

USE OF SOIL STABILIZERS ON HIGHWAY SHOULDERS

A presentation to JCOTS
July 19, 2005

BACKGROUND: This study was undertaken at the behest of the General Assembly (2004 Budget Bill). Based on positive preliminary results using soil stabilizers on higher volume gravel roads, they felt soil stabilizers showed substantial promise to reduce the occurrence of shoulder drop-off at a reasonable cost.

PURPOSE: To study the use of soil stabilizers in highway shoulders with the objective of finding a method of substantially reducing the occurrence of pavement/shoulder drop-off at a reasonable cost.

RESEARCH PLAN:

- Field study only, with no laboratory analysis or investigation.
- At locations based on documented past experience with low shoulders.
- Soil stabilizers from three groups: acrylics, soybean/soy lecithin, and salts.
 - Soiltac (vinyl acetate copolymer emulsion)
 - Centrophase AD (soy/lecithin emulsion)
 - Magnesium chloride (salt) -
- Use test and control evaluation.

HYPOTHESES:

Working – The addition of stabilizers to the shoulder material did affect the strength of the material

Null - The addition of stabilizers to the shoulder material did not affect the strength of the material
(as measured by its stiffness and bearing capacity)

DATA COLLECTION:

- Dynamic Cone Penetration – Measures penetration and correlates to bearing strength
- Geogauge – Measures stiffness or material's resistance to movement.
- Visual inspection

FINDINGS:

- Statistically speaking, on no occasion were test section data better than the control section data
- The February 8th data supports the visual inspection finding that the control section was firmer than either test section.
- Overall, the data supported the null hypothesis

CONCLUSIONS:

- Equipment normally used for road stabilization is not effective or efficient for stabilization of narrow shoulders.
- Soil stabilizers mixed with crusher run stone do not increase the stiffness or bearing strength of the material or prolong the period of optimum stiffness and bearing strength.
- There is insufficient evidence to determine if soil stabilizers improve a shoulder's short-term resistance to erosion due to the action of water or traffic.
- The cost of using soil stabilizers as short-term surface stabilizers for crusher run stone shoulders is greater than the benefit received.

RECOMMENDATIONS:

- Shoulders should be designed for the anticipated traffic load.
- Soil stabilizers should not be used with crushed stone with the intent of improving or prolonging the CBR of shoulder material.
- Consider additional study of soil stabilizers as a short-term solution to shoulder erosion.



Control Section



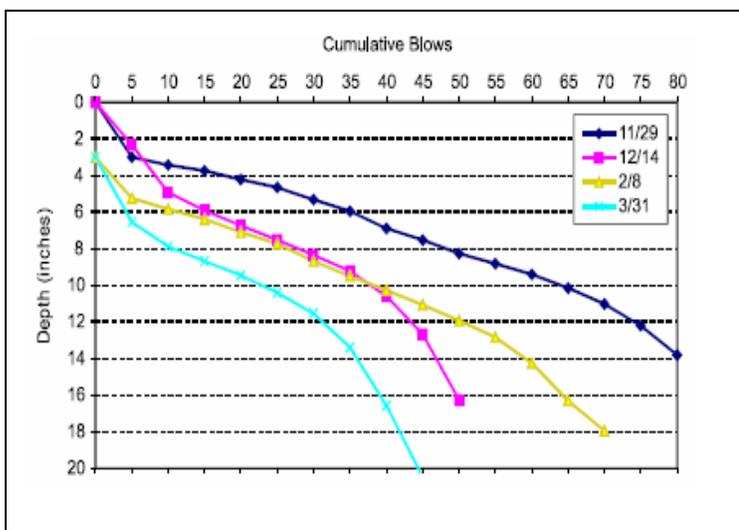
Soiltac-treated Section



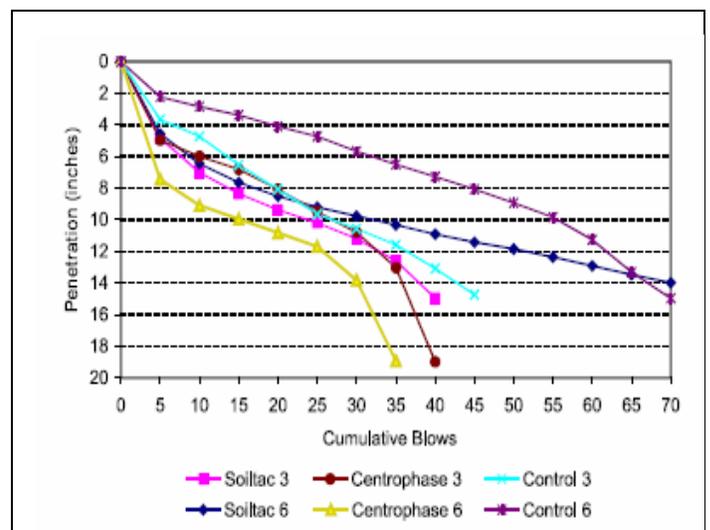
Centrophase-treated Section



Entrance 2/8/2005



DCP Penetration Readings for Sample C-6, by Date



DCP Penetration Data 2/8/2005