

R-454

# OFFICE MEMORANDUM



MICHIGAN  
STATE HIGHWAY DEPARTMENT  
JOHN C. MACKIE, COMMISSIONER

March 20, 1964

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

From: W. L. Frederick

Subject: Decayed Dimension Guard Rail Posts near Farmington.  
Research Project R-63 G-131. Research Report No. R-454.

An investigation of decayed wood guard rail posts on Orchard Lake Road just north of I 96 has been conducted as authorized by W. W. McLaughlin in a memorandum to H. J. Rathfoot dated December 3, 1963. This installation of approximately 1133 lin ft of guard rail (Fig. 1) was included as part of Construction Project IN 63-29, C12, built in 1957. The contract proposal specified wood posts (pressure treated with creosote) or steel posts to support the guard rail. This project was originally planned with cable guard rail, but before construction Departmental policy was changed to provide for steel beam guard rail on expressways. A supplementary sheet attached to the proposal for this project indicated that brush treatment with Osmosalts was an approved alternate for treating round posts for cable guard rail.

A sample post (63 MR-287) was delivered by J. Murphy, Materials Inspector, on December 6, 1963. It was determined later that this sample post was not from the area in question but was removed from permanent guard rail on the north side of I 96 about 300 yd east of Orchard Lake Road during a culvert installation (I 63022C, C20), involving two culverts carrying the Rouge River under Orchard Lake Road and I 96. Fig. 2 shows the I 96 construction area with remaining permanent guard rail at the left center from which the sample was taken. This post was in excellent condition. Chemical testing and examination of sawed sections established that it had been pressure treated with creosote.

Later, a second sample post (63 MR-288) was obtained by M. H. Janson and W. L. Frederick from H. J. Rathfoot, Jr. of the Garavaglia Construction Co., at the Orchard Lake Road-I 96 overpass on December 16, 1963. Posts at this location scaled badly when pulled, leaving a circular cross-section according to contractor's personnel, and were subsequently used for firewood. The guard rail was re-installed on new posts. This second post (63 MR-288) had broken off at ground level when a grader bumped the guard rail north of the culvert, during grading at the close of construction. It did not scale since it had to be substantially dug out. Fig. 3 shows the rotted sample post. The darker

areas (green) at the top of the broken area indicate that the post had received some chemical treatment; the top portion of the post was sound. At the ground level, however, about 3 in. of the post was completely decayed. Below this area, condition gradually improved until the bottom of the post was sound except for some peripheral decay.

Chemical tests on the sound top wood proved that creosote and pentachlorophenol were absent. A positive test for chromate, an ingredient of Osmosalts, was obtained, however. Subsequent contact with the original project engineers, D. L. Wickham and R. G. Johnson, confirmed that Osmosalts had been used to an unknown extent on guard rail posts. Accordingly, a survey was made to determine the location of other Osmosalt-treated posts. The attached line drawing of I 96 (Fig. 5) shows the location of various types of guard rail posts installed in the project area. It was not possible to determine the type of preservative used on painted cable guard rail posts visually, but chemical tests on wood removed from a post near the southeast corner of the Haggerty Road overpass indicated Osmosalt-treatment at that location. Frozen ground prevented inspection of any posts below ground level, where decay would be expected. Several Osmosalt-treated posts had splintered where guard rail had been bumped by a vehicle. Fig. 4 shows two splintered posts. None of the creosote-treated posts inspected had splintered in this manner.

The deterioration of these guard rail posts is due to an ineffective original treatment with Osmosalts which resulted in low penetration and insufficient retention of the preservative.

OFFICE OF TESTING AND RESEARCH

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WLF:js

Attachments



Figure 1. View looking north on Orchard Lake Road, showing guard rail from which decayed posts were removed.

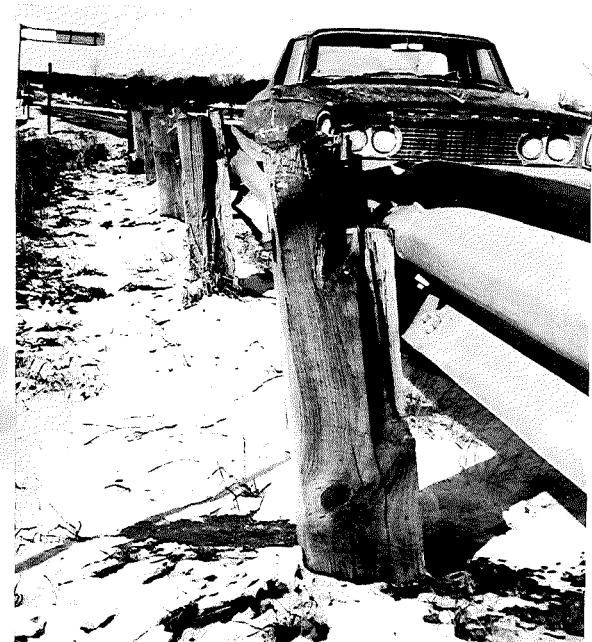


Figure 2. View looking east at I 96 culvert construction area. Sample 63 MR-287 was obtained when permanent guard rail from ramp in background was partially relocated as temporary rail in foreground.

Figure 3 (below). Two parts of decayed post (Sample 63 MR-288); arrows indicate darker areas which show very little penetration of preservative into the wood.



Figure 4 (right). Osmosalt-treated posts which splintered when a vehicle bumped the guard rail.



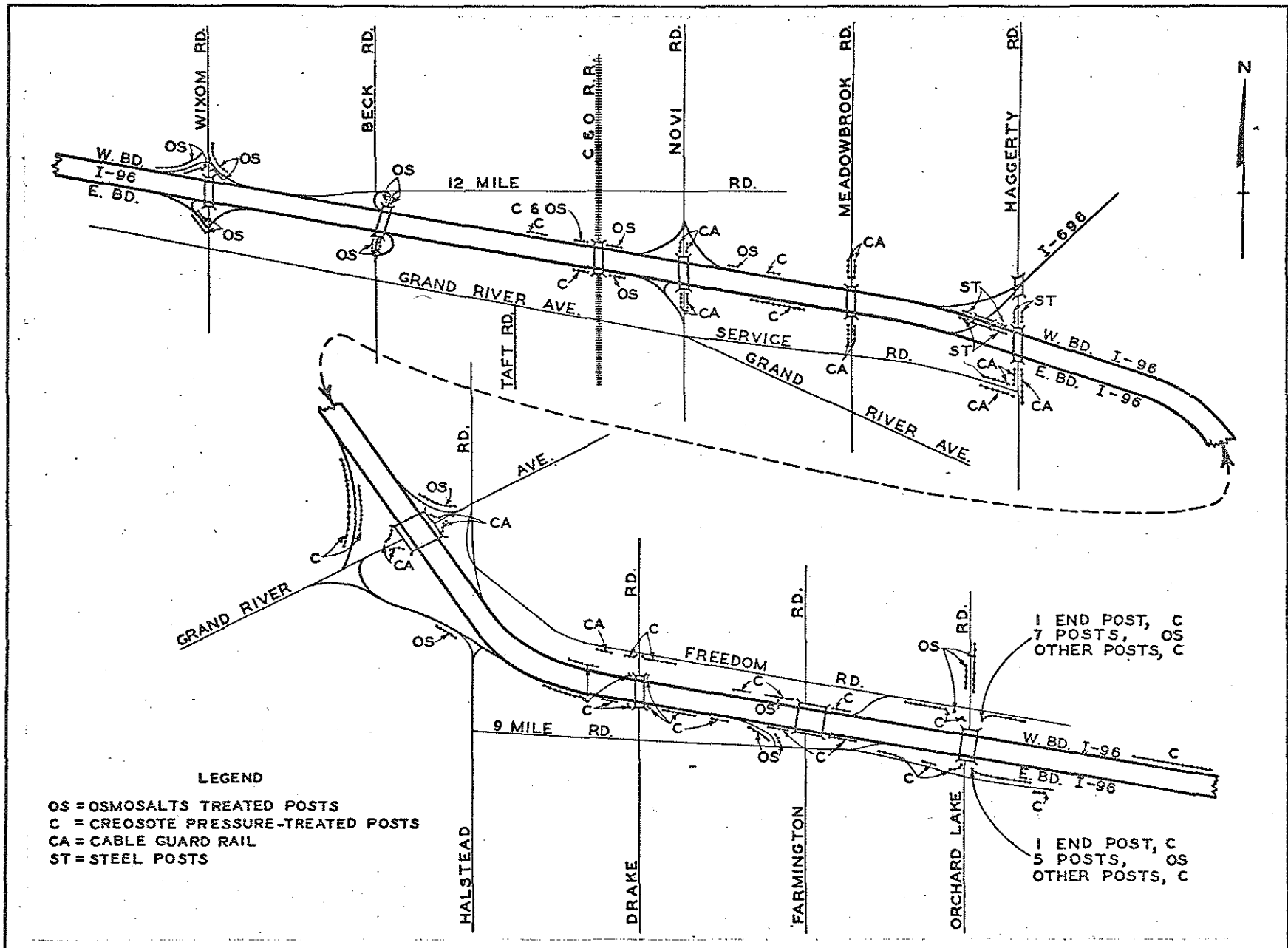


Figure 5. Schematic drawing showing I 96 installations of guard posts having various preservative treatments; note Orchard Lake Road overpass at extreme right.