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USE OF GEOLOGIC MAPPING AND OPTICAL LOGGING TO EVALUATE KARST GEOTECHNICAL RISKS IN AN URBAN AREA, CITY OF SETE LAGOAS, MINAS GERAIS, BRAZIL

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Urban growth in the City of Sete Lagoas (City of Seven Lakes), state of Minas Gerais, Brazil generated significant construction activities, along with an increase in water consumption. These activities together with natural karst conditions have induced subsidence and/or collapse, which happen regularly. For these reasons, the primary goal of this research was to determine the distribution of areas with geotechnical risks based on understanding of the underlying physical mechanisms of collapse development. Using data from geological mapping (scale 1:25,000), aerial photography, lithologic well profiles, optical logs, and previous investigations, a framework was developed for data integration to allow a new geological perspective of the region. Those results helped to define the mechanisms that control the location of subsidence and collapse features in this urban setting. The study showed that the majority of the urbanized area overlies limestone from the Sete Lagoas Formation and unconsolidated sediment from Cenozoic surface coverage contained within a graben, resulting in barrier boundaries for groundwater. This structure together with natural karst processes explains the location of bedding plane conduits and increased hydraulic conductivity. The data indicate that the geotechnical problems in the City of Sete Lagoas are related to both natural factors (unconsolidated sediments deposited over the limestones) as well as the anthropogenic influences related to decreases in the water table in areas with solution features. The use of the geological mapping with lithologic wells logs and optical logs, besides being an inexpensive method, takes advantage of information already available in the cities that have these geotechnical problems. The integrated data approach should improve scientific understanding and sustainable management in areas with urban karst aquifers.

Handouts
- Use of Geologic Mapping and Optical Logging - Copy.pptx (17.3 MB)

Session No. 184

T82. Enhancing the Toolkit for Karst Investigations
Tuesday, 21 October 2014: 8:00 AM-12:00 PM

208/209 (Vancouver Convention Centre-West)
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