

EXPERIMENTAL AND MODELLING STUDY TO EVALUATE LFWD MODULI OF BOTTOM ASH WASTE USED IN ROAD FOUNDATIONS

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ABSTRACT

Shortage of natural aggregate resources has become one of the most important challenges in construction, especially for high demand applications such as roads. Incinerator Bottom Ash (IBA), which is produced from burning domestic waste, has been considered a useful solution to this problem. In this research, IBA was mixed with limestone to produce an acceptable blend for use as a road foundation layer. In-situ simulative testing with a Light Falling Weight Deflectometer (LFWD) and subsequent interpretation of the surface deflection data have enabled the evaluation of the mechanical properties of the foundation and subgrade layers.

This paper presents an experimental and modelling study of the elastic response of a foundation layer of IBA waste and limestone which was subjected to LFWD impact loading. Several parameters were studied, such as IBA content, water content and curing time. Regression and mathematical models were developed to back-calculate the LFWD moduli of the foundation layers. Results showed that IBA blends underwent less deflection, as a foundation layer, than the control limestone blend. Back-calculated models suggested in this study produced different values from those calculated by Boussineq's equation, which is adopted by the LFWD manufacturer.