

Unsaturated Soil Riverbank Collapse under Water Scouring

Sun Jichao

Tsinghua University, Beijing, China, 100084

Degree: Post Doctor Report

Obtain Time: 2009.10

The unsaturated soil riverbank collapse under the water scouring is studied in the paper, which is in the special conditions of river. Three problems are solved, which are unsaturated soils cracking, unsaturated soils riverbank seepage and the unsaturated soils riverbank collapse under scouring. Experiments, the numerical simulation and the theoretical analysis are used to solve these problems. The secondary cracking is analyzed. And the unsaturated soil cracking mechanism and the cracking spacing are obtained. Then the law of the passion ratio effecting on the soil block size and scale is drawn, that the soil block size is reduced with the increase of the passion ratio. The condition of scouring leading the reducing the seepage from the river to the riverbank is numerically simulated. The soils anti-shear strength distributes with the water content, and the riverbank stability is strengthened. The deterioration formula of the stability of the riverbank under scouring is obtained by analyzing the experiment result, which can be used to forecast the riverbank collapse risky path perforation trend and the stability. A few collapse models are analyzed and the analytical solutions are given. Three collapse modes are analyzed, and the series states model of the three phase collapses is given, treating the three phase collapses as a whole, which is more natural understood.

Key words: Cracking Mechanism, Deterioration, Seepage, Collapse Model