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**Impact of Weathering Grade on the Petrological and Engineering
Properties of Some Egyptian Metavolcanics for Utilization as Concrete
Aggregate.**

By

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The present thesis is submitted by Mohamed Mostafa to Faculty of Science, Ain Shams University in partial fulfillment of the requirement for the degree of Master of Science in Geology. Beside the research work materialized in this thesis, the candidate has attended postgraduate courses covering the following topics:

1. Field Geology.
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ABSTRACT

Concrete plays a great role in the security and safety to maintain human life. It is composed of cement and rock aggregates. The latter components are naturally formed in geological environment and they are affected by the weathering conditions surrounding them.

The mutual interaction between the cement, as a binding material, and the metavolcanic concrete aggregates, as natural aggregates, affects the engineering characteristics of the concrete blocks. Such interaction is mainly affected by physical characteristics, aggregate mineralogy, petrography, chemistry, pore system and weathering process.

This research proposal is aiming mainly to integrate both the mineralogical and petrographical characteristics of the different types of metavolcanic rocks and their engineering characteristics to be used as concrete aggregates. Such study will endeavour the classification of Egyptian metavolcanic rocks engineering wise.

This research will focus in details, on the metavolcanic aggregates pore systems and mineral/petrographic characteristics. It relates these data sets to the geotechnical criteria of both the individual aggregates and the formulated concrete blocks. It also considers the reaction zones between the binding material, cement, and the metavolcanic aggregates to explain the possible mineral transformations and their positive/negative impacts.

There is a priority for promoting and fostering economic development of territories outside the Nile valley, especially in the areas around the Red Sea. Most of these areas are surrounded by mountains and valleys composed mainly of hard rocks and filled with metavolcanics and Wadi deposits, respectively. Therefore, detailed studies are important to investigate how far would the metavolcanic rocks can help as unconventional natural concrete aggregates. Metavolcanics represent a group of regionally metamorphosed volcanic rocks and their pyroclastic and tuff equivalents. In Egypt, metavolcanics are found in different locations in Southern and Central Eastern Desert.

The metavolcanics rock aggregates were used in this study classified into basic, intermediate, intermediate-acidic and acidic rocks. Such differentiation induces variation in the mineral and chemical compositions, petrography, physical characteristics and pore system. These characteristics would affect the suitability of the different metavolcanics as concrete aggregates. In this research, the selected areas are located in the Southern and Central Eastern Desert. The Southern Eastern Desert are Shadli area El Sukkari in Idfu Marsa Alam and Central Eastern Desert embraces two location Ambagi area and Sid areas and

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