

Factors Affecting Hit and Run Bicycle Crashes in Victoria, Australia

Sareh Bahrololoom^a, Sara Moridpour^b, Richard Tay^b, William Young^a

^a Monash University, Melbourne, Australia, ^b RMIT University, Melbourne, Australia

Abstract

This study explores the factors that increase the likelihood of hit and run in bicycle crashes, using data of bicycle crashes from 2009 to 2010 in Victoria, Australia. These factors are explored using chi-square tests and subsequently modelled using a binary logistic regression model. The results of the analysis showed that crash time, bicyclist's age and gender, helmet use (for bicyclist), other road user's intention (for movement), bicyclist's intention (for movement), traffic control (other road user's approach), traffic control (bicyclist's approach) and crash severity are significant variables affecting the hit and run bicycle crashes.

Background

Hit and run is a punishable offence and may result in increasing the severity of crashes as a result of the delay in receiving medical help by the victims (Tay et al. 2008, 2009, 2010). Roess et al. (2004) found that about 35% percent of deaths take place up to two hours after the crash. Therefore, it is important to identify the factors that increase the likelihood of leaving the crash scene without stopping and/or reporting it.

A literature review of road safety research showed that few studies have been conducted to understand the main factors increasing the chance of hit and run occurrence. However, no study has been conducted to understand the influence of different crash attributes on the hit and run crashes involving bicyclists. This study examines the effects of road and environment characteristics, as well as human and vehicle specifications, on hit and run crashes in which at least one bicyclist is involved. It will improve our understanding of the factors affecting the hit and run crashes and evidence based countermeasures can then be designed to reduce the likelihood of this type of crashes.

Method

Victorian crash data (RCIS) utilized in this study included all police reported bicycle crashes between 2009 and 2010. The total number of bicycle crashes considered in this study was 6962. Hit and run occurred in 11.7% of the crashes. 30

In this study, a two-step analysis was carried out to explore the factors increasing the chance of leaving the crash scene. In the first step, a series of Chi-Square tests were performed to find the variables influencing hit and run. In the second step, a binary logistic regression model was developed to identify the significant variables as well as the relative importance of the variables.

Results and Conclusions

The results of the analysis showed that crash time, bicyclist's age and gender, helmet use (for bicyclist), other road user's intention (for movement), bicyclist's intention (For movement), traffic control (other road user's approach), traffic control (bicyclist's approach) and crash severity are the significant variables. Model parameters showed that the likelihood of hit and run crashes increased in the following conditions (comparing to other conditions or variable levels):

1. Dark AM (0:00 to 6:00 AM) and dark PM (7:00 to 11:59 PM) time periods,
2. Male bicyclists are involved,

3. Bicyclists aged between 15 and 17 are involved,
4. Bicyclists who used helmets are involved,
5. Crash is property damage only or result in minor injury,
6. Traffic control type is “no control” for both bicyclist and other vehicle approaches,
7. Other vehicle is going straight ahead, overtaking or turning left,
8. Bicyclist is going straight ahead or turning right.

Results of this study improved our understanding of the factors affecting bicycle hit and run crashes. Using the results from this research, some useful countermeasures could be designed to reduce the likelihood of this offensive action.

References

- Roess, R.P., Prassas, E.S., Mcshane W.R., 2004. Traffic Engineering, Third edition. Pearson Education International.
- Tay R, Kattan L & Sun H (2010) A logistic model of hit-and-run crashes in Calgary, Canadian Journal of Transportation, 4, 1-10
- Tay R, Barua U & Kattan L (2009) Factors contributing to hit-and-run in fatal crashes, Accident Analysis and Prevention, 41, 227-233
- Tay, R., Rifaat, S. M., and Chin, H. C. (2008). A logistic model of the effects of roadway, environmental, vehicle, crash and driver characteristics on hit-and-run crashes, Accident Analysis and Prevention, 40(4), 1330-1336.