

EFFECT OF REPLACEMENT OF CEMENT BY METAKAOLIN ON THE PROPERTIES OF HIGH PERFORMANCE CONCRETE SUBJECTED TO ACID ATTACK

D.VISWANADHA VARMA¹ & G. V. RAMA RAO²

¹Research Scholar, Andhra University College of Engineering, Visakhapatnam, Andhra Pradesh, India

²Professor, Department of Civil Engineering, Andhra University College of Engineering,
Visakhapatnam, Andhra Pradesh, India

ABSTRACT

Metakaolin is a valuable admixture for concrete or cement applications and it is a pozzolanic additive product which can provide many specific features. Amongst the various methods used to improve the durability of concrete, and to achieve high performance concrete, the use of Metakaolin is a relatively new approach.

The present study includes the effect of partial replacement of cement with metakaolin by various percentages (0%, 10%, 15%, 20%, 25% and 30%) on the properties of high strength concrete, when it is subjected to acid (HCL, H₂SO₄) attack. Concrete specimens were casted to find compressive strength and cubes are tested for durability studies with present H₂SO₄ and HCL of 0.5% and 1% concentrations. Cubes, cylinders and prisms are tested for temperature study with 15% replacement of cement by Metakaolin. The specimens were heated to different temperatures of 100°C, 200°C, 300°C, 400°C and 500°C for three different durations of 1, 2 and 3 hours at each temperature. After heat treatment, the specimens were tested for compressive strength, split tensile strength, flexural strength and stress-strain behavior. The results conclude that the use of Metakaolin Concrete (MKC) has improved the performance of concrete under various conditions.

KEYWORDS: Metakaolin, High Strength Concrete, Temperatures and Acidic Medium