

The friction measuring tyre / road surface space interface

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This paper considers how the tyre of a friction measuring device interacts with the space between road surface aggregate particles. This space helps facilitate surface drainage and combines with a treaded tyre in the bulk removal of water when trafficked in wet conditions. Unlike cars and trucks, the tyres used on most friction measuring devices are typically smooth and without tread. It has been assumed for many years that use of this type of smooth tyre represents a worst case scenario with respect to measuring a road surface. Aggregate particles will embed into the tyre and the tyre will deform around them and into the spaces between particles. Therefore, trying to better understand what might be happening and what is being measured becomes more difficult. This paper considers just the friction tyre / space between aggregate particles interface. It summarises an investigation of different friction measuring tyres using the Tyre Embedment Apparatus (TEA) Mark I and II. These were developed to investigate the smaller and larger sizes of friction measuring tyre respectively. This investigation removed many of the complicating factors to just those of the tyre and the space. For the tyre this considered tyre wear, inflation pressure and applied vertical load under static laboratory conditions. For the space this considered distance between simulated particles and edge condition. It was found that the amount of tyre displacement into the space increases with aggregate / groove wear, particle distance and applied vertical load. Displacement decreased as the tyre becomes worn. For a given set of test conditions the amount of displacement into the space decreases until a critical value is reached at which there is no further reduction. Comparison of friction measuring tyre data is made with those of treaded tyres.