

Implications of Wetting-Drying Cycles for the Performance of Pavements Systems

Radhey S. Sharma

Department of Civil, Construction, and Environmental Engineering
Iowa State University
Town Engineering Building
Ames, IA 50011-3232

ABSTRACT

Any construction activity involving compacted fills requires an understanding of unsaturated soil behavior. Unsaturated soils comprise three phases: soil solids and pores filled with water and air, whereas in saturated soils the pores are completely filled with water only. In over half of the world the water table is at a considerable depth, which means that the construction activity occurs within unsaturated soils. In such situations the vast majority of geotechnical problems arise from ground movements caused by wetting and/or drying of the unsaturated soil under load. Construction of highways invariably involves unsaturated compacted geomaterials. Elements of pavement system including foundations and subbase are constructed under unsaturated conditions, which are subject to naturally occurring wetting-drying cycles and/or variation of moisture content due to drainage deficiencies. In this paper, key aspects of wetting-drying cycles and implications of such cycles for the performance of pavement systems are analyzed and discussed.

Key words: pavement system performance—unsaturated compacted geomaterials—wetting-drying cycles

Note: Preparation of this paper was still in progress at the time of publication; final results will be presented at the symposium.