Evaluation of Tires on Asphalt Pavement in Sri Lanka

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While considering Sri Lankan Road Network, it can be seen several failures especially cracking in Sri Lankan road network. The main objective of this research is to determine whether effect of tires is a reason for the failure of the roads in Sri Lanka The tire pavement contact pressure distribution is significantly affected by tire inflation pressure, tire type, tire load and tire tread pattern.

Mainly there are two types of tires use in vehicles, and these are known as Radial tires and Bias Tires. The difference is in the way the body cords are put in the tire. Bias tire has diagonal or bias plies. These plies crisscross. This makes tire strong in all directions because of the plies overlap. It causes the tire to overheat when used on a sealed road surface and therefore, wear out quickly. The tire does not contact as much ground as a radial tire, it leads to a loss of engine power transmission and greater ground damage as per literature. When considering tire thread pattern mainly two types of pattern are available. These are circumferential tread pattern [Rib] and Transverse tread pattern [Lug]. Considering the effect of tread pattern on the pavement, it has been shown that the maximum shear stresses and displacement develop under the transverse pattern tire than the circumferential thread pattern tire. Field observation of cores and trench sections extracted from asphalt concrete highway pavements in certain countries exhibited propagation of surface-initiated longitudinal wheel path cracks. The initiations for these cracks was explained by high-contact stresses induced under radial truck tires. So there are some contradictions on effect of tire on road damage. Two roads with longitudinal crack were selected for a case study in Sri Lanka with varying composition of heavy vehicles. Traffic distribution of the roads was investigated. The survey conducted among tire sellers found that bias tires are widely used in buses. It was found that radial tires are used in trucks and mostly for the rear axle which distribute significant amount of load to road surface.

Comparison of tire usage of the selected roads and type of cracking observed in roads were analyzed. Initial finding of this research indicated that the tire type, loan and amount are required for a better comparisons of the distresses appeared in the roads.

Keywords: types of tire, tread pattern, fatigue and rutting on the pavement

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