

ASSESSMENT OF SUSTAINABLE CONCRETE USING CARBON BLACK DUST AS AN ADDITIVE ADMIXTURE

Pravar PARASHAR ^{a*}, Prityumn NAGAR ^a, Ritik NEEMA ^a, Rutul KHADSE ^a, Ashish NIM ^b

^aUG Student; Civil Engineering Department (NBA Accredited), IPS Academy, Institute of Engineering and Science, Indore, INDIA. (A UGC Autonomous Institute)

*E-mail address: 22pravarparashar@gmail.com

^bAssistant Prof.; Civil Engineering Department (NBA Accredited), IPS Academy, Institute of Engineering and Science, Indore, INDIA. (A UGC Autonomous Institute)

Received: 14.04.2021; Revised: 18.10.2021; Accepted: 8.11.2021

Abstract

Concrete is the most essential and demanding construction material that is mainly used to develop structural and non-structural elements. Along with the better engineering properties, concrete has its drawbacks like the presence of pores and micro cracks, and this affects its properties like permeability and water absorption which tend to reduce its durability and strength. Carbon black dust (CBD) is one of the industrial byproducts that can be effectively used as an additive in concrete. It is a necessity for us to reduce environmental pollution arising due to CBD. This research paper attempted an investigation to assess the effect of CBD as an additive material into the concrete. The chemical properties of raw materials were determined by X-ray fluorescence (XRF) spectroscopy analysis and the mechanical properties of hardened concrete were carried out followed by destructive and non-destructive testing. Compressive strength of 150 mm concrete cubes was determined at 7th, 14th and 28th day of curing that contains various percentages (2.5%, 5%, 7.5% and 10%) of CBD. Concrete with 0% CBD served as the control specimen. On the basis of experimental investigations, the maximum compressive strength reported for concrete specimens containing 7.5% CBD as 17.23% was more than that of control specimen. At 10% CBD, strength got decreased but significant improvement with respect to control specimen was also noted. As per the chemical analysis, CBD contains substantial amount of fluxing and strengthening agents that improve the performance of concrete and it can be used as an additive admixture.

Keywords: Carbon dust black; Admixture; Compressive strength; Durability; Sustainability.