



**Effect of Hydrophobic Water Repellent Compounds on
Concrete Compressive Strength in Aggressive
Ambient
(Dead Sea zone as a case study)**

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COMMITTEE DECISION

This Thesis
**Effect of Hydrophobic Water Repellent Compounds on
Concrete Compressive Strength in Aggressive Ambient
(Dead Sea zone as a case study)**

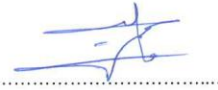
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Dedication

This study is dedicated with love to my father Rashed Ahmed Al-Shirah, my first teacher who encourages and supports me all the time, to my mother and to my brother Wasfi rashed Ahmed Al-Shirah for their endless support and wishes.

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Abstract

The compressive strength of concrete may be affected by the infiltration of saltwater. Dead Sea water is hazardous for concrete for the high concentration of salts. This study aimed to investigate the effect of water-repellent admixture on the compressive strength of concrete in highly aggressive ambient such as Dead Seawater and to determine the optimum percentage of admixture to be used. The study adopted an experimental approach in which the samples were divided based on the type of cement and the sample's age. Three types of cement were used (Ordinary Portland Cement, Pozzolana Portland Cement, and Sulphate Resistant Cement) with various percentages of water repellent admixtures (0%, 2%, and 4% of cement weight). Nine control samples were cured in natural water to ensure that the required compressive strength was reached and (54) samples were cured in Dead Seawater. The samples were tested at 7 and 28 days. From the results, it can be seen that a reduction in the 28-day compressive strength occurred in all specimens for the three types of cement used, but with the addition of water repellent, this reduction was alleviated, and the optimum percentage of admixture was 2% of cement weight.

Key words: compressive strength, aggressive ambient, water repellent admixture, Dead Sea water.

الملخص

تتأثر مقاومة الانضغاط للخرسانة نتيجة التعرض للمياه المالحة. مياه البحر الميت خطرة على الخرسانة بسبب تركيز الأملاح فيها. الهدف العام من هذه الدراسة هو دراسة تأثير المضاف الطارد للماء على خاصية الانضغاط للخرسانة في مياه البحر الميت وتحديد أفضل نسبة يتم استخدامها من المضاف الطارد للماء. اتبعت الدراسة منهجاً تجريبياً قسمت فيه العينات على أساس نوع الأسمنت وعمر العينة. تم استخدام ثلاثة أنواع من الأسمنت (الأسمنت البورتلاندي العادي، الأسمنت البورتلاندي البوزولاني، الأسمنت المقاوم للاملاح) بنسب مختلفة من المواد المضافة الطاردة للماء (٠٪، ٢٪، ٤٪ من وزن الأسمنت). تم معالجة (٩) عينات في المياه الطبيعية للتأكد من الوصول إلى مقاومة الانضغاط المطلوبة ومعالجة (٥٤) عينة في مياه البحر الميت. تم إجراء الفحص على عمر ٧ و ٢٨ يوم من تاريخ الصب. من النتائج، يمكن ملاحظة الانخفاض في مقاومة الانضغاط للخرسانة خلال الـ (٢٨) يوماً في جميع العينات للأنواع الثلاثة من الأسمنت المستخدم، ولكن مع إضافة مادة طاردة للماء، تم تدني هذا الانخفاض، وكانت النسبة المتلى للمضاف هي ٢٪ من وزن الأسمنت.

الكلمات الرئيسية: مضاف طاردة للماء، مياه البحر الميت، خرسانة، بيئة معادية.