

In accordance with the qualification requirements

Psychology, Behaviorism



4. 1. 3.

Setting time This test was performed in conformity with the requirement of ASTM-C191 (2008). This test method determines the time of setting of cement by means of the Vicat needle. Two test methods are given; Method A is the reference Test Method using the manually operated Vicat apparatus, while Method B permits the use of an automatic Vicat machine that has, in accordance with the qualification requirements of this method, demonstrated acceptable performance. In this paper, the Method B is used. The initial setting time is the time elapsed between the primary contact of cement and water and the time when the penetration is measured or calculated to be 25 mm. The final setting time is the time elapsed between primary contact of cement and water and the time when the needle does not leave a complete circular impression on the paste surface.

Fig. 7 shows the change in initial and final setting time at different mixers. The initial setting time shows an increase of 5% and 10% CWP and then decreases slightly at 15% CWP before increasing further at 20% and 25% CWP. A similar trend but more well defined is also observed for the final setting time. This suggests that the CWP is contributing to and influencing hydration and setting in an irregular manner.

The Setting times of mortars do not show consistent changes with increase in CWP content. The rather disordered behavior of setting times of different mortars is attributed to the very intricate associate nature of the cement hydration (Snelson, Wild et al., 2011).

Also, The CWP mortar may contain less water as a consequence of the presence of CWP, and this will influence the rate of stiffening. 4. 2.

Hardened mortar test 4. 2. 1. Dry bulk density Dry bulk density of hardened mortar was obtained by dividing mass in dried conditions by its occupied bulk while floating in water through saturation conditions. The dry bulk density (DBD) of mortars was determined following BS EN 1015-10 (1999).

It entailed weighing the mass of mortar prisms, which were dried in an oven at a constant temperature of about 60 C constantly until constant weights. Consequently, the average weight was divided by the volume to obtain the DBD. The results of DBD of mortar specimens are presented in Fig.

8. Although there was only slight variability in the DBD of the mortars.

However, the density of the control mortar (CP0) was higher than those of other mixes, because the density of cement is greater than CWP.

Fig. 8. DBD of hardened mortar 4. 2. 3. Water absorption by capillary action

Water absorption of mortar by capillary action is a main property as it helps to specify the rate of water ingress into mortar through condensation from the atmosphere, capillary rise from the ground water and from the rainwater.

In this study, broken prisms (approximately 40 mm 40 mm 80 mm) arising from flexural strength tests were used for the determination of coefficient of water absorption by capillary action. The test was performed in conformity with the requirement of BS EN 1015-18 (1999). The results for the water absorption coefficient by capillary action for all mortars are shown in Fig. 9.

It can be observed that mortars containing CWP (CP5, CP10) present the lower values than control mortar. These reduced water absorptions were an indication that there were few porous structures in the mixes. Also, it can be observed that mortars containing CWP (CP15, CP20, CP25) present the higher values than control mortar. Considering that these compositions have lower dry bulk density than control mortar. On a general note, Torres and Matias (2016) described the increase in the water absorption of a mortar to be as a result of the small pore internal structure of the mixture.