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FACULTY OF ENGINEERING
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LAKES INDUCED SOIL SUBSIDENCE AND
DEFORMATION

BY

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DISSERTATION

SUBMITTED FOR PARTIAL FULFILLMENT OF
THE DEGREE OF M.Sc.

IN

CIVIL ENGINEERING

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FAYOUM – EGYPT

2006

ABSTRACT

Artificial lakes are usually created by construction of dams and have several purposes, first, they store water that can be used in irrigation systems, reservoirs may constitute storage of drinking water if the water quality meets the necessary requirements, artificial lakes can also be employed to generate energy if a hydropower plants are incorporated in dam structures, dams are built and reservoirs are created also to control floods and regulate river flows, artificial lakes can support fisheries as well as a variety of recreational activities, all the above aspects of water reservoirs are beneficial to human societies, irrigation systems allow for the development of agriculture in arid areas characterized by low precipitation". Clean, large reservoirs provide towns and cities with constant supply of drinking water. Artificial lakes supporting large fish populations are important for fishery development, dams are capable of preventing severe floods that cause serious damage to property and may even claim human lives. Regulation of the stream flow below the dam may assure that river does not dry out even in extremely dry seasons, but there are hazards to construction of these lakes which may cause damage to the near structures, towns and cities due to the stresses and deformation induced by these lakes, which considered a new structure on the soil. Specially when the geological formation of the soil contains faults and fractures of a different shapes and directions, where the change of stresses in the soil can causes change in shear resistance of the fault plane to reach the failure limit, and the fault begin to slide and causes movement of the soil layers on each other, this movement can causes earthquakes which called reservoir induced seismicity (RIS).

This research study the effect of construction the artificial lakes, new reservoir on the stress, deformation field of the soil, study the effect of the geological formation of the soil in the case of faults, fractures with a different places, different directions, determine the magnitude of induced stresses, deformations, to use it for the check of stability of the adjacent structures, and this research can decide that the chosen place to construct the lake is suitable or not. And the safe distance of the adjacent structures away from the lake.