Disaster Mitigation from an Analysis of a Condemned Building Erected over Collapsible Clay Soil in Brazil

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Abstract : Differential settlement of foundations is a serious pathology in buildings that put at risk lives and property. A common reason for the occurrence of this specific pathology in central Brazil is the presence of collapsible clay, a typical soil in the region. In this study, the foundation of a condemned building erected above this soil is analyzed. The aim is to prevent problems in new constructions, to predict which buildings may be subjected to damages, and to make possible a more precise treatment in less advanced differential settlements observed in the buildings of the vicinity, which includes a hospital, a Military School, an indoor sporting arena, the Police Academy, and the Military Police Headquarters. The methodology consists of visual inspection, photographic report of the main pathologies, analysis of the existing foundations, determination of the soil properties, the study of the cracking level and assessment of structural failure risk of the building. The findings show that the presence of water weaken the soil structure on which the foundation rest, being the main cause of the pathologic settlement, indicating that even in a one store building it was necessary to consider deeper digging, other categories of foundations, and more elaborated and detailed foundation plans when the soil presents this behavior.

Keywords : building cracks, collapsible clay, differential settlement, structural failure risk
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