



## **A GIS-Based Assessment of Liquefaction Potential of the City of New Damietta, Egypt**

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Liquefaction hazard has been recognized as a major cause of damage during earthquakes. In this paper the liquefaction potential of New Damietta city was evaluated deterministically and probabilistically. For a deterministic approach, the Simplified Procedure (Seed and Idriss, 1971) was used. Probabilistically, the probability of liquefaction formula based on Bayesian updating given by Cetin et al, 2004 was applied. Liquefaction assessment of Damietta city was performed on two basis of evaluation. Firstly liquefaction was analyzed at each depth for the all the available soil profiles within the area. The purpose of this method was to try to identify a critical layer through the whole area where liquefaction is highly expected to liquefy. The types of sediments most susceptible to liquefaction are the saturated sand deposits that are located at depth between 3 to 8 meters reaching 15 meters in some locations. The second manner of liquefaction evaluation was based on calculating an integrated value along the soil profile given by liquefaction potential index "LPI". LPI was used to spatially identify the soil with potential to liquefy. Hazard maps of the liquefaction susceptibility of areas in the city of Damietta were displayed using the Geographic Information System (GIS). The map showed that there is a spatial variability in the results obtained which made it difficult to clearly separate between regional areas of high or low potential to liquefy. However it could be noticed that the western parts of Damietta tend to have a high potential to liquefy, whereas the eastern parts of the city have a low potential to liquefy. As a result of spatial variability observed in LPI values across the area and the presence of a thin layer of liquefiable soil even in profiles of low LPI value, it was more useful to evaluate the liquefaction susceptibility of this area based on identifying a critical layer of high potential to liquefy throughout the whole region.

Key terms: liquefaction, GIS, Egypt, hazard map