GEOLOGICAL SURVEY FOR A TUNNEL EXCAVATION IN THE URBAN AREA OF SÃO PAULO CITY, BRAZIL

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The studies were carried out along a segment of the future number 4 line of São Paulo subway.The geology of the site is composed by quaternary alluvial deposits and tertiary sediments above gneiss-migmatite with ENE subvertical foliation that belongs to Ibiúna Complex.New geological and geotechnical information were obtained by some drill holes located over some distance from the subway line and by seismic tests (shallow reflection and cross-hole).The gneiss-migmatite was divided into three different groups, based on its mineralogical, textural and structural characteristics as: biotite-gneiss, banded-gneiss and granite-gneiss.The shallow seismic test was successful in identifying these three groups according to the variation of the bedrock depth. It was realized that in the biotite-gneiss domain the bedrock is deeper than in the granite-gneiss domain, while the banded-gneiss has an intermediary depth.Some difficulties were found due to this area has a dense urban occupation. Geomechanical characteristics of the three domain in the rock mass were submited to statistical treatment. The results were extrapolated to the cross section of the tunnel after careful analysis of their relationship between the results of geophysical tests. Granite-gneiss rock mass shows average Q values (Barton et al., 1974) between 4 and 20; banded-gneiss is between 1 and 4 and biotite-gneiss rock mass shows Q values below 1.Laboratory tests have showed that the granite-gneiss rock mass has the best geomechanical indexes, followed by banded-gneiss and biotite-gneiss, in decreasing order. These results are in accordance with in situ investigation.