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Rock Island Arsenal Laboratory



TECHNICAL REPORT

INTERIM REPORT OF THE DEVELOPMENT OF A
VEHICLE CORROSION PREVENTIVE -
DETROIT AREA FIELD TEST

By

HARRY C. MUFFLEY

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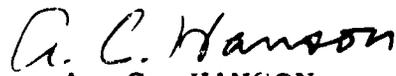
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INTERIM REPORT OF THE DEVELOPMENT OF A
VEHICLE CORROSION PREVENTIVE -
DETROIT AREA FIELD TEST

By


Harry C. Muffley

Approved by:


A. C. HANSON
Laboratory Director

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Rock Island Arsenal
Rock Island, Illinois

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ABSTRACT

A field test was devised for the evaluation of vehicle corrosion preventives in the Detroit area. Seven compounds were selected and applied to 21 vehicles by means of an airless spray unit. A procedure for processing vehicles used in the field test was developed. This included inspections during the various stages of processing, cleaning techniques and the application of the vehicle corrosion preventives. The procedure also indicates when to use prepared data sheets for recording observations made during the different steps of processing. Photographs of specific areas of interest on the vehicles were made and the location noted on the data sheet. Future inspections of the vehicles will be made in April and November 1964 and April 1965.

INTERIM REPORT OF THE DEVELOPMENT OF A
VEHICLE CORROSION PREVENTIVE -
DETROIT AREA FIELD TEST

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INTERIM REPORT OF THE DEVELOPMENT OF A
VEHICLE CORROSION PREVENTIVE -
DETROIT AREA FIELD TEST

OBJECT

To determine whether the various vehicle corrosion preventives will provide satisfactory protection for vehicles when exposed to the corrosive environment usually found in the course of winter driving in the Detroit area.

To develop a detailed procedure for cleaning vehicles prior to the application of a vehicle corrosion preventive.

To develop a technique for applying various vehicle corrosion preventives.

INTRODUCTION

The growing cost of maintenance of vehicles due to body rust out has prompted the Army Materiel Command to investigate the use of vehicle corrosion preventives, hereafter referred to as VCP. This increased cost of maintenance, particularly to operators of vehicle fleets, is reflected in the replacement of body parts, downtime, work delay, and overtime pay. Every vehicle has areas vulnerable to corrosion. Many of these areas where corrosion can take place are on interior structural portions of the body. Here corrosion can progress unobserved until extensive damage has been done.

In the past few years several different types of VCP compounds have appeared on the market which are referred to in a general manner as "petroleum base" compounds. This is in contrast to the conventional underbody coating, TT-C-520a, which is basically asphalt with asbestos fiber.

In order to evaluate these commercial materials from a practical standpoint a field test was devised. Seven compounds of various basic types were selected for field testing on the basis of results obtained from laboratory bench tests. The Detroit area was the logical place to conduct such a field test since Army Tank Automotive Center had a large number of vehicles available in its motor pool, plus the fact that large quantities of salt are used for de-icing purposes during the winter months in this area.

This interim report covers the initial phase of the field test. Additional reports governing subsequent inspections will be forthcoming. A final report will encompass the entire program including the laboratory evaluation, the Detroit field test and a Rock Island Arsenal field test.

PROCEDURE

Vehicles used for the field test were processed in the same manner according to the "General Procedure For Testing Vehicles With Vehicle Corrosion Preventives", Appendix A. This procedure indicates stepwise when to make inspections, clean vehicles, apply VCP, etc. In conjunction with this procedure a set of data sheets, Appendix B, was used to record observations made at the various stages of the procedure.

Vehicles were cleaned as directed by the "Procedure A, Cleaning Procedure For Vehicles", Appendix C, with the following modifications:

1. Vehicles were raised with a fork lift, therefore, only one end of the vehicle could be cleaned at a time.
2. The heavy accumulation of dirt was removed with a screw driver.
3. All vehicles were steam cleaned followed by rinsing with hot water.
4. Vehicles were dried by means of heat lamps as well as compressed air.

Three vehicles were washed in succession in order to provide a longer drying time before the application of VCP.

Each compound being evaluated was applied by means of an airless spray unit to three vehicles. The vehicles employed included 8 sedans, 5 station wagons, 6 pickup trucks and 2 carryalls, making a total of 21 vehicles. The compounds were applied according to "Procedure B, Application of Vehicle Corrosion Preventives", Appendix D. From the experience gained in treating the 21 vehicles it was found that the roto clean spray nozzle was good for applying compound to the large unobstructed areas such as, splash panels, wheel wells, floor pans, gas tanks, etc. The short curved wand was used for touching up areas missed with the roto clean nozzle, small hard to-get-to spaces, fender beads, etc.

Specific areas of interest on the vehicles were photographed and the locations noted on the data sheet. These data sheets will be used and additional photographs made during the periodic inspections that follow in April and November 1964 and April 1965.

The estimated cost of processing a sedan or a small pickup truck in the Detroit Field Test figuring material and labor was \$21.00. This allows approximately \$2.00 for material per vehicle and labor was calculated at \$3.51 an hour plus 5% an hour adjustment for night work. Station wagons and carryalls were processed for \$25.00 to \$30.00. These vehicles required more time and material due to their complexities and size.

In the future it is suggested that all new vehicles purchased by the Government should be treated with a vehicle corrosion preventive before they are put into service. This would substantially cut the cost of treating vehicles by eliminating the cleaning procedure plus the fact that corrosion will not have had the opportunity to progress to any great extent.

APPENDIX A

Rock Island Arsenal Laboratory

8 January 1964

**GENERAL PROCEDURE FOR TESTING VEHICLES
WITH VEHICLE CORROSION PREVENTIVE**

1. Receipt of vehicle. (General information data sheet)
2. Vehicle will be inspected prior to cleaning and observations recorded. (Data Sheet A)
3. Vehicle will be cleaned according to the suggested cleaning procedure. (Procedure A). Pertinent information on the cleaning process will be recorded. (Cleaning data sheet and Data Sheet B)
4. Inspection of the vehicle will follow the cleaning and observations recorded. (Data Sheet C)
5. Vehicle will be inspected just prior to applying the coating. Any additional comments will be added to Data Sheet C.
6. The coating of VCP shall be applied according to the procedure provided. (Procedure B) Facts pertinent to the application will be recorded. (Application data sheet and Data Sheet D)
7. Inspection of the vehicle after coating will be reported. (Data Sheet E)
8. The vehicle will be inspected just prior to release for use and comments added to Data Sheet E.
9. Vehicles will be inspected during the later part of April 1964 and findings recorded. (Data Sheet F)
10. Vehicles will be inspected during the month of November 1964 and findings recorded. (Data Sheet G)
11. Vehicles will be inspected during the month of April 1965 and the findings recorded. (Data Sheet H)

APPENDIX B

TEST PRODUCT & VEHICLE IDENTIFICATION

1. Product Identification:

Manufacture _____ Brand Name _____
Size of Sample _____ VCP No. _____
Date Received _____ Where Received _____

2. Vehicle Identification:

Make _____ Year _____ Model _____
Vehicle No. _____

A. General Condition of Vehicle on Receipt:

Age _____ Date _____

Undercoating (if any):

Appearance:

Major Use:

B. Itemized Condition of Vehicle (See Data Sheet A)

Remarks:

APPENDIX B

TEST PRODUCT & VEHICLE IDENTIFICATION

1. Product Identification:

Manufacture _____ Brand Name _____
Size of Sample _____ VCP No. _____
Date Received _____ Where Received _____

2. Vehicle Identification:

Make _____ Year _____ Model _____
Vehicle No. _____

A. General Condition of Vehicle on Receipt:

Age _____ Date _____

Undercoating (if any):

Appearance:

Major Use:

B. Itemized Condition of Vehicle (See Data Sheet A)

Remarks:

CHECK POINTS

A

Item	REMARKS		Photographed
	Coating	Vehicle	
Rear door pillar, right			
left			
Boxed channels under floor, right			
left			
Body floor pan, right			
left			
Splash panel, front			
rear			
Taillight, right			
left			
Gasoline tank			

A

DATA SHEET FOR CLEANING OF VEHICLE

1. Vehicle No. _____ Model _____
VCP No. _____ Date Cleaned _____
2. Method of Cleaning _____
3. Degree of Cleaning:
 - (a) Condition Before Cleaning: (See Data Sheet A)
 - (b) Details of Cleaning Procedures: (See Data Sheet B)
 - (c) Condition After Cleaning: (See Data Sheet C)
4. Equipment Used _____
5. Pressures Used, psig. _____
6. Temperature of Water or Steam, °F. _____
7. Temperature, Room, °F. _____
8. Time Elapsed Between Final Cleaning and Product Application _____
9. Remarks:

DATA SHEET FOR VCP FIELD TEST OBSERVATIONS

1. Vehicle No. _____ Mileage Reading _____ Date _____
2. Time of Inspection _____ VCP# _____
3. Remarks (Usage, Wash Jobs, Repairs, Down Time)

Item	CHECK POINTS		B
	REMARKS		Photographed
	Coating	Vehicle	
Fender, right, front			
rear			
left, front			
rear			
Headlight area, right			
left			
Rocker panel, right			
left			
Door panel, right, front			
rear			
left, front			
rear			
Door Post, center, right			
left			

CHECK POINTS

B

Item	REMARKS		Photographed
	Coating	Vehicle	
Rear door pillar, right			
left			
Boxed channels under floor, right			
left			
Body floor pan, right			
left			
Splash panel, front			
rear			
Taillight, right			
left			
Gasoline tank			

B

DATA SHEET FOR VCP FIELD TEST OBSERVATIONS

1. Vehicle No. _____ Mileage Reading _____ Date _____
2. Time of Inspection _____ VCP# _____
3. Remarks (Usage, Wash Jobs, Repairs, Down Time)

Item	CHECK POINTS		Photographed
	REMARKS		
	Coating	Vehicle	
Fender, right, front			
rear			
left, front			
rear			
Headlight area, right			
left			
Rocker panel, right			
left			
Door panel, right, front			
rear			
left, front			
rear			
Door Post, center, right			
left			

C

CHECK POINTS

C

Item	REMARKS		Photographed
	Coating	Vehicle	
Rear door pillar, right			
left			
Boxed channels under floor, right			
left			
Body floor pan, right			
left			
Splash panel, front			
rear			
Taillight, right			
left			
Gasoline tank			

C

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DATA SHEET FOR APPLICATION OF VEHICLE CORROSION PREVENTIVE

1. Vehicle No. _____ VCP No. _____ Date Applied _____
2. Product Identification:
Manufacture _____ Brand Name _____
3. Equipment used:
4. Ambient Air Temperature, °F:
5. Air Pressure, psig.:
6. Condition Before Application: (See Data Sheet C)

Details of Application: (See Data Sheet D)

Condition After Application: (See Data Sheet E)
7. Time Elapsed Between Application and Use:
8. Film Thickness:
9. Condition of Coating (adhering, dripping, voids, etc.):
10. Coverage Obtained:
11. Quantity Used:
12. Remarks:

DATA SHEET FOR VCP FIELD TEST OBSERVATIONS

1. Vehicle No. _____ Mileage Reading _____ Date _____
2. Time of Inspection _____ VCP# _____
3. Remarks (Usage, Wash Jobs, Repairs, Down Time)

Item	CHECK POINTS		D Photographed
	REMARKS		
	Coating	Vehicle	
Fender, right, front			
rear			
left, front			
rear			
Headlight area, right			
left			
Rocker panel, right			
left			
Door panel, right, front			
rear			
left, front			
rear			
Door Post, center, right			
left			

CHECK POINTS

D

Item	REMARKS		Photographed
	Coating	Vehicle	
Rear door pillar, right			
left			
Boxed channels under floor, right			
left			
Body floor pan, right			
left			
Splash panel, front			
rear			
Taillight, right			
left			
Gasoline tank			

D

DATA SHEET FOR VCP FIELD TEST OBSERVATIONS

1. Vehicle No. _____ Mileage Reading _____ Date _____
2. Time of Inspection _____ VCP# _____
3. Remarks (Usage, Wash Jobs, Repairs, Down Time)

Item	CHECK POINTS		E Photographed
	REMARKS		
	Coating	Vehicle	
Fender, right, front			
rear			
left, front			
rear			
Headlight area, right			
left			
Rocker panel, right			
left			
Door panel, right, front			
rear			
left, front			
rear			
Door Post, center, right			
left			

CHECK POINTS

Item	REMARKS		Photographed
	Coating	Vehicle	
Rear door pillar, right			
left			
Boxed channels under floor, right			
left			
Body floor pan, right			
left			
Splash panel, front			
rear			
Taillight, right			
left			
Gasoline tank			

APPENDIX C

Rock Island Arsenal Laboratory

8 January 1964

PROCEDURE A

CLEANING PROCEDURE FOR VEHICLES

The purpose of this suggested procedure is to describe the method of cleaning and note the areas of the vehicle which are involved.

The various designs of vehicle bodies and under-structures make a rigid procedure impractical. Experience with the various types of vehicles will determine the best procedure for a particular vehicle. The variations should be entered on the cleaning sheet - Data Sheet B.

The following procedure is suggested:

1. Move vehicle into position on lift.
2. Close all windows, vents and doors.
3. Wear goggles for eye protection.
4. Raise vehicle to effective working level to remove wheels.
5. Remove wheels.
6. Cover brake drum and brake backing plate assembly with plastic covers.
7. Raise vehicle to effective working level.
8. Start cleaning vehicle from front working toward the rear. (Suggested order: front splash panel, headlights area, front fenders, panels and supporting members, fender beads, floor pans, rocker panels, quarter panels, gasoline tank, tail and back-up light area and rear splash panel). Use wire brush, putty knife, screw driver, rubber hammer or improvised tools to remove the heavy accumulation of dirt. Remove heavy deposits of rust, loose undercoating, mud, gravel and foreign material paying particular attention to clean seams, welds and corners.

9. After mechanically removing the heavy accumulation of dirt, wash the entire underbody of the vehicle and chassis using the technique that most effectively cleans the vehicle, such as, water, high pressure water, air and water or steam.
10. Remove as much water from the vehicle as possible by blowing with compressed air.
11. Vehicle should then be inspected and information entered on Data Sheet C.
12. Lower vehicle to effective working level to replace wheels.
13. Remove plastic from brake drum and brake backing plate assembly.
14. Replace wheels.
15. Lower vehicle to floor and put aside to dry before applying protective coating. The next vehicle may be cleaned during this time.

APPENDIX D

Rock Island Arsenal Laboratory

8 January 1964

PROCEDURE B

APPLICATION OF VEHICLE CORROSION PREVENTIVE

This application procedure is suggested in order to indicate the method of coating and the areas of the vehicle which are involved.

As a general rule only sheet metal areas should be treated with vehicle corrosion preventive. The various designs of vehicle bodies and understructures make a rigid procedure impractical. Experience with the various types of vehicles will determine the best procedure for a particular vehicle. Information pertinent to the application of the coating will be entered on the application data sheet and Data Sheet D. The following procedure is suggested, however, the sequence of the steps may be altered to facilitate application:

1. Move vehicle into position on lift.
2. Close all windows, vents and doors.
3. Cover vehicle with drop cloth and vehicles in adjoining areas.
4. Wear goggles for eye protection.
5. Raise vehicle to effective working level to remove wheels.
6. Remove wheels.
7. Cover brake drums and brake backing plate assembly with plastic cover.
8. Raise vehicle to effective working level of underside.
9. Inspect vehicle and record observations on Data Sheet C.
10. Adjust spray gun to obtain optimum coating.

11. Splash panel, front - Using roto-clean spray nozzle, apply coating paying particular attention to the seams, welds and corners (this applies to all areas).

12. Headlight area - Some vehicles may be so constructed that access to this area will be easier from above when the vehicle is on the floor. In some cases access holes may be present or it may be necessary to remove the headlights. The short curved wand may be used to advantage here.

13. Fenders, front, right and left - Using roto-clean spray nozzle treating surface of fender well, fender bead and heavy splash areas. Coat baffles and supporting members.

14. Rocker panels, right and left - Some vehicles will have access holes at each end, remove plugs and insert long straight wand as far as it will go. Spray continuously as you withdraw wand. Replace plugs; if not vented wait until dry. Vehicles with openings in the bottom of rocker panels, insert short curved wand and spray in the same manner. If access cannot be gained by either of the above mentioned ways, 1/2 inch holes should be drilled* in the bottom of the panels and the area treated with a short curved wand. Check drain holes when completed to be sure they are open.

15. Quarter panels, right and left - Access to this area may be through an inspection plug near the bottom of the panel. Care must be taken as this may be an open panel and excessive spraying could result in material penetrating the trunk area. On some vehicles this area may be treated from inside the trunk, in other cases 1/2 inch holes may need to be drilled* in the rear door pillar high enough to clear the inner wheel housing. This hole should be located where the two panels diverge enough to provide room to insert the short curved wand. Plug holes when completed.

*Caution: Always punch pilot hole before using electric drill.

16. Fenders, rear, right and left - Treat the same as front fenders. Access to part of the rear fender may be possible through the trunk when the vehicle is on the floor. Be sure to coat the fender bead.
17. Tail and back-up light area - right and left - If this area is not accessible from underneath, it may be reached through the trunk when vehicle is on the floor.
18. Floor pan, right and left - Spray from front fenders back using roto-clean spray nozzle. Do not apply preservative coating to engine, oil pan, transmission, drive shaft, shock absorbers, axle bumper blocks, steering linkage, muffler, tailpipe, brake drums, brake backing plates, parking brake linkage or gas tank vent tube.
19. Structural members - In a unitized or semi-unitized body boxed frame members are usually used. These areas should be thoroughly treated inside and out because of their contact with the body surface. Small but similar members welded to the floor pan should also be treated inside and out. Access to these areas may be gained through gage and drain holes already present. The short curved wand should be used for spraying the inside of these areas.
20. Gas tank - Apply coating to tank, both upper and lower sides.
21. Splash panel, rear - Treat in the same manner as front splash panel.
22. Inspect the underside of the vehicle to be sure all areas accessible from this side have been properly treated. Check all inspection holes and drilled holes to be sure all plugs have been installed.
23. Lower vehicle to effective working level to replace wheels.
24. Remove plastic covers and replace wheels.
25. Lower vehicle to floor for remainder of the treatment.

26. Door post, center, right and left - (Four -door models) - It may be necessary to drill* a 1/2 inch hole in the post not more than eight inches up from the rocker panel. If door post is concealed when the doors are closed the hole may be made on the outside surface. If not concealed, the holes should be made from the back side, so the hole will not show. Insert short curved wand in a downward direction and spray.
27. Door pillar, front, right and left - Treatment of the front door pillar may be possible through the door hinge openings. If not, drill 1/2 inch hole approximately eight inches from the bottom of the pillar. Insert short curved wand in a downward direction. This opening, in some cases, will provide access to the area behind the front fender and baffle.
28. Door pillar, rear, right and left - If this area is not accessible from the trunk, drill a 1/2 inch hole in a non-critical structural area of the post. The hole should be located where the two panels diverge enough to provide room to insert the short curved wand in a downward direction.
29. Doors, front and rear, right and left - On some vehicles plugged inspection holes can be used, if none available, 1/2 inch holes must be drilled. Check drain holes in bottom edge of door to be sure water has drained from door. Hole should be located in each door end panel approximately six to eight inches from the bottom. Insert long straight wand to treat the lower door panel area. Direct spray downward to prevent compound from reaching window regulator and to insure complete coverage of the critical areas inside the door. Plug all holes. Check drain holes to be sure they are open.
30. Miscellaneous Areas
- a. Trunk lid lower rear bead - Insert short curved wand through the existing holes in the trunk lid and spray the trailing edge.

*Caution: Always punch pilot hole before using electric drill.

b. Tailgate of station wagons - If holes are not available, drill a 1/2 inch hole in each side of the tailgate six to eight inches from the bottom. Insert long straight wand and spray the bottom area of the tailgate. Keep coating off window track and operating mechanisms.

31. Inspect the vehicle to be sure all areas have been treated. Check all inspection holes and drilled holes to be sure all plugs have been installed. Use a clean cloth and solvent to remove any compound that may have lodged on the chrome or body finish.

32. Light trucks are treated in a manner very similar to passenger cars, however, certain differences in body construction creates additional points which require attention.

a. Doors - Many will have a removable metal access plate in the inner panel. Vehicle corrosion preventive can be sprayed inside the door and no holes need be drilled. Be sure the metal access plate is sealed when reinstalled, to prevent rain from leaking through the door.

b. Doors, rear - Compound shall be sprayed into the lower portion of rear doors. If holes are not available, drill a 1/2 inch hole in each vertical edge of the door and coat the lower portion.

c. Inner panels - (Separating the cargo compartment from the outside of the truck) - If the inner panels do not extend to the full height of the body, the compound can be sprayed from the top edge downward. In some cases 1/2 inch holes will need to be drilled six to eight inches from the bottom in the inner panel between all the vertical braces. Insert the short curved wand and spray the lower portion of this area.

d. Rear body skirt - Spray this area from underneath. Examine this area for hollow sections, which need to be coated inside. Vehicles that have the spare tire mounted in this area, be sure to remove it before spraying the area. Remove any compound that may come in contact with the tire.

33. Inspect vehicle upon completion of coating and fill out Data Sheet E.
34. Inspect vehicle at the time it is released for use and enter comments on Data Sheet E.