

# OFFICE MEMORANDUM



MICHIGAN  
DEPARTMENT OF STATE HIGHWAYS

March 30, 1967

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To: R. L. Greenman  
Acting Testing and Research Engineer

From: E. A. Finney

Subject: Driving Performance of Aluminum Delineator Posts. Research Project  
65 NM-145. Research Report No. 629.

At your request, on March 22, 1967 Research Laboratory personnel observed a driving performance test on aluminum delineator posts. Observers from Maintenance, Testing and Research, the Saginaw District Office, and Reynolds Metals Co. were also present. The Saginaw Signal Shop supplied personnel and equipment to install the posts.

The driving tests were conducted at five different sites, all in the vicinity of Saginaw. The location and soil characteristics of each site were described by the District Soils Engineer as follows:

- Site 1. Bridgeport Rest Area: sand, no frost.
- Site 2. Bridgeport Rest Area: sand, 6-in. frost depth.
- Site 3. Inside shoulder of NB I 75 near M 81: clay, 24-in. frost depth.
- Site 4. Outside shoulder of NB I 75 near M 81: sand subbase over clay, 15-in. frost depth with frost lenses to a depth of approximately 30 in.
- Site 5. Maintenance Garage Yard at M 81: clay, no frost.

According to Maintenance personnel, Sites 3 and 4 represent the most extreme soil condition encountered when installing delineator posts. Five posts were driven at each site, except at Site 2 where only four were installed. All posts were driven with an air hammer without much difficulty, but distortion of the driving end of the post resulted in all cases (Fig. 1A), attributed mostly to unequal distribution of driving force on the post end. To minimize damage to the driving end of the post, the Reynolds representative furnished a steel driving cap. Although the cap was too large to fit in the air hammer guide, one post was driven at Site 1 with a sledge hammer to observe the benefit of using a cap. Only very slight crushing of the edges occurred (Fig. 1B).

Severest installation damage occurred at Sites 3 and 4. Figure 1C illustrates typical distortion of posts driven under the conditions previously described for these sites. Examination of the bottom end of each post after removal revealed blunted end points and in some cases bent flanges (Fig. 2). End points driven in sand or unfrozen clay for all practical purposes suffered no damage.

Based on the results of these test installations, it appears that some distortion in the form of flange bending and edge or end crushing occurs from driving this type of post in representative soil conditions. In some cases, end distortion will prevent the delineator button from resting flat against the post. However, the button could easily be satisfactorily installed in the second or third hole from the top of the post. This would probably detract from the aesthetic value of the post.

In addition to installation damage, the Office of Maintenance is also concerned about the aluminum posts not being equivalent to steel posts in resisting permanent deformation due to snow removal operations and vandalism. The performance of aluminum posts in these respects cannot readily be evaluated without an experimental installation. The theoretical bending strength of the 6063-T6 aluminum post would be about one-half that of rail steel delineator posts.

In view of the uncertainties concerning overall performance of aluminum delineator posts, and because it appears that installation damage occurs even in relatively soft soil (using our present hammers), we recommend that use of this type of post be held in abeyance until further performance data are available.

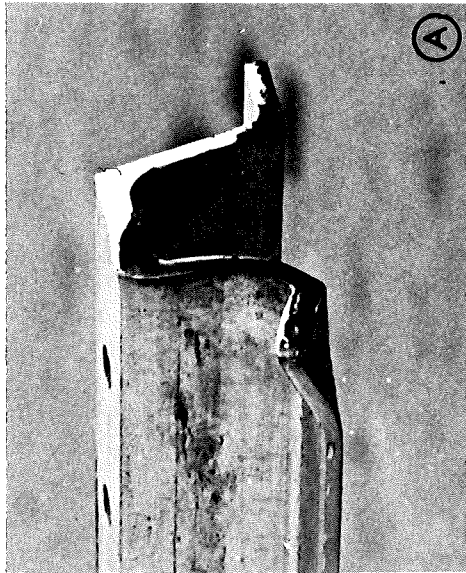
We suggest that the shipment at Saginaw be accepted for use in an experimental installation. If such an installation is to be made, a new type of driving attachment would need to be developed, and periodic inspection of an equal number of posts of both types would be required. It would also be beneficial to install a considerable number of these posts during the next winter to evaluate any new driving attachment under the most severe conditions. Posts installed during the summer could be inspected for vandalism and snow removal damage.

OFFICE OF TESTING AND RESEARCH

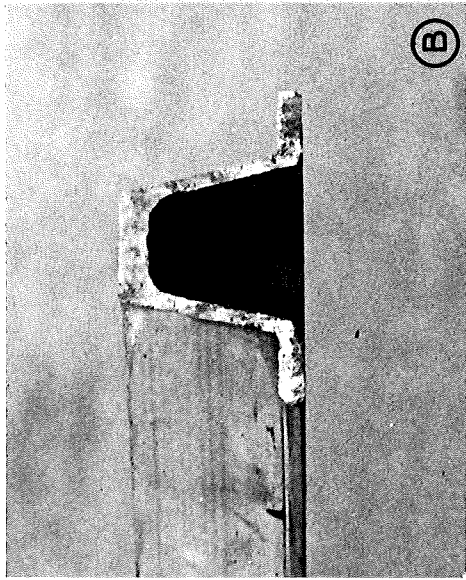


E. A. Finney, Director  
Research Laboratory Division

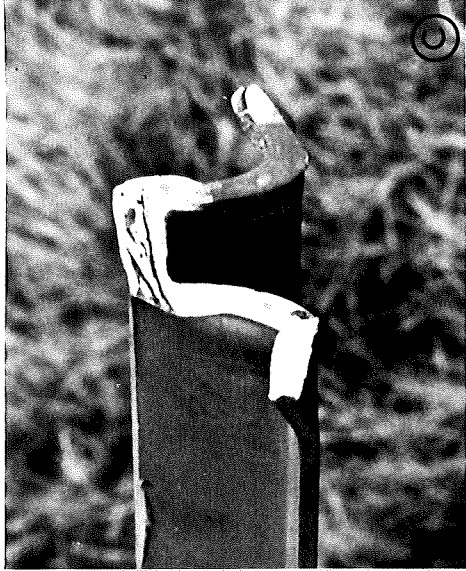
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Driven in unfrozen sand



Driven in unfrozen sand



Driven in frozen sand over clay or in frozen clay

Figure 1. Conditions observed after driving under conditions indicated, included a) distorted end with bent flange, slight crushing of edges, and darkening where hammer contacted end; b) slight crushing when driven with steel cap; and c) bent flanges and typical crushing.



Site 3

Figure 2. Condition of driving points of posts.

Site 4