Analysis of the binder yield energy test as an indicator of fatigue behaviour of asphalt mixes

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Abstract. Empirical binder testing has increasingly failed to predict pavement performance in South Africa, with fatigue cracking being one of the major forms of premature pavement distress. In response, it has become a national aspiration to incorporate a performance related fatigue test into the binder specifications for South Africa. The Binder Yield Energy Test (BYET) was the first in a series of tests analysed for its potential to predict the fatigue performance of the binder. The test is performed with the dynamic shear rheometer, giving two key parameters, namely, yield energy and shear strain at maximum shear stress ($\gamma\tau max$). The objective of the investigation was to perform a rudimentary evaluation of the BYET; followed by a more in-depth investigation should the initial BYET results prove promising. The paper discusses the results generated from the BYET under eight different conditions, using six different binders. The results are then correlated with four point bending beam fatigue test results obtained from asphalt mix samples that were manufactured from the same binders. Final results indicate that the BYET is not ideal as an indicator of fatigue performance.