

OFFICE MEMORANDUM



MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

January 5, 1973

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To: L. T. Oehler
Engineer of Research

From: J. D. Culp

Subject: Semicircular Galvanized Steel Underdrain Pipe ("Full-Flo Subdrain"). Research Project 72 NM-345, Research Report No. R-843.

A section of semicircular galvanized steel underdrain pipe called "Full-Flo Subdrain" was submitted for consideration by Young Metal Products, Inc., Shelby, Michigan. This drain pipe is constructed of a semicircular steel pipe of 4-5/8 in. diameter with a top shield of corrugated steel sheet. This pipe has no water inlet perforations. The water enters the pipe by flowing under the top shield which over-hangs the edge of the semicircular pipe (Fig. 1). The cost of the "Full-Flo Subdrain" is comparable to the cost for other types of underdrain pipe currently in use by the Michigan Department of State Highways.

Use of this type of underdrain pipe is allowed in Section 6.02.01 of the "Michigan Department of State Highways Standard Specifications for Highway Construction" when 6-in. diameter underdrain pipe is specified. The Highway Materials Specification, Part 1, Section M36-18.1.4, of the American Association of State Highway Officials lists the requirements of shielded semicircular underdrain pipe. The construction of the "Full-Flo Subdrain" is exactly as stated in this specification. Therefore, this type of underdrain pipe could be used at the option of the contractor.

It is recommended that the use of this type of underdrain pipe not be promoted for the following reasons. Although galvanized steel has corrosion resistant properties, when it is placed underground in continuous exposure to water and the various chemicals present in the soil, serious corrosion does occur after some initial period of time. The Highway Department is experiencing this now with galvanized corrugated steel culvert installations in the northern region of the State. Once such corrosion begins the underdrain system would soon be rendered useless and the replacement cost would be considerable. In contrast, the newer type of underdrain tubing made of polyethylene plastic is virtually immune to ground water and its constituents and provides a solution to the corrosion problem that we know exists with galvanized steel. Secondly, the lid topped semicircular drainage pipe presents an inefficient use of materials as far as supporting the applied loads is concerned. The loads applied to an underdrain consist of the dead load of the overlying soil and the live loads applied to the soil surface. The semicircular pipe supports the applied vertical loads by the beam action of the straight lid spanning across the top of the semicircular sec-

tion, thus making no use of the available lateral pressure of the surrounding soil. A flexible circular pipe does utilize the lateral soil pressure as the sides try to push out and hence the same amount of vertical load can be supported by a lighter section. Proper bedding and backfilling of the semi-circular pipe section could also present some problems not encountered with a circular pipe section. Since there are other types of underdrain available at similar cost, that have several advantages over the subject pipe, we do not recommend use of this type of underdrain.

TESTING AND RESEARCH DIVISION

James D. Culp
Civil Engineer
Physical Research Unit
Research Laboratory Section

JDC:bf

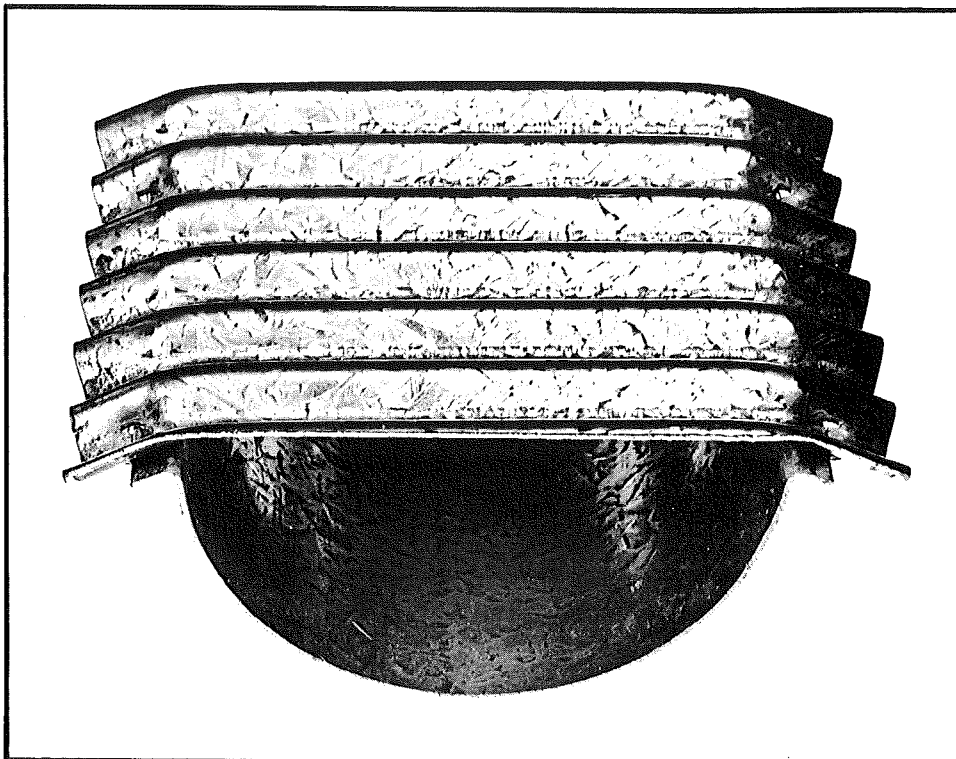


Figure 1.

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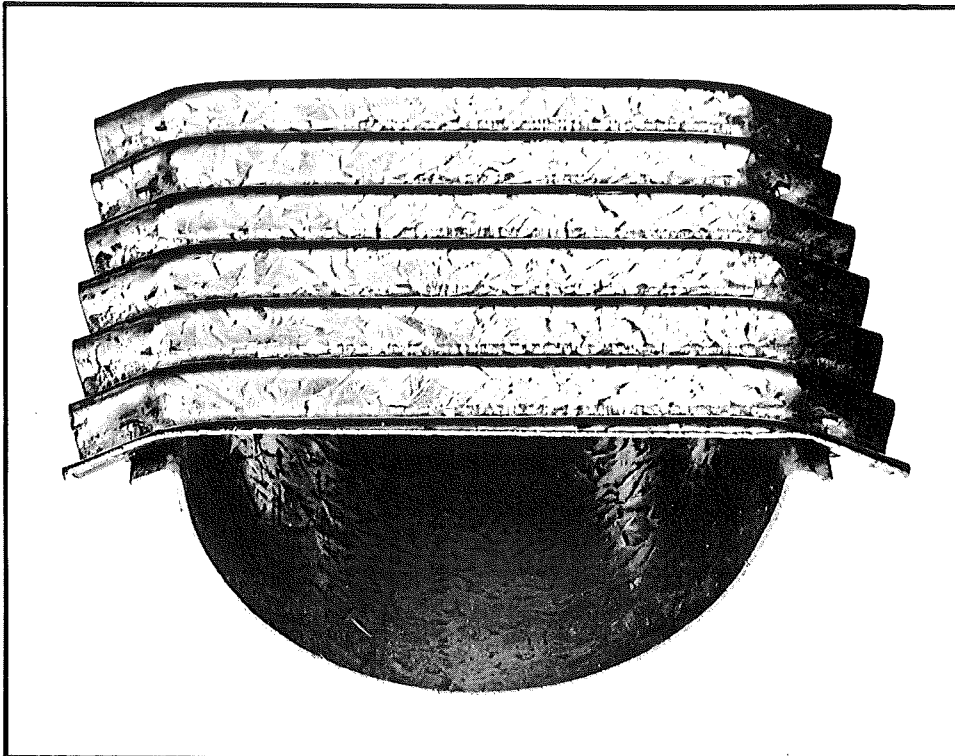


Figure 1.