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GENERIC GIS APPLICATION FOR MANIPULATING SPATIAL AND NON-SPATIAL GEOTECHNICAL DATA

By

Eng. Amal Abbas Abdel Sattar

B. Sc. in Civil Eng., Cairo Univ.,1994

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
STRUCTURAL ENGINEERING
(Construction Management)

Under the Supervision of

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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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ABSTRACT

Construction industry deals with vast amount of data through planning, design and construction phases. Subsurface information and geotechnical data are one of the most essential data to the proper phases of construction projects. During early project stages, there is a need to retrieve information about old jobs in the vicinity of proposed jobs. Such information is useful in the determination of required number of boreholes, the testing method and the type of foundation. The traditional approach to the retrieval of this information is to consult the senior engineers and then reference a manual system to pull out detailed reports. The problem with this is that the increase in the number of jobs in various areas makes it impractical to rely on the memory of the senior engineers.

In this thesis Geographic Information System was developed for the input, manipulation, analysis and output of geotechnical data for Tourist Resort in South of Quseir - Red Sea. This system was developed by integrating the spatial data and the attribute data. The spatial data consists of a number of data layers such as boreholes locations, border of the study area and shoreline of Red Sea. The attribute data consists of information obtained from the technical report such as boreholes profiles data and data of tests that was performed on the samples of borehole. This system enables the decision maker to display all data that was linked to boreholes, predict land profile at any given point, draw borehole profile and borehole samples, draw contour lines for the study area, enter new boreholes and the data linked to them, determine the nearest borehole or boreholes for a specific point, update the data of existing boreholes and query about boreholes that coincides with specific conditions. It makes the decision process much easier by providing to the decision-maker accurate information, speed processing, ease of updating and appending of data, ease of use to non-specialists in computer, and generalization of the system for other areas.

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