GENERAL ORGANIZATION FOR HOUSING, BUILDING & PLANNING RESEARCH
P.O.B. 1770 Cairo - Tel. 981703 - 984564 - Cable Address : HOUDPLAN Cairo
Strength - of - Materials Research & Quality Control Division

PROJECT

AN INVESTIGATION OF POROMENT-POROUS-CONCRETE IN EGYPT

Non-autoclaved light-weight concrete produced by using Poroment as an additive.

Principal Investigator
Prof. Ezzat H. Morsy, M. Sc., Ph. D. Eng.
Head of SMR & QC Division

Applicant

Ali F. Abu Kandil, B.Sc. Civil Eng.,
with Saamoconsult APS Copenhagen - Denmark

19

A B S T R A C T

On the basis of this experimental study carried out on Poroment-Porous-Concrete it could be defined as: "A non-autoclaved aerated concrete consisting of sand, cement, Poroment and Sapora."

In addition to its potentialities and advantages as a light-weight type, Poroment-Porous-Concrete has three main distinct features:

First:

It needs aluminium-flakes (Sapora) contents much less than normally used for production of all aerated concrete types.

Second:

It is produced without high pressure steam-curing process which has been unavoidable for the production of the aerated concrete since 1924.

Third:

Since it does not need such process, Poroment-Porous-Concrete has become appropriately flexible for production on big construction sites as well as in central factories.

S Y N O P S I S

The study was carried out under the fulfillment of the protocol of a contract agreed upon on October 9th, 1980, between two parties:

First: Ali Fouad Abu Kandil, B.Sc. Civil Eng., jointly with SAAHOCONSULT APS - Copenhagen, Denmark.

Second: General Organization for Housing, Building and Planning Research, Egypt.

According to the protocol, the study has been planned with the intension to establish some basic data on Poroment-Porous-Concrete produced with Egyptian ingredients under the prevailing climatical conditions in Egypt and Danish Poroment and Sapora. The latter has not been used before in the field of concrete technology in Egypt. Thus it was agreed upon to orient the scheme to cover, mainly, the basic mechanical properties as well as some of the physical ones.

With the used Alexandria sand, Egyptian ordinary Portland cement and Poroment+Sapora (as supplied by the applicant), it has been found that both the density and the compressive strength, as domenating properties, could be deliberately obtained over a wide range for each. These ranges are very similar with previous data on other types of aerated or porous types of concrete necessarily produced with autoclaving process. However for practical, technological and economical purposes optimization may be achieved around two categories:

	Grade 1	Grade 2
Density - Mg/m^3	<1.1	1.12-1.5
Compressive strength - MN/m^2	4.6-6	6 - 7
Poroment content/m^3 finished concrete-gm.	2500-6000	4000
Sapora content/m^3 finished concrete-gm.	380	250-380

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

The carryout of this programmed study and the preparation of the report was a team effort on a part of the staff of both the Strength-of-Materials Research Division and the Central Laboratory, General Organization for Housing, Building and Planning Research, Cairo. The team leader would like to express his appreciation of the efforts of participating staff.

Acknowledgements are gratefully given to the Chairman of the Board and the Director, General Organization for Housing, Building and Planning Research, for the facilities offered by the Organization.

Ezzat H. Morsy

E.H. Morsy

Team Leader
and
Principal Investigator

August, 1981

MEMBERS OF TEAM

Team Leader & Principal Investigator

Prof. Ezzat H. Morsy*, B.Sc., M.Sc., Ph.D., Eng.
Head of Strength-of-Materials Research Division
GOHBPR.

Senior Research Group

- F.E. El-Refai*, B.Sc., M.Sc., Ph.D., Eng.
  Researcher, SMRD, GOHBPR.
- O.A. Salah El-Din*, B.Sc., M.Sc., Ph.D., Eng.
  Researcher, SMRD, GOHBPR.

Research Group

- H.H. Bahnasawy, B.Sc., M.Sc., Eng.
- N. Nofal, B.Sc. Eng.
- G. Hegab, B.Sc. Eng.

---

* Report preparators in addition to their participation in investigation.

TABLE OF CONTENTS

L I S T O F T A B L E S

LIST OF ILLUSTRATIONS

Section EIGHT

Figure 8.9 Flexural Strength as a Function of the Compressive Strength for PPC.

Figure 8.10 Bond Strength as Influenced by Portment Content.

LIST OF PHOTOS

NOTATION

GOHBPB	General Organization for Housing, Building and Planning Research
SMRD	Strength-of-Materials Research and Quality Control Division
P	Porement
S	Sapora
PPC/P.P.C	Porement Porous Concrete
C	Compressive Strength
T	Splitting Tensile Strength
F	Flexural Strength
$/m^3$	per 1 m^3 of finished hardened PPC
N	10 Kg
MN/m^2	10 Kg/cm^2
Mg/m^3	t/m^3
E	Modulus of Elasticity = MN/m^2