

Abstract:

Most of the present studies related to the field of construction industries tend to make use of the local materials as substitutes for the imported and necessary materials for some of the practical applications. This is so, especially in the fields of concrete production that can be used in production light weight concrete masonry blocks.

For this reason, this study aims at looking for the possibility of using local aggregate. (ordinary aggregate., crushed clay bricks and porcelinite aggregate.) for the purpose of producing suitable light weight concrete as far as physical and mechanical properties are concerned. These kinds of concrete were used some masonry units for Baghdad Mayoralty works.

The practical face of this study can be divided into four parts. In the first part "a no-fine aggregate. concrete" was produced using ordinary aggregate., crushed clay bricks and porcelinite as coarse aggregate.. While the second part included producing light weight concrete by using crushed bricks as fine and coarse aggregate. or coarse aggregate. only with the use of ordinary fine aggregate. However, the properties of the produced concrete have been studied as far as density, bulk absorption, strength and ultrasonic pulse test are concerned.

The third part tackled producing a light weight concrete using porcelinite rocks as fine and coarse aggregate. or as coarse aggregate. only with ordinary fine aggregate. The fourth part is about choosing the produced mixes (the mixes which showed better performance as far as low density is concerned with keeping acceptable strength) for producing masonry units (concrete bricks and kerbs units) which can be used for Baghdad Mayoralty projects. The produced units were compared with improved reference samples or made by using ordinary concrete.

The results of no-fine aggregate. concrete clarified that the dry densities of concretes are between (1490-1800), (1040-1145), (1070-1210) kg/m³. The compressive strength falls between (2.5-10.0), (2.0-5.0), (5.5-9.5) N/mm². While the splitting tensile strength was about (0.171-0.620), (0.137-0.31), (0.376-0.589) N/mm². Finally the values of the modulus of rupture got to (0.33-0.882), (0.264-0.382), (0.794-0.470) by using the ordinary coarse, crushed brick and porcelinite aggregate respectively.

The values of dry concrete density for crushed bricks concrete ranged between (1160-2110) kg/m³ while the results of compressive strength varied between (22.5-39.5) N/mm². The values of splitting

tensile strength were (1.655-4.806) N/mm². The modulus of rupture got to (3.748-7.276) N/mm².

The absorption was about (7.73-13.25)% depending on cement content in the mix and containing superplasticizer addition and replacing the fine aggregate. Ultrasonic pulse velocity reached to (3.597-4.664) km/sec.

The dry density of the porcelnite concrete was (1520-2018) kg/m³, while the compressive strength of this concrete was between (9.0-37.0) N/mm². The splitting tensile strength fluctuated between (1.375-4.299) N/mm². The total absorption was (4.71-10.85)% depending on the properties of concrete mix. Finally, the ultrasonic pulse velocity was between (2.166-4.539) km/sec. All the results above were considered for the samples at (28) days age .

The use of the different kind of light weight concrete is proper to produce masonry units for Baghdad Mayoralty needs. The production of these kinds lead to multi benefits related with cost reducing and environmental advantages besides to things related with the production increase, handling, carrying and manipulating them properly. In addition to the features that the light weight concrete presents like fire resistance, thermal insulating and the like.