Black Spots and Telematics: the link between driver behaviour data, road safety, and the Black Spot program

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Abstract

The emergence of vehicle telematics data (location, speed, acceleration etc) for insurance purposes has opened the possibility of using this data to improve road safety. Treatments to Black Spot intersections were used to analyse correlation between telematics data, and the effect of changes to road infrastructure on driver behaviour. Telematics measurements, including harsh braking, were used to compare driver behaviour before and after road safety treatments at three known, high-risk intersections, with a view to identifying the traits of the driver behaviour that change with the inferred improvement of safety that comes with treatments applied at the intersection. Data analysis at the three sites showed negligible change in behaviour, or even a slight increase in harsh braking, though this was not statistically significant. Consequently, no identifiable characteristics of safe or risky driving behaviour could be determined by comparing behaviour before and after a treatment.

Background, Method, Results and Conclusions

Recent emergence of Usage-Based Insurance (UBI), also referred to as Pay As You Drive (PAYD) insurance adjusts your insurance premiums based on your driving behaviour using a fitted black-box device that records GPS location and accelerometer data. The collection of large quantities of this data has opened up the possibility of using it to analyse driver behaviour across the road network.

Research around telematics data has primarily focused on using feedback to improve driver behaviour. Missing from the equation was whether the telematics incidents were the fault of the road infrastructure, or could be minimised through changes to the infrastructure, as per “Safe Systems” theory. Clusters of telematics events at Black Spot sites may indicate that drivers, operating at their typical capabilities, are consistently struggling to navigate the local infrastructure and environment.

Proactive methods to identify high-risk locations with potential for crashes and injuries (particularly high severity injuries) have been developed and continue to evolve (e.g. ANRAM, AUSRAP). These methods have often identified unsafe road infrastructure out of context with its intended use and environment. Road surveys have also been used to examine risky infrastructure, however the frequency and breadth of surveys required has limited their application across entire road networks. These established methods often draw on available research evidence and road data inventories, and do not take advantage of up-to-date road user behaviour information.

This research uses a case study approach to investigate promising links between driver behaviour data and black spots. Driver trips were isolated around three recently treated black spot sites in semi-urban Melbourne, using de-identified data provided by Capesure, which collates insurance telematics data. Statistical analysis was unable to yield relationships between driver behaviour and treatments at black spot locations, using data recorded both before and after treatments to quantify the characteristics of high-risk behaviour (before treatment) and safer behaviour (after) at Black Spots. Indeed no significant change in behaviour occurred at any site across the observed period.

Future research in this area should examine larger sets of trip data across many more locations in order to find more minute results than could be determined in this pilot study.