INVESTIGATION OF VAC-SITE
"CONE" MAINTENANCE PAVEMENT

by

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INVESTIGATION OF PEN-DATE “500” MAINTENANCE PAINT
Research Project 66-61

Samples of Pen-Date “500” were submitted to the Research Laboratory by A. V. McGillicuddy March 30, 1956 for investigation with respect to the performance features recommended by the manufacturer, the Peninsula Chemical Products Company, 6703 East Nine Mile Road, Ferndale, Michigan.

The purpose of the investigation was to determine if this material could be applicable to special paint conditions existing within the scope of activities of the Highway Department, such as surfaces on ferry boats exposed to heat and moisture, maintenance equipment, highway signs, suicide rooms in laboratories, protection of concrete surfaces against penetration of salts and moisture, etc.

Significant Features of Material:

Manufacturer's literature cites the following outstanding features of Pen-Date “500” Maintenance Paint:

1. Extremely resistant to acids, alkalies, water, diesel fuel, gasoline, oil, and many solvents.

The above features were tested in the Laboratory by painting metal strips and wood samples with Pen-Date under various conditions and placing them in contact with laboratory solvents. Strips and samples were 3" by 3".

Additional surfaces were painted to test resistance to water, such as the inside of the door to the laboratory moist room, the inside of a hot water bath, specimens of wood, steel, and concrete placed in the moist room, and the concrete floor of the laboratory in a location subject to periodic covering with moisture.
Results of the metal strip and wood sample tests may be seen in the accompanying photographs. The metal strips comprise the upper row, the wood samples the lower row. Both are indexed A through H from left to right.

All metal strips were cleaned and treated with Pen-Kote "50%" Conditioner prior to painting. These were then given one coat of black Pen-Kote and air-dried for 24 hours. All wood samples were painted with black Pen-Kote and dried for 24 hours with the exception of samples B and C, which were painted with white Pen-Kote, No. C being painted over freshly-applied tar.

a. Acid

Steel panel B was immersed for 24 hours in 50% hydroscopic acid. Inspection showed considerable wrinkling and peeling of the paint film.

Steel panel C was immersed for 24 hours in 50% sulfuric acid. Inspection showed peeling of the paint film at the edges only.

Wood panel B was immersed for 24 hours in 50% hydroscopic acid. Examination indicated no failure.

Wood panel C was immersed for 24 hours in 50% sulfuric acid. Examination disclosed no failure other than a moderate diminution of gloss.

b. Alkali

Steel panel B was immersed for 24 hours in a 10 oz./gal. solution of sodic hydroxide. Inspection showed moderate blistering of the painted surface and peeling at the edges.

Steel panel B was immersed for 24 hours in 50% sodium hydroxide. Examination showed intense uniform peeling and varying of the entire paint film.
Wood panel 1 was immersed for 24 hours in a 10 oz/gal. solution of sodium hydroxide. Inspection showed no failure. White area in photograph was produced by evaporation of solid NaOH.

Wood panel 2 was immersed for 24 hours in 50% ammonium hydroxide. Examination disclosed no failure other than slight creep in place.

2. Water

Wood panel 2 was immersed for 24 hours in water. This panel was painted white. Inspection after immersion period showed no failure other than very slight dimension of glass.

4. Alcohol and Gasoline

Steel panel 1 (not shown in photograph) was immersed for 24 hours in alcohol, then for 24 hours in gasoline. Inspection showed no failure.

5. Salt Spray

Steel panel 2 was subjected to salt spray for 28 hours. Examination disclosed no failure.

Wood panel 3 was subjected to salt spray for 28 hours. Examination disclosed no failure.

2. Non-Stickiness: Will not Support Contamination, Safe to Use and Store Under All Conditions

This feature was tested in the laps of steel panels A and B. Panel A was painted and air dried, then heated to 850°F, and flipped. Partial scaling and blistering occurred.

Panel B was heated to 850°F, and painted last. This surface did not fail.

It was determined that Pen-Kote either as received or in use will not harm any support coating.
Cover All Surfaces — Hot or Cold — Hot or Cold — With Enamel Base

and Effects

This feature was substantiated in the case of steel panels F and G, F being cut at 55°F, then painted, and G being 200°F, then painted. No failure occurred.

The interior of the hot water bath was brushed with one coat of gray Pan-Kote. After 2 months, this surface was in good condition except over previous paint which blistered, over rusted areas and in areas subject to continued erosion.

Hot areas in the moist room consisting steel, wood and concrete surfaces painted wet with 1 coat held up well with the exceptions of one spot painted over tar, which bled through in 3 days, and of the interior surface of the moist room door. Examination of Figures 8 and 9 show the condition of this door 2-1/2 months after painting with Pan-Kote Conditioner and Pan-Kote "500" gray Maintenance Paint in accordance with the manufacturer's instructions. At the end of 2-1/2 months the paint had blistered and peeled off badly near the bottom of the door and irregularly over the remaining area. The old paint had not been entirely removed from the door prior to applying Pan-Kote, and this evidence together with that offered by the water bath would indicate that Pan-Kote applied over previous coatings of ordinary paint tends to react unfavorably with the previous coatings, causing them to lose adhesion to the underlying surface. No erosion entered into consideration here.

The concrete floor of laboratory was painted with 1 coat over old paint in a wet area and covered by a rubber mat 24 hours later. This area stripped rapidly and practically no adhesion occurred. Intermittent abrasion had to be considered here.
Condition of Moist Room Door
2-1/2 months after painting with Pen-Kote Conditioner and Pen-Kote "501" Gray Maintenance Paint.

Blistering and peeling of bottom of Moist Room Door after having been painted 2-1/2 months with Pen-Kote Conditioner and Pen-Kote "501" Gray Maintenance Paint.
Good results were obtained with 1 coat of white Pen-rite applied by brush over a coating of bar showed志愿 witch checking and discoloration in 24 hours.

5. Highly Adhesive: Flexible, Durable. It withstands abrasion and wear. About the only quality under this heading that could be substantiated in the laboratory was that the material is flexible. Repeated tests indicated poor resistance to abrasion and wear, whether the surface was wet or dry over the "set" paint film.

6. Exceptionally Easy to Apply by Brush. It or Sprays as Free-Working as Regular Paint.

Evidence obtained during the investigation indicated that brushing, while not difficult, is by no means as easy as in the case of ordinary paint. As received, the paint is too thick to spray easily. Dipping is satisfactory if undiluted, all strength.


Little difference could be found between results obtained with 1 or 2 coats.

8. Sets in 30 minutes or less to a hard but flexible film of plastic. Investigation indicated a rapid set in the case of Pen-rite, being in the neighborhood of 45 minutes to 1 hour. The film is not hard in the ordinary sense of the word, except in comparison with softer materials. The word "plastic" is probably acceptable.

9. Odorless: No Discomfort or Health Hazard to Painters or Users Required.

This quality was fully substantiated to the extent possible during the investigation.
A Perfect Integral Abrasive, Tar and Other Paints Will Not Blend

Thomas, Fundamentally Wrong.

This statement was found to be incorrect. When painted over old paint, Per-Kote did not usually stand up well. Examination of road panels & spans that had been in place for 6 months after painted over tar. The paint film had chipped severely and was discolored due to bleeding of tar to underneath.

Conclusion:

Per-Kote “500” is a rapidly setting paint which will dry in the presence of solvents. Investigation shows great interest in its ability to withstand solvents and wear. Certain solvents including water and gasoline are without apparent injurious effect on the dried film. Durability is only moderate.

On the basis of this investigation it is the recommendation of the Research Laboratory that in those cases where it is desired to use Per-Kote “500” Maintenance Paint, a trial coating be employed under conditions as near as possible to conditions which will be met by the permanent coating. The trial coating will then serve as a guide to the probable value of the proposed permanent coat.
Manufacturers' literature gives the following instructions for using Pen-Kote "502". (Note: the Pen-Kote "502-P" Conditioner mentioned below was analyzed and found to consist of a solution of ortho-phosphoric acid of approximately 10 percent concentration).

**Instructions for Using**

Manufacturers' literature gives the following instructions for using Pen-Kote "502":

Pen-Kote "502" is an aqueous dispersion of an extremely inert chemical-resistant and insoluble plastic, together with suitable plasticizers, pigments, etc., in water. As the only medium employed, this paint can be applied rapidly and efficiently to fabric, paper, and all constructional materials, such as wallboard and plastic, in addition to such conventional surfaces as wood, concrete, metal, and painted surfaces.

Surfaces to be painted should be free from grease, oil, and loose dirt, but need not be either cold or dry. For iron or steel (either clean or rusty) and galvanized metal should first be treated with Pen-Kote "502-P" Conditioner as described below.

Use a clean, soft brush, and always have the brush well filled with paint. Work from unpainted to freshly painted areas, leveling with light strokes of the brush.

Pen-Kote "502" paint is so similar or less, so that the brush in clear water immediately after use. If interrupted while painting, keep the brush completely immersed in water; and upon ready to continue, merely drain out the water and resume painting. If the brush should accidentally become hard and unusable it can be cleaned with lacquer thinner.
Note: Do not mix Pen-Elte "500" with any other material - and do not use a thinner at any time, as it will discolor, brush or spray perfectly just as received. Keep tightly closed when not in use.

Pen-Elte "500-E" Conditioner

In protecting bare iron or steel, galvanized metal and all body rusted surfaces with Pen-Elte "500" Maintenance Paint, an initial application of Pen-Elte "500-E" Conditioner is recommended to inhibit corrosion and ensure maximum adhesion.

The Conditioner may be applied by brush or wiped on with a cloth. With rusty surfaces, use a wire brush or steel wool to remove loose rust and scale while the surface is still wet; then wipe clean with a second application of Conditioner. After 10 or 15 minutes, wipe with a wet cloth or rinse with water. The surface is then ready for painting with Pen-Elte "500" Maintenance Paint.

Except for wrought or bare metal surfaces as noted above, Pen-Elte "500-E" Conditioner should not be used.