

MICHIGAN  
STATE HIGHWAY DEPARTMENT  
LANSING 13

136

Charles M. Ziegler  
State Highway Commissioner

INTEROFFICE COMMUNICATION

August 1, 1952

TO: W. W. McLaughlin  
Testing and Research Engineer

SUBJECT: Foundry Slag as an Abrasive for Icy Pavements  
Research Project 52 G-63 - Report No. 180

This is a laboratory report on the two samples of foundry slag submitted respectively by Auto Specialties Manufacturing Company of St. Joseph (52 MR-26) and by the Board of County Road Commissioners of Muskegon County (52 MR-28). Reference is made to your letters of June 5 and June 24. In both cases this material was submitted to the Department for investigation into its use as an abrasive with calcium chloride for ice control on pavements.

The following tests were run: Microscopic examination, gradation, crushing strength, and calcium chloride absorption. Results were as follows.

Microscopic Examination:

Under the microscope the particles were identified as crushed foundry slag, being fused and glassy in appearance, largely green in color from iron content, and with sharp edges. They were transparent and amorphous, and jagged. See attached photograph.

Gradation

Sieve	Cumulative Percent Passing		
	Foundry Slag		2-NS
	52 MR-26	52 MR-28	
3/8"	100.0	100.0	100.0
4	99.7	97.0	95 - 100
8	80.0	80.2	65 - 95
16	27.7	37.1	35 - 75
30	5.6	8.8	20 - 55
50	1.4	1.9	10 - 30
100	0.3	0.3	0 - 10

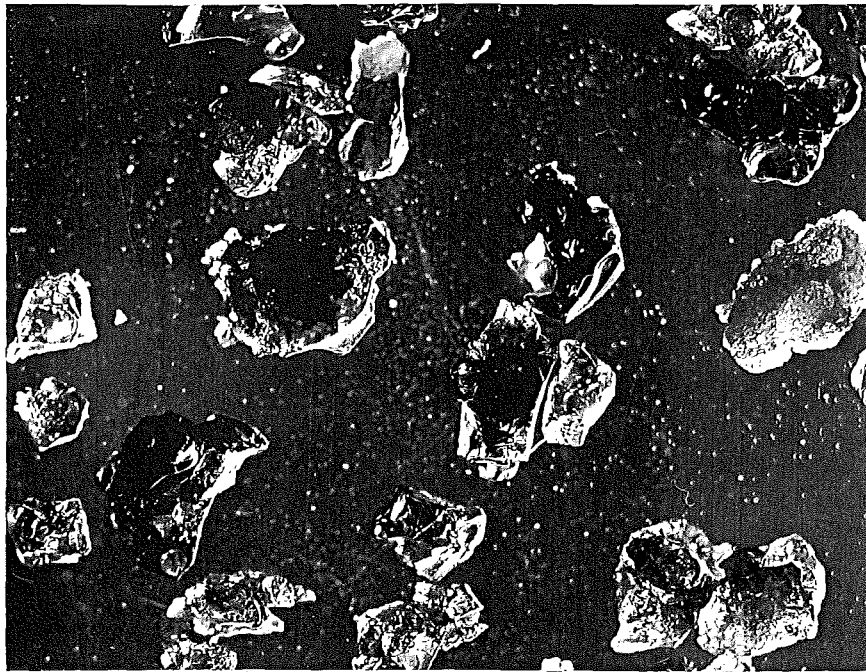
Crushing Strength

This test was conducted in accordance with the Department's method of determining the crushing strengths of glass beads for use in pavement marking, Type I, and are expressed in kilograms of average crushing strength of 25 particles passing No. 30 and retained on No. 40 sieve.

<u>Sample</u>	<u>Crushing Strength</u>
Slag (52 MR-26)	2.65 kg
Slag (52 MR-28)	3.08 kg
2-NS	3.37 kg
Ottawa Sand	4.54 kg
Type I Glass Beads	7.5 kg min. (spec.)

Calcium Chloride Absorption

Tests show that the foundry slag in either sample had a very slight increase in calcium chloride absorption and release as compared to ordinary 2-NS sand made up to the same gradation.



Foundry Slag, Enlargement Six Diameters

The second phase of the investigation will be conducted during the coming winter season in the western part of the State. This work will cover the performance of the material under normal winter maintenance operations, traffic, and road conditions.

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in charge of Research

EAF:mw