Date	44:05	54:15

Fuel and Oil (Gallons)	Fuel	Engine	Transmission	Differential
Previously Rec'd.	615	6.5	0	0
Added This Date	0	0	0	0
Total To Date	615	6.5	0	0

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. The modification of the left rear bogie assembly was completed. That is, the adjacent bogie wheels were tied together so that they will move together vertically. APG Photographs Nos. 92509 and 92510, which are attached, show the manner in which the inside and outside bogie wheels were fastened together by welding braces across the supporting arm. The damaged bogie wheels on this suspension were then replaced, and the suspension was installed on the vehicle. The intention is to operate the vehicle with this suspension, and, if the structure proves sufficiently strong to resist distortion during cross country operation, the other bogie assemblies will be modified in an identical manner in an attempt to prevent track throwing and damage to the bogie wheels.

2. Modification of the crankcase breather opening was completed. The breather pipe was extended to the top of the engine and both the filler opening and the breather filter are attached at the top end of the pipe.

69

RESTRICTED

The installation is shown in APG Photograph #92690 which is attached. As shown in the photograph, the filler opening is now quite accessible and the breather filter which is inclosed in a metal shield, with the exception of the bottom side, can be serviced with little difficulty. Also, the installation of the relocated dipstick was completed, and the new dipstick is shown in the above mentioned photograph, just below and to the side of the left bank of the engine. The dipstick is the long ribbon type.

3. The broken block in the left track was replaced. The broken block is shown in APG Photograph #92096 which is attached.

4. There is no tachometer cable available to replace the one which failed. Therefore, a new one is being obtained.

5. In an attempt to eliminate the surging of the engine when operating against the governor, the 6#/in. spring was removed from the governor assembly, and a new spring, with a rate of 80#/in., was installed. The installation was made by Mr. Steele of the Novi Equipment Company, manufacturers of the governor. Then, after freeing up the throttle linkage which was quite sticky and difficult to operate, the engine was operated for a short time to adjust the governor and observe the results of the installation of the new springs. Before this could be completed, however, a knock was noted in the engine and the engine was shut off. During this short operation, the engine was operated twice momentarily at approximately 3400 rpm.

6. The oil pan was removed from the engine, and it was found that the #4 connecting rod bearing had failed. The bearing seat was found to be out-of-round, the back of the bearing indicated that the bearing had been excessively hot, and the face of the bearing was in bad condition, some metal had been displaced. The bearing evidently had not been floating, but had seized the bearing cap. This bearing was designed to float on a film of oil between the bearing and the cap. The crankshaft journal for #4 connecting rod bearing was also damaged, but none of the other bearings or journals were damaged. Also, considerablesludge was removed from the crankshaft oil channels. The damaged bearing was photographed, and a print will be attached to a later log.

7. The engine, Ford GAZ#2, was therefore removed from the vehicle and will be shipped to the Ford Motor Company, Detroit, Michigan, at the request of the Ford representative. Also, preparation of Ford engine GAZ #1-R for installation was completed. The oil pan with the newly installed dipstick, the breather pipe assembly, and the dust-proof distributor were removed from engine GAZ#2 and installed on engine GAZ#1-R. The latter engine has been previously reworked, which included increasing the clearance between rod bearings and caps and installation of the new one-piece cylinder head gasket. While engine GAZ#2 is being repaired by the Ford Motor Company, the above mentioned modifications will also be incorporated.

8. Since this vehicle was not operating, the right fan belts were removed and installed on the Assault Tank T14#2 - Pilot to replace a set which failed on that vehicle. In the meantime, new fan belts are being obtained.

9. The engine oil pan and flywheel housing in the Assault Tank T14#2 were damaged when the starter mounting failed. Therefore, this pan and housing have been installed on engine GAZ#2 and will be returned to the Ford Motor Company on that engine.

70

10. Modification of the air intake grill was begun. It is intended to install the grill and splash plate below the grill so that they will hinge upward and facilitate servicing of the air cleaners and the forward portion of the engine.

11. Photographs were taken of engine GAZ#1-R, and prints will be inclosed in a later log.

12. When the dust-proof Auto-Lite distributor was removed from engine GAZ#2, it was found that considerable dust had entered the distributor. There are two threaded openings in the base of the distributor where the dust may have entered. These holes were evidently threaded for a purpose, but there were no attachments on the distributor when they were received. A photograph was taken to show the condition of the distributor, and also a photograph was taken of the standard Auto-Lite distributor for this engine. Prints will be attached to a later log.

13. Stickiness was eliminated from the flexible bow machine gun mounting by removing roughness from the ball joint with emery cloth and installing 0.010" shim between the mounting plates to relieve binding. Also, a small portion of the mount was removed just above the gun to make room for the front sight, because, previously, the gun could not be installed without removing the front sight. Then, the pistol grip and firing mechanism was removed from the mount since it did not function satisfactorily and was in the way of the legs of the assistant driver.

14. Attached is Automotive Laboratory Report #43-135 which presents in detail the results of the dynamometer test of this vehicle.

15. Also attached is the 2nd Ind. to letter directive TAC 451.25/4941, APG 451.21/374-289Z107, dated 8 September 1943, which authorizes work to make the air cleaners more accessible for servicing.

II - Detailed Record of Activities:

1. 14 September 1943:

a. Installation of a new tachometer cable was attempted, but it was found that there is no cable available at Aberdeen Proving Ground to fit this vehicle.

b. Modification of the crankcase breather pipe was continued.

c. Modification of the left rear bogie assembly was completed, and replacement of the damaged bogie wheels was begun.

d. The inside of the vehicle was cleaned thoroughly.

e. The vehicle did not operate on this date.

2. 15 September 1943:

a. Replacement of the damaged bogie wheels on the left rear bogie assembly was completed.

b. Modifications of the crankcase breather was continued.

c. The vehicle did not operate on this date.

91

3. 16 September 1943:

a. The left rear bogie assembly was installed on the vehicle.

b. Modifications of the crankcase breather and dipstick were continued.

c. The vehicle did not operate on this date.

4. 17 September 1943:

a. Modification of the crankcase breather and relocation of this dipstick were completed, and the oil pan was installed and the new dipstick was calibrated. The original spring in the governor assembly, rating 6#/in., was removed and a new spring, rating 80#/in., was installed in an attempt to eliminate the surging of the engine when operating against the governor. The installation was made by Mr. Steele, representative of the Novi Equipment Company, manufacturers of the governor.

b. The broken track block in the left track was replaced.

c. Stickiness in the engine throttle linkage was eliminated by cleaning and lubricating the linkage.

d. The vehicle did not operate on this date.

5. 18 September 1943:

a. The engine was subjected to a 25-hour check and was found to be functioning satisfactorily.

b. The engine was operated for a short time to adjust the governor, but the work was not completed due to the fact that a knock developed in the engine which was worthy of investigation. Therefore the engine was shut down. Twice during this operation, the engine operated momentarily at approximately 3400 rpm.

c. The operation on this date was as follows:

Mileage		
Concrete	-	1
Running time		
Vehicle	-	1:25
Engine	-	1:45

6. 19 September 1943:

a. The engine was inspected, and it was found that #4 connecting rod bearing had failed. Also, considerable sludge was found in the oil channels of the crankshaft.

b. The vehicle did not operate on this date.

7. 20 September 1943:

a. #4 connecting rod bearing which failed was further inspected. The back of the bearing showed signs of extreme heat and the bearing cap was out-of-round. The remainder of the bearings, connecting

rods and mains, were inspected and found to be in satisfactory condition. The engine was removed from the vehicle.

b. Preparation of another engine, GAZ#1-R, for installation in the vehicle was begun. The oil pan with the relocated dipstick, breather assembly, and dust-proof distributor were taken from engine GAZ#2 and installed on this engine.

c. The dust-proof distributor taken from engine GAZ#2 was inspected and found to contain considerable dust, indicating that the case of the distributor is not dust-proof. The distributor was photographed. This distributor had operated approximately 65 miles over dusty cross country terrain.

d. The right fan belt on this vehicle was installed on Assault Tank T14#2.

e. The throttle linkage of engine GAZ#2 was very hard to operate, and most of the stiffness appeared to be caused by friction of the parts due to the eccentric action of the linkage at the carburetors.

8. 21 September 1943:

a. The engine compartment was cleaned thoroughly.

b. Preparation of engine GAZ#1-R for installation was continued.

c. The Ford representative requested that engine GAZ#2 be shipped to the Ford Motor Company, Detroit, Michigan where it will be reconditioned and modified. This modification will include increasing the clearance between the rod bearings and cap, installation of the new one-piece cylinder head gasket, and installation of the new oil pan with the center partition, new oil pump, and relocated dipstick. Engine GAZ#1-R has already been modified with the exception of the new oil pan.

d. #4 rod bearing, engine GAZ#2, which failed was photographed.

9. 22 September 1943:

a. Preparation of engine GAZ#1-R for installation in the vehicle was completed, and the engine was photographed.

b. Modification of the air intake grill and splash plate to make the air cleaners accessible for servicing was begun. It is intended to mount the grill and plate on hinges so that they can be swung upward.

10. 23 September 1943:

a. Modification of the air intake grill and splash plate were continued.

b. Stickiness of the bow machine gun was eliminated by removing roughness from the ball joint with emery cloth and installing a 0.010" shim between the mounting plates. Also, a small portion of the mount was cut away just above the gun to make room for the front sight of the gun. Previously, it was necessary to remove the front sight from the gun in order to install the gun in the mount. Also, the pistol grip and

and firing mechanism was removed from this mount since it did not function properly and was generally in the way.

11. 24 September 1943:

a. Modification of the air intake grill and splash plate was continued.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

6 Incls.
Incls. 1 - 4 : APG Photographs Nos. 92096, 92509, 92510 & 92690
" 5 : Automotive Laboratory Report No. 43-135
" 6 : 2nd Indorsement to Letter Directive TAC 451.25/4941
APG 451.21/374-2[illegible]2107

R. W. S.
Spinner/fmb
Extension 3278
Project #1810/3-14-1

RESTRICTED

Reference	TAC 451.25/4941		APG 451.21/374-2892107
Report For	25 - 30 September 1943	Last Report Dated	14 - 24 Sept. 1943
Test of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested 93,930#		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total
Previously Reported	209	80	128	416
This Date	0	0	0	0
Total To Date	209	80	128	416

Running Time	Vehicle	GAZ#2	Engine GAZ#1-R
Previously Reported	44:05	54:15	0
This Date	0	0	4:00
Total To Date	44:05	54:15	4:00

Fuel and Oil (Gal.)	Fuel	Oil	Average Mileage	Difficulties Incl.		
Previously Reported	615	6.5	0	0		
Added This Date	0	0	0	0		
Total To Date	615	6.5	0	0		

Operation Supervised by: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, Ford engine GAZ#1-R was installed in the vehicle. Following the installation, the engine was operated at idle speed for approximately 4 hours for break-in purposes. It was intended to operate the engine for a longer period, but, after 4 hours, the engine was shut down due to the fact that the water temperature gauge on the instrument panel indicated 260°. The condition will be investigated. APG Photographs Nos. 92920, 92021, 92022, and 92023 which are attached show various views of this engine.

2. The modification of the air intake grill and splash shield at the top of the engine compartment was continued. A wood model was made of the desired installation, and construction of the final installation has begun.

75

3. APG Photograph #92919 showing the dustproof Auto-Lite distri-

butor after approximately 65 miles of cross country operation is attached. See Report for 14 & 24 September 1943, para. I, 12.

4. APG Photographs Nos. 93208 & 93209 show the dustproof Auto-Lite distributor and Standard Auto-Lite distributor for the Ford engine Model GAZ. Both of these photographs are attached.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

17 Incls.: APG Photographs Nos. 92919 - 92923, 93208 & 92309

76

AMERICAN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941	APO 451.21/374-289Z107	
Report For	1 - 7 October 1943	Last Report Dated	25-30 Sept. 1943
Test Of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested	93,930#	Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total
Previously Rec'd	209	80	128	416
This Date	1	0	0	1
Total To Date	210	80	128	417

Running Time	Vehicle	GAZ#2 Engine	GAZ#1-R
Previously Rec'd.	44:05	54:15	4:00
This Date	:10	0	4:00
Total To Date	44:15	54:15	8:00

Fuel and Oil (Gallons)	Fuel	Engine	Transmission	Differential
Previously Rec'd.	615	6.5	0	0
Added This Date	0	0	0	0
Total To Date	615	6.5	0	0

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. As noted in the previous log, 25-30 September 1943, the engine break-in operation was halted due to the fact that the water temperature gauge indicated approximately 260°. The condition was investigated, and it was found that the temperature gauge sending unit was not functioning properly. The unit was therefore replaced, and the engine operation at idle speed for break-in purposes was completed. The engine has operated a total of 8 hours in this manner.

2. The fan belt was then removed from the vehicle to be used on the Assault Tank T14#2, since between the two vehicles there are only three fan belts, instead of the required four, two for each vehicle.

3. The modification of the top of the engine compartment was continued.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

77

Spithner/Tmb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941 APG 451.21/37h-2892 107		
Report For	8 - 15 October 1943	Last Report Date	1 - 7 October 1943
Test Of	Assault Tank T14 - Pilot (KO-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested	93,390#	Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Recd.	103	80	128	311	418
This Date	0	0	0	0	0
Total To Date	103	80	128	311	418

Running Time	Vehicle	GAZ#2	Engine GAZ#1-R
Previously Recd.	44:05	54:14	8:00
This Date	0	0	0
Total To Date	44:05	54:14	8:00

Fuel and Oil (Gal.)	Fuel	Engine	Transmission	Differential			
Previously Recd.	615	6.5	0	0			
This Date	0	0	0	0			
Total To Date	615	6.5	0	0			

Prepared in Duplicate By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. Modification of the air intake grill and the splash shield below the grill was completed. The grill and splash shield are now hinged at the forward end of the engine compartment and can be raised into a vertical position to provide access to the air cleaners and the forward portion of the engine. Since these pieces are quite heavy, a chain-pull jack is used to raise and lower them. Loops to accomodate the ends of the jack were attached to the grill and the top of the turret. Also, because of the shape of the turret it is necessary to turn the turret sidewise, that is with the gun pointing to the side of the vehicle, to raise the grill. Although this arrangement is somewhat cumbersome, the accessibility of the front of the engine compartment, including the air cleaners, has been much improved over the original installation. Photographs will be taken of the new installation, and prints will be attached to a later log.

2. Since the above modifications rendered the splash shield movable, the expansion tank in the cooling system, the water lines to the ex-

pansion tank, and fire extinguisher lines had to be remounted in a different manner from their original mounting since they were fixed to the splash shield. The expansion tank was mounted on the air horn by fastening a horizontal base to the horn and then fastening the tank to the base with a felt cushion between the tank and the base. The water lines to the expansion tank were re-routed by passing the line from each side of the radiator over the fan shrouding to the center of the radiator where the lines meet and join into one larger line, which extends from the top center of the radiator forward to the expansion tank. It will be recalled that these lines originally extended along the sides of the engine compartment, and then they ran to the expansion tank along the top of the splash shield. The fire extinguisher lines were attached to the sides of the engine compartment just below the splash shield rather than being attached to the top of the shield as they were originally. Photographs will be taken of these installations, and prints will be attached to a later log.

3. It is next intended to relocate the air cleaner intakes. The most desirable location would be to take the air from the crew compartment, and therefore the possibilities of running the intake pipes through the bulkhead are being investigated. Thus far, the turret and basket have been removed from the vehicle.

4. Captain C. W. Tauss, TAC, inquired by telephone 7 October 1943 concerning the status of this vehicle, and also the Assault Tank #2. He was informed that this vehicle cannot operate until new fan belts are received. A record of this telephone conversation is attached. Information concerning this telephone conversation was not included in the previous report dated 1 - 7 October 1943.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

1 Incl.: Report of telephone conversation, dated 7 October 1943

79

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941 APG 451.2[illegible]4-289Z107		
Report For	16 - 22 October 1943	Last Report Dated	8 - 15 October 1943
Test Of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested	93,930#	Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	103	80	128	311	418
This Date	0	0	0	0	0
Total To Date	103	80	128	311	418

Running Time	Vehicle	GAZ#2	Engine	GAZ#1-R
Previously Rec'd.	44:05	54:14		8:00
This Date	0	0		0
Total To Date	44:05	54:14		8:00

Fuel and Oil (Gallons)	Fuel	Engine	Trans-mission	Differential			
Previously Rec'd.	615	6.5	0	0			
Added This Date	0	0	0	0			
Total To Date	615	6.5	0	0			

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, openings were cut in the bulkhead through which to pass the air cleaner intake pipes. The location of the air cleaners was not changed, and the openings are directly behind the air cleaners. Due to the shape of the air cleaners, the original air cleaner intake pipe will not be used since the position of the air cleaners cannot be conveniently altered. Therefore, a new intake pipe will be installed on the air cleaner with the pipe entering the cleaner from the rear, the original pipe will be removed. This modification may effect the efficiency of the cleaner, and therefore the manufacturer will be consulted later if the modification is satisfactory.

2. Since this vehicle has been very difficult to steer, the original steering linkage with anchor mounted on the top front plate was removed. A new linkage was then installed not using the anchor, but instead a long lever was installed off of the brake operating shaft. This linkage is less complicated than the original linkage, and it is possible that addi-

tional leverage will be attained. The linkage will be tested as soon as the vehicle is in operating condition.

3. Since the turret and basket are removed from the vehicle, the vehicle is being cleaned thoroughly inside and all necessary repairs are being made.

4. During this period, the work being performed on this vehicle was somewhat curtailed by the activity of higher priority projects.

II - Detailed Record of Activities:

1. 16 October 1943:

a. The removal of the turret and basket was completed, and the portions of the bulkhead through which the air cleaner intake could pass were located.

2. 17 October 1943:

a. Cleaning of the inside of the vehicle was begun.

b. Activity on this date was curtailed by work on higher priority projects.

3. 18 October 1943:

a. Continued cleaning inside of vehicle.

b. Burned holes through bulkhead through which to pass air cleaner intakes.

c. Activity was somewhat curtailed by higher priority projects.

4. 19 October 1943:

a. Modified air duct from auxiliary generator set in order that it would clear left air cleaner intake opening in fighting compartment. Made duct one inch narrower.

5. 20 October 1943:

a. No activity because of work on higher priority projects.

6. 21 October 1943:

a. Modified air cleaners to fit new inlet locations. Removed original intake pipes and installed new ones properly located.

b. Modified left steering linkage by removing togle with anchor and replaced it by long lever on brake actuating shaft.

7. 22 October 1943:

a. No activity because of work on higher priority projects.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941 APG 451.21/[redacted]289Z107		
Report For	23 - 29 October 1943	Last Report Dated	16 - 22 October 1943
Test Of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested	93,930#	Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	103	80	128	311	418
This Date	0	14	6	20	20
Total To Date	103	94	134	331	438

Running Time	Vehicle	Engine GAZ#2	Engine GAZ#1-R
Previously Rec'd.	44:05	54:14	8:00
This Date	2:55	0	3:45
Total To Date	47:00	54:14	11:45

Fuel and Oil (Gallons)	Fuel	Engine	Trans-mission	Differential			
Previously Rec'd.	615	6.5	0	0			
Added This Date	19	3.0	0	0			
Total To Date	634	9.5	0	0			

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the air cleaner and engine compartment modifications were completed.

II - Discussion:

1. The original air cleaner intake pipe was removed, and a new pipe was installed at the rear of the air cleaner so that it could conveniently pass through the bulkhead without altering the position of the air cleaner. It would be practically impossible to alter the position of the cleaner because of its shape and size and the confined condition of the location in which it is mounted. This applies to each of the two cleaners.

2. The fire extinguisher horns which were originally mounted on the splash plate below the air intake grill were relocated, because it is

impossible to leave them in their original position and still be able to hinge the plate as planned. They were therefore removed from the plate and mounted in the forward portion of the engine compartment near the bulkhead and just below the splash plate.

3. While the vehicle was disassembled, it was noted that it is practically impossible to check the oil or add oil to the auxiliary generator set in its present location, in the left sponson very close to the rear wall of the fighting compartment. Also, it is very difficult to service the universal joint in the center of the propeller shaft since the joint is not readily accessible through the opening in the turret basket floor, and also it is difficult to remove the propeller shaft covering since the catch holding the cover in place cannot be operated due to its proximity to the tool box also mounted below the turret basket floor. In addition, the rear engine support bolts are practically inaccessible.

4. The top of the engine compartment was then reassembled, and the turret and basket were reinstalled in the vehicle. The engine was then operated for a short time to check operation. The engine did not function satisfactorily and will therefore be investigated.

5. Photographs were taken of the newly modified air cleaner intake openings and of the re-routed water overflow lines, and prints of these APG Photographs Nos. 94612 & 94613 are attached.

6. The work during this period was considerably curtailed by the activity of higher priority projects.

III - Detailed Record of Activities:

1. 23 & 24 October 1943:

a. No work was accomplished during this period due to the activity of higher priority projects.

2. 25 October 1943:

a. Relocation of the air cleaner intake openings was completed, and photographs were taken of the new installation.

b. Relocation of the fire extinguisher horns that were originally mounted on the splash plate below the air intake grill was begun.

c. Photographs were taken of the re-routed water overflow lines.

d. There was no operation on this date.

3. 26 October 1943:

a. Relocation of the fire extinguisher horns was completed. The horns were installed at the front of the engine compartment just below the splash plate and point horizontally toward the engine.

b. There was no operation on this date.

4. 27 October 1943:

a. The turret and basket were reinstalled, and the top of the engine compartment was reassembled.

b. There was no activity on this date.

5. 28 October 1943:

a. The vehicle was ready to operate, but there was no activity because of the activity of higher priority projects.

6. 29 October 1943:

a. The vehicle was driven in the Palmer Area, over the cross country course to check operation, but the engine did not function satisfactorily and will be investigated.

b. The operation on this date was as follows:

Mileage		
Gravel	-	14
Cross country	-	6
Running time		
Vehicle	-	2:55
Engine	-	3:45
Fuel added	-	19 gal.
Engine oil added	-	12 qts.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

2 Incls.: APG Photographs Nos. 94612 & 94613

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

No. 1
Spinner/fmb
Extension 3278
Project #1810/3-14-1

Reference	TAC 451.25/4941 APG 451.2[illegible]4-2892[illegible]107		
Report For 30 October - 5 November 1943		Last Report Dated 23-29 October 1943	
Test Of	Assault Tank T14 - Pilot (KG-201)		
O.P. 5621		Vehicle No. 1	Sheet No. 1
Total wt. as tested 93,930#		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	103	94	134	331	438
This Date	20	0	0	0	20
Total To Date	123	94	134	331	458

Running Time	Vehicle	GAZ#2 Engine	GAZ#1-R
Previously Rec'd.	47:00	54:14	11:45
This Date	2:15	0	2:35
Total To Date	49:15	54:14	14:20

Fuel and Oil (Gallons)	Fuel	Engine	Trans-mission	Differen-tial			
Previously Rec'd.	634	9.5	0	0			
Added This Date	74	1.5	0	0			
Total To Date	708	11.0	0	0			

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the engine difficulty was investigated and corrected. Following this, however, a transmission failure occurred, and therefore the power train was removed from the vehicle for investigation.

II - Discussion:

1. The engine difficulty, as discussed in the previous report, was investigated, and it was found that the throttle linkage was sticking, and there was a small oil leak in the governor.

2. Following correction of the above difficulties, the vehicle was operated over the cross country course in the Palmer Area. After operating approximately 20 miles, however, it was noted that the trans-

mission was not functioning correctly and was noisy. Therefore, the power train was removed from the vehicle, and the transmission and the final drive were inspected. It was found that the cotter key which locks the nut on the forward end of the output shaft of the transmission had sheared, and the nut was striking the compensating case in the differential. The case was slightly damaged, and shavings were found in the bottom of the differential case. Therefore, the shavings will be cleaned out of the case and new oil will be put in the unit.

3. The work during this period was considerably curtailed by activity of higher priority projects.

4. Judging by the operation that has been performed since the completion of the modifications to this vehicle, these modifications in no way hinder the operation of the vehicle and do considerably improve the accessibility of the engine compartment, as well as provide cleaner air to the air cleaner intakes.

III - Detailed Record of Activities:

1. 30 October 1943:

a. The engine difficulty was investigated, and it was found that the throttle linkage was sticking and there was a slight oil leak at the governor. These difficulties were corrected, and the operation over the cross country course in the Palmer Area was continued. After approximately 20 miles of operation, however, it was noted that the control differential or transmission was noisy, and was not functioning correctly.

b. Operation during this date was as follows:

Mileage		
Cross country	-	20
Running time		
Vehicle	-	2:15
Engine	-	2:35
Fuel added	-	74 gal.
Engine oil added	-	6 qts.

2. 31 October 1943:

a. There was no activity on this date.

3. 1 November 1943:

a. There was no activity on this project on this date due to the activity of higher priority projects.

4. 2 November 1943:

a. The tracks were broken and removal of the power train was begun.

5. 3 November 1943:

a. Removal of the power train from the vehicle was com-

pleted.

6. 4 November 1943:

a. The control differential and transmission were inspected, and it was found that the cotter pin that locks the nut at the forward end of the transmission output shaft was sheared and allowed the nut to move forward on the shaft. The nut then struck the compensating case in the control differential. The compensating case was gouged by the nut, but no particular damage was done. Metal shavings were found, however, in the bottom of the control differential housing with the oil, and therefore it will be necessary to completely clean the unit.

7. 5 November 1943:

a. Damage to the compensating case of the control differential was photographed.

b. Disassembly of the differential for complete cleaning was begun.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

A.T.-1

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION
[redacted]
ORDNANCE RESEARCH CENTER

MEMORANDUM REPORT
RESTRICTED

Spinner/Lab

DATE 16 November 1943

TO:

T.A.C. PROJECT NO. KG-201 | PCN PROJECT NO. 1810/3-14-1 | A.P.G. FILE 451.21/374-8892107

DATES OF TEST 6 - 15 November 1943 | LAST REPORT DATED 30 October-5 November 1943

TEST OF Assault Tank T14 - Pilot

O.P. 5621 | VEHICLE NO. 1 | SHEET NO. 1

TOTAL WT. AS TESTED 93,930# | LOAD CARRIED | TOWED LOAD

MILEAGE	Concrete	Gravel	Cross Country	Total	Odometer
PREVIOUSLY REC'D	123	94	134	331	458
THIS DATE	0	0	0	0	0
TOTAL TO DATE	123	94	134	331	458

RUNNING TIME	VEHICLE	GAZ#2	ENGINE GAZ#1-B
PREVIOUSLY REC'D	49:15	54:14	14:20
THIS DATE	0	0	0
TOTAL TO DATE	49:15	54:14	14:20

FUEL AND OIL (GALLONS)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
PREVIOUSLY REC'D	708	11.0	0	0			
ADDED THIS DATE	0	0	0	0			
TOTAL TO DATE	708	11.0	0	0			

OPERATION SUPERVISED BY: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the transmission was reassembled following which engine difficulties occurred, and it was necessary to remove the head of both banks of the engine.

II - Discussion:

1. After cleaning the metal particles from the differential case, the power train was reinstalled in the vehicle. New oil was put in

the differential. APG Photograph #95019 which is attached shows the damage to the differential compensating case.

2. Immediately following reassembly of the power train of the vehicle, it was noted that the gasket in the head of the left bank of the engine had failed, and was allowing coolant to flow into the cylinders. The head was therefore removed, and it was found that no cylinder seal gasket had been installed below the head gasket. The head is therefore being removed from the right bank of the engine to determine whether or not the same condition exists.

3. The weights which simulated the load in the vehicle during the test operation have been removed, and the interior of the vehicle has been cleaned thoroughly.

4. Replacement of damaged bogie wheels has begun.

5. The attached teletypes nos. 83 and 97813 explain the status of the fan belts and tachometer cable for this vehicle.

III - DETAILED RECORD OF ACTIVITIES:

1. 6 November 1943:

a. The controlled differential parts were cleaned and inspected, with particular attention being given to the bearings. The bearings were found to be in good condition. Reassembly of the controlled differential was then begun.

2. 7 November 1943:

a. Reassembly of the controlled differential was completed.

3. 8 November 1943:

a. Installation of the power train in the vehicle was begun.

4. 9 November 1943:

a. Installation of the power train in the vehicle was completed, and the installation of the tracks was begun.

5. 10 November 1943:

a. The weights simulating the load of the vehicle during test operation were removed, and the interior of the vehicle was thoroughly cleaned.

b. Replacement of the damaged bogie wheels was begun, and installation of the tracks was completed.

6. 11 November 1943:

a. Replacement of the damaged bogie wheels was completed.

7. 12 November 1943:

a. It was noted that the head gasket under the left bank of the engine had failed, and removal of the head gasket was begun.

8. 13 November 1943:

a. Removal of the head gasket from the left bank of the engine was completed, and it was found that the cylinder seal gasket below the head gasket had not been installed, and the head gasket had failed and allowed the coolant to flow into the cylinders.

9. 14 November 1943:

a. There was no activity on this date.

10. 15 November 1943:

a. The cylinder seal gaskets and a new head gasket were installed in the left bank of the engine, and removal of the head from the right bank of the engine was begun in order that this head might be inspected to determine whether or not the same condition exists.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

3 Incls.
Incl. 1 : APG Photograph #95019
" 2 : Teletype #83
" 3 : " #97813

A. T. I.

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION
~~PROVING CENTER~~
ORDNANCE RESEARCH CENTER

RESTRICTED

MEMORANDUM REPORT

Spinner/fmb
Extension 5295

DATE 29 November 1943

TO:

T.A.C. PROJECT NO. XG-201 | ORD. RES. CENTER PROJECT NO. 1810/3-14-1 | A.P.G. FILE 451.21/374-2002107

DATES OF TEST 16 - 29 November 1943 | FINAL REPORT LAST REPORT DATED 6 - 15 November 1943

TEST OF Assault Tank T14 - Pilot

O.P. 5621 | VEHICLE NO. 1 | SHEET NO. 1

TOTAL WT. AS TESTED 93,930# | LOAD CARRIED | TOWED LOAD

MILEAGE	Concrete	Gravel	Cross Country	Total	Odometer
PREVIOUSLY REC'D	123	94	134	331	458
THIS DATE	0	0	0	0	0
TOTAL TO DATE	123	94	134	331	458

RUNNING TIME	VEHICLE	ENGINE GAZ#2	ENGINE GAZ#1-R
PREVIOUSLY REC'D	49:15	54:14	14:20
THIS DATE	0	0	0
TOTAL TO DATE	49:15	54:14	14:20

FUEL AND OIL (GALLONS)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
PREVIOUSLY REC'D	708	11.0	0	0			
ADDED THIS DATE	0	0	0	0			
TOTAL TO DATE	708	11.0	0	0			

OPERATION SUPERVISED BY: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. The engine was reassembled and the vehicle was prepared for shipment during this period.

II - Discussion:

1. When the head was removed from the right bank of the engine, it was found that the same condition existed as on the left bank. That is, there were no cylinder seal gaskets installed below the head gasket, and the head gasket had begun to fail. Therefore, the seal gas-

kets and new head gaskets were installed, and the engine was reassembled.

2. Following reassembly of the engine, the vehicle was prepared for shipment.

3. This is the final log, and a formal report will follow.

III - Detailed Record of Activities:

1. 16 November 1943:

a. The head was removed from the right bank of the engine, and it was found that no cylinder seal gaskets had been installed and the head gasket had begun to fail.

2. 17 November 1943:

a. The engine was reassembled and new head gaskets, and cylinder seal gaskets were installed.

3. 18 - 29 November 1943:

a. During this period, the vehicle was serviced and prepared for shipment. Since a new tachometer drive cable and a new set of fan belts have not yet been received, the vehicle will be shipped without these parts.

W. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicle Branch

Form TA-

RESTRICTED

Project #1810/3-14-1-1
Spinner/fmb

Daily log for 26 August - 4 September 1943		~~XXXXXXXX~~ INITIAL	
Test of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621	T.S.T.P. --	Vehicle No. 2	Sheet No. 1
Total wt. as tested	Load carried	Towed load	
Temperature 8:00 a.m.		Temperature 4:00 p.m.	
Weather conditions		Road conditions	

MILEAGE	Concrete				
Previously recorded	83				
This date	0				
Total to date	83				

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	5:00 (estimated)	5:30 (estimated)
This date	0	0
Total to date	5:00	5:30

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously recorded	-	-	-	-			
Added this date	-	-	-	-			
Total to date	-	-	-	-			

Operation supervised by N. G. McLean, Captain, Ordnance Dept.

Remarks: I - Authority:

1. The authority for this test is letter directive TAC 451.25/4951.1, APG 451.21/374-289Z115, dated 10 August 1943, which is attached.

II - Description:

1. This vehicle, Assault Tank T14#2, Pilot, is identical to the Assault Tank T14#1, Pilot, with the exception that the tracks of this second pilot vehicle do not have center guides while the tracks of the first pilot vehicle do have center guides. For the characteris-

RESTRICTED

Proof Officer. Approved:

93

Daily log for 26 August - 4 September 1943 INITIAL

Test of Assault Tank T14 - Pilot #2 (KG-201)

O.P. 5621	T.S.P. --	Vehicle No. 2	Sheet No. 2

tics and description of these vehicles see the Initial Log of Project #3-14-1, which covers the test of the first pilot vehicle, dated 29 July - 5 August 1943.

III - Summary of Activities:

1. Since this vehicle will be operated at Aberdeen Proving Ground only for mechanical reliability, as prescribed in letter directive TAC 451.25/4951.1, APG 451.21/374-2892113, the vehicle will be operated approximately 500 miles. Also, the modifications deemed necessary on the first pilot vehicle will be applied to this vehicle while this mileage is being accumulated. Therefore, this mileage will be accumulated rather sparingly, pending the progress of the test of the first pilot. The vehicle was received at Aberdeen Proving Ground 26 August 1943, see teletype #TT236, dated 19 August 1943.

2. Thus far, the mechanical inspection of the vehicle has begun.

1 Incl. : Letter Directive, TAC 451.25/4951.1, APG 451.21/374-2892113

R. W. Spinner 1st Lt., Ord. Dept. Proof Officer	Approved	L. Gray Lt. Col., Ord. Dept.

94

Form TA-1

RESTRICTED

Project #1810/3-14-1-1
Spinner/fmh

Daily log for 5 - 11 September 1943	Last log dated 26 Aug.-4 Sept. 1943

Test of Assault Tank T14 - Pilot #2 (XB-201)

O.P. 5621	T.S.T.P.	Vehicle No. 2	Sheet No. 1

Total wt. as tested	Load carried	Towed load

Temperature 8:00 a. m.	Temperature 4:00 p. m.
Weather conditions	Road conditions

MILEAGE	Generator				
Previously recorded	83				
This date	1				
Total to date	84				

RUNNING TIME	VEHICLE	ENGINE
Previously recorded	5:00	5:30
This date	0:10	0:20
Total to date	5:10	5:50

FUEL AND OIL (Gallons)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
Previously received	-	-	-	-			
Added this date	-	-	-	-			
Total to date	-	-	-	-			

Operation supervised by W. G. McLean, Captain, Ord. Dept.

Remarks: I - Summary of Activities:

1. Mechanical inspection of the vehicle was continued during this period. Thus far, the engine and electrical checks have been completed, and the vehicle has been serviced thoroughly. The armament and power train checks were begun. The mechanical inspection check form TA-27 is attached.

2. New batteries were installed since the original batteries were found to be totally discharged and were not capable of taking a charge.

RESTRICTED

Proof Officer	Approved:

95

Daily log for 5 - 11 Sept. 1943	Last log dated 26 Aug.-4 Sept. 1943

Test of Assault Tank T14 - Pilot #2 (KG-201)

O.A. 5621 T.S.P.P. -- Vehicle No. 2 Sheet No. 2

3. The exhaust manifold on the right engine bank was found to be cracked and was replaced. The manifold which was installed does not contain the partition which aids carburetor heating, and, therefore, a manifold with the partition will be installed in the near future. In the meantime, however, the manifold which was temporarily installed will be satisfactory for operation of the vehicle.

4. The oil pressure at idling speeds was 10#/sq.in. This was investigated, and it was found that the oil pressure gauge line was attached to the oil filter by-pass line instead of to the oil main gallery as it should be. This line was therefore removed and properly installed. Incidently, the oil pressure which was obtained in the filter by-pass line shows that the filter is being by-passed and indicates that the check valve is allowing oil to pass by unnecessarily. During the above inspection, the oil pan was removed, and, to accomplish this, it was necessary to cut away a small portion of the right front engine support, due to the shape of the oil pan and its proximity to this motor support. Judging by appearances of this support, it has evidently been necessary to cut away some of it when the vehicle was worked upon previous to its arrival at Aberdeen Proving Ground.

5. Also, it is impossible to remove the starter from the engine compartment without removing the oil pan, due to the small clearance between the oil pan and the floor of the engine compartment. After the starter was removed, it was found that the wires were broken off of two brushes, and the field ground binding post was loose and making a poor contact. A new starter was installed.

6. Captain Fauss, TAC, inquired concerning the status of the test of this vehicle by telephone 11 September 1943. A record of the telephone conversation is attached.

2 Incls.
Incl. 1 : Check Form TA-37
" 2 : Record of Telephone Conversation, 11 September 1943

RESTRICTED

R. W. Spinner 1st Lt., Ord. Dept. Proof Officer	R. Grey Approved Lt. Col., Ord. Dept.

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

Reference	TAC 451.25/4951.1	Reference	APG 451.21/374-289Z113
Report For	12 - 22 September 1943	Last Report Dated	5 - 11 Sept. 1943
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 3621		Vehicle No. 2	Sheet No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Total		
Previously Rec'd	84	0	84		
This Date	154	15	169		
Total To Date	238	15	253		

Running Time	Vehicle	Engine
Previously Rec'd.	5:10	5:50
This Date	11:50	14:15
Total To Date	17:00	20:05

Fuel and Oil (Gallons)	Fuel	Engine	Transmission	Differential		
Previously Rec'd.	0	0	0	0		
Added This Date	148	0	0	0		
Total To Date	148	0	0	0		

Vehicle Superintendent: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. The brakes were modified in the same manner as those on the Assault Tank T14#1 - Pilot. That is, the cams were modified and reversed, and 1/8" was removed from the steering lever stops in order to provide additional adjustment. See Project #1810/3-14-1, Daily Log dated 29 July - 5 August 1943 and attached sketch. When this vehicle was received, it was very difficult to steer, but, after this modification, the steering was much improved but not entirely satisfactory. Following the modification of the brakes, the vehicle was operated approximately 65 miles during which the steering became increasingly difficult. Therefore, the brake linings were inspected and found to be very badly glazed. New linings were then installed, and, since that time, the steering has been as good as can be expected in view of the steering difficulties that have been experienced on the first pilot vehicle.

2. The armament inspection was completed. Stickiness was

97

eliminated from the flexible mounted bow machine gun by removing paint and cleaning up the ball mount with emery cloth and installing a 0.010" shim between the mounting plates to relieve binding. Also, on the bow machine gun, the holes into which the mounting pins fit were slightly enlarged to facilitate installation, and a small portion of the mount just above the .30 cal. machine gun was cut away to make room for the front sight so that the gun can be installed with the sight in place. In addition, the pistol grip and trigger mechanism was removed from this mount since it would not fire the gun, interferred with installation of the gun, and was generally in the way. The size of the holes in the floor through which the foot-firing switches pass was enlarged since the switches were binding and remaining in the "on" position. Also, friction was eliminated from the manual firing controls of the 75mm gun. A 4# weight was installed on the rear of the recoil guard to balance the gun, and it was noted that at maximum depression of the 75mm gun, -9° 44', the recoil guard strikes the padding around the turret hatch, and the headrest on the direct sight just strikes the stabilizer oil reservoir. The speed of rotation of the turret on level ground is 4 rev. in 64 secs.

3. Shields identical to those installed on the Assault Tank T14#1 - Pilot, were installed over the air cleaner intake openings. See Project #1810/3-14-1, Daily Log dated 31 August - 6 September 1943 and attached APG Photograph #91533. This shield prevents dust from entering the air cleaners directly below the air intake grill.

4. The overflow pipe on the expansion tank of the liquid cooling system pointed directly at the intake opening of the left air cleaner as originally installed, and therefore an extension was added to the pipe to direct the overflow to the bottom of the engine compartment. This modification was also necessary on Assault Tank T14#1 - Pilot. Also, a large crack in the filler neck of the expansion tank was soldered.

5. Following the above modifications and repairs, the vehicle was operated on the concrete straight-away in the Palmer Area. The vehicle operated satisfactorily until the right fan belts failed. Since the Assault Tank T14#1 - Pilot was not operating at that time and no other fan belts of this size were available, the belts were taken from the first pilot and installed on this vehicle. Shortly afterwards, however, it was noted that the starter was not functioning properly, and, when the difficulty was investigated, it was found that the boss on the fly-wheel housing and flange on the oil pan to which the starter is mounted were broken. The top mounting stud was found to be loose and had worked out of place, which probably was the cause of the failure. Removal of the engine has begun.

6. Twice during this period Captain Tauss, Tank-Automotive Center, was informed of the status of the test of this vehicle by telephone. Records of these telephone conversations are attached. Captain Tauss stated that he would try to obtain three sets of fan belts and two tachometer drive cables to be used on this vehicle and Assault Tank T14#1.

II - Detailed Record of Activities:

1. 12 September 1943:

a. The vehicle was operated a short time to check the operation of the brakes. They functioned poorly, and therefore modifi- 98

cation identical to that performed on the Assault Tank T14#1 - Pilot was begun, that is, reversing the cam and removal of 1/8" from the steering linkage stop.

b. The armament check was continued. Roughness was eliminated from the flexible mount of the bow machine gun with emery cloth, and a 0.010" shim was placed between the mounting plates to relieve binding of the ball mount. Also, the size of the holes in the mount for the mounting pins of the machine gun were enlarged, and a small portion of the mount just above the .30 cal. machine gun was removed in order to allow room for the front sight and to make it possible to install the gun with this sight in place. The pistol grip and trigger mechanism was removed from the bow machine gun mount because it would not satisfactorily fire the gun, interferred with installation of the gun, and was in the way of the driver's legs.

c. During the operation of the vehicle on this date the engine of the vehicle did not function properly.

d. The operation on this date was as follows:

Mileage	
Concrete	- 3
Running time	
Vehicle	- 0:30
Engine	- 1:10

2. 13 September 1943:

a. Modification of the steering brake linkage was completed.

b. The armament check was continued. The round openings in the floor of the turret basket through which the foot-firing switches pass were enlarged to eliminate binding. Previously, the switches were sticking in the "on" position. Also, friction was eliminated from the manual firing controls of the 75mm gun by lubrication and proper adjustment of the linkage.

c. During the short operation on this date again the engine did not appear to be functioning properly.

d. The operation on this date was as follows:

Mileage	
Concrete	- 4
Running time	
Vehicle	- 0:25
Engine	- 0:45

3. 14 September 1943:

a. The armament check was completed. A 4# weight was added to the rear of the recoil guard to balance the 75mm gun, and it was noted that at maximum depression, -9° 44', the recoil guard strikes the padding around the turret hatch and the headrest on the direct sight just strikes the stabilizer oil reservoir. The speed of rotation of the turret on level ground was found to be 4 rev. in 64 secs.

b. The engine performance was checked and it was found that one spark plug was loose and not functioning. Metal elbows were installed on all of the spark plug leads. Also, the compression in the cylinders was measured and found to range from 115 - 130#/sq.in.

c. The vehicle was cleaned thoroughly.

d. Installation of shields over the air cleaner intake openings, identical to those installed on the Assault Tank T14#1 - Pilot, was begun. These shields prevent the air from entering the cleaners directly below the air inlet grill, and thus eliminating a large portion of the dust that was previously entering the cleaners.

e. The operation on this date was as follows:

Mileage	
Concrete	- 2
Running time	
Vehicle	- 0:05
Engine	- 0:10
Fuel added	- 60 gal.

4. 15 September 1943:

a. The vehicle was operated over the 3-mile concrete straight-away in the Palmer Area. The vehicle steered to the right fairly well but very poorly to the left, and, to make the situation worse, the vehicle drifted to the right. The brakes were adjusted three times during the operation.

b. The operation on this date was as follows:

Mileage	
Concrete	- 55
Gravel	- 10
Running time	
Vehicle	- 4:30
Engine	- 4:50
Fuel added	- 88 gal.

5. 16 September 1943:

a. Installation of the shields over the air cleaner intake openings was completed.

b. An extension was installed on the overflow pipe of the expansion tank of the liquid cooling system to direct the overflow to the bottom of the engine compartment. Previously, the overflow pipe pointed directly at the intake opening of the left air cleaner. Also, a large crack in the filler neck of the expansion tank was soldered.

c. The fan belts were tightened.

d. The brake linings were inspected, and found to be badly glazed, and they therefore were removed.

e. The vehicle did not operate on this date.

6. 17 September 1943:

a. New brake linings were installed and the brakes were adjusted.

b. The vehicle was then operated on the 3-mile concrete straight-away in the Palmer Area, but, after approximately 23 miles, both right fan belts failed. The steering was satisfactory during this operation.

c. The operation on this date was as follows:

Mileage	
Concrete	- 23
Gravel	- 5
Running time	
Vehicle	- 1:50
Engine	- 2:30

7. 18 September 1943:

a. Since there were no fan belts available to fit this vehicle it was impossible to operate on this date.

8. 19 September 1943:

a. There was no operation on this date.

9. 20 September 1943:

a. Since the Assault Tank T14#1 - Pilot was not operating, the fan belts were removed and installed on this vehicle. The vehicle then operated on the concrete straight-away in the Palmer Area. Toward the end of the operation, it was noted that the starter was not functioning properly.

b. The operation on this date was as follows:

Mileage	
Concrete	- 67
Running time	
Vehicle	- 4:30
Engine	- 4:50

10. 21 September 1943:

a. The malfunctioning of the starter was investigated and it was found that the boss on the fly-wheel housing and flange on the oil pan to which the starter was mounted was broken, and, as a result, the starter was free to move considerably. The upper support stud of the starter was loose and had worked loose and out of place. This was probably the cause of the failure.

b. Removal of the engine from the vehicle was begun.

c. The vehicle did not operate on this date.

11. 22 September 1943:

a. Removal of the engine was completed.

b. The vehicle did not operate on this date.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

102

APPROVED PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT

RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

Reference	TAC 451.25/4951.1	~~Refer~~	APG 451.21/374-2892113
Report For	23 -29 September 1943	Last Report Dated	12 - 22 Sept. 1943
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621		Vehicle No. 2	Sheet No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Total		
Previously Rec'd	238	15	253		
This Date	0	0	0		
Total To Date	238	15	253		

Running Time	Vehicle	Engine
Previously Rec'd.	17:00	20:05
This Date	0	0
Total To Date	17:00	20:05

Fuel and Oil (Gallons)	Fuel	Engine	Transmission	Differential			
Previously Rec'd.	148	0	0	0			
Added This Date	0	0	0	0			
Total To Date	148	0	0	0			

Operation supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, removal of engine GAZ#3 from this vehicle was completed. The flywheel housing and oil pan, both of which had to be replaced, were removed from the engine. It will be recalled, as explained in the last report dated 12 - 22 September 1943, that the boss on the flywheel housing and the flange on the oil pan which support the starter both failed. APG Photograph #93058 which is attached shows the broken boss on the flywheel housing. A photograph showing the broken oil pan flange will be attached to a later log. Since Ford engine GAZ#2 which was taken from Assault Tank T14#1 was scheduled to be returned to the Ford Motor Company, Detroit, Michigan, for reconditioning, the flywheel housing was removed from that engine and was used to replace the housing which failed on engine GAZ#3. Then, to replace the damaged oil pan, a new type pan was obtained from the Ford Motor Company. The new type pan is equipped with a long dipstick, which is accessible from the top of the engine compartment, and has a partition in

the center and a modified oil pump. The partition and modified oil pump are designed to provide satisfactory lubrication of the engine parts while operating on slopes. This new pan has arrived and has been photographed, and prints will be attached to a later log. Also, although there is an opening in this particular pan for the long dipstick, there is no dipstick well, guide tube, or dipstick with the pan. Therefore, fabrication of these parts has begun.

2. Since the engine was removed from this vehicle, it was deemed a very convenient time to relocate the crankcase filler opening and the crankcase breather, similar to the installation on Assault Tank T14#1, see Project #1810/3-14-1, report for 14 - 24 September 1943 and attached APG Photograph #92690. This installation has begun, but has not yet been completed.

3. Also, a dustproof distributor, Auto-Lite, has been installed on the engine. This distributor was photographed previous to installation, along with a standard Auto-Lite distributor, and prints will be attached to a later log.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

1 Incl.: APG Photograph #93058

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

TAC 451.25/4951.1 APG 451.21/374-2892113

30 September - 8 October 1943 | 23-29 Sept. 1943

Assault Tank T14 - Pilot #2 (KG201)

O.P. 5621 | 2 | 1

	Concrete	Gravel	Total		
	238	15	253		
	0	0	0		
	238	15	253		

	17:00	20:05
	0	0
	17:00	20:05

	148	0	0	0		
	0	0	0	0		
	148	0	0	0		

N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period the manufacture and installation of the long dipstick and breather assembly was completed, and these units were installed on Ford engine GAZ#3. These modifications on the Ford GAZ engine are clearly shown in APG Photographs Nos. 92920, 92921 and 92922 attached to report for 29-30 September 1943, Project #1810/3-14-1 concerning Assault Tank T14#1 Pilot. As previously explained, the crankcase will be filled through the filter opening.

2. APG Photographs Nos. 93208 and 93209 attached to report for 25-30 September 1943, Project #1810/3-14-1 concerning the Assault Tank T14#1 Pilot, show the dust-proof distributor and the standard distributor, respectively. Both were manufactured by Auto-Lite for the Ford GAZ engine.

105

3. When the new oil pan was installed on the Ford engine GAZ#3, it was found that there was a small opening in the flywheel housing just below the oil pan, because of the shape of the pan. This opening was closed

by fastening a small piece of metal over it. Also, it was necessary to bend the baffle in the pan downward to clear the main bearing studs when installed APG Photographs Nos. 93482 and 93661 which are attached, show respectively the modified oil pan and the original pan.

4. The engine was installed in the vehicle, and it was necessary to cut a larger opening in the plate at the bottom of the engine compartment in order that oil can be drained from the engine without removing the large plate. The opening that was originally in the plate was satisfactory when the original oil pan was being used, but the new oil pan has two drain plugs, one in the forward section and one in the rear section, and therefore the original opening in the bottom plate was not sufficiently large to accommodate both plugs.

5. Following the installation of the engine in the vehicle, the top of the engine compartment, door, splash plate, and grill, were installed, and an attempt was made to graduate the new dipstick. It was found, however, that the oil level could not be measured correctly on the dipstick since oil does not flow from one section of the new pan to the other. In other words, the level of the oil in the two sections is not the same when the engine is not operating. Therefore, the pan was removed from the engine and a 5/16" hole was drilled in the center of the partition as close to the bottom of the pan as possible, in order to allow the oil to flow from one section to the other slowly. This work was done according to instructions of the Ford representatives. The oil pan was then reinstalled, and the dipstick was calibrated.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

2 Incls.: APG Photographs Nos. 93482 and 93661

Spinner/fmb
Extension 3278
RESTRICTED Project #1810/3-14-1-1

Project No.	TAC 451.25/4951.1 APG 451.21/374-289Z113		
Report For	9 - 12 October 1943	Last Report Period	30 Sept.-8 Oct. 1943
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621		Vehicle No. 2	Chart No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	155	15	0	170	253
This Date	2	21	86	109	109
Total To Date	157	36	86	279	362

Running Time	Vehicle	Engine
Previously Rec'd	17:00	20:05
This Date	10:30	11:55
Total To Date	27:30	32:00

Fuel and Lubricants	Fuel	Engine	Transmission	Differential		
Total Previously Rec'd.	148	0	0	0		
Added This Date	189	20	0	0		
Total To Date	337	20	0	0		

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the vehicle was operated a distance of 86 miles over the Cross Country Course in the Palmer Area and 36 miles over the gravel course in the Phillips Field Area for the purpose of checking the operation. The vehicle was very difficult to steer, particularly to the left, in spite of the fact that the brakes were adjusted twice. The brake linings will be replaced in the near future. Also, the throttle linkage did not return to idle position properly. Otherwise, the operation of the vehicle was satisfactory.

II - Detailed Record of Activities:

1. 9 October 1943:

a. The vehicle was operated over the gravel course in the

Phillips Field area. The operation was satisfactory, with the exception of the steering which was difficult.

b. The operation on this date was as follows:

Mileage		
Gravel	-	21
Running time		
Vehicle	-	2:15
Engine	-	2:55

2. 10 October 1943:

a. The steering linkage was adjusted.

b. The operation on this date was as follows:

Mileage		
Concrete	-	1
Running time		
Vehicle	-	0:10
Engine	-	0:15
Engine oil added	-	4 qts.
Fuel added	-	49 gal.

3. 11 October 1943:

a. The vehicle was operated over the Cross Country Course in the Palmer Area. Again, the steering was difficult, but otherwise the operation was satisfactory.

b. The operation on this date was as follows:

Mileage		
Cross Country	-	43
Concrete	-	1
Running time		
Vehicle	-	4:15
Engine	-	4:35

4. 12 October 1943:

a. The operation over the Cross Country Course in the Palmer Area was continued. The steering brake linkage was adjusted once, but it did not improve the steering of the vehicle appreciably. Also, the throttle linkage was not returning to idle position freely.

b. Incidently, this vehicle is equipped with 26" tracks with outside guides and without center guides, and, thus far, after 279 miles of operation, 86 of which has been cross country, the tracks and bogie wheels are in very good condition.

c. A set of grooved brake linings was prepared for installation on this vehicle. The grooves are spaced three inches apart.

d. The operation on this date was as follows:

Mileage		
Cross Country	-	43

108

Sheet No. 3

Project #1810/3-14-1-1

Running time		
Vehicle	-	3:50
Engine	-	4:10
Engine oil added	-	4 qts.
Fuel added	-	140 gal.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

Reference	TAC 451.25/4951.1 APG 45 Data/374-289Z113		
Report For	13 - 19 October 1943	Last Report Dated 9-12 October 1943	
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621		Vehicle No. 2	Sheet No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	157	36	86	279	362
This Date	5	9	88	102	102
Total To Date	162	45	174	381	464

Running Time	Vehicle	Engine
Previously Rec'd.	27:30	32:00
This Date	10:50	12:50
Total To Date	38:20	44:50

Fuel and Oil (Gallons)	Fuel	Engine	Trans-mission	Differen-tial			
Previously Rec'd.	337	2.0	0	0			
Added This Date	130	2.0	0	0			
Total To Date	467	4.0	0	0			

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. The brakes were relined, using grooved lining with 3" between grooves, following which the operation over the Cross Country Course in the Palmer Area was continued. The vehicle operated 88 miles over this course during this period. The steering of the vehicle was still poor and quite unsatisfactory, in spite of the fact that the brakes were relined, and the grooved linings are no more effective than the original linings. Also, the throttle was slightly sticky and did not return to idle position in the proper manner.

2. The vehicle was used for demonstration purposes once during this period. During this demonstration, practically all of the engine oil was lost, and, upon investigation, it was found that the oil pressure line to the governor was broken at the governor end. This line was installed at the time that the dustproof distributor was installed on the engine, but evidently the line was not properly fitted and it was broken by vibration. A new line was installed.

3. Once during the Cross Country operation, it was necessary to tighten the bolts which fasten the exhaust pipes to the manifolds.

4. The vehicle was serviced according the the 250-mile schedule.

II - Detailed Record of Activities:

1. 13 October 1943:

a. The vehicle was operated over the Cross Country course in the Palmer Area. The throttle linkage was slightly sticky and the steering was poor.

b. The brakes were relined using a grooved lining with 3" between grooves.

c. The vehicle was cleaned and prepared for the demonstration.

d. The operation on this date was as follows:

Mileage		
Gravel	-	4
Cross Country	-	12
Running time		
Vehicle	-	1:40
Engine	-	2:15
Fuel added	-	23 gal.

2. 14 October 1943:

a. The vehicle was used for demonstration purposes on this date. During the demonstration, practically all of the oil was lost from the engine, and the operation of the vehicle was halted.

b. The operation on this date was as follows:

Mileage		
Concrete	-	2
Gravel	-	2
Running time		
Vehicle	-	1:10
Engine	-	1:45
Oil added	-	4 qt.
Fuel added	-	21 gal.

3. 15 October 1943:

a. The loss of engine oil was investigated, and it was found that the oil pressure line to the governor had been broken, probably by vibration, at the governor end.

4. 16 October 1943:

a. The oil line which was broken was replaced, and the top of the engine compartment, the grill and splash shield, was installed.

b. The engine was operated for a short period to check the functioning.

c. The operation on this date was as follows:

Mileage	-	0
Running time		
Vehicle	-	0:10
Engine	-	0:15
Oil added	-	4 qt.

5. 17 October 1943:

a. The vehicle was serviced according to the 250-mile schedule.

b. There was no operation on this date.

6. 18 October 1943:

a. The operation over the Cross Country Course in the Palmer Area was continued. The steering was still poor.

b. The operation on this date was as follows:

Mileage		
Cross Country	-	47
Running time		
Vehicle	-	4:00
Engine	-	4:55
Fuel added	-	86 gal.

7. 19 October 1943:

a. The operation over the Cross Country Course in the Palmer Area was continued. The steering was poor, and the bolts which fasten the exhaust pipes to the manifolds were tightened.

b. The operation on this date was as follows:

Mileage		
Cross Country	-	29
Gravel	-	3
Concrete	-	3
Running time		
Vehicle	-	2:50
Engine	-	3:40

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

Reference	TAC 451.25/4951.1	APG 451.21/374-2892113	
Report For	20 - 27 October 1943	Last Report Dated	13-19 Oct. 1943
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621		Vehicle No. 2	Sheet No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	162	45	174	381	464
This Date	3	0	88	91	91
Total To Date	165	45	262	472	555

Running Time	Vehicle	Engine
Previously Rec'd.	38:20	44:50
This Date	6:10	7:45
Total To Date	44:30	52:25

Fuel and Oil (Gallons)	Fuel	Engine	Transmission	Differential			
Previously Rec'd.	467	4.0	0	0			
Added This Date	138	2.0	0	0			
Total To Date	605	6.0	0	0			

Operation Supervised By. N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the vehicle operated 91 miles, 88 miles of which were over the cross country course in the Palmer Area. With this operation, the test of this vehicle, as prescribed by the letter directive TAC 451.25/4951.1, APG 451.21/374-2892113, dated 10 August 1943, was completed.

2. It is believed, however, that many of the modifications incorporated into the Assault Tank T14#1 should be incorporated into this vehicle prior to its shipment to England.

II - Discussion:

1. During the 91 mile operation, the vehicle functioned very satisfactorily with the exception of the steering. The brakes were adjusted several times, but the steering was not appreciably improved.

113

2. Also, during this operation, it was noted that the track guides are beginning to damage the edges of the bogie tires, much the same as on the Assault Tank T14#1. It will be recalled that this vehicle is equipped with tracks having outside guides but no center guides, while the Assault Tank T14#1 is equipped with tracks having outside and center guides.

3. The vehicle was used for demonstration purposes once during this period.

4. Operation during this period was considerably curtailed by the work on higher priority projects.

III - Detailed Record of Activities:

1. 20 October 1943:

a. The vehicle was cleaned and used for demonstration purposes on this date.

b. The operation on this date was as follows:

Mileage		
Concrete	-	1
Running time		
Vehicle	-	0:10
Engine	-	0:15
Engine oil added	-	4 qts.
Fuel added	-	67 gals.

2. 21 October 1943:

a. The brakes were adjusted, and the operation over the cross country course in the Palmer Area was continued.

b. The operation on this date was as follows:

Mileage		
Cross country	-	37
Running time		
Vehicle	-	2:45
Engine	-	3:15
Engine oil added	-	4 qts.
Fuel added	-	71 gals.

3. 22 October 1943:

a. The operation over the cross country course in the Palmer Area was continued. The steering was very difficult.

b. The operation on this date was as follows:

Mileage		
Concrete	-	2
Cross country	-	51
Running time		
Vehicle	-	3:15
Engine	-	4:18

114

4. 23 - 27 October 1943:

a. There was no work accomplished during this period due to the activity of higher priority projects.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

115

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION

MEMORANDUM REPORT
RESTRICTED

Spinner/fmb
Extension 3278
Project #1810/3-14-1-1

Reference	TAC 451.25/4951.1 APG 45[illegible]/374-289Z113		
Report For 28 October - 2 November 1943		Last Report Dated 20-27 Oct. 1943	
Test Of	Assault Tank T14 - Pilot #2 (KG-201)		
O.P. 5621		Vehicle No. 2	Sheet No. 1
Total wt. as tested		Load Carried	Towed Load

Mileage	Concrete	Gravel	Cross Country	Total	Odometer
Previously Rec'd	165	45	262	472	555
This Date	0	0	0	0	0
Total To Date	165	45	262	472	555

Running Time	Vehicle	Engine
Previously Rec'd.	44:30	52:25
This Date	0	0
Total To Date	44:30	52:25

Fuel and Oil (Gallons)	Fuel	Engine	Trans-mission	Differen-tial			
Previously Rec'd.	605	6.0	0	0			
Added This Date	0	0	0	0			
Total To Date	605	6.0	0	0			

Operation Supervised By: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, modification of the vehicle was begun. It is intended to modify this vehicle in a manner similar to that of the Assault Tank T14#1.

II - Discussion:

1. The turret and basket have been removed from the vehicle, and the inside of the vehicle has been cleaned thoroughly. The water overflow lines from the radiator to the expansion tank were then rerouted over the fan shrouding where the lines meet in the center of the vehicle and empty into a common line which runs to the expansion tank. Also, the mounting for the expansion tank has been removed from the splash plate and the tank is being mounted on top of the carburetor air horn. The two fire extinguisher horns that were located on the splash plate have been removed and have been remounted in the front of the engine compartment near the bulkhead just below the splash plate level. 116

2. The holes in the bulkhead through which the air cleaner intakes will pass have been located, but they have not yet been cut through. Also, the auxiliary generator air duct has been marked for modification so that it will provide sufficient clearance for the left air cleaner intake opening passing through the bulkhead.

3. New brake linings have been installed with Thermoid BX9 on the left drum.

4. Work on this vehicle has been considerably curtailed by the activity of higher priority projects.

III - Detailed Record of Activities:

1. 28 October 1943:

a. The turret and basket were removed from the vehicle.

2. 29 October 1943:

a. Modification of the air intake grill and the splash plate below the grill was begun. The water overflow lines from the radiator were removed, and the air duct to the auxiliary generator was removed.

b. New brake linings were installed with Thermoid BX9 on the left side of the vehicle.

3. 30 October 1943:

a. The inside of the vehicle was thoroughly cleaned.

b. New bolts were installed in the U-joints to replace the original bolts which were considerably worn and loose.

c. Work on this date was considerably delayed by activity of higher priority projects.

4. 31 October 1943:

a. There was no activity on this date.

5. 1 November 1943:

a. The water overflow lines from the radiator to the expansion tank, which were previously removed, were rerouted over the fan shrouding where they meet in the center of the engine compartment at the rear and join into a common line which flows to the expansion tank mounted on top of the carburetor air horn. Also, the fire extinguisher horns that were mounted on the splash plate were relocated in the front of the engine compartment near the bulkhead and below the level of the splash plate.

b. The position of the holes in the bulkhead through which the air cleaner intakes will pass were located, but were not cut.

c. Work on this date was considerably curtailed by work on higher priority projects.

6. 2 November 1943:

a. The air duct of the auxiliary generator was marked for modification, but modification has not yet been made.

b. Also, the modification to the carburetor air horn so that the expansion tank can be mounted on top of it have been laid out but not accomplished.

c. Work on this date was considerably curtailed by the activity of higher priority projects.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

A.T.-1

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION
PROVING CENTER

RESTRICTED

MEMORANDUM REPORT

Spinner/fmb
Extension 3273

DATE 11 November 1943

TO:

T.A.C. PROJECT NO. KG-201 PCN PROJECT NO. 1810/3-14-1-1 A.P.G. FILE 451.21/374-2892113

DATES OF TEST 3 - 10 November 1943 LAST REPORT DATED 28 October - 2 November 194

TEST OF Assault Tank T14 - Pilot #2

C.P. 5621 VEHICLE NO. 2 SHEET NO. 1

TOTAL WT. AS TESTED LOAD CARRIED TOWED LOAD

MILEAGE	Concrete	Gravel	Cross Country	Total	Odometer
PREVIOUSLY REC'D	165	45	262	472	555
THIS DATE	0	0	0	0	0
TOTAL TO DATE	165	45	262	472	555

RUNNING TIME	VEHICLE	ENGINE
PREVIOUSLY REC'D	44:30	52:25
THIS DATE	0	0
TOTAL TO DATE	44:30	52:25

FUEL AND OIL (GALLONS)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
PREVIOUSLY REC'D	605	6.0	0	0			
ADDED THIS DATE	0	0	0	0			
TOTAL TO DATE	605	6.0	0	0			

OPERATION SUPERVISED BY: N. G. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, modification of the vehicle was completed.

II - Discussion:

1. The air cleaners were modified so that the air intake pipes enter the cleaners at the front, and holes were burned in the bulkhead. The air cleaner intake pipes were then passed through these holes into the

fighting compartment. Thus, the air cleaner intake air is taken from the fighting compartment of the vehicle. Also, the air intake grill at the top of the engine compartment and splash plate below the grill were mounted on hinges so that they can be swung upward in a vertical position to allow access to the air cleaners and the front portion of the engine compartment. These modifications have been completed, and the vehicle has been reassembled.

2. While the vehicle was disassembled, the interior was thoroughly cleaned.

3. Following the completion of the above modifications, the vehicle was prepared for the firing test.

III - Detailed Record of Activities:

1. 3 November 1943:

a. The holes were burned in the bulkhead through which to pass the intake pipes of the air cleaners. Also, modification of the air intake grill and splash plate below the grill, so that they can be swung into a vertical position, was begun.

2. 4 November 1943:

a. Modification of the air intake grill and splash plate was continued.

b. The new intake pipes were prepared for the air cleaners, and modification of the air cleaners was begun.

3. 5 November 1943:

a. Modification of the air intake grill and the splash plate was continued.

b. Modification of the air cleaners was completed. The intake pipes of the air cleaners are now located at the forward side of the cleaners rather than the rear side. That is, the intakes enter the sides closest to the bulkhead so that the intakes can pass through the bulkhead and take the air to the fighting compartment.

4. 6 November 1943:

a. Installation of the air cleaners in the vehicle was completed. The cleaners were installed with the intake passing through the bulkhead and a felt seal was used to seal the opening through which the air cleaner intake pipes pass.

5. 7 November 1943:

a. There was no activity on this date.

6. 8 November 1943:

a. Since modification of the vehicle has been almost completed, the inside of the vehicle was cleaned thoroughly previous to reassembly.

7. 9 November 1943:

a. Modification of the air intake grill and splash plate below the grill was completed. The grill now can be swung upward into a vertical position and allows access to the air cleaners and the forward portion of the engine compartment. To raise the grill, it is necessary to turn the turret so that the gun points to the side because of the shape of the turret. Then, to raise the grill and plate a chain jack is used with one end attached to a loop on the top portion of the turret and the other end on the edge of the grill, since the grill and shield are too heavy to be lifted by one or two individuals.

b. Following completion of the modification of the vehicle, reassembly of the vehicle was begun.

8. 10 November 1943:

a. Reassembly of the vehicle was completed, and the vehicle was prepared for the firing test.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

A T-1

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION
~~PROVING CENTER~~
[illegible]

MEMORANDUM REPORT Spinner/fmb

RESTRICTED

DATE 16 November 1943

TO:

T.A.C. PROJECT NO. [illegible]-201 PCN PROJECT NO. 810/3-14-1-1 A.P.G. FILE 451.21/374-2892-113

DATES OF TEST 11 - 15 November 1943 LAST REPORT DATED 3 - 10 November 1943

TEST OF Assault Tank T14 - Pilot #2

[illegible] 5621 VEHICLE NO. 2 SHEET NO. 1

TOTAL WT. AS TESTED			LOAD CARRIED		TOWED LOAD
MILEAGE	Concrete	Gravel	Cross Country	Total	Odometer
PREVIOUSLY REC'D	165	15	262	472	555
THIS DATE	4	0	2	6	6
TOTAL TO DATE	169	15	264	478	561

RUNNING TIME	VEHICLE	ENGINE
PREVIOUSLY REC'D	44:30	52:25
THIS DATE	:30	:40
TOTAL TO DATE	45:00	53:05

FUEL AND OIL (GALLONS)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL			
PREVIOUSLY REC'D	605	5.0	0	0			
ADDED THIS DATE	97	0	0	0			
TOTAL TO DATE	702	5.0	0	0			

OPERATION SUPERVISED BY: N. S. McLean, Captain, Ord. Dept.

I - Summary of Activities:

1. During this period, the vehicle was subjected to a firing test in order to determine whether or not the weapons functioned satisfactorily. The test proved that all of the weapons function satisfactorily, and only very small modifications were incorporated.

II - Discussion:

1. After boresighting the 75mm gun, 5 rounds were fired at a

RESTRICTED

122

range of 500 yds, the vertical dispersion 17" (.94 mils) and the horizontal dispersion 7" (.39 mils). A spring was then added to the rear of the sight holder with one end of the spring attached to the bottom of the sight holder and the other end to the front inside of the turret in order to apply tension to remove slack from the sight linkage. After this installation, approximately the same results were obtained with 5 rounds fired. It is believed, however, that this spring should be permanently installed since it definitely improved the accuracy of the firing of the Assault Tank T14#1, and, although it did not improve firing on the Assault Tank T14#2 at the present time, it might definitely improve the results after the sight linkage has become loosened. A total of 15 rounds were fired from the 75mm gun. While the 75mm gun was being used, approximately 100 rounds were fired from each of the .30 cal. machine guns and they functioned satisfactorily. During this firing test, it was found that several modifications would improve functioning of the weapons. These modifications are as follows:

a. Shorten the sight linkage rod in order to allow more adjustment.

b. The travel lock interferes with the belt feed on the bow machine gun, and therefore the lock should be moved.

c. The bow machine gun is very difficult to operate.

d. There is no ammunition box for the bow machine gun, and therefore one should be installed.

e. There is no ammunition box for the co-axial gun, and therefore one should be installed.

2. Following the firing test, the gun was cleaned, stargauged and prepared for shipment. Also, the above mentioned modifications were incorporated into the vehicle, including the spring on the back of the periscopic sight holder.

3. Major Sykes of the British Army Staff inquired concerning the status of this vehicle, and a record of the telephone conversation is attached.

III - Detailed Record of Activities:

A. 11 November 1943:

a. Firing test was performed. After boresighting the gun 5 rounds were fired, and a dispersion of 17" (.94 mils) vertically and 7" (.39 mils) horizontally was obtained at a range of 500 yds. The spring was then attached with one end on the bottom rear of the sight holder and the other end on the front inside of the turret in such a manner that it would take up the slack in the sight linkage. After the installation of this spring, 5 more rounds were fired with results approximately the same as those obtained previous to the installation of the spring. During this firing program it was found that:

1) The long rod in the sight linkage should be shortened approximately 1"

2) The travel lock on the bow machine gun interferes with the belt feed

3) The bow machine gun is difficult to operate

4) There is no ammunition box for the bow machine gun

5) There is no ammunition box for the co-axial machine gun

b. While the 75mm gun was being fired, approximately 100 rounds were fired from each of the .30 cal. machine guns, and the functioned satisfactorily.

c. The operation of the vehicle on this date was as follows:

Mileage		
Concrete	-	2
Cross country	-	1
Running time		
Vehicle	-	0:15
Engine	-	0:20
Fuel added	-	97 gals.

2. 12 November 1943:

a. The gun was cleaned, stargauged, and sealed for shipment.

b. The operation on this date was as follows:

Mileage		
Concrete	-	2
Cross country	-	1
Running time		
Vehicle	-	0:15
Engine	-	0:20

3. 13 November 1943:

a. The above mentioned deficiencies were corrected by:

1) Shortening the rod in the sight linkage 1"

2) Moving the travel lock on the bow machine gun slightly to the rear

3) Mounting an ammunition box for the bow machine gun

4) Mounting an ammunition box for the co-axial machine gun

5) Mounting a spring on the rear of the sight holder in such a manner that it would take up the slack in the sight linkage

4. 14 November 1943:

a. There was no activity on this date.

5. 15 November 1943:

a. The vehicle was serviced, and cleaning of the vehicle was begun in preparation for shipment.

N. G. McLean
Captain, Ord. Dept.
Chief, Combat Vehicles Branch

1 Incl.: Report of Telephone Conversation

A T-1

ABERDEEN PROVING GROUND, MARYLAND

AUTOMOTIVE DIVISION
~~PROVING CENTER~~
Ordnance Research Center

RESTRICTED

Project 3-14-1-1
SPINNER/mms

MEMORANDUM REPORT

DATE 4 December 1943

TO: FINAL REPORT

T.A.C. PROJECT NO. KG-201 | Ord. Res. Center ~~BGN~~ PROJECT NO. 1810 | A.P.G. FILE 451.21/374-2892113

DATES OF TEST 16 November - 4 Dec. 1943 | LAST REPORT DATED 11-15 November 1943

TEST OF Assault Tank T14 - Pilot #2

C.P. 5621 | VEHICLE NO. 2 | SHEET NO. 1

TOTAL WT. AS TESTED | LOAD CARRIED | TOWED LOAD

MILEAGE	Concrete	Gravel	Cross Country	Total	Odometer
PREVIOUSLY REC'D	169	45	264	478	561
THIS DATE	3	0	0	0	3
TOTAL TO DATE	172	45	264	478	564

RUNNING TIME	VEHICLE	ENGINE
PREVIOUSLY REC'D	45:00	53:05
THIS DATE	:15	:20
TOTAL TO DATE	45:15	53:25

FUEL AND OIL (GALLONS)	FUEL	ENGINE	TRANS-MISSION	DIFFEREN-TIAL
PREVIOUSLY REC'D	702	6.0	0	0
ADDED THIS DATE	0	0	0	0
TOTAL TO DATE	702	6.0	0	0

OPERATION SUPERVISED BY: M. G. McLean, Capt., Ord. Dept.

I. SUMMARY OF ACTIVITIES:

1. During this period, the vehicle was prepared for shipment. The vehicle will be shipped in the very near future.

RESTRICTED

126

II. DISCUSSION:

1. Following the completion of the firing test and incorporation of the modifications as discussed in the Memorandum Report for 11-15 November 1943, the vehicle was prepared for shipment.

2. Attached is Teletype to Tank-Automotive Center, Attention: Capt. Tauss, requesting shipping instructions for this vehicle.

3. This is the final Memorandum Report and a formal report will follow.

III. DETAILED RECORD OF ACTIVITIES:

1. 16 November 1943:

a. Preparation of the vehicle for shipment from Aberdeen Proving Ground was begun. On this date the operation of the vehicle was as follows:

Mileage	
Concrete	- 3
Running Time	
Vehicle	- 0:15
Engine	- 0:20

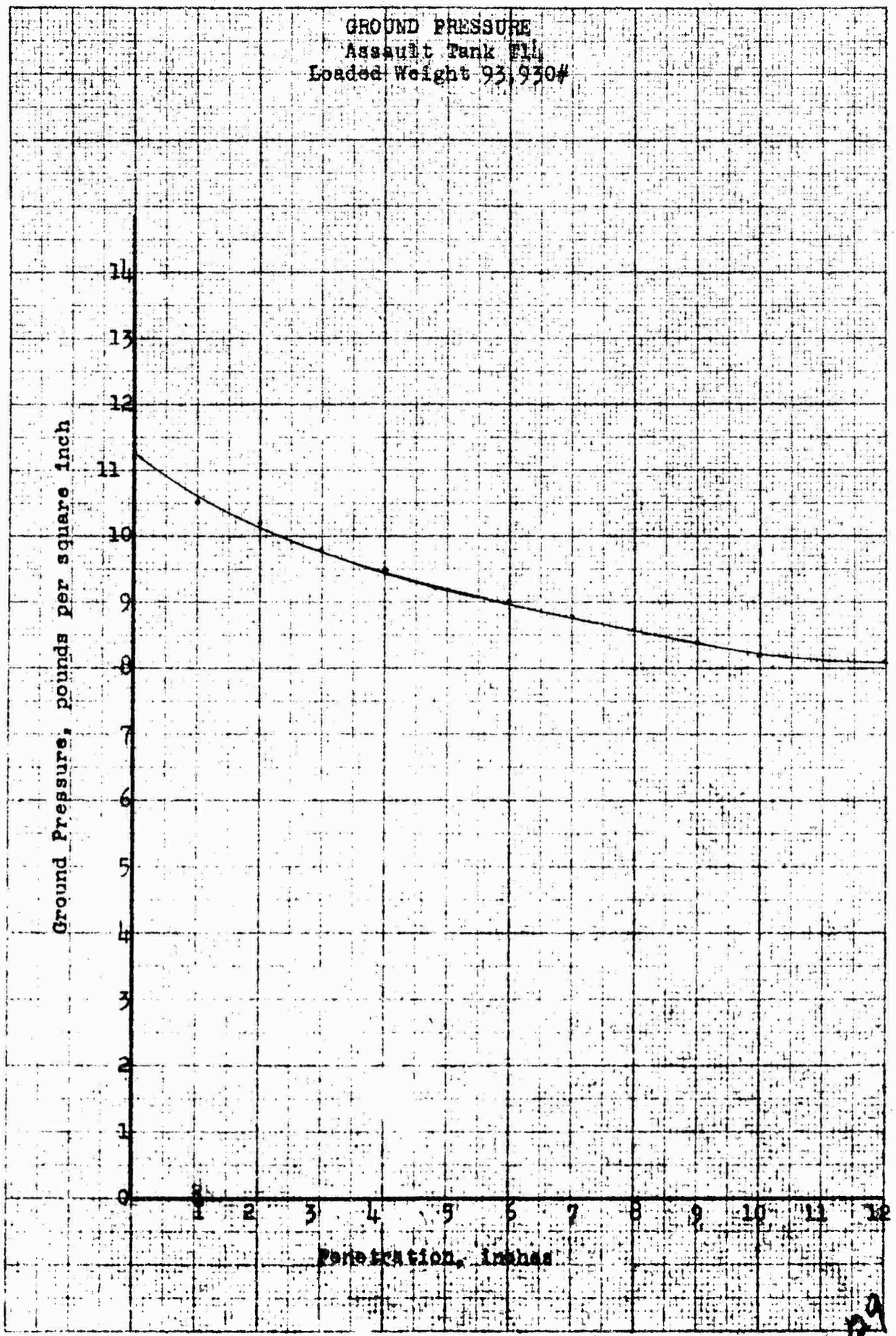
2. 17 November - 4 December 1943:

a. During this period the shipping preparations were completed and the vehicle is awaiting shipment.

N. O. McLean
Capt., Ord. Dept.
Chief, Combat Vehicle Branch

1 Incl.
Incl. 1 - TT to TAC Attn: Capt. Tauss
dated 17 November 1943.

APPENDIX "C"
CHARTS AND CURVE SHEETS


GROUND PRESSURE
Assault Tank T14
Loaded Weight 93,930#
Ground Pressure, pounds per square inch
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
1
2
3
4
5
6
7
8
9
10
11
12
Penetration, inches

D A T A S H E E T

GROUND PRESSURE

Assault Tank T14

Loaded Wt. 93,930#

3 August 1943

Penetration inches	Track width inches	Track length inches	Track area Sq. inches	Ground pressure pounds/sq. in.
0	26	160.38	8339.8	11.3
1	26	172.00	8944.0	10.5
2	26	177.75	9243.0	10.2
3	26	184.88	9614.8	9.8
4	26	191.00	9932.0	9.5
6	26	200.38	10419.8	9.0
7	26	206.13	10718.8	8.8
9	26	214.00	11128.0	8.2
10	26	219.00	11388.0	8.2
12	26	223.75	11635.0	8.1

- - - - -

APPENDIX [illegible] U.S.T.P. 1935-709

[illegible] INSPECTION

(1) [illegible] Tank
(2) O. [illegible] DATE

(3) DATE OF ARRIVAL July 29, 1943
(4) [illegible] OF [illegible] freight
(5) [illegible] 109 MILES

		VERIFY	ACTION TAKEN
(6)	VEHICLE GREASED	yes	—
(7)	OIL LEVEL CHECKED [illegible] INSPECTED [illegible]	x	
(8)	ENGINE	OK	
(9)	TRANSMISSION	OK	
(10)	AUX. TRANSMISSION	x	
(11)	TRANSFER CASE	x	
(12)	FRONT DIFFERENTIAL	OK	
(13)	REAR DIFFERENTIAL	x	
(14)	LOOSE NUTS, BOLTS, etc.	none	
(15)	MISSING PARTS	none	refilled
(16)	AIR CLEANER	OK	
(17)	OIL FILTER	OK	
(18)	FUEL LINES	OK	
(19)	OIL LINES	OK	
(20)	WATER LEVEL IN [illegible]	x	
(21)	TIRE PRESSURE	x	
(22)	FRONT WHEEL TOE-IN	x inches	
(23)	TRACK ADJUSTMENT	OK	
(24)	ALL CONTACTS CHECKED ON [illegible]	x	
(25)	HEADLIGHTS	OK	
(26)	TAIL LIGHTS	OK	
(27)	STOP LIGHTS	OK	
(28)	PARKING LIGHTS	x	
(29)	SPOTLIGHTS	x	
(30)	HORN FUNCTIONING	OK	
(31)	STARTER	OK	
(32)	GENERATOR	OK	
(33)	MAX. CHARGING RATE	100 amps.	
(34)	TACHOMETER	OK	
(35)	OIL PRESSURE GAUGE	OK	
(36)	FUEL GAUGE	OK	
(37)	WINDSHIELD WIPERS	x	
(38)	WATER TEMP. INDICATOR	OK	
(39)	OIL TEMP. INDICATOR	OK	

	OK	
	OK	
	OK	
	x	
	OK	
	steer hard to left	
	OK	
	OK	

good

OK

Steering not any good

P.L.Dewey

Form TA-57

fmb

APPENDIX C — Section II, T.S.T.P. 1935-709

MECHANICAL INSPECTION

(1) VEHICLE T14 #2

(2) O. P. — DATE 3 - 8 Sept. 1943

(3) DATE OF ARRIVAL ?

(4) METHOD OF DELIVERY freight

(5) SPEEDOMETER READING UPON ARRIVAL 83 MILES

	CONDITION	ACTION TAKEN
(6) VEHICLE GREASED	yes	
(7) OIL LEVEL CHECKED AND INSPECTED FOR LEAKS IN:		
(8) ENGINE	low ?	changed oil #50
(9) TRANSMISSION	low ?	added 2½ qt. #50
(10) AUX. TRANSMISSION	--	
(11) TRANSFER CASE	--	
(12) FRONT DIFFERENTIAL	OK	
(13) REAR DIFFERENTIAL	--	
(14) LOOSE NUTS, BOLTS, etc.	none found	
(15) MISSING PARTS	one track wedge	replaced
(16) AIR CLEANER	OK	
(17) OIL FILTER	OK	
(18) FUEL LINES	OK	
(19) OIL LINES	OK	
(20) WATER LEVEL IN BATTERY	full	battery dead, replaced
(21) TIRE PRESSURE	--	
(22) FRONT WHEEL TOE IN	-- inches	
(23) TRACK ADJUSTMENT	OK	
(24) ALL CONTACTS CHECKED ON	OK	
(25) HEADLIGHTS	OK	
(26) TAIL LIGHTS	OK	
(27) STOP LIGHTS	repaired	
(28) PARKING LIGHTS	--	
(29) SPOTLIGHTS	--	
(30) HORN FUNCTIONING	OK	
(31) STARTER	OK	
(32) GENERATOR	OK	
(33) MAX. CHARGING RATE	100 amps	
(34) TACHOMETER	?? rpm	
(35) OIL PRESSURE GAUGE	? 5# at 500 rpm	
(36) FUEL GAUGE	OK	
(37) WINDSHIELD WIPERS	--	
(38) WATER TEMP. INDICATOR	? 260	
(39) OIL TEMP. INDICATOR	-- OK	transmission

183

MECHANICAL INSPECTION

	CONDITION	REMARKS
(40) ENGINE	good	
(41) CLUTCH ACTION	fair	
(42) SHIFTING GEARS	OK	
(43) SPEEDOMETER	OK	
(44) FOOT BRAKES	--	
(45) HAND BRAKES	OK	
(46) STEERING	fair	
(47) FOOT THROTTLE	OK	
(48) HAND THROTTLE	OK	
(49) OTHER DETAILS		

(50) GENERAL CONDITION OF:

a. BODY & HULL

Good. Weather stripping on commanders door loose on one end. Repaired same.

b. SUSPENSION SYSTEM

OK

(51) REMARKS

Manifold on right bank cracked

Replaced with a new manifold

(52) INSPECTED BY Sines & Pvt. Hogge

ASSUMPTION [illegible] IMPROVEMENT
Reversing or interchanging the right & left cams
will give the [illegible] of a single anchor brake -
[illegible] for clearances -
Use appears as a ready modification to all vehicles
using Mahon; Thus M3 & M4 transmissions without
the [illegible] of single anchor brakes

[illegible] Capt. K.F. Pyle [illegible] 43

APPENDIX "D"
AUTOMOTIVE LABORATORY REPORT

ABERDEEN PROVING GROUND, MD.

RESTRICTED

DATE 15 September 1943 REPORT NO. 43-135

REF Problem No. DP43-101 LAB. NO.
Project No. 3-14-1

AUTOMOTIVE LABORATORY

REPORT

of

DETERMINATION OF TRACTIVE RESISTANCE, DRAWBAR, FUEL CONSUMPTION, ACCELERATION, MAXIMUM SPEED, BRAKING AND COOLING CHARACTERISTICS OF ASSAULT TANK T14

DATES OF TEST - 20, 21, 23, and 25 August 1943

AUTHORITY - TAC. 451.25/4941

PROOF OFFICER - R. A. Ackerman, T/3, Ord. Dept.

TABLE OF CONTENTS

	Page
TITLE AND IDENTIFICATION	1
SEC. I - INTRODUCTION	2
SEC. II - CONCLUSION	2
SEC. III - PRIOR DATA SURVEY	3
SEC. IV - DISCUSSION	4
AUTHENTICATION	8

ENCLOSURES -
3 Curve Sheets, Numbers 43-135-1 to 43-135-3
11 Data Sheets, Numbers 43-135-4 to 43-135-14

SECTION I INTRODUCTION

1. The Assault Tank T14 was tested on dry, approximately level concrete to determine tractive resistance characteristics from 3.0 M.P.H. to 25.0 M.P.H. road speed, drawbar pull and drawbar horsepower characteristics in 2nd and 3rd gears, fuel consumption in 2nd gear, acceleration characteristics in 2nd, 3rd, 4th, and 5th gears, maximum road speeds in 1st, 2nd, 3rd, 4th, and 5th gears, braking characteristics in 2nd gear with full load, full throttle operation.

2. The vehicle is powered with a Ford V8, Model GAZ, gasoline, liquid cooled engine governed at 2900 R.P.M. engine speed, and rated at 500 BHP at 2600 R.P.M. engine speed and 1050 pounds-feet torque at 2200 R.P.M. engine speed (bare engine ratings).

3. The vehicle is equipped with rubber-bushed, steel tracks of 26" width and 6" pitch with rubber on the bogie side operating against rubber tired bogie wheels. It employs the standard Medium Tank M4 five-speed transmission, and an engine cooling system of 17 gallons capacity designed to operate under a pressure of 7.5 pounds per square inch above one atmosphere which will raise the boiling temperature of water to 233°F. The gross weight of the vehicle as tested was 95,000 pounds.

SECTION II CONCLUSIONS

1. The tractive resistance characteristics of the Assault Tank T14 are satisfactory for a vehicle of this type being less than the Heavy Tank T1E1 (M6A2), or M4 Medium Tanks with either rubber block or steel tracks.

2. The drawbar horsepower of 326 in 2nd gear at 4.75 M.P.H. (2300 R.P.M.), which is below the speed of governor interference, is below the normal power of M4A3 Medium Tanks, 350 at 2300 R.P.M., indicating that the engine was not in proper condition, or that the installation losses are greater in the Assault Tank T14.

3. The maximum drawbar pull in 2nd gear, 26,500 pounds, is not as much higher than the normal drawbar pull of the M4A3 Medium Tanks as would be indicated by the greater gear reduction of the Assault Tank T14, a further indication of the lower power of the engine of the Assault Tank T14.

4. The maximum drawbar pull in 1st gear, computed from the observed drawbar pull in 2nd gear and disregarding track slippage, i.e. tractive effort in 1st gear, is 68,500 pounds; this is a tractive effort to weight ratio of 0.72.

5. The grade ability of the Assault Tank T14 in 2nd gear is limited to a maximum grade of approximately 28% as compared to approximately 42% for the Medium Tank M4A3.

137

6. As tested, with ambient temperature of 94 to 96°F, the engine cooling temperatures of the Assault Tank T14 are satisfactory, the lowest ambient temperature for boiling being 143°F at 2000 to 2400 R.P.M.

SEC. III PRIOR DATA SURVEY

1. The Russian Heavy Tank KB was tested on dry, approximately level concrete on 20 January 1943 to determine acceleration and braking characteristics and on 8 March 1943 to determine tractive resistance characteristics (see Laboratory Report No. 43-38).

a. The Russian Heavy Tank KB is powered with a Diesel, 12-cylinder, 60°V, liquid cooled engine rated at 600 BHP at 2000 R.P.M. engine speed as compared to the 500 BHP, Ford V8, gasoline engine of the T14. Both vehicles were equipped with steel tracks, but the Russian tank employed clutch-brake steering and weighed 103,500 pounds as tested, compared to the controlled differential braking and 95,000 pounds of the T14.

b. As may be seen from the curves on Sheet Number 43-135-1, the tractive resistance of the Russian Tank was slightly less than that of the T14 up to a road speed of approximately 11 M.P.H.; above that speed, however, resistance values were considerably higher than those of the T14. The minimum value of tractive resistance of the Russian vehicle was 45 pounds per ton at 3 M.P.H. road speed and the maximum 110 pounds per ton at 19 M.P.H. road speed. These may be compared with the minimum and maximum values of 52 and 71 pounds per ton obtained for the T14.

c. The vehicle accelerated with full throttle using 3rd and 4th gears from rest to maximum road speed (21 M.P.H.) in 27.4 seconds. Acceleration characteristics are shown graphically, with those of the T14, on Curve Sheet Number 43-135-3. Inspection of these curves will show that, if the time required for shifting the T14's transmission from 2nd to 3rd and from 3rd to 4th gears were eliminated to simulate the test operation of the Russian tank, the acceleration characteristics of the two vehicles are quite similar.

d. An average of 47.2 feet were required in which to bring the vehicle to rest from a road Speed of 20 M.P.H. by full application of the brakes and with the vehicle in neutral gear as compared to 70.7 feet for the T14.

2. A Standard Medium Tank M4A3 was tested on dry, approximately level concrete to determine drawbar characteristics and coolingcharacteristics. Test dates were 3 and 4 November 1942 and all data are contained in Laboratory Report Number 42-142.

a. The vehicle was powered with a Ford GAA engine identical to the Ford GAZ engine of the T14 except that magneto instead of battery ignition was used, and the carburetors were

mounted differently. The vehicle was equipped with steel tracks and weighed 63,400 pounds as tested - 31,600 pounds less than the T14.

b. The maximum drawbar pull, with the vehicle operating in 2nd gear under full load, full throttle conditions, was 25,000 pounds at 4.0 M.P.H. road speed (1650 R.P.M. engine speed) with approximately 2% track slippage, and the maximum drawbar horsepower was 320 DBHP at 5.1 M.P.H. road speed (2150 R.P.M. engine speed) with approximately 2% track slippage. These maximum values may be compared with like values of 26,530 pounds and 329 DBHP obtained with the T14. Drawbar characteristics are shown on Curve Sheet Number 43-135-2 for comparison with 2nd gear characteristics of the T14.

c. No cooling test comparable to that of the T14 has been conducted by the Dynamometer Section with a vehicle powered either with a Ford GAZ or GAA engine. Some cooling data are available for the GAA engine of this M4A3, however, and inspection of these data will show that a minimum ambient temperature of 149°F would have been necessary to cause the coolant to boil (the cooling system was designed to operate under a pressure of 6 pounds above atmospheric which raised the boiling point of water to 230°F). The minimum ambient temperature to boil would have been 152°F if the cooling system of this vehicle had been equipped with a 7.5 pound pressure cap like that of the T14. This value of 152°F should be compared with the minimum ambient temperature of 143°F which would have caused boiling in the engine of the T14.

3. The 3" Gun Motor Carriage M10A1 #2552, equipped with a Ford GAA engine, steel tracks, and controlled differential braking was tested on 3 August 1943 to determine acceleration, maximum speed, and braking characteristics (Laboratory Report No. 43-112). The gross weight as tested was 62,400 pounds - 32,600 pounds less than the T14.

a. The vehicle accelerated in 5th gear with full throttle from 5.5 M.P.H. to 26.3 M.P.H. (maximum road speed) in 26 seconds. Acceleration characteristics are shown with those of the subject vehicle and the Russian Heavy Tank KB on Curve Sheet Number 43-135-3.

b. Approximately 65 feet were required in which to bring the M10A1 #2552 to rest from a road speed of 20 M.P.H. by full application of the brakes and with the vehicle in neutral gear. This distance may be compared with the 47.2 feet and 70.7 feet required for braking the Russian Heavy Tank KB and the T14 respectively.

SEC. IV DISCUSSION

1. Tractive resistance characteristics were determined by measuring the pull required to tow the T14 with the

Field Dynamometers M6 and M5 and a Dart tractor at nominal road speeds of 3, 6, 9, 12, 15, 18, 21, and 25 M.P.H. The test vehicle was towed in neutral gear and the pull required at each nominal road speed was measured and recorded by the rear hydraulic drawbar and the instruments located in the cab of the Dynamometer M6. Temperatures of the lubricants in the transmission and final drives were kept within their normal operating limits to avoid excessive drag of the power train gears and shafts in lubricants of high viscosity. These temperatures are recorded on the Tractive Resistance Data Sheets Numbers 43-135-4 & 43-135-8. Total track sag was 1.80 inches for the left and 2.15 inches for the right track.

2. To determine drawbar characteristics, the Field Dynamometer M6 and four power absorption trailers were towed by the T14 operating under full load, full throttle conditions at nominal engine speeds of 1000, 1400, 1800, 2200, 2400, and 2600 R.P.M. in 2nd and 3rd gears. Engine speeds were indicated by a calibrated tachometer driven from the engine tachometer take-off and were obtained by varying the load which the towed units applied to the test vehicle. Drawbar pulls were measured by the front hydraulic drawbar and recording instruments of the Dynamometer M6. The effect of governor action on maximum attainable engine speed was found to vary considerably depending on the loading of the engine. Governor interference, under full load operation, occurred approximately 200 R.P.M. below the no-load governed engine speed of 2900 R.P.M.

3. Fuel consumption characteristics were determined simultaneously with 2nd gear drawbar determinations and were obtained by measuring the time required for the engine of the test vehicle to use a metered quantity of fuel while operating under full load, full throttle conditions at several nominal road speeds. The specific gravity of the fuel used was determined for the ambient air temperature at the time of test (Tabulated Data Sheet Number 43-135-13) and specific fuel consumption computed from these values.

4. Acceleration characteristics were determined by starting the vehicle from rest and accelerating with full throttle (road load) through 2nd, 3rd, 4th, and 5th gears to maximum road speed. The time-distance relation was obtained with the Time-Distance Recorder and a trailing G.M. Fifth Wheel.

5. Maximum speed data were obtained with a G.M. Fifth Wheel speedometer which consists of a calibrated voltmeter actuated by a generator mounted on, and driven by, the trailing fifth wheel.

6. Braking characteristics were determined by measuring the distance required in which to bring the vehicle, in neutral gear, to rest from a road speed of 20 M.P.H. by full application of the steering brakes. Data were obtained with a trailing G.M. Fifth Wheel and pousometer.

7. To determine cooling characteristics, the Field

140

Dynamometer M6 and four power absorption trailers were towed by the T14 operating under full-load, full-throttle conditions in 2nd gear at nominal engine speeds of 1000, 1200, 1600, 2000, 2400, and 2700 R.P.M. Sufficient load was applied by the towed units to hold the test vehicle to the desired engine speeds until the observed temperatures became stabilized. Temperature data were obtained with a cablibrated potentiometer actuated by copper-constantan thermocouples. The thermocouple measuring ambient air temperatures was placed sufficiently far from the vehicle to prevent any radiated heat from affecting these data.

8. The power train gear ratios, and computed road speeds, at the governed engine speed of 2900 R.P.M. are listed below:

Power Train Gear Ratios

Transmission

1st Gear - 7.53 to 1
2nd Gear - 3.10 to 1
3rd Gear - 1.785 to 1
4th Gear - 1.108 to 1
5th Gear - 0.733 to 1

Bevel Set - 3.529 to 1
Final Drive - 3.57 to 1

Road Speeds at 2900 R.P.M. Engine Speed (0% Track Slippage)

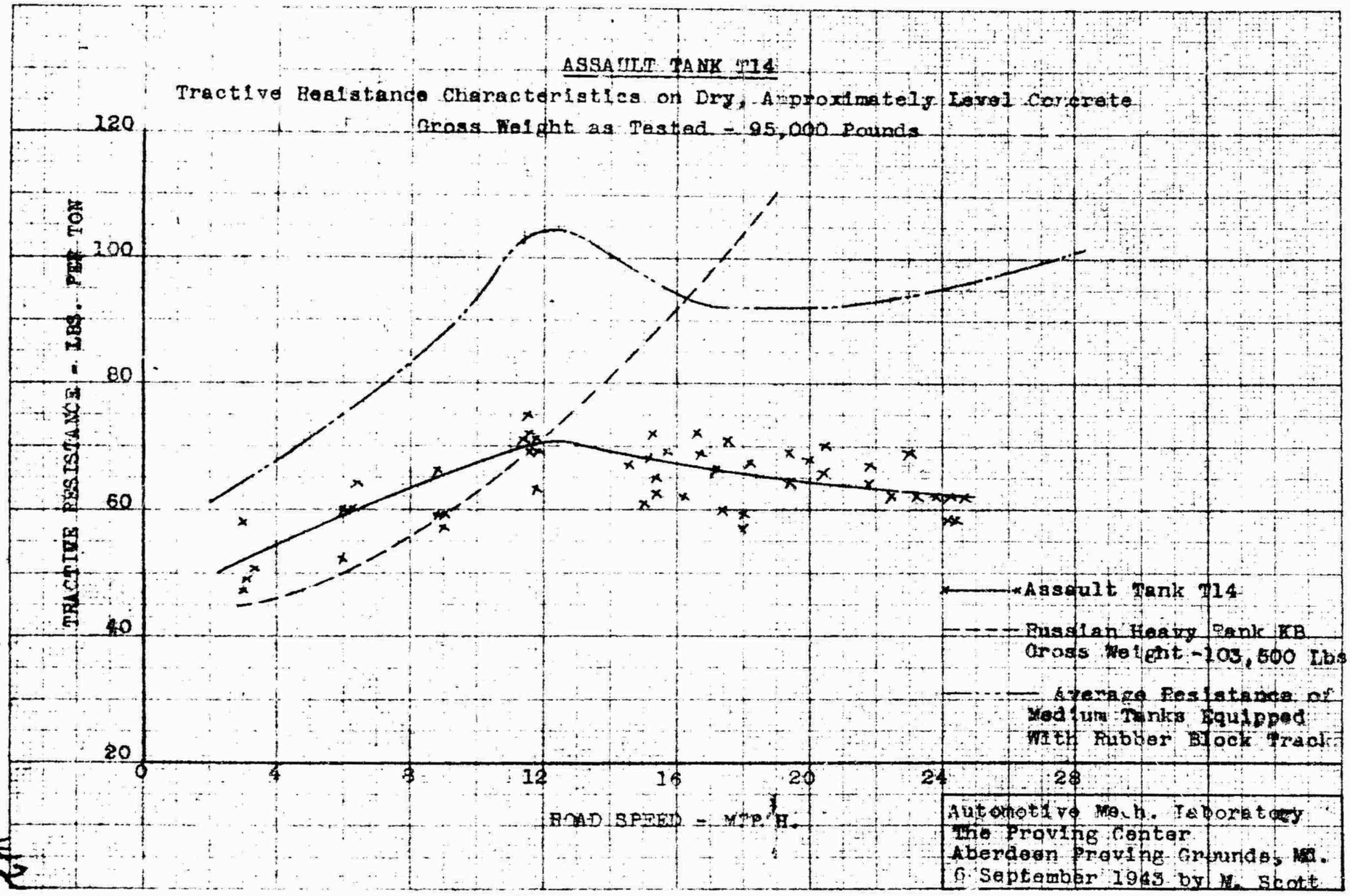
Transmission Gear	Road Speed, M.P.H.
1st	2.47
2nd	6.01
3rd	10.44
4th	16.81
5th	25.41

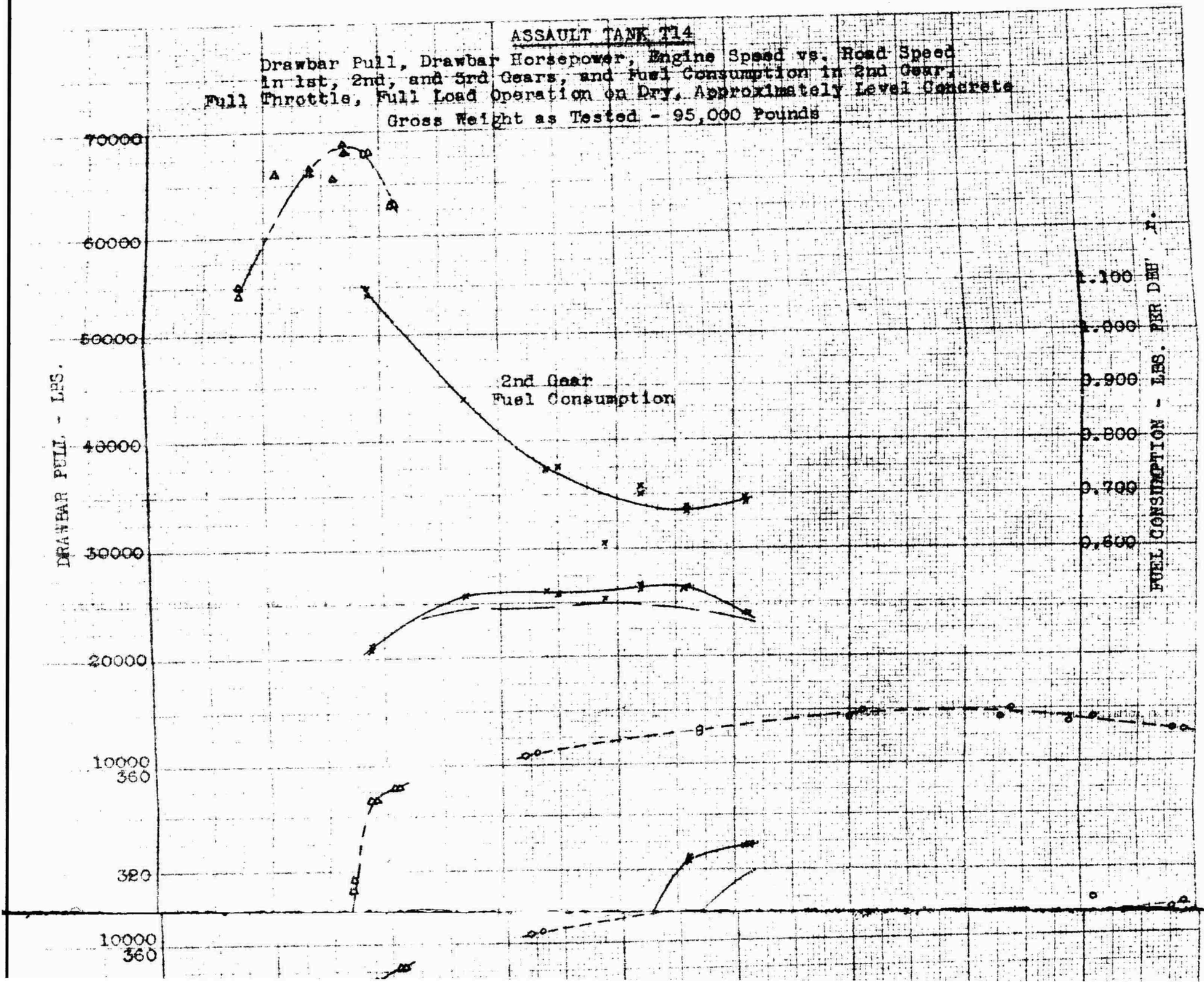
AUTHENTICATION

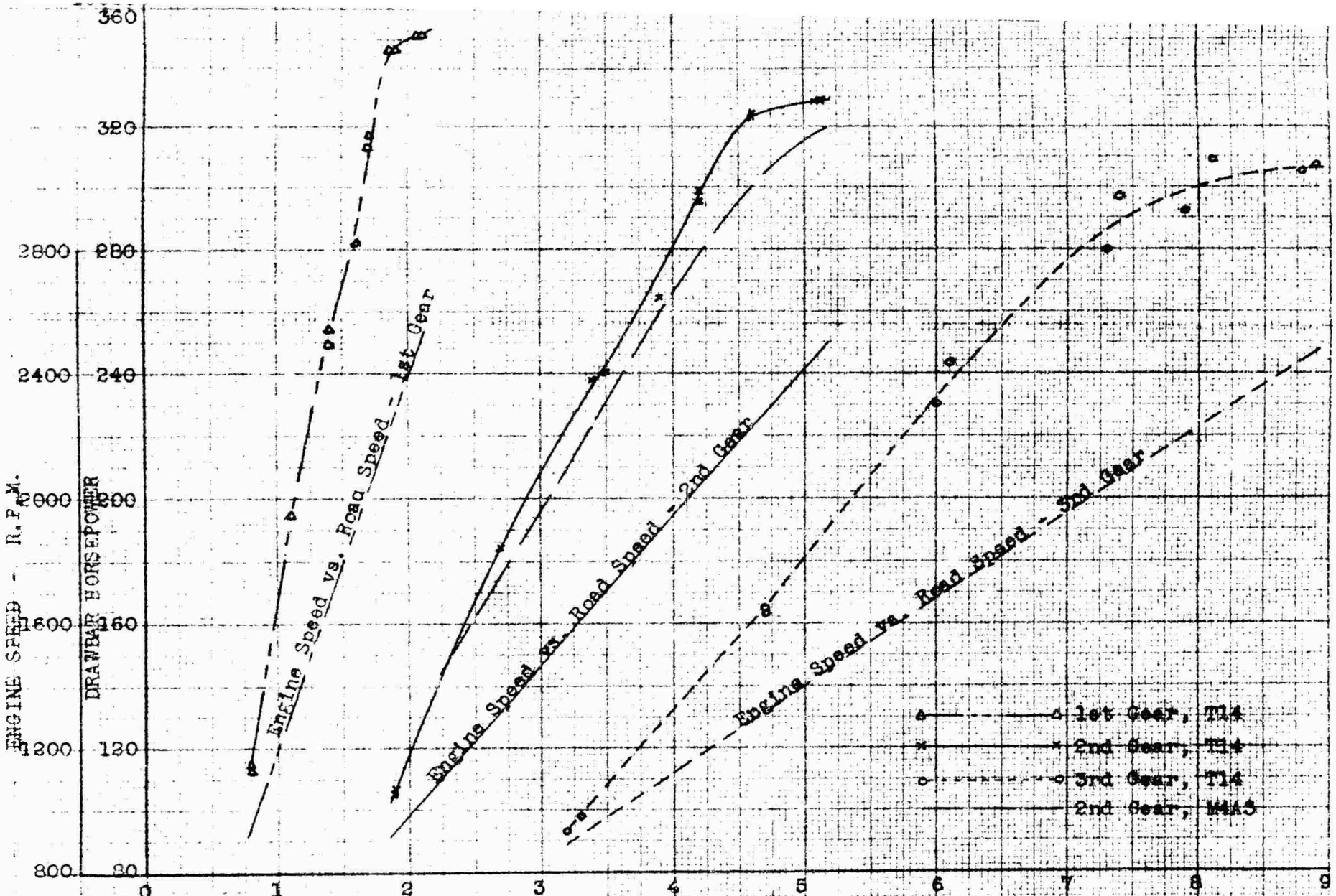
R. A. Ackerman
T/5, Ord. Dept.

C. S. McKenzie
Capt., Ord. Dept.
Chief, Mechanical
Laboratory Branch

W. M. Stephens
1st Lt., Ord. Dept.

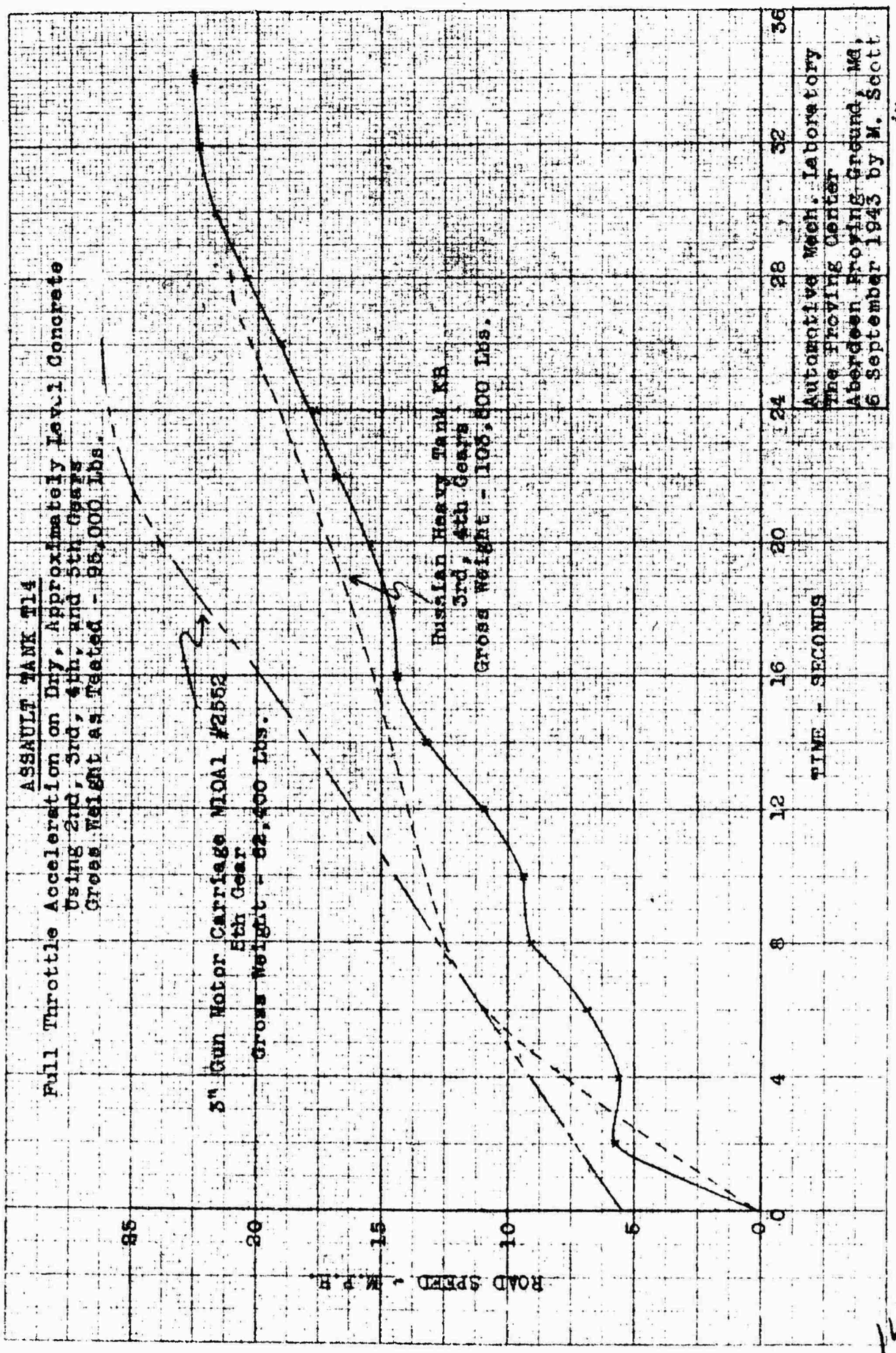

ASSAULT TANK T14
Tractive Resistance Characteristics on Dry, Approximately Level Concrete
Gross Weight as Tested - 95,000 Pounds
TRACTIVE RESISTANCE - LBS. PER TON
120
100
80
60
40
20
0
4
8
12
16
20
24
28
ROAD SPEED - MPH.
Assault Tank T14
Russian Heavy Tank KB
Gross Weight -103,500 Lbs.
Average Resistance of
Medium Tanks Equipped
With Rubber Block Track
Automotive Mech. Laboratory
The Proving Center
Aberdeen Proving Grounds, Md.
6 September 1943 by M. Scott


ASSAULT TANK T14
Drawbar Pull, Drawbar Horsepower, Engine Speed vs. Road Speed
in 1st, 2nd, and 3rd Gears, and Fuel Consumption in 2nd Gear,
Full Throttle, Full Load Operation on Dry, Approximately Level Concrete
Gross Weight as Tested - 95,000 Pounds
DRAWBAR PULL - LBS.
70000
60000
50000
40000
30000
20000
10000
360
320
10000
360
2nd Gear
Fuel Consumption
FUEL CONSUMPTION - LBS. PER DBH' Hr.
1.100
1.000
0.900
0.800
0.700
0.600



Sheet Number 43-135-2

RES...ICTED


ASSAULT TANK T14
Full Throttle Acceleration on Dry, Approximately Level Concrete
Using 2nd, 3rd, 4th, and 5th Gears
Gross Weight as Tested - 95,000 Lbs.
3" Gun Motor Carriage M10A1 #2552
Eth Gear
Gross Weight - 62,400 Lbs.
Russian Heavy Tank KB
3rd, 4th Gears
Gross Weight - 105,800 Lbs.
ROAD SPEED - M.P.H.
TIME - SECONDS
0
5
10
15
20
25
0
4
8
12
16
20
24
28
32
36
Automotive Mech. Laboratory
The Proving Center
Aberdeen Proving Ground, Md.
6 September 1943 by M. Scott

144

RESTRICTED

VEHICLE Assault Tank T-14 Gross wt. 95,000 pounds

COURSE Concrete DYNAMOMETER M-6

RUN NUMBER	DATE	TOTAL RESIST ANCE LBS	SPEED M.P.H.	D.B.H.P.	RESIST ANCE LBS PER TON	TEMPERATURE °F. AMBIENT	Transm.	Rt. Final Drive	Left E. Drive		REMARKS
C-4222	8/21/43	2305	3.1	19.1	49	81	118	118	118		North
4223		2830	6.3	47.5	60	81	118	118	118		"
4224		3125	8.8	73.3	66	82	118	119	118		"
4225		3425	11.6	105.9	72	80	119	119	118		"
4226		3550	11.6	109.8	75	80	119	120	119		"
4227		2775	3.0	22.2	58	84	119	120	119		"
4228		3060	6.2	50.6	64	83	120	120	119		"
4229		2420	3.3	21.3	51	80	119	120	120		South
4230		2455	6.0	39.3	52	80	120	121	120		"
4231		2780	8.8	65.2	59	80	122	121	120		"
4232		3370	11.8	106.0	71	81	122	121	121		"
4233		2990	11.8	94.1	63	81	121	122	121		"
4234		2210	3.0	17.7	47	81	122	120	121		"
4235		2870	6.0	45.9	60	81	121	120	121		"
4236		2820	9.0	67.7	59	81	120	120	119		North
4237		2685	9.0	64.4	57	81	120	120	119		"
4238		3300	11.7	103.0	69	80	118	118	116		"
4239		3260	11.7	101.7	69	80	118	118	116		"
4240		3360	11.6	103.9	71	80	118	118	116		"
4241		3070	15.4	126.1	65	84	124	123	120		South
4242		3000	15.4	123.2	63	84	125	123	122		"
4243		3300	15.7	138.2	69	84	125	124	122		"
4244		3175	14.5	122.8	67	84	125	124	122		North

ABERDEEN PROVING GROUND, MD
AUTOMOTIVE TEST. & RES. DIV.
DATE 6 September 1943

RESTRICTED

RESISTANCE TO TRACTION
DATA SHEET
SHEET NO. 43-135-4

RESTRICTED

VEHICLE Assault Tank T-14 Gross Wt. 95,000 lbs.

COURSE Concrete DYNAMOMETER M-6

RUN NUMBER	DATE	TOTAL RESISTANCE LBS	SPEED M.P.H.	D.B.H.P.	RESISTANCE LBS PER TON	TEMPERATURE °F AMBIENT	Trans.	Right F. Drive	Left F. Drive		REMARKS
C-4247	8/21/43	3280	16.7	146.1	69	87	128	127	125		North
4248		3130	17.1	142.7	66	87	128	127	125		"
4249		3440	16.7	153.2	72	87	128	127	125		"
4250		2710	17.9	129.4	57	87	128	127	125		South
4251		3035	19.4	157.0	64	84	130	129	127		"
4252		3190	18.1	154.0	67	84	130	129	127		"
4254		3300	19.5	171.6	69	84	130	129	127		"
4255		3230	20.0	172.3	68	84	130	129	127		North
4256		3335	20.4	181.4	70	86	131	130	128		"
4257		3145	20.4	171.4	66	86	131	130	128		"
4258		2950	24.6	193.5	62	86	131	130	128		"
4259		2930	24.2	189.1	62	85	132	130	128		"
4260		2750	24.3	178.2	58	85	132	130	128		South
4261		3275	23.0	200.9	69	85	134	132	130		"

46

ABERDEEN PROVING GROUND, MD
AUTOMOTIVE TEST. & REC. DIV.
DATE 6 September 1943

RESTRICTED

RESISTANCE TO TRACTION
DATA SHEET
SHEET NO. 43-135-5

RESTRICTED

TEST: Assault Tank T-14 Gross Wt. 95,000 lbs.

COURSE: Concrete DYNAMOMETER M-6

RUN NUMBER	DATE	TOTAL RESISTANCE LBS	SPEED M.P.H.	D.B.H.P.	RESISTANCE LBS PER TON	TEMPERATURE °F AMBIENT					REMARKS
C-4262	8/25/43	3210	15.2	130.1	68						
4263		3430	15.3	139.9	72						
4264		3395	17.5	158.4	71						
4265		2785	17.9	132.9	59						
4266		2935	23.9	187.1	62						
4267		2750	24.2	177.5	58						
4268		2940	23.2	181.9	62						
4269		2945	22.4	175.9	62						
4270		3030	21.8	176.1	64						
4271		3185	21.8	185.2	67						
4274		2890	15.0	115.6	61						
4275		2885	17.4	132.5	60						
4276		2945	16.1	126.4	62						

ABERDEEN PROVING GROUND, MD.
AUTOMOTIVE TEST & RES. DIV.
DATE 6 September 1943

RESTRICTED

RESISTANCE TO TRACTION
DATA SHEET
SHEET NO. 43-135-6

RESTRICTED

Form 4349
jr

FIELD DYNAMOMETER TESTS OF PRIME MOVERS
REPORT SHEET

Assault Tank T14

Gross Weight - 95,000 Lbs.

RUN NUMBER	DATE 1943	GEAR	ENG. SPEED R.P.M	% SLIP	D.B. PULL POUNDS	ROAD SPEED M.P.H	D.B.H.P.	LBS PER D.B.H.P HR.	TEMP °F	REMARKS Direction	VEH NO.	ENG. SPEED MEAN COUNTERS	ENG. SPEED TIME SECS	ACTUAL TRAVEL FEET	FUEL CONSUM. AMT. C.C.'S	FUEL CONSUM. TIME SECS.
CA-4198	8/20	2nd	925	0.5	20880	1.9	105.8	1.100		North						
4199	"	"	940	0.4	21200	1.9	107.4	1.088		"						
4200	"	"	1330	0.6	25620	2.7	184.5	0.878		"						
4201	"	"	1895	0.5	25420	3.9	264.4	0.611		"						
4202	"	"	1665	0.6	26260	3.4	238.1	0.749		"						
4203	"	"	1680	0.6	25740	3.5	240.2	0.752		"						
4204	"	"	2040	0.8	26700	4.2	299.0	0.706		"						
4205	"	"	2020	0.8	26360	4.2	295.2	0.715		"						
4206	"	"	2480	0.5	24160	5.1	328.6	0.685		"						
4207	"	"	2465	0.8	24160	5.1	328.6	0.691		"						
4208	"	"	2235	0.6	26420	4.6	324.1	0.672		"						
4209	"	"	2230	0.4	26360	4.6	323.3	0.679		"						
4210	"	3rd	915	0.8	11180	3.3	98.4			"						
4211	"	"	915	1.4	10920	3.2	93.2			"						
4212	"	"	1315	0.8	13020	4.7	163.2			"						
4213	"	"	1320	1.0	13120	4.7	164.4			"						
4214	"	"	1685	0.4	14400	6.0	230.4			"						
4215	"	"	1705	0.5	14980	6.1	243.7			"						
4216	"	"	2060	0.3	15060	7.4	297.2			"						
4217	"	"	2045	1.0	14360	7.3	279.5			"						
4218	"	"	2215	0.2	13860	7.9	292.0			"						
4219	"	"	2280	1.1	14320	8.1	309.3			"						
4220	"	"	2475	0.8	12940	8.9	307.1			"						
4221	"	"	2455	0.3	13000	8.8	305.1			"						

ABERDEEN PROVING GROUND, MD.
AUTOMOTIVE BRANCH

DRAWBAR PULL
DATA SHEET

DATE 6 September 1943

SHEET NO. 43-135-7

48

RESTRICTED

RESTRICTED

Form 4349
jr

FIELD DYNAMOMETER TESTS OF PRIME MOVERS
REPORT SHEET

Assault Tank T14 — Gross Weight - 95,000 Lbs.

RUN NUMBER	DATE 1943	GEAR	ENG. SPEED R.P.M	% SLIP	D.B. PULL POUNDS	ROAD SPEED M.P.H.	D.B.H.P	LBS PER D.B.H.P HR	TEMP °F	REMARKS	VEH. NO	ENG. SPEED MEAN COUNTERS	ENG. SPEED TIME SECS	ACTUAL TRAVEL FEET	FUEL CONSUM. AMT. C.C.'S	FUEL CONSUM. TIME SECS.
*	9/1	1st	925	0.5	54200	0.78	112.7									
			940	0.4	55000	0.78	114.4									
			1230	0.6	66900	1.11	195.1									
			1895	0.5	65700	1.61	282.1									
			1665	0.6	66700	1.40	249.0									
			1680	0.6	66300	1.44	254.6									
			2040	0.8	68900	1.73	317.8									
			2020	0.8	68900	1.73	313.7									
			2480	0.5	62800	2.10	351.7									
			2485	0.8	62800	2.10	351.7									
			2235	0.6	68300	1.90	346.1									
			2230	0.4	68200	1.90	345.5									

ABERDEEN PROVING GROUND, MD.
AUTOMOTIVE BRANCH

DRAWBAR PULL
DATA SHEET
SHEET NO 43-135-8

DATE 6 September 1943

RESTRICTED

149 * Data Computed from 2nd Gear Road Readings

jr

XXXXXXXXXXXX - ACCELERATION [illegible]

Assault Tank T14 Gross Weight - 95,000 Lbs.

6.85

Date of Test: 23 August 1943

	7384	7385	7386	7387	
0	0	0	0	0	0
2	5.76	5.90	5.43	5.85	5.7
4	4.96	5.39	5.34	6.69	5.6
6	5.85	7.75	6.60	6.84	6.8
8	8.85	9.36	8.80	9.55	9.1
10	9.17	9.88	9.27	9.27	9.4
12	10.53	11.70	10.56	10.62	10.9
14	13.01	13.53	13.15	13.11	13.2
16	14.32	14.56	14.18	14.72	14.4
18	14.93	14.32	14.72	14.39	14.6
20	15.77	15.21	14.95	15.59	15.4
22	17.32	17.04	16.05	16.64	16.8
24	17.55	18.14	17.13	17.78	17.7
26	18.91	19.54	18.25	19.54	19.1
28	20.78	20.17	19.85	20.90	20.4
30	22.84	21.15	20.94	21.65	21.6
32	22.84	21.41	21.93	22.98	22.3
34	22.84	21.41	22.84	22.98	22.5

3830
jr

Date: 25 August 1943 Sheet No.

Cooling Test Of: Assault Tank T14 (Gross Weight - 95,000 Lbs.) Operating at 1000 and 1200 R.P.M. Engine Speed (1.8 and 2.2 M.P.H. Road Speed) in 2nd Gear with Full Throttle and Full Load on Dry, Approximately Level Concrete

Temperatures - °F

Engine Speed	1000 R.P.M.									
Direction	North									
Time (Hours, Minutes)	10:10	:13	:16	:19	:22	:25	:28	:31	:37	:40
Thermocouple Position										
1. Oil, Transmission Drain Plug	95	100	100	100	100	102	104	104	104	104
2. Oil, Right Final Drive	96	96	95	96	98	98	98	98	98	98
3. Oil, Left Final Drive	96	96	96	96	98	98	98	99	98	98
4. Water, into Radiator	155	166	175	175	176	178	180	181	181	181
5. Water, out of Radiator	143	153	160	160	165	165	167	170	170	170
6. Air, into Engine Compartment	96	92	96	94	94	94	95	95	95	95
7. Air, out of Engine Compartment	142	153	155	159	163	164	164	165	166	166
8. Air, Ambient	96	94	94	94	93	93	94	94	94	94

Engine Speed	1200 R.P.M.				
Direction	North				
Time (Hours, Minutes	10:40	:43	:46	:49	:52
Thermocouple Position					
1. Oil, Transmission Drain Plug	105	106	104	104	105
2. Oil, Right Final Drive	100	99	99	99	99
3. Oil, Left Final Drive	100	99	99	99	99
4. Water, into Radiator	178	175	175	175	175
5. Water, out of Radiator	166	164	163	164	164
6. Air, into Engine Compartment	95	94	94	95	95
7. Air, out of Engine Compartment	163	160	159	160	160
8. Air, Ambient	94	94	94	94	95

Sheet Number 43-135-10

3830
jr

Date: 25 August 1943

Sheet No.

Cooling Test Of: Assault Tank T14 (Gross Weight - 95,000 Lbs.) Operating at 1600 and 2000 R.P.M. Engine Speed (2.9 and 3.7 M.P.H. Road Speed) in 2nd Gear with Full Throttle and Full Load on Dry, Approximately Level Concrete

Temperatures - °F

Engine Speed	1600 R.P.M.				
Direction	North				
Time (Hours, Minutes)	10:55	:58	11:01	:04	:07
Thermocouple Position					
1. Oil, Transmission Drain Plug	105	105	106	106	106
2. Oil, Right Final Drive	99	98	100	100	100
3. Oil, Left Final Drive	99	98	100	100	100
4. Water, into Radiator	175	175	175	175	175
5. Water, out of Radiator	164	165	165	165	165
6. Air, into Engine Compartment	95	94	95	95	95
7. Air, out of Engine Compartment	156	158	159	158	159
8. Air, Ambient	95	94	94	95	95

Engine Speed	2000 R.P.M.				
Direction	South				
Time	11:10	:13	:22	:25	:28
Thermocouple Position					
1. Oil, Transmission Drain Plug	110	110	115	115	115
2. Oil, Right Final Drive	103	103	105	106	106
3. Oil, Left Final Drive	103	103	106	106	107
4. Water, into Radiator	184	186	185	185	185
5. Water, out of Radiator	173	175	175	175	175
6. Air, into Engine Compartment	95	95	95	94	95
7. Air, out of Engine Compartment	165	167	166	166	165
8. Air, Ambient	94	94	90	94	95

152

Sheet Number 43-135-11

3830
jr

Date: 25 August 1943 Sheet No.

Cooling Test Of: Assault Tank T14 (Gross Weight - 95,000 Lbs.) Operating at 2400 and 2700 R.P.M. Engine Speed (4.5 and 5.0 M.P.H. Road Speed) in 2nd Gear with Full Throttle and Full Load on Dry, Approximately Level Concrete

Temperatures - °F

Engine Speed	2400 R.P.M.					2400 R.P.M.				
Direction	South					North				
Time (Hours, Minutes)	11:31	:34	:37	:40	:43	12:04	:07	:10	:13	:16
Thermocouple Position										
1. Oil, Transmission Drain Plug	117	117	117	119	119	122	122	122	122	122
2. Oil, Right Final Drive	106	110	110	111	112	116	116	116	116	116
3. Oil, Left Final Drive	107	110	110	111	112	116	116	116	116	116
4. Water, into Radiator	190	187	187	187	187	185	185	185	185	185
5. Water, out of Radiator	180	177	177	176	177	175	175	175	175	175
6. Air, into Engine Compartment	95	95	95	95	95	96	96	96	96	96
7. Air, out of Engine Compartment	170	168	166	164	164	160	160	160	160	160
8. Air, Ambient	95	95	95	95	95	96	96	96	96	96

Engine Speed	2700 R.P.M.				
Direction	South				
Time (Hours, Minutes)	11:46	:49	:53	:56	:59
Thermocouple Position					
1. Oil, Transmission Drain Plug	122	122	122	121	122
2. Oil, Right Final Drive	116	116	116	115	116
3. Oil, Left Final Drive	116	116	116	115	116
4. Water, into Radiator	184	185	187	185	186
5. Water, out of Radiator	173	175	177	175	176
6. Air, into Engine Compartment	96	96	96	97	96
7. Air, out of Engine Compartment	160	162	160	160	160
8. Air, Ambient	95	95	96	98	98

Sheet Number 43-155-12

Sheet Number 43-135-13

ABERDEEN PROVING GROUND, MD.

jr

DATE 24 August 1943

REF.

REPORT NO.

LAB. NO. 4266

AUTOMOTIVE LABORATORY

REPORT

of

DETERMINATION OF SPECIFIC GRAVITY OF
80 OCTANE GASOLINE AT 83°F

RESULTS

Specific Gravity at 83°F - 0.701

M. Rosenfeld
Associate Chemist

C. S. McKenzie
Capt., Ord. Dept.
Chief, Mechanical
Laboratory Branch

Observer: Sheets
Reported By: Sheets

154

BRAKING CHARACTERISTICS

Assault Tank T14

Gross Weight - 95,000 Pounds

23 August 1943

Run Number	Stopping Distance from 20 M.P.H. Road Speed
1	67.0 Feet
2	70.0 "
3	71.0 "
4	73.0 "
5	75.0 "
6	68.0 "
Average	71.0 Feet

APPENDIX "E"
CORRESPONDENCE

copy/aor RESTRICTED Project 1810/3-14-1

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE Tauss/cw
TANK AUTOMOTIVE CENTER
FISHER BUILDING
DETROIT, MICHIGAN

TAC. 451.25/4941
SPOMD-CC (KG-201)

APG. 451.21/374-289Z[107]

13 July 1943

Subject: Test of Assault Tank, T14.

To: The Director
The Proving Center
Aberdeen Proving Ground
Maryland

Attn: Automotive Division

1. The first pilot vehicle, Assault Tank T14 has been completed by The American Locomotive Company, Schenectady, N. Y. A number of minor modifications are now being made and as soon as these are completed, the vehicle will be shipped to Aberdeen Proving Ground. The shipping date will be on or about 16 July 1943, Shipping Order No. SPOMD-D 10-2461.

2. For your information this vehicle is a tank weighing approximately 47 tons and using Medium Tank M4 components wherever possible. The tracks and suspensions are similar to those used on the Heavy Tank M6. The vehicle can be readily identified by its low hull, steeply sloped front plate and the skirting plates covering the suspensions.

3. It is requested that this vehicle be tested in accordance with the following features of the T. S. T. P. 1935-709.

a. Feature 2 - Mechanical Inspection

b. Feature 5 - Determination of Center of Gravity

c. Feature 6 - Determination of Load Distribution and Ground Pressure

d. Feature 13 - Determination of Obstacle Crossing Ability

e. Feature 16 - Slope Operation

During the slope operation it is requested that tests be made of the Turret Traversing Mechanism while on the slope.

157

f. Feature 17 - Determination of Maximum and Minimum Speeds and Braking Characteristics

g. Feature 19 - Determination of Drawbar Pull, Acceleration, Fuel Consumption & Resistance to Traction

h. Feature 20 - Studies of Cooling

i. Feature 21 - Operation in Sand, Mud and Snow

j. Feature 22 - Firing Tests

k. Feature 23 - Continuous Operation Tests

l. Feature 24 - Operating Tests

m. Feature 27 - Preparation of Motion Picture Film

4. It is requested that the above tests be conducted as rapidly as possible so that the vehicle may be made available for Service Board tests at an early date.

By order of the Chief of Ordnance:

/s/ H. N. Brownson
Major, Ord. Dept.
for JOSEPH M. COLBY
Lt. Col., Ord. Dept.
Assistant

158

TAC 451.26/4941
3?OMD-CC (KG-201)
ARG 451.21/374-2892[107]

RESTRICTED

1st Ind.

Project #1810/3-14-1
Spinner/ss
Extension 5293

The Proving Center, Aberdeen Proving Ground, Maryland. 10 August 1943

To: Chief, Tank-Automotive Center, Fisher Building, Detroit, Michigan.
Attn: Development Branch, Major H. N. Brownson

1. The Assault Tank T14 has been thoroughly inspected at Aberdeen Proving Ground, as a result of which it is recommended that:

a. The turret basket be removed.

b. The 75 MM ammunition be stowed below the sponson level.

c. The engine compartment and/or the doors and air intake louvers above the engine compartment be redesigned in order to improve accessibility, and facilitate servicing and repair of the various components within the engine compartment, such as air cleaners, carburetors, cam shaft assemblies etc.

2. It is requested that Aberdeen Proving Ground be authorized to install the above modifications, which work would not appreciably curtail the tests to which the vehicle is now being subjected.

3. Major General A. E. Gatehouse of the British Army Staff, who inspected the vehicle 7 August 1943, agrees that the above modifications will greatly increase the combat efficiency of the vehicle.

4. Please return this letter for further indorsement.

For the Commanding General

Wm. H. Johnson
Col., Ord. Dept.
Chief, Automotive Division

19

COPY/vmc

RESTRICTED

Project #181C/3-14-1

Kolb/cma
4294

1st Memo. Ind.

Mobile Artillery Branch, The Proving Center, Aberdeen Proving Ground, Maryland, 16 August 1943.

To: Col. William B. Johnson, Chief, Automotive Division.
Thru: Lt. Col. John W. Cave, Chief, Arms & Ammunition Division.

1. As requested in the basic communication, the gun mount for the Assault Tank, T14, has been given a four round proof firing test, reference Firing Record M25557.

2. The mount was tested in accordance with and did meet the ballistic acceptance requirements of U.S. Army Specification (Proposed Draft) No. 60-82-3, dated 27 October 1942, and is recommended for acceptance.

STUART McLAIN
Lt. Col., Ord. Dept.
Chief, Mobile Artillery Br.,
Arms & Ammunition Division.

RESTRICTED

1810/3-14-1

RESTRICTED

COPY/jwn

TAC 451.25/4941
Attn: SPOMD/CC (KG-201) 107
APG 451.21/374-289Z

2nd Ind.

Tauss/cw
Ext. 279-10th Fl.

War Department, Army Service Forces, Office of the Chief of Ordnance, Tank Automotive Center, Union Guardian Bldg., Detroit (26) Michigan, 8 September 1943.

To: The Director, The Proving Center, Aberdeen Proving Ground, Maryland. Attn: Automotive Division.

1. In reference to paragraph 1, 1st Indorsement, it is unnecessary that the interior of the vehicle be reworked for the 75-mm ammunition. Should the T14 be put into production, it will undoubtedly be equipped with a larger gun than that which is now installed.

2. It is requested that the air cleaners be made more accessible either by cutting openings in the bulkhead or by relocating the cleaners. Further modifications to the engine compartment are not desired at this time since it is necessary that the vehicle be shipped to the Armored Board as soon as possible.

By Order of the Chief of Ordnance:

/s/ H. N. Brownson
H. N. BROWNSON
Major, Ord. Dept.
Assistant

161

RESTRICTED

Copy/vdk

Project 1810/3-14-1

RESTRICTED

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON, D.C.

Beasley/jk

O.O. 470.8/228 Tank (R)
ATTN: SPOTT
APG 451.21/374-289z108

Subject: Assault Tank T14

To: Director, The Proving Center
Aberdeen Proving Center, Md.

Attn: Capt. Persons

1. Copy of Memorandum, 30 July 1943, to Col. Colby, outlining the situation with reference to the test of the Assault Tank T14 is inclosed for your information. Please note last paragraph in which it is stated that any change in instructions will originate in the Development Branch, Tank-Automotive Center.

By order of the Chief of Ordnance:

/s/

G. M. BARNES
Major General, Ordnance Dept.
Chief, Technical Division

By: W. F. Beasley

1 Incl.
Cy. Memo 30 JUL 43

RESTRICTED

162

Copy/vdk Project 1810/3-14-1

RESTRICTED

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON, D.C.

Beasley/jk

O.O. 470.8/229 Tank (R)
ATTN: SPOTT
APG 451.21/374-289z108 Incl. 1

30 July 1943

MEMORANDUM FOR Chief, Development Branch
Tank-Automotive Center
Fisher Bldg., Detroit, Mich.

Subject: Assault Tank T14.

1. Reference is made to telephone conversation of this date between the undersigned, Col. Colby and Capt. Tauss, concerning the desire of the Army Ground Forces representatives of the Armored Command to expedite delivery of the Assault Tank T14 to the Armored Board. Reference is also made to 4th Indorsement from this office dated 29 July 1943, O.O. 400.3295/21567 England, forwarding correspondence on this subject.

2. Following receipt of the information obtained from Col. Wales that the Armored Command is desirous of obtaining the Assault Tank at Ft. Knox for comparative testing with the heavy tank as early as possible, a memorandum was written to Col. Borden covering this matter. This was discussed with Gen. Barnes, whose decision was as follows: "This tank should be tested at Aberdeen Proving Ground sufficiently to determine whether it is a reliable tank before shipment to Ft. Knox". Col. Wales suggested that some or all of the endurance test might be done at Ft. Knox. I personally believe that sufficient operation, in the neighborhood of 500 miles, should be accomplished at Aberdeen to establish reliability before shipment to Ft. Knox.

3. In telephone conversation with Capt. Tauss he suggested consideration of the installation of either the 76mm or 90mm gun turret on this vehicle. He also suggested that if this were accomplished at Ft. Knox it might expedite matters.

4. The above outline is included in this memorandum to give you a complete view of the situation up to this time. A copy of this memorandum is being forwarded to Capt. Persons at Aberdeen so that all concerned are fully conversant with the situation as of today. Any change in formal instructions to the proving ground should be initiated in your office so that all directives emanate from the same source.

For the Chief, Technical Division:

W. F. Beasley
Chief Engr., Tank & Motor
Transport Development Liaison Br.

163

copy/aor/fmb

RESTRICTED

Project 1810/3-14-1-1

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
TANK AUTOMOTIVE CENTER
FISHER BUILDING
DETROIT, MICHIGAN

Tauss/cw

10 August 1943

TAC 451.25/4951.1
SPOMD-CC (KG-201)

APG 451.21/374-289Z113

Subject: Test of Pilot Vehicles, Assault Tank T14

To: The Director
The Proving Center
Aberdeen Proving Ground
Maryland

Attn: Automotive Division

1. Shipping orders have been issued to American Locomotive Co. for the second pilot, Assault Tank T14 and it is expected that the vehicle will arrive at the Proving Center within the next few days, on S.O. SPOMD/D 10-2575.

2. It is desired that the tank be tested at the Proving Center sufficiently to determine its reliability before shipment to the United Kingdom. It is believed that 500 miles of operation will be satisfactory.

3. In accordance with O.O. No. 470.8/229 dated 30 July 1943, a copy of which was forwarded to his station, and in order to expedite shipment of the first pilot to Fort Knox, Ky. for Service Board Test, it is requested that the Firing Tests and 2,000 miles Operating Tests designated in the original directive TAC File No. 451.25/4951 dated 13 July 1943, be eliminated. These tests may then be conducted at Fort Knox with a proof officer from his station present as an observer.

4. It is further requested that rear fenders for the two (2) pilot vehicles be fabricated and applied at the Proving Center. Rear fenders are deemed necessary because of the excessive amount of mud thrown on the rear deck during cross-country operation.

By order of the Chief of Ordnance:

/s/ H. N. Brownson
Major, Ord. Dept.
for JOSEPH M. COLBY
Lt. Col., Ord. Dept.
Assistant

164

RESTRICTED

copy/aor/fmb Proj. 1810/3-14-1

AMER LOCO CO ROD BRANCH OFFICE SCDY NY

JULY 22, 1943 2125Z CLEMONS NMW TT 74

COMMANDING GENERAL

ABERDEEN PROVING GROUND

ABERDEEN, MD.

ONE PILOT TANK T14, OS. SPOMD-D 10-2461, SERIAL NO. 1, REGESTRATION NO. 3062372, HAS BEEN SHIPPED TO THE COMMANDING GENERAL, ABERDEEN PROVING GROUND, MARYLAND

ZIMMERMAN

7-2219

165

Copy/vdk Project 13-14-1

T & A CENTER ENG DEV BR DE113 26 JULY 1943 Z1492 NVB

THE DIRECTOR

THE PROVING CENTER

ATTN- AUTOMOTIVE DIVISION

ONE /1/ FORD GAZ ENGINE SHIPPED TO ABERDEEN THIS DATE. THIS ENGINE TO BE RETAINED AS SPARE FOR ASSAULT TANK T14. SND CITE SPGRD-CC /KO-201/ TAUSS/TT12616

COLBY

TANK AUTOMOTIVE CENTER

FISHER BLDG

ANC

7-2657

166

copy/fmb

Pyle/pjf
Ext. 153

1449/5-14-1

SPOMD-CC (KG-12-3)

28 July 1943

APG 451.21/878

Subject: Test of Modified Steering Cams with Thermoid BX-9 Grooved Brake Lining.

To: The Director
The Proving Center
Aberdeen Proving Ground
Maryland

Attn: Automotive Division (Col. W. B. Johnson)

1. Reference is made to the telephone conversation with Mr. Ray Wiles, Civilian Engineer, on 17 July 1943, pertaining to the test of Thermoid BX-9 grooved brake lining in the Light Tank M3A3 and Medium Tanks M3 and M4. During this conversation, the modification of steering cams now used in the Medium Tanks M3 and M3 differential was discussed, and it is requested that Aberdeen Proving Ground modify two (2) sets of cams in accordance with the attached Layout T.A.D.B. #12345. One set of the modified cams should be installed in the Medium Tank M4 with Thermoid BX-9 grooved brake lining, while the second pair should be set aside for installation in the pilot model of the Assault Tank T14 when it arrives at the proving ground.

2. The layout of the steering brake installation T.A.D.B #12345 shows the proposed installation of the modified cam, which if positioned correctly, should give a brake equivalent to the Chrysler single anchor brake. Shown on the overlay in dotted lines is an outline of the standard cam setting and it is to be noted that the pin center joining the lower band to the cam results in an angle of approximately 30° to the vertical. When the brakes are applied and the brake lining contacts to the drum, the resultant force, due to the rotation of the drum, tends to release the brake and this force is transmitted back to the steering levers, resulting in difficult steering. By modifying the cams to secure clearance and interchanging the right and the left cams in the differential housing, the pin center attaching the lower band to the cam is then held in a near vertical position. When the brake is applied the resultant force is carried by the cam bearings and not transmitted back through the steering linkage, which will result in a decided reduction in steering effort.

3. It is requested that the test of these modified cams be a part of the project "Test of Thermoid BX-9 Grooved Brake Lining", and this test installation made at an early date. The feasibility of making this modification in the field, as well as performance in steering and braking characteristics of the tank be commented upon, as it is intended to correct a second pilot of the Assault Tank T14 prior to its shipment.

167

Subject: Test of Modified Steering Cams with Thermoid BX-9 Grooved Brake Lining

28 July 1943

To: Automotive Division (Col. W. B. Johnson)

By order of the Chief of Ordnance:

JOSEPH M. COLBY
Lt. Col., Ord. Dept.
Assistant

1 Incl. - T.A. D.B. Drawing #12345

168

copy/aj/fmb

Project 3-14-1

T-51

WA270

TAO WDT B 35 NC WD

T&A CENTER DETROIT NOV 13 1943 2114Z WH TT 97813

TO THE DIRECTOR

THE PROVING CENTER A P G MD

ATTN AUTOMOTIVE DIV

SIX /6/ FAN BELTS FOR ASSAULT TANK T14 SHIPPED PARCEL POST FROM GATES RUBBERT CO TWO /2/ TACHOMETER CABLES FROM STEWART WARNER TO BE SHIPPED 15 NOV END SPOMD/CC TAUSS TT 97813

COLBY

11-1270

169

Project #3-14-1-1/Spinner
17 November 1943

5293

Combat Vehicle Branch Automotive SPOTZ-R

Ordnance Research Center, Aberdeen Proving Ground, Maryland

ARMY SERVICE FORCES
CHIEF, TANK-AUTOMOTIVE CENTER
UNION GUARDIAN BUILDING
DETROIT, MICHIGAN

ATTENTION: CAPT. W. TAUSS
DEVELOPMENT BRANCH

N. G. McLean
Capt.Ord.Dept.

SPOMD ASSAULT TANK T14 #2 READY FOR SHIPMENT. REQUEST SHIPPING INSTRUCTIONS

END SPOTZ-R SPINNER.

EDDY DIRECTOR ORDNANCE RESEARCH CENTER

170

copy/aj/fmb

Project 3-14-1

TT 83

FROM ZIMMERMAN AM LOCO CO ROD BRANCH OFC SCDY NY 111531Z NOV 1943

TO DIRECTOR OF PROVING CENTER A.P.G. ATTN LT. DOUGLAS

SPARE PARTS REQUESTED FOR T-14 TANK. FAN BELTS B261265 REV. 1 AND FLEXIBLE SHAFT TACHOMETER B261598 HAVE BEEN ORDERED BY CAPT. TAUSS OF T.A.C. AND HAVE BEEN SHIPPED BY VENDOR. END CITE MC CARTHY 111548Z

NMW

11-989

171

11 December 1943

5293

Combat Vehicle Branch Automotive SPOTZ-R
Ordnance Research Center, Aberdeen Proving Ground, Maryland

ARMY SERVICE FORCES
CHIEF, TANK-AUTOMOTIVE CENTER
UNION GUARDIAN BUILDING
DETROIT, MICHIGAN

ATTN: CAPT. W. TAUBS
DEVELOPMENT BRANCH

ASSAULT TANK T14 #2 BEING SHIPPED TO CHESTER TANK DEPOT 11 DECEMBER 1943.

END SPOTZ-R SPINNER

EDDY DIRECTOR ORDNANCE RESEARCH CENTER

172

UNCLASSIFIED

16 Dec. 1943

2293

Combat Vehicle Br., Automotive Division

SPOTZ-R

Ordnance Research Center, Aberdeen Proving Ground, Md.

Chief, Tank-Automotive Center
Union Guardian Building
Detroit 26
Michigan

x

ATTN; Development Branch
Capt. W. Tauss

SPINNER/fmb

ASSAULT TANK T14 #1 SHIPPED TO FORT KNOX, KENTUCKY 16 DECEMBER 1943.
END SPINNER SPOTZ-R

EDDY DIRECTOR ORDNANCE RESEARCH CENTER

UNCLASSIFIED

173