

Compression Strength of Concrete and its Role in Resisting Acid Environment¹

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Abstract

During the last two decades of the last century a considerable development happened in concrete manufacture, such as high resistance concrete (60-100 MPa), and polymer concrete ... etc. And the most important issue in research laboratories became to maintain a good performance of concrete, and concrete structures and reinforced concrete structures safety against destructive environments, depending on concrete durability enhancement.

For a long time concrete degree evaluation used to be done according to it's mechanical compression resistance, not considering any other effects. But because of the fast development and variation of construction, compression strength became no more the essential issue to evaluate the concrete, especially when concrete is being attacked by chemicals, acid, sulphates, .. etc.

Thus the purpose of this research was to concentrate on this subject, where four types of concrete mixes of the same shape were prepared (Abrams settlement about 20 cm), but the cement content and compression strength in each mixture were different, all samples were exposed to destructive acid effect (nitric acid, sulphuric acid) of a ratio 3% and $\text{PH} \leq 4$.

¹ For the paper in Arabic see pages (9-35).

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Results obtained from uncovered with polymer or epoxy concrete samples submerged in acid shows loss in weight and strength of samples. In the high strength samples the ratio of strength loss was higher, while the strength of samples covered with polymer and submerged in acid didn't change. This indicates, that it would be much better to cover concrete surface with high chemical resistance paints, than to raise the compression strength according to the available conditions.