Observations, analyses and developmental technologies associated with a full-scale Heavy Vehicle Simulator (HVS) on pavement structures

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ABSTRACT

The presentation is concerned with historical research in South Africa using amongst others full scale Heavy Vehicle Simulator (HVS) devices. New failure law(s) such as Crushing and Fatigue were defined both quantitatively and phenomenologically for lightly cementitious layers, differentiating between “dry” and “wet” test conditions. This led to improved mechanistic-empirical (ME) design and evaluation methodologies, including slip between layers. In addition the Stress-In-Motion (SIM) technologies for defining traffic inputs into M-E design method(s) were investigated in great detail. Of the products in the focus of pavement research includes the following: Dynamic Cone Penetrometer (DCP) methods (including software packages), the Rapid Compaction Control Device (RCCD) for compaction control, even on trench re-in statements. On the recycled material side developments resulted in an advanced laboratory twin-shaft pugmill mixer technology, currently available in practice. The skillful use of above aspects allows pavement and material engineers to assess rural highways and pavements (also lower class such as “Low Volume Roads” (LVR)) in a much more technical focussed way. It is based on viewing and analysing pavements as structural systems which respond to traffic and environmental loading influences. In particular, the presentation emphasis will be on the HVS & SIM technology, as well as the Strain Energy of Distortion (SED) pavement response parameter.

Note: All acronyms used above are currently searchable by Google.