

# الآية

قال تعالى:

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

فَمَا أَوْاتِ وَأَنْزَلَ رُضٍ وَ اخْتِلَافِ الْيَلِ وَ النَّهَارِ وَ الْفُلُوكِ الَّتِي تَجْرِي فِي  
بِمَا يَنْفَعُ النَّاسَ وَ مَا أَنْزَلَ اللَّهُ مِنْ السَّمَاءِ مِنْ مَّاءٍ فَافْتَالُوا فِي رُضٍ بَعْدَ مَا وَتَّهَا  
دَابَّةٍ وَ وَتَبَثَّرَ يَفِ الرِّ يَاحِ وَ السَّحَابِ الْمُسَخَّرِ بَيْنَ السَّمَاءِ وَ الْأَرْضِ  
لَا يَأْتِ لِقَوْمٍ يَعْقِلُونَ

صدق الله العظيم

سورة البقرة الآية (164)

# *DEDICATION*

*To my father..*

*To my mother..*

*To my Sister..*

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*In preparing this thesis, I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts.*

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## ABSTRACT

The aim of this study was to evaluate the performance of high strength Concrete (HSC) containing supplementary cementations materials (Silica Fume) and to find optimum range of silica fume content in the mix.

In these study we prepared to tested some properties of high strength concrete 60 mpa in both fresh and hardened cases used slump test , compressive strength test and absorption test . The mix content silica fume in deferent percentage: 0.00%, 5.00%,10.00% and 15.00% replacement . 12 cube at each percentage tested at 3,7,28 days . Tested using local Sudanese aggregates with replacement (Silica Fume) and super plasticizers MCs 100 with 0.8%, 1%, 1.2% liter /100 kg c.m. Various percentages of silica fume (SF) were added at one water/cementations materials ratios (w/c.m).

The methodology adopted to achieve the objectives of the research focuses mainly on a collection of data from different sources, an extensive review of previous studies, designing concrete mixes and implementing a lot of laboratory experiments using different ratios of silica fume and super plasticizer with low water contents. Ninety six of specimens were performed and 8 trial mix design of grade (60 MPa) HSC had been success fully produced and their mechanical properties were measured and documented.

From these research we observed that the storage of silica fume has very important in final result ,whence silica fume replacement increases the slump test and compressive strength decreases as a result of bad storage

## المستخلص

يهدف هذا البحث الى تقييم اداء الخرسانة عالية المقاومة والمتضمنة مواد أسمنتية (غبار السيليكا) كما يهدف الى إيجاد النسب المثلى من غبار السيليكا للحصول خرسانة تصل مقاومة إنضغاطيتها إلى 60 نيوتن/ملم<sup>2</sup>. إشمطت الدراسة على برنامج للتجارب المعملية يشتمل على إختبار المواد الأولية ومن ثم إختبارات الهبوط ، إختبار مقاومة الضغط ، وإختبار الإمتصاص. تحتوى الخلطة على نسب إحلال غبار السيليكا بنسب 0،5%، 10%، 15% من وزن الأسمنت.

تم إعداد 12 مكعب لكل نسبة إحلال وإختبارها فى اعمار 3،7،28 يوم وأستخدم الركام المحلي كما تم إستخدام الملدنات فائقة الفعالية بنسبة (0،8 ، 1،2،1 لتر لكل 100كجم من المواد الأسمنتية). ولتحقيق أهداف البحث تم إتباع منهجية اولا تم تجميع البيانات من مصادر مختلفة ومن ثم إجراء مراجعة شاملة للدراسات السابقة ، وتصميم الخلطة الخرسانية تبعا للمواصفة البريطانية وإجراء الإختبارات المعملية مع إستخدام نسب الإحلال المختلفة من غبار السيليكا والملدنات فائقة الفعالية وكانت نسبة الماء إلى الأسمنت فى الخلطة (0،33).

تم صب 96 عينة لعدد 8 خلطات تجريبية لخرسانة مقاومتها(60 ميغا باسكال ) ومن ثم قياس الخواص الميكانيكية لها.

من خلال هذه الدراسة تبين أهمية التخزين الجيد لمادة غبار السيليكا حيث أعطت نتائج سلبية وذلك بخلاف ما ذكر فى الدراسات السابقة إذ ان زيادة نسبة غبار السيليكا فى الإحلال ادت الى نقصان نتائج إختبارات الهبوط ومقاومة الضغط للخرسانة ويعزى ذلك الى سوء التخزين.

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