



شبكة المعلومات الجامعية

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شبكة المعلومات الجامعية  
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# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

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**BEHAVIOURS OF BUILDING MATERIALS FOR  
LINING TUNNELS  
CONSTRUCTED UNDERNEATH SALINE WATER**

**M . S<sub>c</sub>. THESIS**

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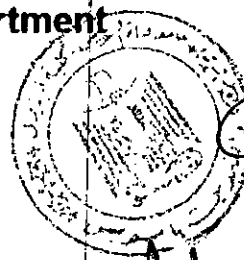
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At the beginning and at the end Praise be to Allah, Lord of the worlds. The Beneficent, the Merciful, Master and King of the Day of Judgment. And Peace be upon His last Prophet Muhammad.

# **ABSTRACT**

# **BEHAVIOURS OF BUILDING MATERIALS FOR LINING TUNNELS CONSTRUCTED UNDERNEATH SALINE WATER**

by  
**YOUSEF ABDALLAH YOUSEF**

## **ABSTRACT**

The increasing demand for underground constructions, especially tunnels, has led to widen worldwide the areas of research in this field. The main concern of most investigations in this field was to prevent any deterioration could occur to these constructions due to the environment surrounding them, and hence lengthen their life. Therefore studying the behaviour of construction materials which are subjected to aggressive surrounding media, such as saline water or acidic water the prime concern of most research works.

The main body of most various purposes tunnels being made of concrete and reinforced concrete. This main body is almost attacked by the aggressive media which are present in the water saturating the covering soil or rock strata.

The present work high - lights the results of a research programme that has treated this subject.

Usually, the concrete constituents are cement, aggregates and water. The aggregates themselves are of two kinds, coarse and fines.

Natural sands are usually used as fines. However, coarse aggregates may be crushed stones or natural gravels. Cement, being of various types, as well. Clean fresh water is always recommended to be used in manufacturing and curing the concrete. Hence, the programme of the present research will be systematically directed towards the first two components ( i.e, cement and coarse aggregates) which having several types.

In the present work, three types of coarse aggregates varying in their chemical and physical properties were employed. They are natural gravels, crushed dolomite and crushed basalt gravels. The cement was also of three types, ordinary Portland, iron slag and sulphate resisting cement, to make nine different types of concrete.

Hundreds of concrete cubes (150 x 150 x 150 mm ) were cast of each type of cements and aggregates. These cubes were subjected to enviromental conditions similar to those facing the underground constructions. These cubes were tested for their strength changes due to these various enviromental conditions with the progress in time. . The results indicated that all parameters which were investigated have great effects on the made up concrete.

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