

Title: The Effect of Groove-Underside Shaped Concrete Block on Pavement Permanent Deformation

Author/Authors: Azman M., Hasanan Md Nor, Mohd Rosli Hainin, Haryati Yaacob, Che Ros Ismail, Nur Hafizah, A. K.

Abstract: The aim of this study was to investigate the permanent deformation of Concrete Block Pavement (CBP) with the underside surface grooved. Permanent deformation is one of the important factors that influence pavement performance and often happens due to increases in axle load and tire pressure. Such increments have also resulted in greater increment of contact pressure at the tyre-pavement interface. In this study, a new CBP was developed with the concrete blocks grooved at the underside block surface to reduce pavement permanent deformation, termed as Underside Shaped Concrete Blocks (USCB). 13 USCBs were manufactured in the laboratory in this study with their patterns divided into three categories. The CBP models were constructed, from bottom to top, with hard neoprene, 70 mm thick loose bedding sand, and jointing sand which was used to fill in the gaps between USCBs. The test pavement was subjected to 10,000 rounds of load repetition under 1,000 kg single wheel load using the first Malaysian accelerated loading facility called Highway Accelerated Loading Instrument (HALI). The pavement was examined in terms of transverse deformation profile, average rut depth along the wheel path, and longitudinal rut profile other than being visually inspected. Results indicated that permanent deformation is significantly influenced by USCB geometry, groove shape, groove depth, bedding sand settlement during block setting, and load repetitions. From the results, it has been proven that USCB is a potential choice for CBP construction to reduce permanent deformation.