Topic : PAVEMENT SURFACE PROPERTIES – ENVIRONMENTAL AND ROAD USER IMPACT

Number 30, 2011

1 A quantitative model of road-surface safety

Hu, J

International Surface Friction Conference, 3rd, 2011, Gold Coast, Queensland

ARRB Group Ltd, Vermont South, Vic, 13 pages

Online [accessed 26 October 2011] Click here to view (requires registration)

A reduction in the quality of the road surface leads to a decrease in the safe following distance and stability on curves, and causes accidents such as rear-end collisions and skids. Eight road surface skid-resistance evaluation parameters were used to establish a quantitative model of road-surface safety.

2 Developing instantaneous tyre/road noise profiles: a note

Mak, KL et al

Transportation Research: Part D-Transport and Environment, 2011

Volume 16D, Number 3, pages 257-259

Based on the close proximity method specified in draft ISO/CD 11819-2, the instantaneous tyre/road sound pressure levels of eighteen road sections constructed with the same pavement surfacing materials are recorded and analysed. A "tyre/road noise versus vehicle motion" profile, presented by a 3-D plot of the tyre/road noise against the instantaneous acceleration/speed, provides an easy way to estimate the instantaneous tyre/road noise level.

3 Developing porous asphalt for freeways in the Netherlands: reducing noise, improving safety, increasing service life

Van de Zwan, JT

TR News, 2011

Number 272, pages 22-29

Porous asphalt - gap-graded mix with 20 % air voids - was introduced in the Netherlands after many years of testing and implementation. It is particularly suitable for this country where roads are wet for approximately 12% of the time. One side effect of the implementation was that it reduces road noise. However, safety factors of its implementation could not easily be determined because the Netherlands already had a very high road safety record. This paper discusses many aspects of the use of porous asphalt in this overall discussion.

4 **Greener roads: comparing intelligent transportation systems with construction-phase options to reduce emissions and fuel use.**
Tupper, LL and others
Transportation Research Board, Washington, DC, USA, 2011
TRB 90th Annual Meeting, paper number 11-4238

The research presented in this paper compares the direct emissions and fuel consumption savings of five different strategies for greener roads. Specifically, savings from an Intelligent Transportation System (ITS) is compared to savings from strategies focused on the construction phase including; using regionally provided materials, reducing fossil fuel use, recycled pavement, and using warm mix asphalt.

The analysis showed that an ITS system focused on incident management will generally surpass the emissions and fuel consumption reductions of the construction-phase strategies.

5 **Identification of localized roughness features and their impact on vehicle durablity**
Zaabar, I and Chatti, K
International Heavy Vehicle Symposium, 2010, Melbourne, Victoria
Victorian Transport Association, Melbourne, Vic.

Online [accessed 26 October 2011] Click here to view

While vehicle design is focussed on strong suspension and good response to different road surfaces, changes in the surface profile still directly affect heavy vehicle user costs, including repair and maintenance costs and damage to goods, and these factors are examined in this paper.

6 **Pavement surface friction and noise: integration into the pavement management system**
Ahammed, MA and Tighe, SL
Canadian Journal of Civil Engineering, 2010
Volume 37, Number 10, pages 1331-1340

A challenge of pavement management is to provide a smooth, quiet, long-lasting, and economic pavement with adequate and durable surface friction. This paper addresses this challenge and provides a guideline. The correlation of tyre–road noise and surface friction is examined using data collected from five different asphalt pavements. Frameworks for desired minimum surface friction and maximum roadway noise are provided. A modified value-engineering approach is proposed to accommodate the construction and maintenance costs, longevity, smoothness, safety, and noise in the selection of pavement surfaces.

7 **Road bicycle dynamics in the presence of idealized roadway irregularities**
Metz, LD
SAE 2010 World Congress and Exhibition, April 2010, Detroit, MI, USA
Society of Automotive Engineers, Warrendale, PA, USA

Bicycle accidents may occur in the presence of roadway unevenness, discontinuities and other pavement failure modes and conditions. This paper examines the dynamics of ramp-climbing and potential pitchover by the rider when idealized asperities (unevenness) are encountered, and derive a speed at which pitchover will occur if and when a sudden stop occurs. A series of experiments was carried out in which road bicycle behaviour was examined for roadway asperities of known size and configuration. Finally, a series of braking experiments was performed to determine the emergency stopping potential of a road bicycle.

8 **Road roughness and whole body vibration: evaluation tools and comfort limits**
Cantisani, G and Loprencipe, G
Journal of Transportation Engineering, 2010
Volume 136, Number 9, pages 818-826

An important element of achieving quality in a road network is the control of vehicle vibration due to pavement roughness and road irregularities. In this paper the authors present a model using a real and common vehicle. The authors propose threshold values for both vibration and roughness indexes; these thresholds could be used for road users' comfort evaluation and adopted in technical standards.

9 **Study of vibration and its effect on health of the motorcycle rider**
Shivakumara, BS and Sridhar, V
Online Journal of Health and Allied Sciences, 2010
September

Online [accessed 26 October 2011] Click here to view

Motorcycle riders are subjected to extreme vibrations from the engine, from some motorcycle structural designs and from certain road conditions. Experiments were conducted to measure the magnitude of the vibrations acting on the rider during motorcycle riding under various road conditions. Experimental values of accelerations and frequencies which are beyond permissible limits, according to the literature, confirm that vibration affects health of the motorcycle rider.

10 **Synthesis of effects of pavement properties on tire rolling resistance**
Jackson, RL and others
National Center for Asphalt Technology, Auburn University, Auburn, AL, USA
NCAT Report 11-05, August 2011

Online [accessed 26 October 2011] Click here to view

Smoother pavements result in greater fuel saving. While it costs money to implement and maintain fuel-efficient pavements, where texture is optimised for rolling resistance without sacrificing friction/safety, there are strong cost benefits in fuel and vehicle wear. Fuel savings could be in the region of 3.3%, significantly outweighing the cost of good pavement rehabilitation with reduced rolling resistance.

11 **Tire/pavement and environmental traffic noise research study**
Rasmussen, RO
Colorado Department of Transportation, Denver, CO, USA
Report CDOT-2011-1, January 2011

Online [accessed 26 October 2011] Click here to view

Traffic noise pollution has become a growing concern to residents worldwide. Though noise produced from the tyre -pavement interaction is just one of several types of traffic noise, it is the primary source for roads which have low truck volumes and with vehicle speeds over 30 mph (48kmh). While not a cure-all, certain pavement type and texture options have led to improvements in noise levels and in some cases, have reduced the need for or height of noise walls while improving neighbourhood quality of life.

12 **TYROSAFE: tyre and road surface optimisation for skid resistance and further effects**
Scharnigg, K, Schwaibe, G and Haider, M
International Surface Friction Conference, 3rd, 2011, Gold Coast Queensland
ARRB Group Ltd, Vermont South, Vic, 14 pages

Online [accessed 26 October 2011] Click here to view (requires registration)

Tyrosafe is the European Community project to raise awareness for European harmonisation of skid resistance policies, and to optimise essential tyre/road interaction parameters on which to build road safety benefits. It provides a synopsis of the science behind this approach, and identifies future research needs.

13 **Update of vehicle / road relationships underpinning road user costs and externality costs: literature review**
Tan, F, Thorosen, T and Lloyd, B
Austroads, Sydney, NSW
Report number AP-T189/11, 2011

Online [accessed 26 October 2011] Click here to view (requires registration)

This report examines the vehicle operating costs (VOC) relationship with road roughness through a review of the literature. Costs include fuel consumption, repair and maintenance, tyres, lubricating oil and vehicle depreciation costs. The review shows that : there is scientific evidence for the relationship; harmonisation ensures similar road user costs estimates are used across models and scenarios, and Australian jurisdictions can maintain their models while reconciling results with harmonised results.

14 **Using data mining to predict road crash count with a focus on skid resistance values**
Emerson, D, Nayak, R and Weligamage, J
International Surface Friction Conference, 3rd, 2011, Gold Coast Queensland
ARRB Group Ltd, Vermont South, Vic, 16 pages

Online [accessed 26 October 2011] Click here to view

This paper presents a case study that generates data mining models that contribute to understanding of road crashes by examining the role of skid resistance (F60) and other road attributes in road crashes. The results provide evidence of the significance of road attributes in contributing to crashes, with a focus on the evaluation of skid resistance.

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