ANOTHER

SLAG SUCCESS STORY

MICHIGAN TESTS RECONFIRM SUPERIOR FRICTION QUALITIES OF STEEL-INDUSTRY SLAGS

One of the most difficult and important responsibilities of highway designers and officials is predicting the long-range friction characteristics of aggregates used in highway bituminous concrete.

The Michigan Department of Transportation has developed and proven a relatively simple test which greatly increases the accuracy and reliability of determining which aggregates will most economically attain the long-range surface friction values required for varying traffic types and densities.

This laboratory test provides an Aggregate Wear Index (AWI) for individual aggregates which correlates with friction tests on in-place highway pavements and can predict the capability of that aggregate to maintain long-range satisfactory surface friction.

The lab testing is done on a 7' diameter track, consisting of 16 panels of 3/8"-1/4" aggregate cemented in place to provide an aggregate exposure (macrotexture) of 2mm. Wearing is accomplished by two 15" standard smooth tires loaded to 800 pounds each. The AWI is determined by a static skid tester recording the drag force when a standard test tire revolving at 40 miles per hour is dropped on continuously wetted test panels. AWI readings are taken at 500,000 wheel pass intervals and completed at 4,000,000 wheel passes, which is the equivalent of about 10,400,000 passes on a highway due to random distribution of tracks on a highway.

This procedure was initiated in 1974 and has proven to be an accurate means of predicting long-range friction of bituminous surfaces. Extensive correlation of laboratory tests with actual highway surfaces has shown that the correlation coefficient for the drag force AWI in the laboratory compared to dynamic coefficients in field tests is 0.94.

Both blast-furnace and steel-furnace slags have produced very high AWI's and maintain a higher SN over a long period of time than any other aggregate tested by the Michigan Department of Transportation, as shown in Figure 1. The data listed below has been officially reported by the Michigan Department of Transportation (see Appendix 1) for several sources of slag (an AWI of 390 is the equivalent of a 42 wet dynamic friction number):

Lab No.	Source	Material	AWI
83A-1801	Dix #1, Detroit	Blast-furnace slag	410
83A-1800	Trenton, Detroit	Blast-furnace slag	460
83A-1802	Mellon, Detroit	Steel-furnace slag	450
78A-2302	Burns Harborn, IN	Blast-furnace slag	390
78A-1406	Gary, IN	Blast-furnace slag	410
83A-763	South Works, Gary	Blast-furnace slag	440

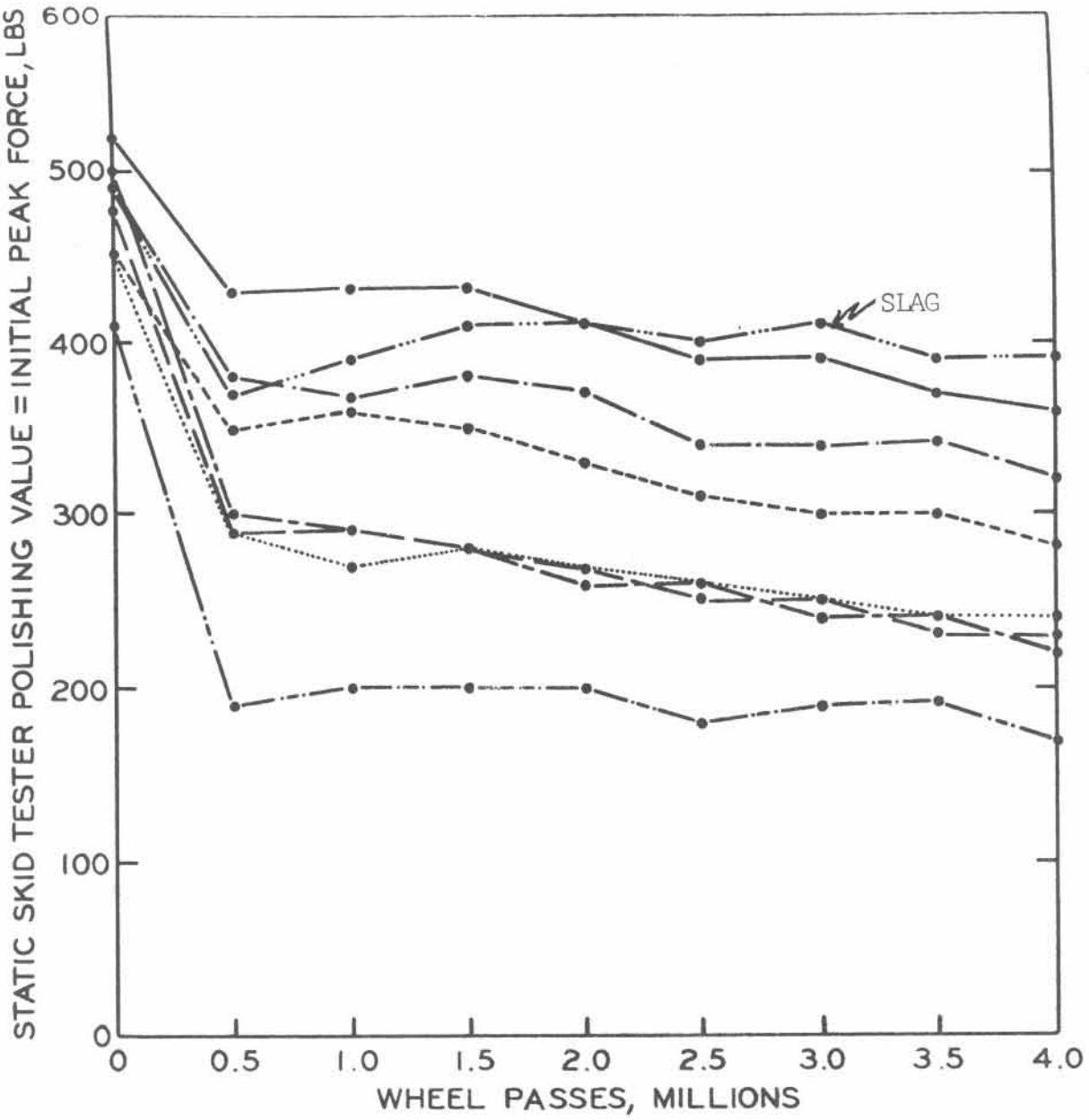

Figure 1. Wear
Series No. 13.

STATE OF MICHIGAN

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JAMES P. PITZ, DIRECTOR

October 15, 1985

E. C. Levy Company
8800 Dix Avenue
Detroit, Michigan 48209

Attention: Mr. James Broderick

Gentlemen:

Aggregate Wear Index testing has been completed on two blast-furnace slag samples and two steel-furnace slag samples. Results are noted below:

Laboratory Number	Pit Number	Material	Aggregate Wear Index
83 A-1801	82-19	Blast Furnace Slag	410
80 A-1565	82-21	Steel Furnace Slag	390 *
83 A-1800	82-22	Blast Furnace Slag	460
83 A-1802	82-24	Steel Furnace Slag	450

Sincerely,

MATERIALS & TECHNOLOGY DIVISION

G. H. Gallup - Geologist

*National Slag Association footnote: Initial test in 1975. Subsequent tests shown provide more typical values.

Appendix 1