NTEC
Nottingham Transportation Engineering Centre

Tyre Contact Pressure and Surface Distress

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Background

The current practice in pavement design is to use a circular uniformly distributed load as the input to ascertain the maximum stresses in the pavement. This is not the reality; tyre-pavement contact stress distributions are very complex. The stresses and strains created on/near the surface are higher than those created at the bottom of the asphalt and the top of the subgrade. The distress on the surface of the pavement in the form of rutting and surface initiated cracking is very much dependent on these complex stresses. This then gives rise to premature distress and maintenance interventions and causes an increased economic cost to the infrastructure stakeholders.

Aim

- The main aim is the modelling of the effects that non-uniform contact pressures have on the two main sources of surface distress, namely surface initiated cracking and surface rutting.

Objectives

- The Finite Element (FE) simulation of 3-D non-uniform contact pressure in conjunction with TU Delft.

- Highlighting that there is significant stress/strain produced on the surface/near surface from the FE models.

- The comparison of the results with full-scale pavement sections testing in conjunction with the University of Illinois Urbana-Champaign.

- Comparison of small scale wheel tracker results at NTEC with further FE modelling .

- Overall, to highlight the impact that non-uniform contact pressures have on the deterioration of pavements through FE and testing.

Current Progress

The main activities that are currently being done are the modelling of static and moving loads. The lab testing of materials for material characterisation for FE modelling. There is collaboration and interaction on the project with TU Delft, University of Illinois and the University of Ulster. All of this will lead to the successful completion of the project by September 2013.

Support

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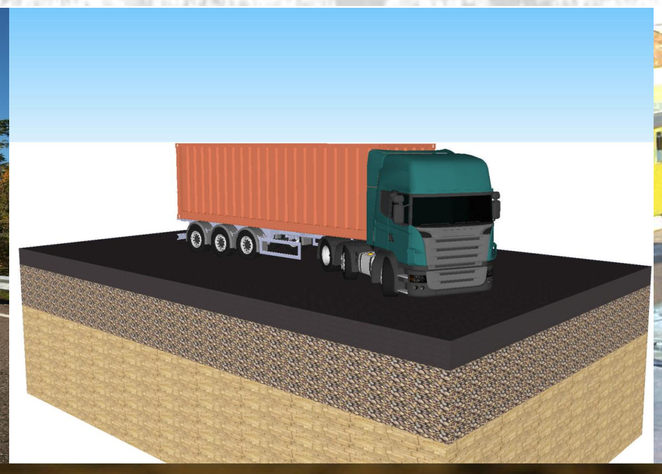

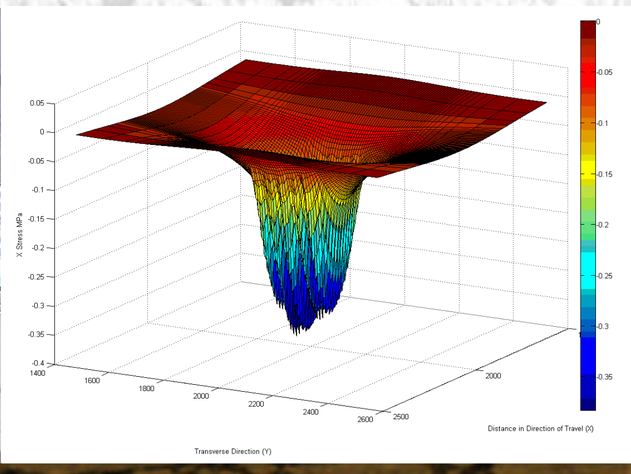

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