

Traffic safety and traffic enforcement

1. Background and goals

In 2012, the number of traffic accidents in Japan decreased for the eighth consecutive year to around 660,000. These accidents resulted in 4,411 fatalities, a reduction to approximately 30% of the peak in 1970. Although the downward trend in injuries continues, this year there have already been 820,000 people involved in traffic accidents, so accident prevention remains a significant problem. In particular, there is a need for further efforts to eradicate fatal accidents due to drunk driving.

In the past, traffic enforcement efforts have had some level of success in preventing traffic accidents. However, there seems to be no end to drivers who do not obey traffic rules. Cracking down on traffic violations and strengthening penalties can result in a short-term reduction of traffic accidents, but they tend to return to their previous levels with the passage of time.

This study aims to provide a quantitative measure of the effect of traffic enforcement on reducing traffic accidents, and examines possible measures.

1-1. Research viewpoint and method

The embodiment of traffic enforcement has regional characteristics. For example, in large metropolitan areas there are often efforts to control parking violations and vehicle access violations, both of which most frequently occur in densely populated areas. By contrast, in less densely populated rural areas, efforts tend to be directed toward speed limit enforcement. There are also seasonal variations, such as speed limit enforcement being more concentrated during the summer in regions that receive heavy snow in winter. We therefore performed an analysis from the viewpoint of the regional characteristics of violators and violation enforcement.

2. Research content

2-1. Relation between traffic enforcement and traffic accidents

This section discusses whether traffic enforcement is effective in reducing traffic accidents. To give an example, a relational diagram is presented showing the number of traffic enforcement incidents per day and the number of traffic accidents per 1 million population in Tochigi Prefecture (Fig. 1). There were very few traffic enforcement incidents (e.g., 100 incidents per day or less) on days such as the New Year's

holidays when little traffic was on the roads, and there were few traffic accidents on such days. Because of the existence of such atypical days, simply determining the correlation coefficient between enforcement and accidents would likely not give a clear relation.

However, we also found a tendency for the maximal number of traffic accidents to decrease as the number traffic enforcement incidents increases. The relational

diagram clearly shows that the upper bound (95th percentile) on the number of traffic accidents is reduced as the number of traffic enforcement incidents increases. This tendency was the same in Okinawa Prefecture and Akita Prefecture. These results suggest that traffic enforcement has the effect of decreasing the number of frequent traffic accidents.

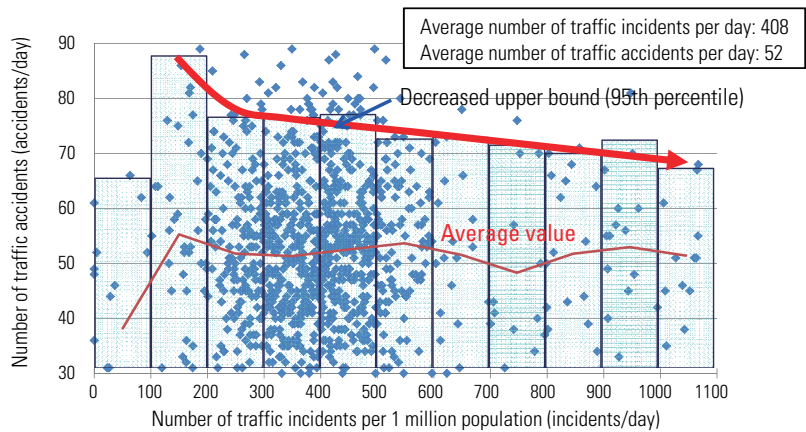


Figure 1. Relation between number of traffic enforcement incidents and number of accidents in Tochigi Prefecture

2-2. Violation history of first parties in traffic accidents

Next, the focus is turned to first parties in traffic accidents—the pedestrian or driver of the vehicle who bear the greatest responsibility for the accident—and the first party’s history of past violations is considered.

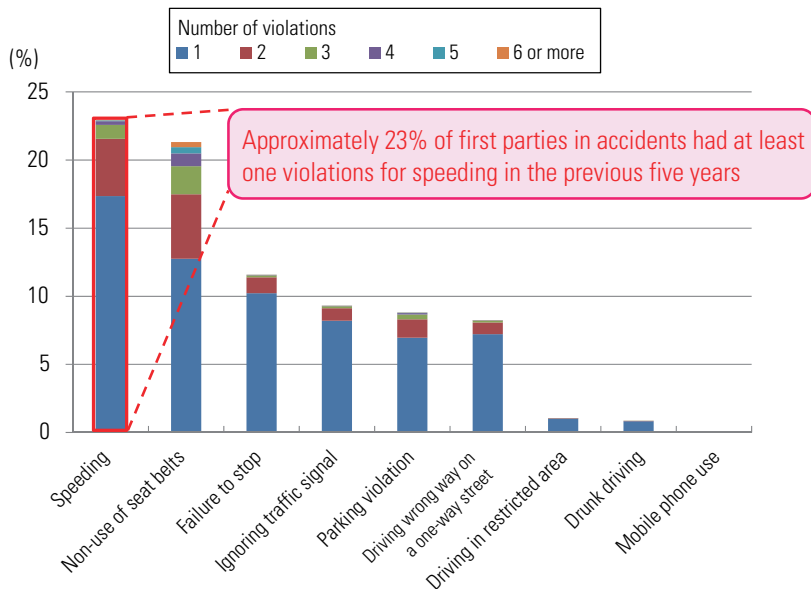


Figure 2. Violation history of first parties in accidents for the previous five years

Figure 2 shows of the types of traffic violations for which the first parties in accidents occurring in 2009 were cited during the five-year period 2004–2009. The violation histories show that 64% of male and 45% of female first parties had some type of traffic violation on record from the previous five years. Compared with second parties, the first parties had a higher violation rate for all types of violations. This seems to indicate that the driving etiquette of drivers who bear primary

responsibility for accidents is worse than that of others involved in the accidents.

2-3. Regional trends in violations and their causes

To better understand the regional characteristics of serious traffic violations, we examined cities and prefectures with particularly high rates of repeated willful violations, such as ignoring traffic signals, speeding, and drunk driving (Fig. 3). Particularly notable were ignored traffic lights in Osaka and drunk driving rates in Okinawa. We discussed the latter finding with the Okinawa prefectural police, who gave the following reasons for the high rates of drunk driving:

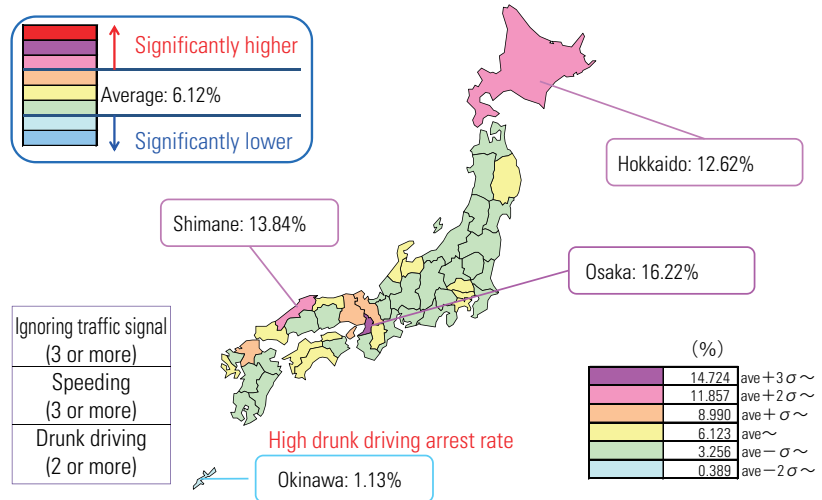


Figure 3. Percentage of repeated violations by first parties in traffic accidents

- Okinawan drinking culture: starting to drink at late hours, the popularity of *awamori* (a local beverage with a particularly high alcohol content), and the custom of passing drinks around.
- High reliance on automobiles because of lacking public transportation infrastructure and the prevalence of parking lots at drinking establishments.

To cope with this situation, efforts to combat drunk driving are concentrated between 2:00 and 6:00 a.m., when most accidents due to driving under the influence of alcohol occur. Moreover, since about five years ago, early-morning operations have been conducted to prevent driving with an alcohol hangover.

Such drunk driving enforcement efforts require significant time, and in recent years have become inefficient. There are limits to how much effort can be exerted, so ways to further reduce accidents is a topic requiring further study.

2-4. Planning efforts based on numbers of traffic accidents and violations

As a simple method for investigating the effect of traffic enforcement, we created a plot showing the number of traffic accidents and number of traffic enforcement incidents.

Figure 4 shows the relation between the number of traffic accidents and the number of traffic enforcement incidents by police station jurisdiction for individual town areas. The area covered is divided into four zones (1–4), based on the average number of citations issued and average number of traffic accidents.

Zone 3 has a low number of both citations and accidents. We therefore consider this area to be satisfactorily maintaining the status quo. Zone 4 has many citations and few traffic accidents. Areas

in this Zone where traffic enforcement is considered excessive may therefore require policy revisions, and in areas where accident suppression is considered necessary, traffic enforcement efforts may need to be

continued. Zone 1 has a many traffic citations but also many traffic accidents. Traffic enforcement efforts should continue in this area, but policies should also include consideration of other traffic safety measures such as improvement of the traffic environment. Finally, there were more traffic accidents in zone 2 than in the other areas but the number of citations was below average. This likely indicates a need to focus on strengthening traffic enforcement in this area.

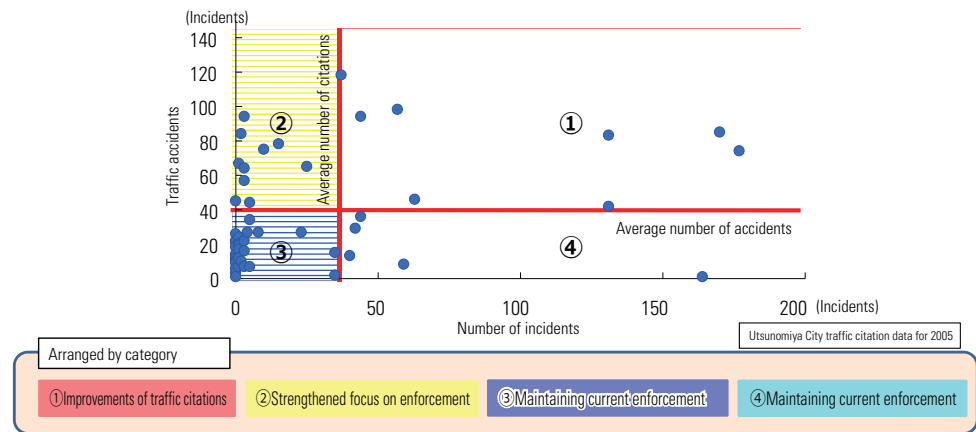


Figure 4. Example measures based on number of traffic accidents and number of incidents

3. Conclusions

This project performed a scientific investigation of the relation between traffic enforcement and traffic accidents on the basis of a summary of statistical data from the results of previous research. The results indicate that the relation between traffic accidents and traffic enforcement is strongly associated with regional characteristics, and that investigations should be performed on a regional basis.

The following is a summary of our major findings.

- Traffic enforcement has the effect of decrease the occurrence of frequent traffic accidents.
- First parties in traffic accidents are typically poor drivers with a history of repeated traffic violations.
- Repeated violations tend to be most common for drivers aged 25–34 years and to decrease beyond that age range.
- Traffic enforcement varies according to the conditions of individual cities and prefectures, and policies best suited to each locale are required.

4. Future outlook

Connecting the results of this research to a reduction in the number of accidents in actual society will fundamentally require consideration of measures on a regional basis. In 2013, we published *Kotsu torishimari handobukku* (the Handbook for Traffic Enforcement) to promote traffic enforcement that is effective for suppressing accidents. We hope this work will lead to efforts in accordance with the actual regional situation surrounding traffic accidents.