

Untreated Wood Ash as a Structural Stabilizing Material in Forest Roads

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Abstract:

Due euphoric use of “green” energy produced by biomass power plants up to 350.000 tons of ash are coming up every year. For this reason utilization methods for wood ash must be found. One solution could be the application as a stabilizing material in forest roads. In this case the pozzolanic characteristic (self-hardening process caused by free lime in wood ashes) is used to bind the gravel in the road base. Expected performance of wood ash could provide the chance to minimize the requirement of gravel on forest roads with a simultaneous enhancement of bearing capacity. Behaviour of bearing capacity was investigated with an outdoor-trial, were two different untreated wood ashes (fluidized bed ash and dry bottom ash) were applied in two mixture ratios of 15:85 and 30:70, each on a 100 meter long forest road section. The ashes had been selected by their different properties, emergence and economical concern. Mixing depth was 50 cm and the road base was covered by a 10 cm thick surface layer. Elastic modulus of these sections was measured before the application and according to the concrete testing method 7, 21 and 28 days after construction by using a light falling weight deflectometer. Measurements had been separated on the lanes and the medial strip for estimating the influence of upcoming traffic which was logged with remote sensor cameras. For long term analyses the measurements were repeated each month during the vegetation period. After the first vegetation period the mean elastic modulus of the zero variant section was 32,0 MN/m² and a significant improvement of the elastic modulus of 65 % (52,9 MN/m²) for the 15:85 mixing value section and 76 % (56,4 MN/m²) for the 30:70 mixing value section for the dry bottom ash was detected. The results for the fluidized bed ash sections fell short of expectation. Only 95% (30,3 MN/m²) of the initial value could be reached for both mixing values.

Keywords: wood ash, forest road, structure stabilizing, deflectometer