

**INVESTIGATING EARLY LIFE STIFFNESSES OF COLD
RECYCLED ASPHALT MIXTURES USING THE NAT VACUUM
REPEATED LOAD AXIAL TEST (VRLAT)**

O. L. Oke *

Research Student, University of Nottingham, Nottingham, UK

T. Parry

Associate Professor, University of Nottingham, Nottingham, UK

N. H. Thom

Lecturer, University of Nottingham, Nottingham, UK

* University of Nottingham, Nottingham Transportation Engineering Centre,
Nottingham, UK, NG7 2RD, evxoo1@nottingham.ac.uk

ABSTRACT

This paper focuses on the characterisation of the early and later life stiffnesses of cold recycled asphalt mixtures containing severely aged Reclaimed Asphalt Pavement (RAP) and some virgin materials, stabilised with bitumen emulsion. The Repeated Load Triaxial Test (RLTT), which was used for this investigation is known to simulate vehicle loading and enables characterisation of both stiffness and permanent deformation properties. The specimens were manufactured in the gyratory compactor and cured to represent both early life and fully cured conditions. The digitally controlled servo-pneumatic system of the NAT combined with a newly developed Universal Software allowed for a multi-stage testing protocol in the VRLAT mode. The tests were conducted at temperatures of 20, 30 and 40°C. The results clearly indicate that the resilient moduli of the mixtures investigated in this work are stress dependent as they all fitted the $k - \theta$ model.

KEY WORDS: Cold recycled asphalt, resilient modulus, ITSM, NAT, VRLAT