

OFFICE MEMORANDUM



MICHIGAN
STATE HIGHWAY DEPARTMENT

September 24, 1965

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

From: R. C. Mainfort

LAST COPY
DO NOT REMOVE FROM LIBRARY

Subject: Testing of "Coherex" Emulsified Oil. Research Project 65 NM-149.
Research Report No. R-546.

At the request of R. L. Greenman, a proprietary compound called "Coherex" has been tested to see whether it could stabilize a sand subbase to such an extent that heavy equipment and other traffic could be carried during construction operations. On the basis of these preliminary findings, it is to be decided by the Department's Committee for the Investigation of New Materials if the material warrants further consideration.

Coherex is the trade name for a thin emulsified oil, manufactured by the Golden Bear Oil Co. of California, for the purpose of preventing wind erosion of sands and fine grained soils. For highway purposes it is recommended as a dust palliative for unpaved surfaces and as a mulch for slopes. The material is marketed in this area by Pams Products, Inc. of Detroit, through their local representative, Robert O. Berube.

Sands meeting Departmental specification for Porous Grade A backfill were used in the laboratory tests. The rate of treatment recommended by the manufacturer varied from 3/4 to 1-1/2 gal per sq yd of surface, depending upon soil types, applied as one part Coherex to seven parts water solution. In the laboratory tests, the range of treatment was extended to 3 gal per sq yd and solution strength was varied from a 1:4 to 1:10 mixture.

The CBR test was used to evaluate the effectiveness of Coherex. In this test, both treated and untreated samples were compacted in a standard CBR mold at their optimum moisture content and tested to determine CBR ratios. Coherex was applied both as a surface treatment to the molded sample (in which the solution was allowed to penetrate into the sample), and as an integral mix with the sand prior to compaction. In some tests the samples were allowed to moist cure for 24 hr before testing.

An average of three tests was used to establish the CBR value for the untreated sand. This value was used as a basis for comparison with individual test results

obtained using the different Coherex treatments. Samples were tested at their molded or cured moisture content and were not subjected to water absorption prior to testing.

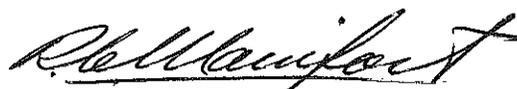
Test results are summarized in Table 1, which indicates that Coherex did not improve the bearing capacity of sand. In fact, there was an average reduction in CBR values for the treated samples. Apparently, the thin oily mixture of Coherex tends to lubricate the sand particles in such a manner that the natural shear strength is reduced. This is also shown by the fact that the more thoroughly mixed samples produced lower CBR values than those treated by surface penetration. There was a small increase in maximum density for the treated samples but this cannot be considered significant.

Additional tests were performed in which Coherex was mixed with sand and studied under different moisture conditions as the samples dried. In no case was there a noticeable improvement over the untreated sand.

Based on our laboratory tests it is concluded that Coherex is not suitable for improving the stability of sand as used for subbase construction and it is recommended that no further consideration be given to its use for this purpose.

On September 3, 1965, Mr. Greenman indicated in a telephone conversation with L. T. Oehler that the dust palliative characteristics of this material had been considered previously by the Committee for Investigation of New Materials and at that time there was no interest by the Department in this phase of its performance. Consequently, no further testing of Coherex is planned by the Research Laboratory unless the Committee shows new interest in this material.

OFFICE OF TESTING AND RESEARCH



R. C. Mainfort, Supervisor
Soils Unit
Research Laboratory Division

RCM:nw

TABLE 1
SUMMARY OF TEST RESULTS

Type Sampled	Compacted		CBR, percent	Percent of Untreated Strength
	Percent Moisture	Density, pcf		
<u>Untreated</u>				
Sample 1	7.1	103.2	7.5	
Sample 2	6.8	102.1	7.7	
Sample 3	7.5	102.3	7.9	
Average	7.1	102.8	7.7	100.0
<u>Surface Treated (1:7 solution)</u>				
3/4-gal per sq yd	7.5	103.7	5.2	
1-1/2-gal per sq yd	6.4	102.3	8.8	
3 gal per sq yd*	6.4	102.3	1.8	
3 gal per sq yd*	7.5	101.5	5.1	
Average	7.0	102.5	5.2	67.5
<u>Solution Mixed In (17 gal per sq yd)</u>				
1:4 Solution	---	---	5.3	
1:7 Solution	7.5	104.3	5.7	
1:10 Solution	7.2	104.0	6.5	
1:10 Solution*	4.2	104.7	0.0	
Average	6.3	104.3	4.4	57.1

* Cured 24 hr.