

BEARING CAPACITY MAP FOR BHARATPUR METROPOLITAN CITY ON SHALLOW FOUNDATION

Abstract— Building is safe not only by the correct simulation of the superstructure but also through the analysis of underground soil where all the load of superstructure is being transferred. We can ensure that the building is safe and reliable if foundation stability is considered. Reliability of the building depends not only on the reliability of structural members and the entire structure of the system. Thus, underlying soil strata plays a major role. Shallow foundations are commonly used to support structures of residential buildings having height less than equal to 10 meters. This research takes different analytical methods to find bearing capacity in shallow foundation of Bharatpur Metropolitan City, combines it with PLAXIS-3D analysis and applies integration method, numerical simulation method and GIS for the zonation of bearing capacity of that particular city. Many buildings are constructed in this city without considering the underlying soil strategy and just following the thumb rule of foundation design by structural engineers which could be crucial in coming future. This thesis helps to know the possible bearing capacity of the area and can save time and prevent hazards which is very much necessary for low cost residential buildings.

To carry out this research work, the data from 67 different sites of Bharatpur Metropolitan City was used with 210 boreholes. The step followed are collecting data, selecting and grouping, analytical and numerical modelling and plotting in Bharatpur Metropolitan City map. Bearing capacity has been found using Terzaghi, Meyerhof and Hansen for shear failure criteria and Terzaghi and peck (1948) and Meyerhof (1965) for settlement criteria and least value of bearing capacity is used in zonation mapping. The result of these models is compared by using numerical analysis on Plaxis 3D. Various soil parameters like cohesion, unit weight, frictional angle, Poisson's ratio and elasticity for 1.5m depths have been considered in models as well as in theoretical approaches. The differences between each model is highlighted. Mohr Coulomb failure criteria is used for simulation of soil as a 3-D model with drained condition. The results of the bearing capacity were further verified by the result from PLAXIS 3D to study soil behavior and constitutive models. The study shows that the bearing capacity of Bharatpur ranges from 364.56 KN/m² to 63.77 KN/m² .

Keywords: Bearing Capacity, Bharatpur Metropolitan, Mapping, SPT-N, Plate load test, PLAXIS-3D