

Application of Hazard Based Duration Model to Investigate - Traffic Incident Duration

Abdulla Alkaabi
Newcastle University, United Kingdom
a.m.s.k.al-kaabi@ncl.ac.uk

Roger Bird
Newcastle University, United Kingdom
r.n.bird@ncl.ac.uk

Dilum Dissanayake
Newcastle University, United Kingdom
dilum.dissanayake@ncl.ac.uk

Abstract

Tackling traffic incidents is becoming one of the high priority tasks in many communities around the world. The reason is that such incidents have many impacts such as increased possibility of secondary accidents, increased fuel consumption, and reduced roadway capacity. Traffic Incident Management (TIM) is considered an important component in the mitigation of traffic incidents, and plays a vital role in reducing the undesirable impact of traffic incidents. TIM can be defined as the application of available resources to reduce the impacts of traffic incidents.

Over the last decade hazard based modelling techniques have been developed that may be able to identify how incident duration can be reduced. However this needs to be applied without compromising the safety of any people involved in the process, or reducing the quality of the accident investigation process.

Based on the previous work, total incident duration can be divided into a number of intervals such as detection time, response time, clearance time and recovery time. Therefore investigating these intervals through analysing duration-dependence factors may play a part in reducing incident duration. This presentation aims to demonstrate the proposed methodology of collecting traffic incident duration data and the application of hazard based duration methods to analyse the effect of incident characteristics on incident duration.

Obtaining and Applying of Traffic Accident Data Using Automatic Accident Recording System in Korea

Jaehoon Sul and Seonghee Cho
Republic of Korea, The Korea Transport Institute, jhsul@koti.re.kr

1. INTRODUCTION

There are current limitations in reconstructing traffic accidents. In field examination, there are difficulties to keep an accident site and marks resulting from the accident on roads. Delay of field examination and transformation on distribution of debris are also the factors to make impossible to reconstruct traffic accidents. Vehicle damages from collision with other vehicles or pedestrian prevent reconstruction.

Reconstructing accidents are dependent on statements of people concerned, eyewitness evidence, and a driver's statement. Objectiveness and accuracy of constructing accidents are always controversial issue.

2. NEEDS FOR AARS

The number of registered vehicles is 16,428,177 and 220,755 accidents occurred in Korea. It means a person is injured every 90 second. Social costs of traffic accidents are 9 trillion Korean Won having 1.1% of GDP. The number of hit-and run accidents is 2,500 resulting in 353,000 fatalities.

Evidences for accidents are needed due to increase of accident disputes. AARS could prevent accidents resulting in decreasing damage (fatalities and properties).

Recording of driving information are necessary for finding accurate causes of accidents and follow-up measures. Therefore, U.S, Japan, EU, China and Korea are making a law and standard of AARS.

US DoT (Department of Transport) announced AARS standard in 2004. NHTSA (National Highway Traffic Safety Administration) recommended installing an in-car accident recorder in 2006. State of California (2003), Arkansas, Nevada, North Dakota (2004) made a law to mandatorily install AARS. A law requiring all vehicles to install an in-car accident recorder since 2009 was made in EU. In Japan, a taxi, bus, truck started installing in-car accident recorders because some kinds of vehicle must install them. In China, all vehicles were required to install an in-car accident recorder before Beijing Olympic 2008. In Korea, the standard for making AARS was established in 2008. The law requiring all vehicles to install a digital tachometer is developing.

In Incheon Metropolitan City, all company taxis (5,300) installed in-car accident recorders in April 2008. The half of cost was sponsored by taxi insurance association and half by the taxi company. In Gyeong-gi Province, all company taxis and individual taxis (34,000) installed in-car accident recorders in March 2009. The half of cost was sponsored by Gyeong-gi province government, 4/10 of cost by the city & county government and 1/10 of cost by: the taxi company and individual taxi drivers.

3. BENEFIT FOR INSTALLING AN IN-CAR ACCIDENT RECORDER

When it comes to the qualitative effect, an in-car accident recorder could save repairing costs and insurance payments due to decrease of accidents. It could increase fuel efficiency due to safe driving. Besides, it could decrease negotiation and management cost for accidents and improve the commercial company image with the aim of safety.

As the qualitative effect, accidents and amounts of injury could be judged based on video images. False witness and insurance frauds could be prevented. AARS could solve troubles with passengers as a voice recorder. Handling process after accidents would be fast and effective through precise judgment on deciding who are victims or harmers. An in-car accident recorder could be used as a tool of education and emphasis of safety to drivers. The prejudice that taxi drivers are always harmers would be removed.

Table 1 illustrates rate of monthly accidents for every three months from 2006 to 2008 as an example of Taxi union in Incheon City. Average rate of accidents for three months is decreased from 63.4% in 2006 to 56.3% in 2008.

Table 1. Rate of Monthly Accidents for three months (Incheon City)

Year	Rate of monthly accidents (%)				Rate of increase (%)
	July	August	September	Average	
2006	70.2	60.1	63.6	63.4	-
2007	66.8	57.4	58.4	60.6	-2.8
2008	60.8	49.8	51.3	56.3	-4.3

4. FEATURES OF IN-CAR ACCIDENT RECORDERS IN KOREA

Among current features of in-car accident recorders in Korea, not only first impact but also second and third impacts would be recorded. Through all-the-time recording a driver's behavior would be monitored. Sound in the car would be recorded because of voice recording function. GPS information (location, speed, time) would be obtained from AARS.

There is some weakness in Korean products. As external factors, there is shortage of capabilities in maintenance. Two channel of camera (outside and inside view) should be needed. AARS market is aftermarket not before-market. When it comes to internal factors, there are difficulties with stable power supply, installing in the middle of a car, and handling a power cable. When a serious accident occurs, it could be possible to be separated from the car.

5. AARS 도입방안

In case of commercial vehicles, it is recommended AARS should be installed in taxies first of all. After then, it is recommended buses and trucks also adopt AARS. When AARS is widely used, a law requiring AARS to be installed could be legislated. In case of private cars, discount of insurance fee (a premium) is a good idea. In Korea "T" insurance company, "E" insurance company, and "S" insurance company give 3% discount of insurance fee to private cars having AARS. "H" and "D" insurance companies will give some discount soon. The discount could encourage drivers to purchase AARS.

The retail price of AARS is 290,000 WON for private drivers and 137,000 WON for commercial vehicle owners. For private drivers, they could save 180,000 WON for discounted insurance fee during five years. They also could save 600,000 ~ 1,200,000 WON for special discounted insurance fee because of no accidents. For commercial vehicle drivers, they could save 150,000 WON for discounted insurance fee during five years. They also could save 500,000 ~ 1,000,000 WON for special discounted insurance fee because of no accidents.

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