

Safe bearing capacity evaluation for the proposed National Testing Services building at Sector H-8, Islamabad

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Islamabad, the capital of Pakistan, is a planned city constructed since 1960 at the foot of the Margalla Hills just north of the old city of Rawalpindi. Rapid growth of both Islamabad and Rawalpindi to a combined population of over 3 million has made ever-increasing demands of shelter for residential and other purposes. It is emerging as a major business involving expert engineering.

The present research focuses on the outcome of geotechnical investigations carried out by GEOENGINEERS, Islamabad assigned by Designmen Consulting Engineers (Pvt.) Ltd. for the construction of the National Testing Services Building Sector H 8/1 Islamabad, having two basements and ten stories. The fieldwork was started on 28th July, 2009 and completed on 16th August, 2009. During the field operation, eight bore holes of varying depth (10 to 18 meters deep) were drilled to evaluate the foundation's bearing capacity of soil, over which the entire proposed building will rest. The soil samples were collected at a regular interval or at any change in the lithology of the strata observed. Selected samples were sent to the geotechnical laboratory to evaluate their index and engineering properties, and their results have been compiled.

The Subsurface soil consists of light brown lean clay (CL), followed occasionally by sandy-silty gravels (SM). The Eastern part of the studied area consists of a few meters dumped rubble material from surrounding construction sites. The standard penetration test data reveals that N-values vary from a minimum of 6 at shallow depths to a maximum of 18 at depth. Geotechnical laboratory analyses for the representative soil samples collected during the drilling of boreholes have also been discussed. Grain size analysis data exhibit that gravel ranges from 0% to 5 %, sand from 5.9% to 29%, silt 63 – 94.1%, and clay 14.7 to 33.1%. The natural moisture content ranges from 11.12% to 24.5%. The soil consistency data reveals that liquid limit for studied samples ranges from 30.7 to 39.1%, plastic limit 22.2 to 29.9%, and the plasticity index from 7.1% to 12.0%. Specific gravity for soil samples are 2.65 g/cc. The unconfined compressive strength varies from 0.91 to 1.15 Kg/cm³. The evaluated dry density is 1.485 to 2.171 g/cc, whereas the angle of repose is less than 26°, indicating gentle fraction. Chemical data reveal that sulfate and chloride are well below hazardous range.