



Compressive Strength of Revibrated Concrete Using Smart Combination of Sawdust Ash from Selected Wood Species to Partially Replace Cement

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Abstract. Study into the compressive strength of revibrated concrete using smart combination of sawdust ash from selected wood species to partially replace cement is presented. Apa and mahogany wood species were used to carry out this study. Chemical analysis of the ASDA and MSDA contain the major chemical oxides found in cement which includes SiO_2 , Al_2O_3 and Fe_2O_3 . Six (6) concrete cubes of 0% replacement by weight were produced with ordinary Portland cement (OPC), while another Six (6) concrete cubes were cast each using 5, 10, 15, 20, 25 and 30% replacement of OPC with SDA from the specified wood species giving rise to a total of fifty-six (56) cubes produced without revibration. These cubes were cured and subjected to a compressive strength test at 7 and 28 days. The optimum ASDA replacement for cement was attained at 5%, while that of concrete cube containing MSDA was attained at 10%. Another set of concrete cubes numbering eighty-four (84) was produced, fifty-six (56) of which were cast using the optimum percentage from ASDA and MSDA, while the remaining twenty-eight (28) were cast using OPC only. All the eighty-four cubes were revibrated for 1 min 20 s at 10 min intervals to a duration of 1 h after initial vibration. The cubes were cured for 7 days, 28 days and subjected to compressive strength test. The result reveals that the compressive strength of the revibrated concrete cubes increases up to a certain time lag and thereafter decreases to the lap hour of 1 h. The result also reveals that the percentage increase in compressive strength value obtained after revibration for a curing period of 7 and 28 days using 0% (only OPC) increased by 28.01 and 37.31%, that of the 5% ASDA optimum percentage replacement obtained increased by 48.40 and 40.49% and also that of 10% MSDA optimum percentage replacement obtained increased by 33.58 and 40.83% compared to the average value obtained for the corresponding percentage replacement for the non-revibrated concrete cubes. Hence, the study suggests that re-vibration enhances the strength of concrete once done within the plastic stage of the concrete.

Keywords: Compressive strength · Revibration · ASDA · MSDA