New Approaches to Reduce Road Traffic Accidents in Japan

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(1) Current Situation of Traffic Accidents in Japan
Traffic Accidents in Japan

"Traffic war*" led by post-war motorization became a social problem and fatality reached a record high of 16,765 in 1970. In 2011, however, the number decreased down to less than one third of the 1970-level.

Changes in traffic fatalities

*expression indicating a high number of deaths from traffic accidents

Data from National Police Agency
Factors of the decline in traffic fatalities during the last 40 years

1. Improvement of road infrastructure
2. Reduction in drunk driving accidents
3. Increased use of seatbelts
4. Increased pedestrian awareness to keep traffic rules
5. Enhanced vehicle safety
Goals

(1) Reduce the annual number of deaths resulting from traffic accidents to below 3,000 so that Japan becomes the nation with the world’s safest road traffic.

(2) Reduce injuries to 0.7 million or fewer.

Countermeasures

〈Point of view〉

① Ensure safety of the elderly and children.
② Ensure safety of pedestrians and cyclists.
③ Ensure safety of road users on residential and arterial roads.
(2) The Management Approach for Safer Roads
Accident rates in the Tokyo Metropolitan region

- Accidents tend to occur frequently at certain spots on arterial roads.
- Measures are focused on these black spots.

An example of black spot (National Hwy 16, Yokohama)

Legend
- 1,000 or fewer accidents per billion vehicle km
- 2,000 or fewer accidents per billion vehicle km
- 3,000 or fewer accidents per billion vehicle km
- 3,000 or more accidents per billion vehicle km
Designation of Black Spots

- Designate arterial road sections with high frequency of accidents as “black spots” and promote accident prevention measures.
- About 4,000 black spots were designated in 2003 and 3,400 spots in 2008.

Criteria for black spot designation in 2008

All of the following segments for the average from 2003 to 2006
- 1,000 or more injury accidents/billion vehicle km
- 10 or more fatal accidents/billion vehicle km
Countermeasures for Black Spots and Their Effects

- Improvements of signal system and intersections were carried out through the cooperation between police and road administrators.
- Fatal and injury accidents were declined by 31% amongst 3,271 “black spots” after the improvements during the target years (2003 to 2007)
Daiku intersection on Hwy 2 is one the most accident-prone spots in Okayama pref. Reduced radius of left turn channel on one side and removal of left turn channel on the other side brought reduction of sudden collision and left turning accidents.

Causes of accidents:
- Reduced radius of left-turn channel
- Removal of left-turn channel

Countermeasures (completed in 2008):
1. Reduced radius of left-turn channel
2. Removal of left-turn channel

Change in traffic accidents:
- Car collisions: 13.8 to 12.5, 50% reduction
- Cyclists/pedestrians: 19.0 to 6.0, 50% reduction

Diagram:
- High-speed cars enter pedestrian crossing causes frequent car-cyclist/pedestrian collisions.
- Approx. 50% reduction in collisions.
Case Example of Countermeasure at Black Spot
(Nagare Intersection on National Hwy 3, Fukuoka Pref.)

- With increasing traffic volume, more than 20 accidents occur annually.
- Improvement of intersection (grade separation) brought accident reduction by half.

Before

\[ \text{Traffic accidents} \]
22 accidents in 2001
↓
(improvements completed in 2003)
↓
10 accidents in 2004

After

Nagare intersection
Hwy 3 (Fukuoka pref.)
Reduced to less than half
Conduct effective measures under the management cycle to improve black spots including causal analysis, planning of countermeasures, implementation of countermeasures and evaluation of the effects.
A database was created to support management cycle to improve black spots.
The database is accessible on the web by every road administrator for planning countermeasures.

Outline of accident database

Subject
- Black Spots
  - About 4,000 spots designated in 2003
  - About 3,400 spots designated in 2008

Data Items
- Traffic Accident Situation
- Process of Planning Countermeasures
- Items of Countermeasures
- Accident data before and after countermeasures
Format A (basic information, examination of measures)

Displays a graph to show annual changes of accident status.

Displays information such as names of roads, types of roads, and traffic status.

Displays accident factor analysis and the history of examining proposed preventive measures.

Displays photographs and figures to show road structures and roadside conditions before implementing measures.
Displays implemented measures and years of implementation.

Displays road conditions after implementing measures.

Displays a diagram of accident status before implementing measures.

Displays a diagram of accident status after implementing measures.

Displays genre-based accident data before and after implementing measures to identify preventive effects.

Displays photographs to show how the measures are implemented.
(3) New Efforts to Combat Traffic Accidents
Utilizing Probe Data from Telematics Service to Identify Hazardous Spots

-Typical Telematics Service Managed by Automobile Manufacturers-

A data center collects from subscribers
And provides refined traffic information

Providing Refined Traffic Information
(current travel time, expected congestion on the road)

Collecting Running Data (vehicle location, speed, etc)

IP communication

- The number of subscribers to HONDA system has reached 1.48 millions.
- TOYOTA and NISSAN provide a similar system.
Saitama pref. signed an agreement with Honda and uses probe data for road development (since Dec 2007).

Traffic accident countermeasures are carried out after identifying sudden-braking-prone spots using the probe data.

After improvements, frequency of sudden braking and fatal or injury accidents declined on the spots.

**Work flow**

5 or more sudden-brakings* occur in the same direction in a 50m-mesh area.

Designate these spots as “sudden-braking-prone spots”

Identify the causal factors on site.

Carry out the countermeasures (160 spots in the pref.)

* Defined as a breaking with deceleration at 0.3G or higher. Generally, deceleration at 0.3G or higher is thought to cause passengers discomfort.

**Effects**

Total number of sudden-brakings in a month

70% reduction!

Number of fatal and injury accidents

20% reduction!

145 spots where improvements were completed by Sep 2010
Elementary school students in Japan walk to school on the school-commuting roads designated by their schools (in groups for security reason).

A series of traffic accidents involving students on the road to and from school occurred this April.

- April 23rd (Mon) Kameoka city, Kyoto pref.
  A car crashed into a group of 9 students and a parent of Ansyo municipal elementary school killing 2 students and a parent with 7 major or minor injuries.

- April 27th (Fri) Tateyama city, Chiba pref.
  A car crashed into an elementary student who had been waiting for a bus to death.

- April 27th (Fri) Okazaki city, Aichi pref.
  A car crashed into 2 elementary students who had been crossing the pedestrian crossing, causing both injuries.

Images of elementary school students going to school in a group
Cooperative Urgent Inspection of School–Commuting Roads

- Ministry of Infrastructure
  - Report
  - Notice
- Ministry of Education
  - Report
  - Notice
- National Police Agency
  - Notice
  - Report
- School board
  - Adjustment
  - Adjustment
- Road administrator
- Pref. police

School and PTA
- School route setting and safety inspection
- Identifying the dangerous spots

Joint inspection
Identifying spots to be improved
by the end of August 2012

≪Findings≫
- Number of inspected schools: about 20,000
- Number of inspected spots: about 70,000
- Number of spots to be improved: about 60,000
Cyclists and students use the same road, which can cause accidents.

**Countermeasure**

- Traffic controlling by volunteers

**Involved party**
- School board, school, PTA
- Road administrators
- Police
- Road users

Pedestrians sometimes have to enter the roadway to go around utility poles.

**Countermeasure**

- Undergrounding

A bus stop in the middle of narrow sidewalk

**Countermeasure**

- Change of school route

Narrow side walk with gaps

**Countermeasure**

- Sidewalk widening
- Barrier-free side walk

Too narrow pedestrian space in grade crossing

**Countermeasure**

- Grade crossing widening

Large vehicle on the narrow residential roads

**Countermeasure**

- Restrict large vehicles
- Narrow the road using fence

Points to be improved:

- Designated route

- Points to be improved
Conclusion

- Systematic efforts in traffic safety are effective.
- New approaches such as introduction of a management cycle and utilization of prove data should be continued.
- Cooperative work with other authorities and cooperation with citizens are effective and should be enhanced.
Thank You for Your Attention