**IMPROVING INVESTMENT EFFICIENCY BASED ON OBJECTIVE DATA**

*MIEKURA PROJECT: IDENTIFYING AND VISUALIZING PROBLEMS*

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**Abstract:** We have scientifically identified road sections which have the most frequent accidents by compiling data on traffic accident occurrence in each road section. Countermeasures are being focused on very worst sections, which we call the "red zone." The red zone consists of only about 7% of the total number of road sections under our management, but about 65% of the budget for measures to prevent traffic accidents will be devoted to the improvement of these sections.

We anticipate that this kind of rational management, in which problematic locations are scientifically identified and made a budget priority, will lead to more effective use of invested funds for the reduction of traffic accidents.

**Key words:** traffic accident, focused investment, scientific analysis

1. CURRENT SITUATION OF TRAFFIC ACCIDENTS IN JAPAN

In the 1960s and 1970s, traffic accidents were so frequent in Japan that the situation was termed a "traffic war." One reason was that the road transportation infrastructure was not sufficiently developed to handle soaring motorization during the period of rapid economic growth which followed World War II. Traffic accident fatalities in Japan increased rapidly throughout the 1960s, peaking in 1970. About 17,000 lives were lost that year(Fig.1). At that time, the annual death toll due to traffic accidents was one person in 6,000. On average, there was an incidence of about 300 traffic accidents per 100 million vehicle-kilometers(Fig.2)
This situation of frequent traffic accidents has been greatly improved by better roads, improved vehicle performance, and driver education. At present, the average incidence has fallen to about 100 traffic accidents per 100 million vehicle-kilometers (Fig. 2). The number of traffic accident fatalities in fiscal 2006 was 6,352. This was the first time that traffic accident fatalities had fallen below the 6,500 mark since 1956, a time half a century ago when motor vehicles were not yet very prevalent (Fig. 1).

Nevertheless, with a growing volume of automobile traffic, more than one million people are injured in traffic accidents every year. In fiscal 2004, the number of traffic accident injuries (including fatalities) was the highest ever at 1.19 million persons (Fig. 1). In 2006, about 32% (357,508 persons) of the total number of traffic accident injuries in Japan were concentrated in the Kanto region. The declining trend in the incidence of injury accidents per 100 million vehicle-kilometers has bottomed out, and incidence remains high in comparison to advanced countries in North America and Europe (Fig. 2). A major reason is the existence of certain sections of the road network where accidents are occurring at an even higher rate than that of the so-called "traffic war" era.
Certain locations and sections are particularly prone to traffic accidents because of characteristics of the road structure and characteristics of traffic utilization. In Japan, arterial highways make up about 16% of general roads nationwide (not including expressways), but they account for about 70% of all traffic accident fatalities, and about half of all traffic accidents and traffic accident injuries (Fig. 3). In fact, there is data to indicate that more than half of all fatal accidents (about 56%) are concentrated in only about 9% of arterial highway sections (Fig. 4).

It is believed that accident countermeasures should be focused on these dangerous sections as a budget priority, for the sake of efficient reduction of traffic accidents.

![Figure 3 Accident occurrence on arterial highways and everyday roads (2005)](source)

![Figure 4 Concentration of traffic accidents on arterial highways (not including intersections)](source)

2. **MIERUKA, A NEW ADMINISTRATIVE TOOL OF THE KANTO REGIONAL DEVELOPMENT BUREAU**

In Japan today, as both national and local government are faced with a challenging financial situation, there is a strong need for administrative organizations to find ways to provide services efficiently with limited budget resources. The Kanto Regional Development Bureau, a local organ of the Ministry of Land, Infrastructure and Transport, which controls the administration and operation of the nation's roads overall, has developed its own administrative policy for improving the efficiency of public investment in road administration and operation. Specifically, we have proposed and are promoting the Road Mieruka Plan, in which we will accurately identify the issues that should be addressed by the road administration, find the optimal solutions, and take steps to implement those solutions, beginning with the most urgent problems.
The purpose of this project is to achieve mieruka, which means "making visible," by taking steps to ensure that the administrative process, which has been less than transparent to outsiders in the past, will be more clearly understandable. The Mieruka Plan will analyze objective data concerning the issues, develop rational solutions on that basis, and convey the results of implementing those solutions by making them "visible" to road users, taxpayers, and administrative staff, thereby increasing the investment efficiency and transparency of government (Fig. 5).

Our efforts to promote measures against traffic accidents are also being pursued in accordance with the Mieruka Plan. We are taking steps to improve the efficiency of government by collecting and analyzing objective data on traffic accidents and optimizing investment on that basis. This is the "red zone" strategy, as explained below.

3. IMPROVING INVESTMENT EFFICIENCY FOR TRAFFIC ACCIDENT COUNTERMEASURES: RED ZONE STRATEGY

Our policy is to scientifically identify the sections with the most frequent accidents by compiling data on traffic accident occurrence in each road section, and to take steps that are focused on those sections. Specifically, we divided the network of all arterial highways in the Kanto region (about 30,000 kilometers) into 220,000 sections, compiled data on the numbers of traffic accidents occurring in each section, and arranged these sections in order of accident rates in order to make the problems "visible," as shown in the graph below. The sections with the highest accident rates, more than 300 accidents per 100 million vehicle-kilometers, account for about 7% of the total. These sections are identified as the "red zone" where the danger of traffic accidents is high. Concentrated measures are particularly necessary in this zone. Similarly, the "yellow zone" consists of the sections with the next highest accident rates, at a level of more than 100 accidents per 100 million vehicle-kilometers (Fig. 6).

The Kanto region, the subject of our bureau's work, includes the Tokyo metropolitan area, one of the world's largest cities, and has a large number of very high-volume traffic routes. Even so, traffic accidents are concentrated in a limited proportion of its road sections. While the red zone makes up only 7% of the total, it accounts for about 30% of the total number of traffic accidents. The red zone and the yellow zone together make up 24% of the total, but account for about 70% of the region's injury accidents.
For example, let us examine the case of Arajuku Machi Kita intersection on National Highway 16 (Fig. 7), which is part of the red zone of locations requiring urgent action. This strategy has been formulated in Tokyo and 8 prefectures. Sections with problems: 52% Sections with no traffic accidents: 48%

Although the red zone accounts for only about 7% of the total road sections under our management, it is believed that focused action to prevent traffic accidents in this zone will have the greatest direct effect on reducing the overall accident rate, thereby improving the efficiency of investment in traffic accident prevention. We refer to this approach of focused investment as the "red zone strategy." Based on this strategy, the Kanto Regional Development Bureau has adopted a policy of focused investment in which, as a general rule, accident prevention projects will only be implemented in the red zone and the yellow zone.

We anticipate that this kind of rational management, in which problematic locations are scientifically identified and made a budget priority, will lead to more effective use of invested funds for the reduction of traffic accidents. In fiscal 2007, traffic accident prevention projects will be implemented in 226 road sections, with a total budget of about ¥15.6 billion (cost of focused traffic accident prevention projects). Of these 226 road sections, 99% are located in the red and yellow zones. About 67% are located in the red zone, and 65% of the budget has been allocated to these sections.

4. ACTION BASED ON LOCAL CONDITIONS

When applying this strategy to actual communities, in addition to an emphasis on objective data, it is important to take the actual conditions in the community into consideration. Therefore, we have developed a system to promote the plan through cooperation with local experts and road users. A Traffic Safety Mieruka Plan has been formulated in Tokyo and each prefecture in the Kanto region under this system. We are gathering the views of the general public and road users, analyzing the causes of accidents at specific locations, and taking appropriate actions.

For example, let us examine the case of Arajuku Machi Kita intersection on National Highway 16 (Fig. 7), which is part of the red zone of locations requiring urgent action. This
is the third worst road section on national highways within Saitama Prefecture for injury accidents involving children, with an incidence of 379 accidents per 100 million vehicle-kilometers. Two children have been killed in traffic accidents in this section during the past two years. We learned that about 80% of the accidents involving pedestrians and bicyclists in this road section have occurred near a bicycle crossing. Based on this knowledge, the action committee studied specific measures. Action was quickly taken to move the stop line for vehicles, as well as the bicycle crossing, and to add a traffic island within the intersection in order to increase the level of visibility for drivers.

In the future, we plan to take action based on analysis of the actual conditions of each road section, as in the case described above, and to verify the effectiveness of the steps taken.
5. TO ACHIEVE THE WORLD'S SAFEST ROAD TRANSPORTATION

The Japanese government has adopted the policy goal of achieving the world's safest road transportation. We are working toward the realization of this goal. Our strategy of focused investment based on objective data concerning accident rates per road section is part of that effort. Of course, we do not depend only on this kind of data for decision making. The process is made visible (mieruka) to the general public, and in order to pursue efficient accident prevention measures that are suited to the realities of everyday life, we plan to actively incorporate information received from the general public in the form of their opinions and requests, reports of their own experiences (including alarming experiences of near misses when actual accidents did not occur), and their viewpoints concerning individual measures.

We also plan to further enhance and develop the red zone strategy in the promotion of traffic accident prevention measures based on scientific analysis. This will include improving data-based accident analysis, sharing knowledge on the study of countermeasures (by introducing successful cases), improving the manual for evaluation of traffic accident prevention measures, and studying approaches and evaluation methods that take traffic behavior into consideration.

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REFERENCES

Website of the Kanto Regional Development Bureau: Road Mieruka Plan [in Japanese]
http://www.ktr.mlit.go.jp/kyoku/road/mieruka/

Website of the Kanto Regional Development Bureau: Traffic Safety Mieruka Plan, part of the Road Mieruka Plan [in Japanese]
http://www.ktr.mlit.go.jp/kyoku/road/mieruka/anzen01.html