GENERAL ORGANIZATION FOR HOUSING, BUILDING & PLANNING RESEARCH

Strength - of - Materials Research & Quality Control Division

AN INVESTIGATION OF THE POTENTIALITY OF GREEK PORTLAND POZZOLANA CEMENT FOR CONSTRUCTION PURPOSES IN EGYPT

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FORWARD

The construction plan in Egypt has been, recently, too ambitious that the total amount of cement produced locally is not sufficient to fulfil the needs. Consequently the importation of cement has become necessary. Portland Pozzolana Cement is among the brands which may be imported. Although this type of cement has been produced and used in different countries, it has not yet been accepted in the building industry in Egypt. Reluctance to its use may be attributed to the fact that it is not locally produced, and when Egypt started to import cement, no attempt was done to provide builders with necessary information about its properties and field of application.

The present study is carried out with a view to provide builders with necessary information about the properties and potentials of Portland Pozzolana Cement for successful utilization in mortars, concrete making and different applications.

S Y N O P S I S

The study was carried out under the fulfillment of the protocol of a contract between the Greek Cement Industry Association and the General Organization for Housing, Building and Planning Research, Cairo. The contract was agreed upon on February 8th, 1979.

The scope of the study covers the technological aspects of using Portland Pozzolanic Cement. The phases of the study are separate researches for determining the status of Portland Pozzolana Cement with respect to the requirements of the Egyptian standard specifications for Ordinary Portland Cement, investigating the properties of mortars, properties of concrete and the behaviour of some reinforced concrete elements.

It has been found that Portland Pozzolana Cement containing 10% of pozzolana can be used safely and satisfactorily for different concrete works in replacement to the Ordinary Portland Cement.

All conclusions are only applicable to concrete and mortar mixes made of the same Portland Pozzolana Cement investigated in the present study. Also the mixes have to be made of materials having similar properties and similar proportioning as the corresponding present constituents.

A C K N O W L E D G E M E N T S

The carryout of this programme and the preparation of the reports was a team effort on the part of the staff of both the Strength-of-Materials Research & Quality Control Division and the Central Laboratory, General Organization for Housing, Building and Planning Research, Cairo. The team leader and the principal investigator would like to express their appreciation of the efforts and contribution of the members of the staff to this study.

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Ezzat H. Morsy — 30.11.1979

M. Moustafa El-Said — 30.11.1979

M E M B E R S   O F   T E A M

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NOTATION

GOHBPR	General Organization for Housing, Building and Planning Research
AGCI	Association of the Greek Cement Industry
SMR & QCD	Strength-of-Materials Research & Quality Control Division
PPC	Portland Pozzolana Cement
OPC	Ordinary Portland Cement
f	Stress
ε	Strain
f_c	Concrete stress in compression
f_{cu}	Concrete ultimate strength in compression
f_{ccu}	Concrete ultimate cube strength in compression
f_{clu}	Concrete ultimate cylinder strength in compression
$f_{ccu3,7,14,28}$	Ultimate concrete cube strength at the ages of 3,7, 14 and 28 days respectively
f_t	Concrete stress in tension
f_{tu}	Concrete ultimate tensile strength
f_{tfu}	Concrete ultimate splitting tensile strength
f_{bu}	Concrete ultimate bond strength between concrete and steel reinforcement
E_c	Modulus of elasticity of concrete in compression
E_s	Modulus of elasticity of steel
P_u	Ultimate failure load in compression
M	Bending moment
M_r	Cracking bending moment

M_u Ultimate bending moment

ε_c Strain in concrete

ε_s Strain in steel