

A STUDY OF FOUNDATION SCOUR IN THE EAST COAST OF SRI LANKA DUE TO TSUNAMI 2004

V. SUTHAGARAN, V. KANDEEPAN and G. KALATHEEPAN

Department of Civil Engineering, University of Peradeniya

Sri Lanka experienced its worst natural disaster on record when the massive earthquake registering 9.0 on Richter scale struck off the coast of Sumatra, Indonesia. The Tsunami, resulting from this earthquake devastated two third of the area of the coastal belt from east to west causing over 31000 deaths and caused direct damage over 2 billion U.S. Dollars. A project was carried out to find out the main geotechnical problems associated with Tsunami. Field observations were made in a selected area of Eastern Coast. The observations revealed that scouring, settlement due to rising pore pressures, and drawdown failures are the most significant of the problems encountered. Because of the limited time and resources available for the study, the data collection and analysis were concentrated on scour problem, the major problem encountered.

The analysis of the effect of scouring around structures in the Tsunami affected area is complicated because of the variable wave length, wave period and wave height of the Tsunami waves with location and time. There are many factors to be taken into account for e.g., coastal topography and bathymetry, the height of the tsunami wave and the inundation distance. It is difficult to analyze the problem in detail without making a comprehensive study of the above factors. Therefore, the study concentrated on evaluating the more salient effects of scour. During the field survey carried out four days in September 2005 in the Batticaloa District of Eastern province of Sri Lanka, the state of about 50 buildings within 200 m of the sea line, in partial state of failure was recorded. For each building distance from the sea front, type of soil, type and geometric details of the buildings and the presence of obstructions on the seaside (if any) were recorded. The details of the scour scar, the depth and the dimensions were also recorded.

The maximum depth of scouring observed varied between 1.2 m to 0.8 m with an average of 0.7 m. The scour hole is of elliptical shape in plan and width of scour varied from 1 m to 4 m. The depth and the width of scour showed no significant reduction with the distance from the building to the sea. The effect of obstruction had no significant effect on the depth and width of scour. The buildings with sharp corners (rectangular buildings etc.) showed more damage than circular or rounded buildings. A design depth against scour of foundation would have been 1.5 m below ground surface in this case, considering the possibility of scour holes getting gradually filled since the occurrence of Tsunami up to the time of observation.