Stiffness Based Construction Quality Evaluation for Pavement Subgrade and Base Applications

Nishantha Bandara[1]

The success of any pavement construction project depends on using durable materials as well as following proper construction practices. Durability of the pavement depends on selecting proper materials to meet design material properties and constructing pavement layers to achieve design strength properties. Pavement layer strength generally measured using deformation characteristics in terms of elastic modulus or resilient modulus values. Both AASHTO 1993 empirical pavement design guide and the new mechanistic pavement design guide use subgrade soil resilient modulus as a primary design parameter. However, during pavement construction subgrade and base construction quality measurements are routinely measured in terms of field density and moisture content. This is the accepted method for most of the highway agencies in the world. The main reason for this practice is the long history and experience of using density/moisture measurements for compaction control and also lack of proper field measuring equipments for modulus measurements.

Due to recent interest in mechanistic based pavement designs, an interest is gaining towards using design parameters such as resilient or elastic modulus for construction quality control and acceptance. Several highway agencies such as in United Kingdom and Germany extensively evaluated several portable field devices for subgrade and base construction QA/QC. These devices include Light Weight Deflectometer (LWD) GeoGauge and Dynamic Cone Penetrometer (DCP). In the USA, several states have started evaluating these devices for pavement construction QA/QC.

This study is aimed at evaluating DCP and LWD as a pavement construction QA/QC tool. The objectives of this study are (i) complete literature search for using stiffness measurements for pavement construction quality evaluation (ii) determining the in-situ stiffness values based on DCP and LWD on number of construction projects (iii) compare and contrast the stiffness measurements with density and moisture content measurements.

This paper will include the literature search portion of the project and some preliminary results of stiffness measurements and density/moisture content measurements on few construction projects.

Key words: *Construction Quality, Pavement, Subgrade*

Authors Details;

1. Michigan Department of Transportation, Metro Region Office, 18101 W Nine Mile Road, Southfield, MI 48075, USA. bandaran@michigan.gov