

Benefits of using pieces of crushed brick in the concrete



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17 May, This research was conducted to study the benefits of using pieces of crushed brick in the concrete in place of the aggregates that are conventionally used. It is the most widely used construction material because of its ease of making and rapid availability of the materials from which it is made. Aggregates in the concrete make the concrete weather resistant through their design and composition. Brick can not be considered a suitable material for mixing in concrete if its weather resistance is declined. To increase the durability of concrete structures, Romans tried several materials in place of aggregates. Owing to the lower modulus of elasticity and higher tensile strength than stone aggregate concrete, brick aggregate concrete is considered a suitable option. Three different concrete mixtures were produced and tested in different conditions. The first sample group was made of 100% gravel, the second sample group contained 100% crushed bricks and the third sample group contained 50% bricks and 50% gravel. A total of 33 concrete cubes were cast, 11 from each group. The concrete cube samples were subjected to repeated cycles of the frosting and thawing process to simulate the real-world conditions. For each concrete mixture, 3 of the cubes were not frozen at all, 3 cubes underwent 10 freeze-thaw cycles and the last 3 cube samples were subjected to a maximum of 20 freeze-thaw cycles. The remaining 2 cubes were subjected to the oven temperatures to determine their porosity. Each concrete cube was tested for its compressive strength, and tensile strength. Brick concrete showed more compressive and tensile strength than ordinary concrete because of lower w/c ratio. Conclusion: The mix of concrete that contained 100 per cent brick showed better performance in tests than the other two mixes. This can be attributed to the fact that porous bricks absorb more water and reduce the

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free water in the mix, thus lowering its free w/c ratio, and improving its compressive and tensile strength. After the 20 freeze thaw cycles, no reduction in the compressive strength of any of the three mixes was noticed. This leads to the conclusion that brick when used as 100% aggregate in the concrete has no significant effect on the performance of concrete in freezing / thawing cycles. Therefore, brick concrete can be used commercially for non-structural concrete as well as in the cementitious sub bases for highways because of the advantage it offers as compared to the stone aggregate in terms of lower cost and lower workability. The low workability achieved with brick may not be practicable for most site concrete but would satisfy stabilized sub base requirements. This makes brick concrete a very useful material for the sub base. Further investigation will be needed to predict the variation expected from the source of brick and consideration given to the use of plasticizers to increase the workability of fresh concrete. Future research can generate valuable information and validate the results of this research by experimenting on more samples than 3. Moreover, experiments can be conducted on different types of bricks as coarse aggregate and more number of freezing and thawing cycles.