Impact of Spatial Pavement Friction on Crash Risk Assessment

2017 Mid-Continent Transportation Research Symposium
Ames, IA
August 16, 2017

Ahmad Alhasan, Ph.D.,
Associate Research Scientist
Iowa State University
515.294.5504
aalhasan@iastate.edu

Pavement frictional behavior impacts pavement performance in terms of safety.

The Hamilton Spectator, 2017
Different components of surface condition interact with safety.
Understanding how friction develops is elementary to understand crash dynamics.
Device harmonization is necessary for standardized procedures.
Crash rates can be described using a binomial distribution.

\[ AADCrashes \sim B(AADT, \hat{p}) \]

\[ Pr(AADCrashes = \hat{k}; AADT, \hat{p}) = \left( \frac{AADT}{\hat{k}} \right) \hat{p}^\hat{k} (1 - \hat{p})^{AADT - \hat{k}} \]

\[ E[AADCrashes] = AADT \times \hat{p} \]

\[ E[Spending] = \sum_{j \in \text{Crash class}} \tilde{E}_j[AADCrashes] \times \text{Crash Cost} \]
Previous studies have defined the crash rate.

Long et al., 2014
Initial Investigation show the need for a full scale study.
Bayesian paradigm is most suitable for pavement friction management.
Previous models can be used to facilitate the implementation in Iowa.

NSS, Analytics Vidhya, 2016
Friction among other variables can be used to devise risk maps.
Friction among other variables can be used to devise risk maps.
A full model can be included in a pavement management systems.
Impact of Spatial Pavement Friction on Crash Risk Assessment

This work is licensed under the Creative Commons Attribution 3.0 Unported License. To view a copy of this license, visit http://creativecommons.org/licenses/by/3.0/ or send a letter to Creative Commons, 444 Castro Street, Suite 900, Mountain View, California, 94041, USA.

Ahmad Alhasan, Ph.D.,
Associate Research Scientist
Iowa State University
515.294.5504
aalhasan@iastate.edu