

A STUDY OF PERMEABILITY CONTROL WITH ASPHALT EMULSIONS

by

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I N T R O D U C T I O N

Statement of the Problem

The control of soil permeability has been an engineering problem dating as far back as the Roman Empire. Then they sought to control it in canals and aqueducts for rural and urban use. Today some of the problem areas are dams, highway embankments, building foundations, and sewage lagoons. This study deals specifically with the aspects of the latter problem area. The methods employed have been treatment with bentonite and installation of plastic linings. The bentonite has not proved to control the permeability accurately and the plastic linings present problems in construction and economic feasibility.

Purpose of the Study

The purpose of this study was to investigate the usage of asphalt emulsions to accurately control permeability. The asphalt used was a slow curing anionic emulsion. The soil studied was a river valley silt which is commonly the soil underlying lagoons in Kansas. A value of 0.25 inches/day was sought. This value was adopted because it is that set by the Environmental Protection Agency and Kansas Public Health as the maximum permeability rate for low standing sewage lagoons. Any value lower than this results in an increased size of the lagoon and consequently a much higher cost.

Scope of the Study

The scope of this study included a literature review of permeability control with asphalt emulsions and the characteristics of asphalt emulsions. Very little has been published in this area and the author found practically no literature concerning permeability control with asphalt emulsions, but ample literature concerning asphalt emulsions themselves.

The scope also included extensive laboratory experiments to determine the permeability of the soil mixed with varying amounts of asphalt emulsion mixtures. The effect of time on the permeability of the soil-asphalt specimens was studied also.