

OFFICE MEMORANDUM



MICHIGAN

STATE HIGHWAY DEPARTMENT

JOHN C. MACKIE, COMMISSIONER

October 28, 1964

To: E. A. Finney, Director
Research Laboratory Division

From: A. J. Permoda

Subject: Paint Peeling Off Pressure-Treated Wood Posts.
Research Project R-62 G-114. Research Report No. R-483.

This project was initiated in 1962 on the basis of complaints from the Saginaw District. At J. C. Brehler's suggestion, C. C. Curnow, L. G. Dunn, and the writer inspected some recent installations of painted, pressure-treated wood posts in that District, and found an undesirable, excessive peeling of paint, as was reported in your memorandum to Mr. Brehler dated May 24, 1962. That memorandum offered no explanation of the peeling observed, but requested that other Districts survey their areas regarding this phenomenon, and stated that the Research Laboratory Division would initiate a field test to study paint peeling from posts.

J. C. Brehler's request of June 8, 1962 for District condition surveys produced varied replies concerning incidence of paint peeling, including the following:

1. "The paint condition of recently installed pressure-treated guard posts in District 1 is good, some damage by porcupines."
2. District 4: "It is my opinion from observation and an experiment that round cedar posts need not have a curing period prior to treatment, which was thought necessary by some people, but must have a drying period after treatment and before painting is done. Posts that show 'peeling' are in guard rail cable sections and were not pressure treated. They also were not cured as per our specifications. I presume the sap removed the paint during curing."
3. "Inspection in District 5 was made on Project SSb 41101, C1R, and I found many posts with excessive peeling, especially on the NW corner of the intersection of Ramsdell Road and M 44. It appears wherever the treatment penetrates the paint, the paint will peel; also, wherever the inner bark was left."
4. "To my knowledge no pressure-treated guard posts have been installed in District 6 since late last fall. The ones that were installed last summer and fall show excessive paint peeling. Some have been wire brushed and repainted this spring."

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5. "We find no pressure-treated guard posts showing peeling in District 10."

Field Test

Three untreated posts, three posts treated with pentachlorophenol, and three posts treated with Osmosalts were secured and air-dried outdoors from June to September 1962. This was longer than planned, due to scheduling problems caused by the Laboratory's move from East Lansing to Lansing. Subsequently, it was found that only two posts of each of these three types were available for field installation, and one additional post was obtained having each of the two preservative treatments. Both were cured indoors for two weeks prior to painting, but this period was inadequate for the penta-treated post, which still exuded solvent when indented. The following procedure was followed in painting the eight posts, after touch-up removal or "skinning" of bark fragments:

1. Half the surface area down the length of the post was sealed with a pigmented shellac.
2. Each post was then coated with one of three paints: a No. 6B-4 white paint (standard control), proprietary white breathing latex paint, or proprietary white breathing alkyd paint.

After application of standard black cap paint, the eight test posts were installed in the median area at the intersection of Waverly Road and US 27-M 78 southwest of Lansing on December 4, 1962. In installing the test posts, eight posts of a previous installation were pulled out, and the test posts were set in the same holes (Fig. 1). Water was present at the bottom of each hole, the removed posts were heavy with water, and the paint lay on their surfaces but did not adhere firmly.

The painted test posts were inspected in August 1963, and again on October 13, 1964 after the posts had inadvertently been maintenance repainted. In the first inspection all test posts, including the untreated, showed staining and minor checking of the white paints, and no definite superiority for any of the three paints nor advantage gained from use of the sealer.

The second inspection showed that the penta-treated and untreated posts had greater staining of the white paint, paint failure due to cracking was present on the penta-treated posts (Fig. 2), and paint on the untreated posts had lost adhesion and could be pulled off (Fig. 3) displaying moisture at the wood-paint interface.

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Summary

On the basis of the field test and several inspections of other field installations, it seems probable that the reported excessive failure of paint on wood posts is due to the following causes:

1. Water rising in the post, as in a wick, hydrolizes the paint, changes wood dimensions, and disrupts the bond, as evidenced by the presence of moisture at the wood-paint interface. A similar phenomenon occurs on water-soaked house siding.

2. Paint peeling is encouraged by other factors such as incomplete de-barking of posts, and inadequate curing to allow for evaporation of sap in untreated posts or solvents in treated posts, both of which contribute to early staining of white paint.

There was no indication that untreated posts form a better base for painting than test-treated posts that were properly cured. There was no indication that better paint performance could be obtained by use of a sealer or a change in white paints. However, a faster drying modification than current No. 6B-4 would collect less wind-blown dirt during the drying period.

OFFICE OF TESTING AND RESEARCH

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AJP:nl

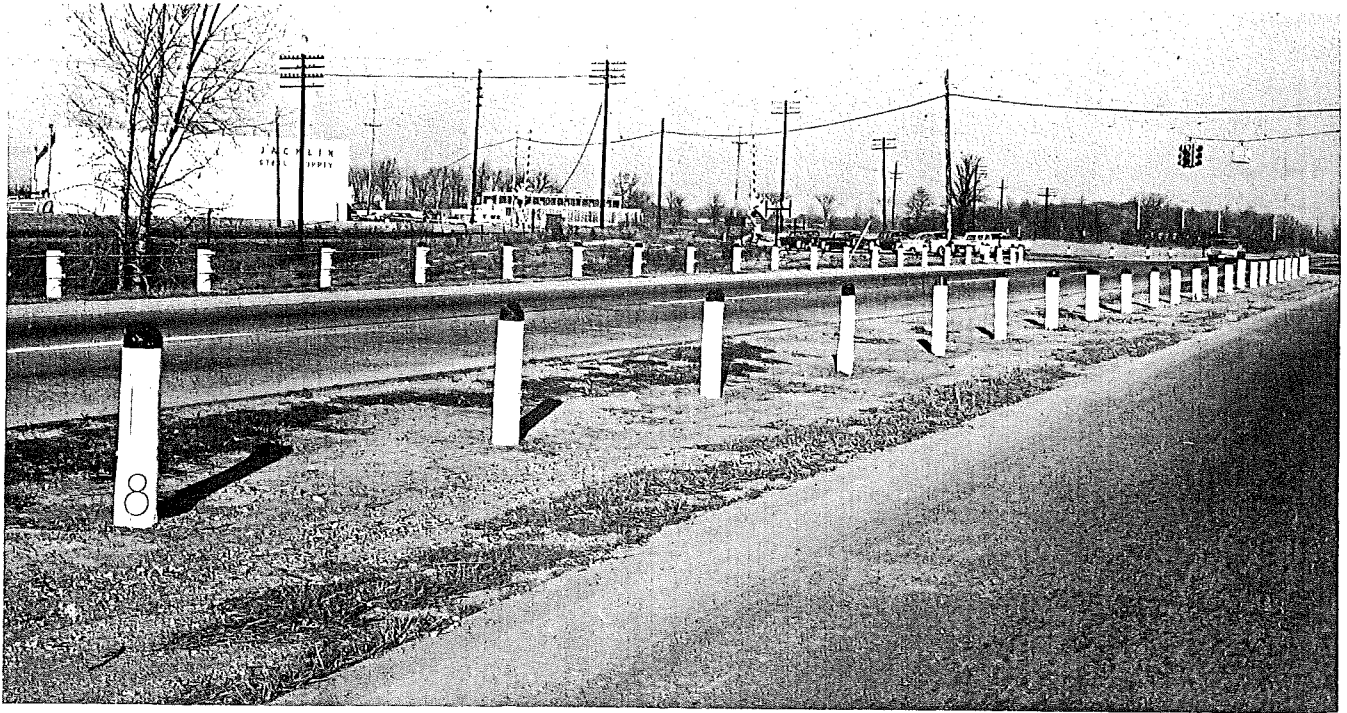


Figure 1. Eight test posts in median installation on US 27.

Figure 2. Failure and staining of white paint No. 6B-4 on penta-treated post after almost two years of service. Post was air-cured for several months before painting.

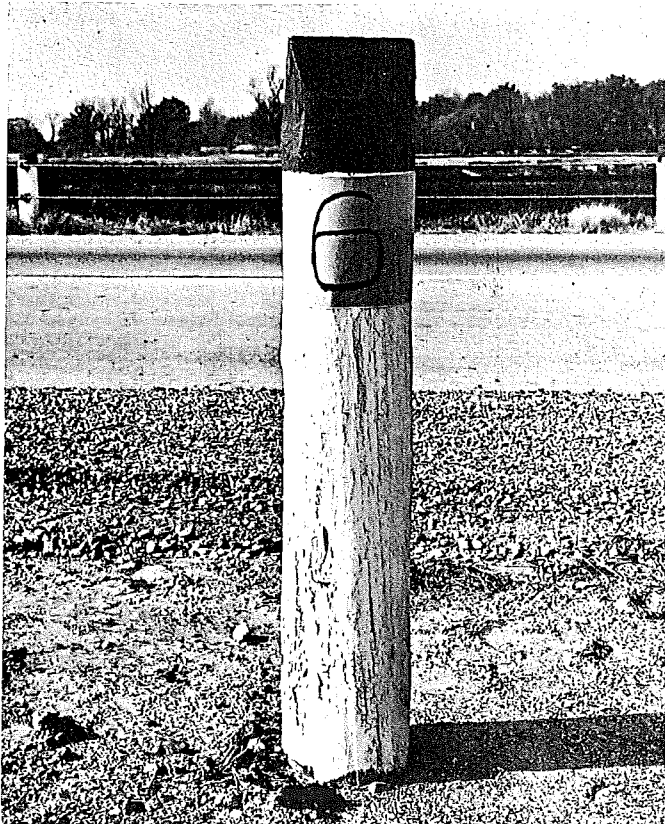


Figure 3. Breathing white paint exhibited staining and could be peeled off untreated post after almost two years of service.

