Road Safety Countermeasures by Road Administrator

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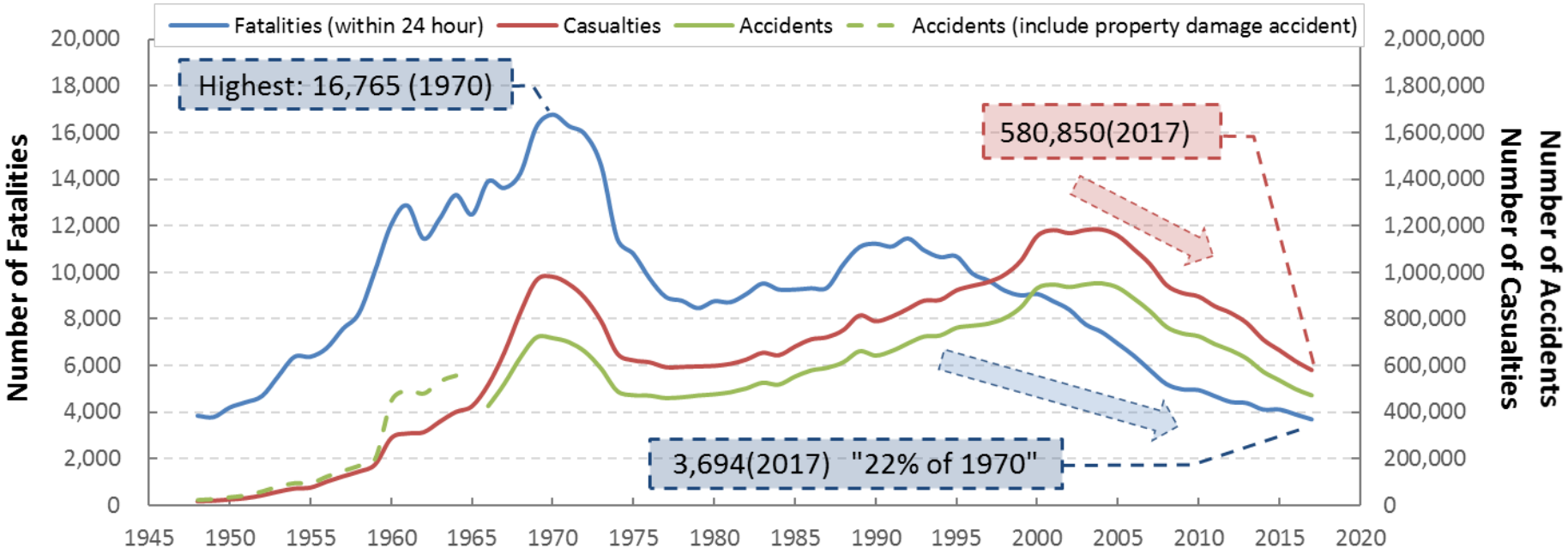
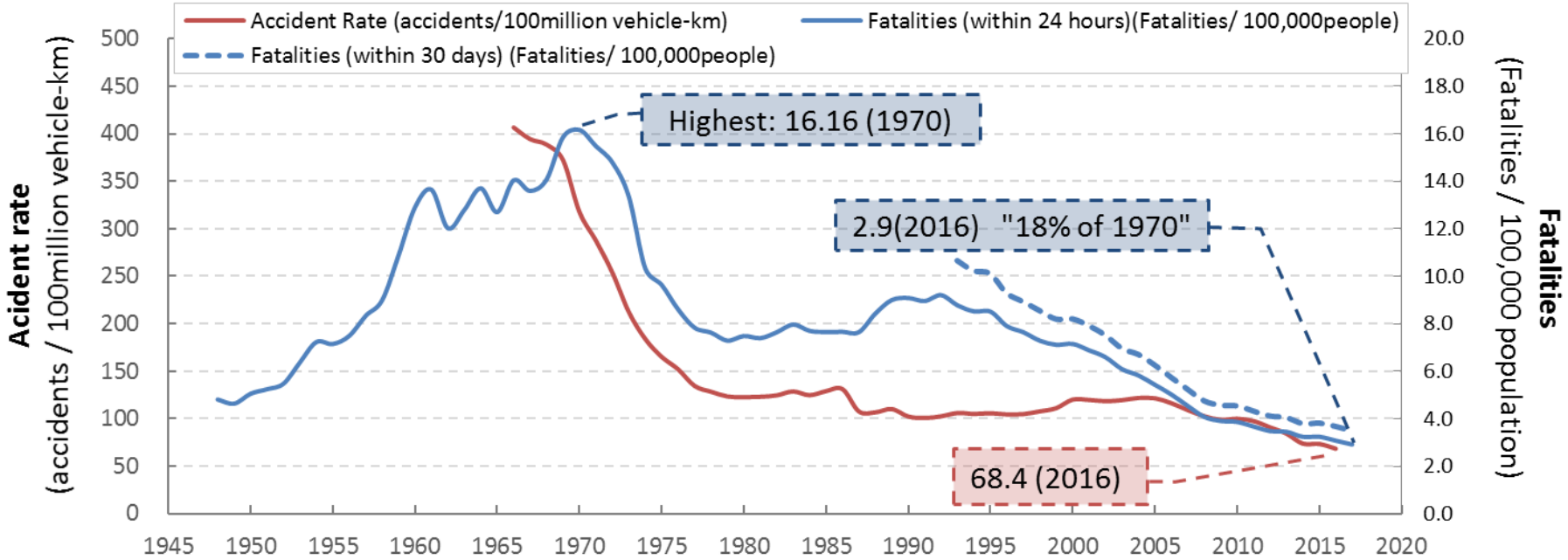
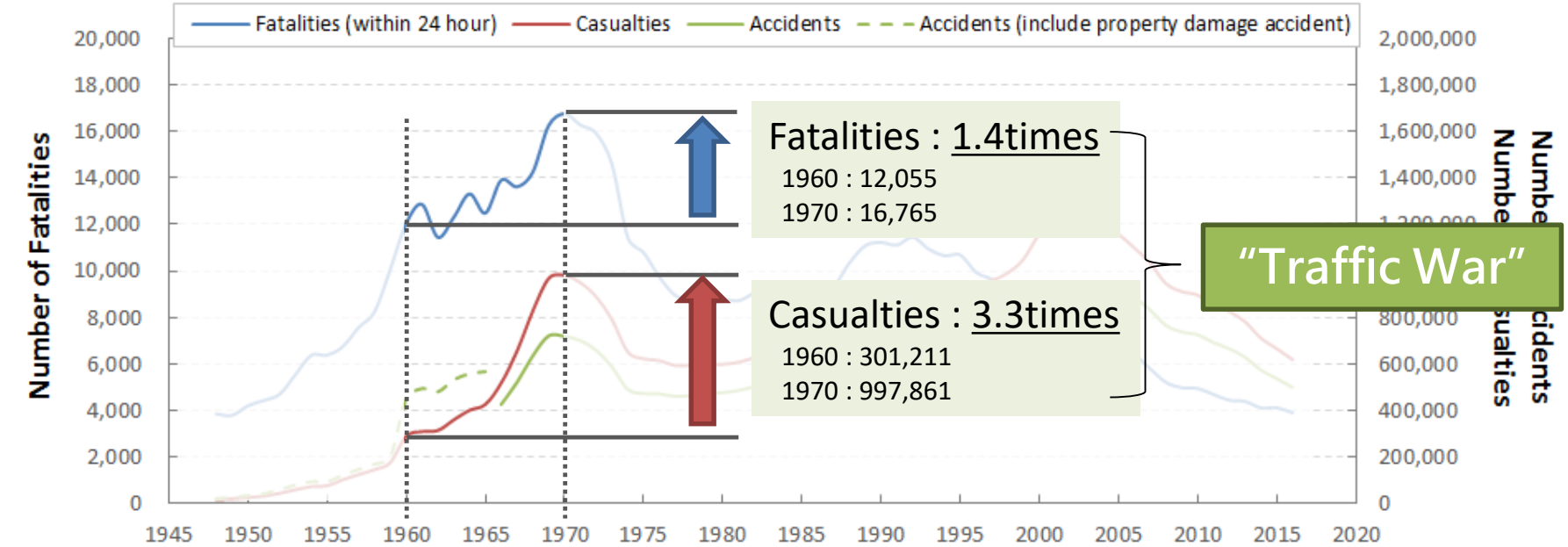
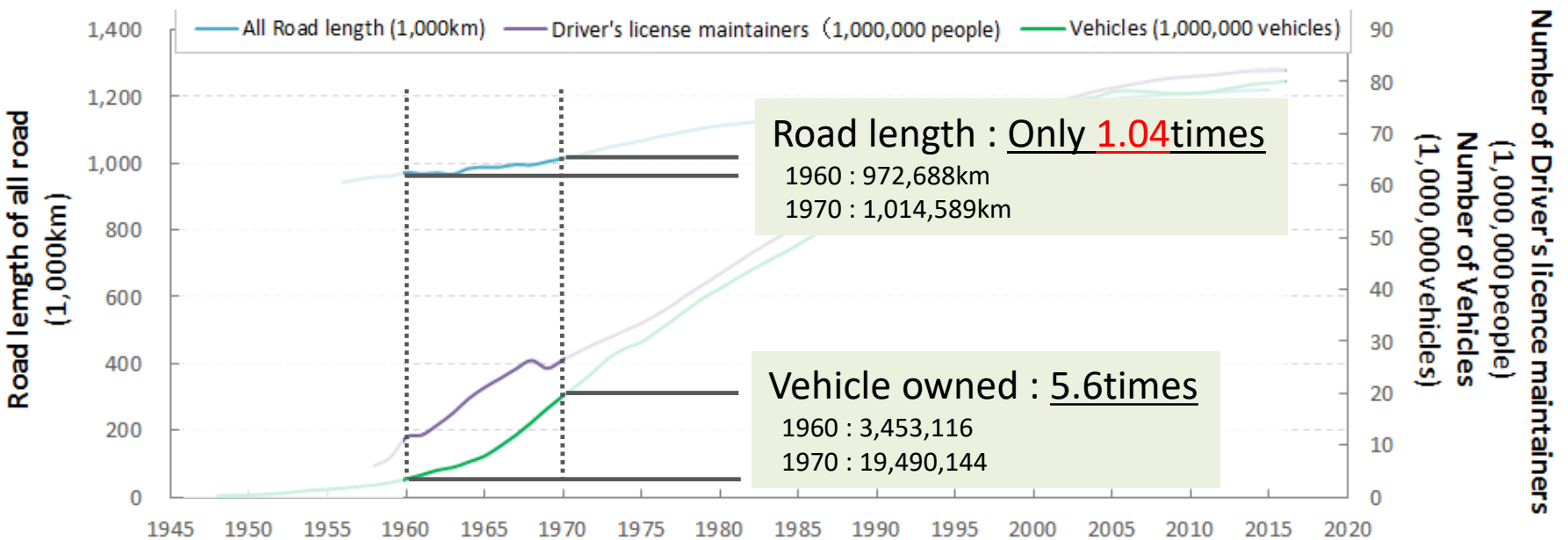
1. Outline of Traffic Safety in Japan





～1970 “Traffic War”





～1970 Traffic Safety Policies Basic Act

The sharp increase in traffic accident has become a matter of public concern.

“Traffic War”

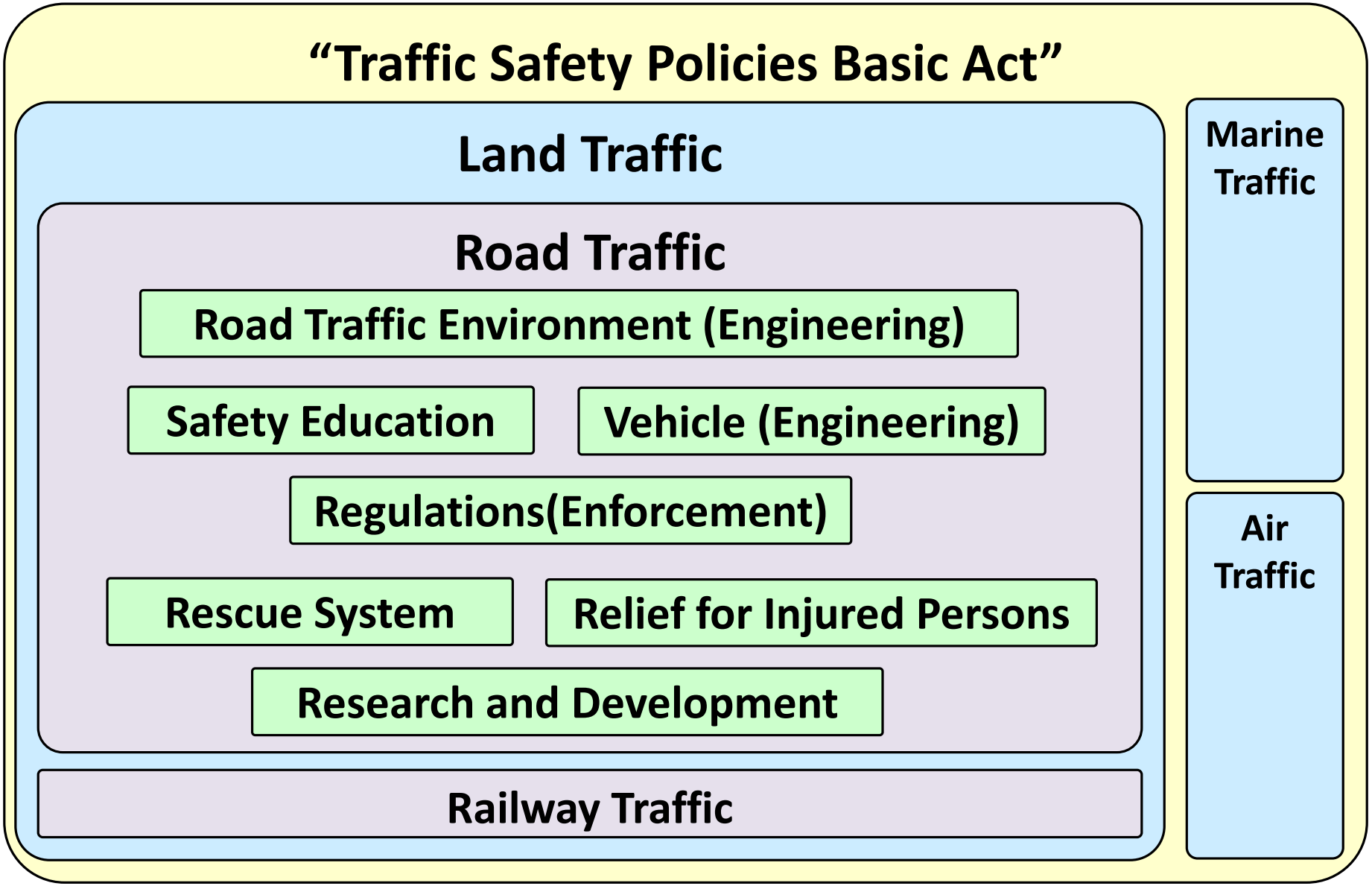
Law was enacted in order for the whole country to take countermeasures against the increasing number of traffic accidents like this.

“Traffic Safety Policies Basic Act”

Traffic Safety Policies Basic Act…

- The Basic Law on Traffic Safety countermeasures covers all aspects of **land**, **marine**, and **air** traffic.
- Road traffic safety is further divided **into road traffic environment**, **safety education**, **vehicles**, **control** (regulations), **rescue systems**, and **relief for injured persons**.
- It requires establishment of **the Central Committee on Traffic Safety Measures** and formulation of **the Fundamental Traffic Safety Program** by this Committee.

～1970 Traffic Safety Policies Basic Act



～1970 Traffic Safety Policies Basic Act

“Traffic Safety Policies Basic Act”

Road Traffic Environment (Engineering)

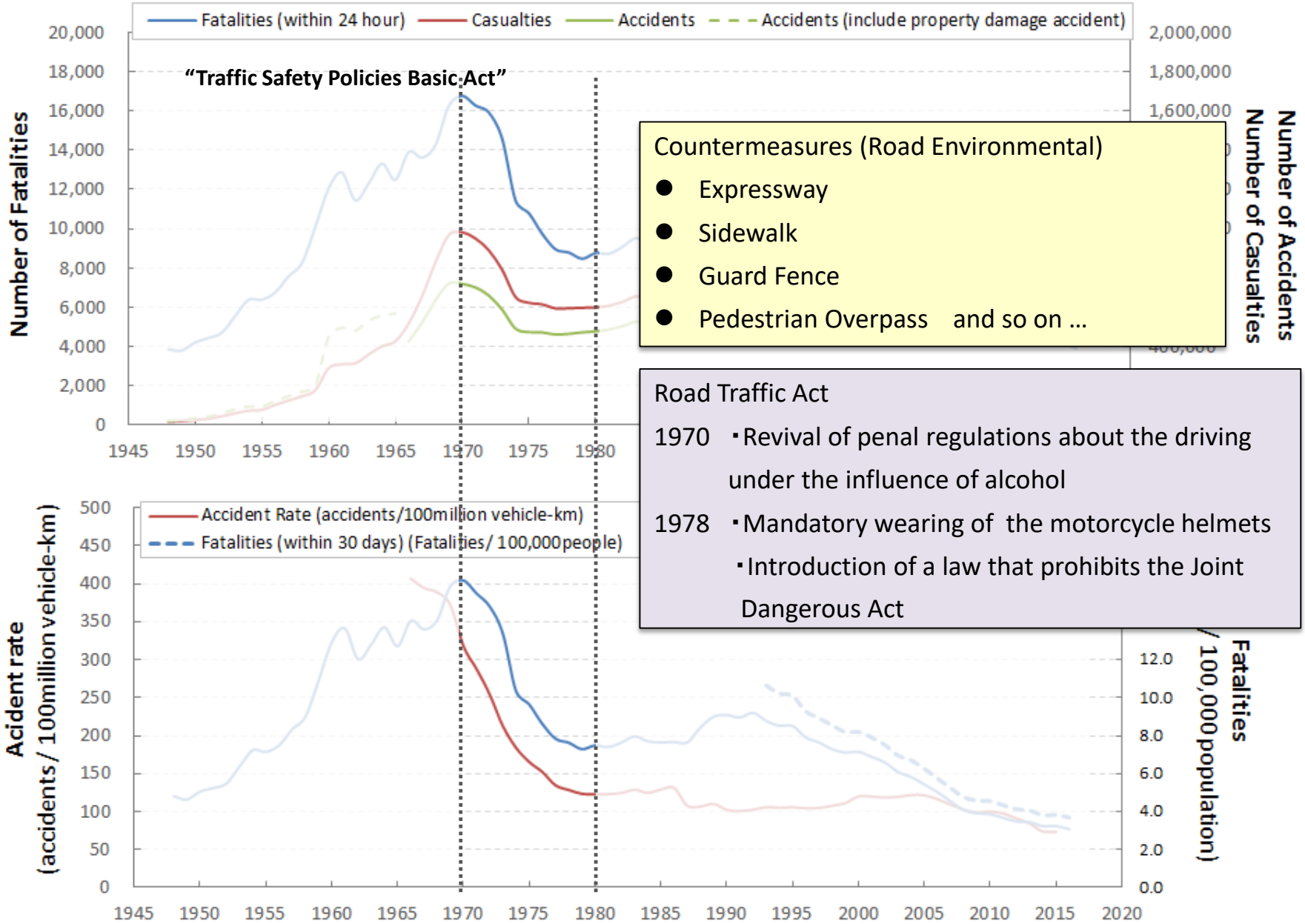
Road Bureau, MLIT and NILIM

- Road (express way, bypass etc…)
- Road Structure (figure of intersection etc…)
- Safety Facilities (guard fence, road lighting etc…)

National Police Agency (NPA)

- Traffic Control (road signal, regulation of one-way traffic etc…)

1970～1980 Fundamental Traffic Safety Program



Countermeasures (Road Environmental)

- Expressway
- Sidewalk
- Guard Fence
- Pedestrian Overpass and so on …

Road Traffic Act

1970 ・Revival of penal regulations about the driving under the influence of alcohol

1978 ・Mandatory wearing of the motorcycle helmets

・Introduction of a law that prohibits the Joint Dangerous Act

1970～1980 Fundamental Traffic Safety Program

●Expressway

●Guard fence

1970～1980 Fundamental Traffic Safety Program

●Sidewalks

●Bicycle roads

●Shared pedestrian and bicycle tracks

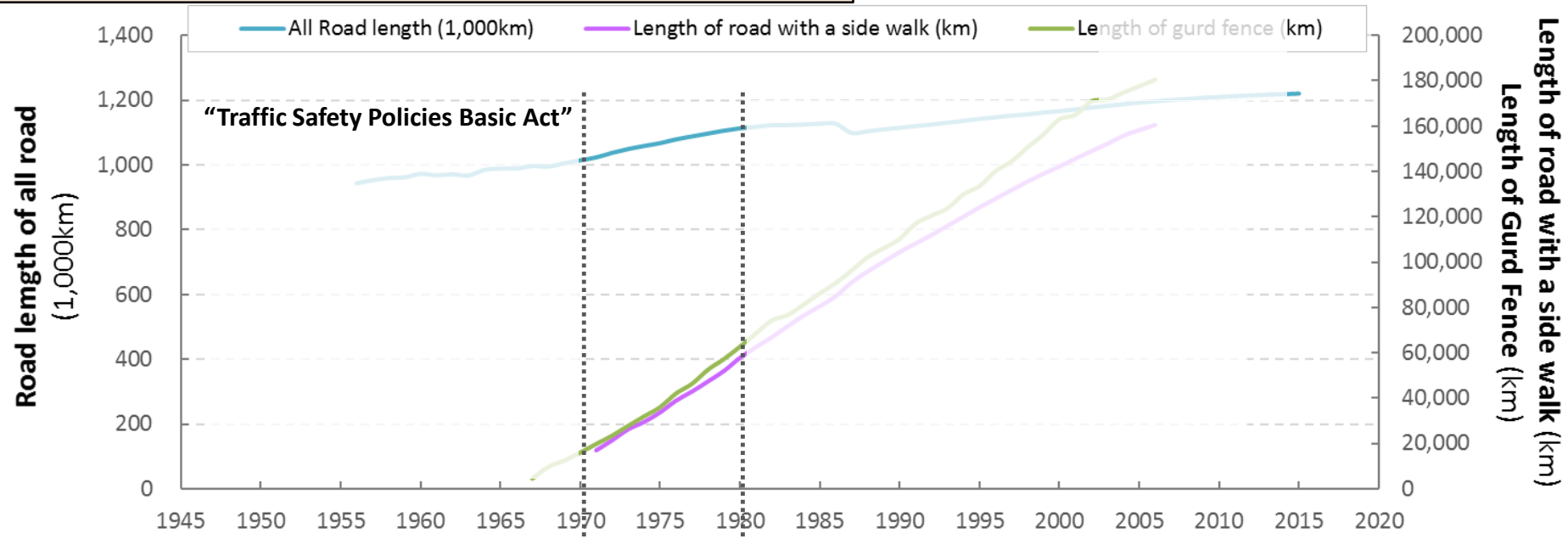
●Pedestrian overpass road crossings

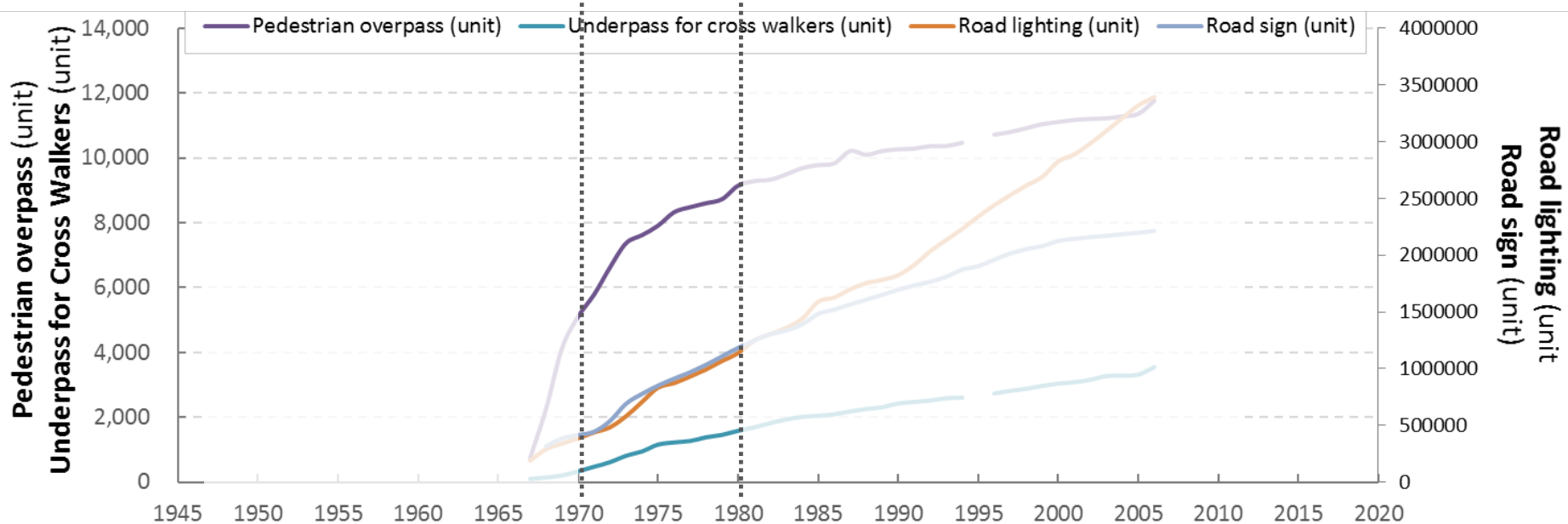
1970～1980 Fundamental Traffic Safety Program

- Median strips

- Road lighting

1970～1980 Fundamental Traffic Safety Program





1970～1980 Fundamental Traffic Safety Program

- The construction of expressways and arterial roads contributed improvement of road safety.

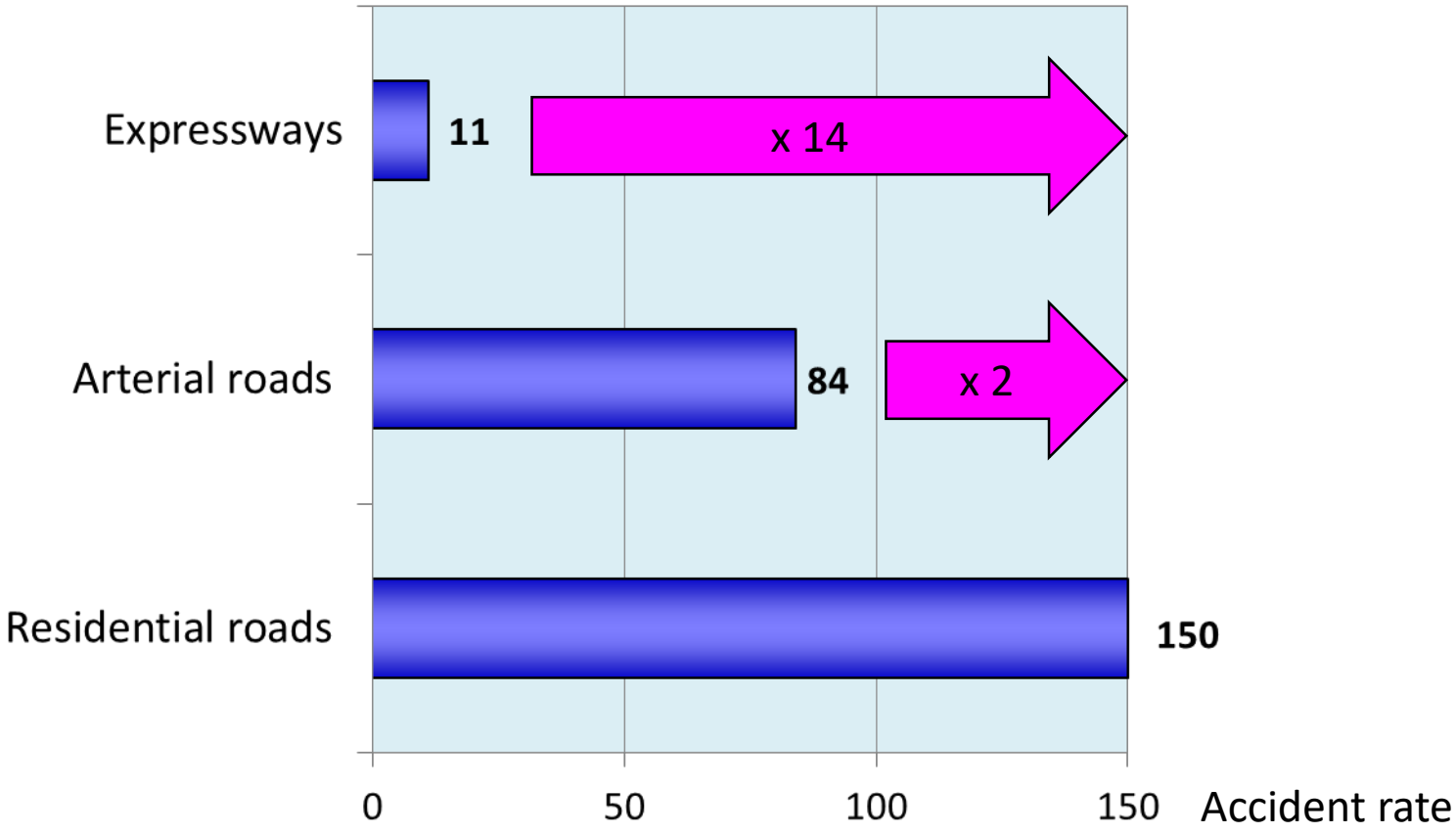


Fig. -6 Accident Rates by Road Types (Accident data : 2011)

1970～1980 Fundamental Traffic Safety Program

- The construction of sidewalks introduced safety for especially children.

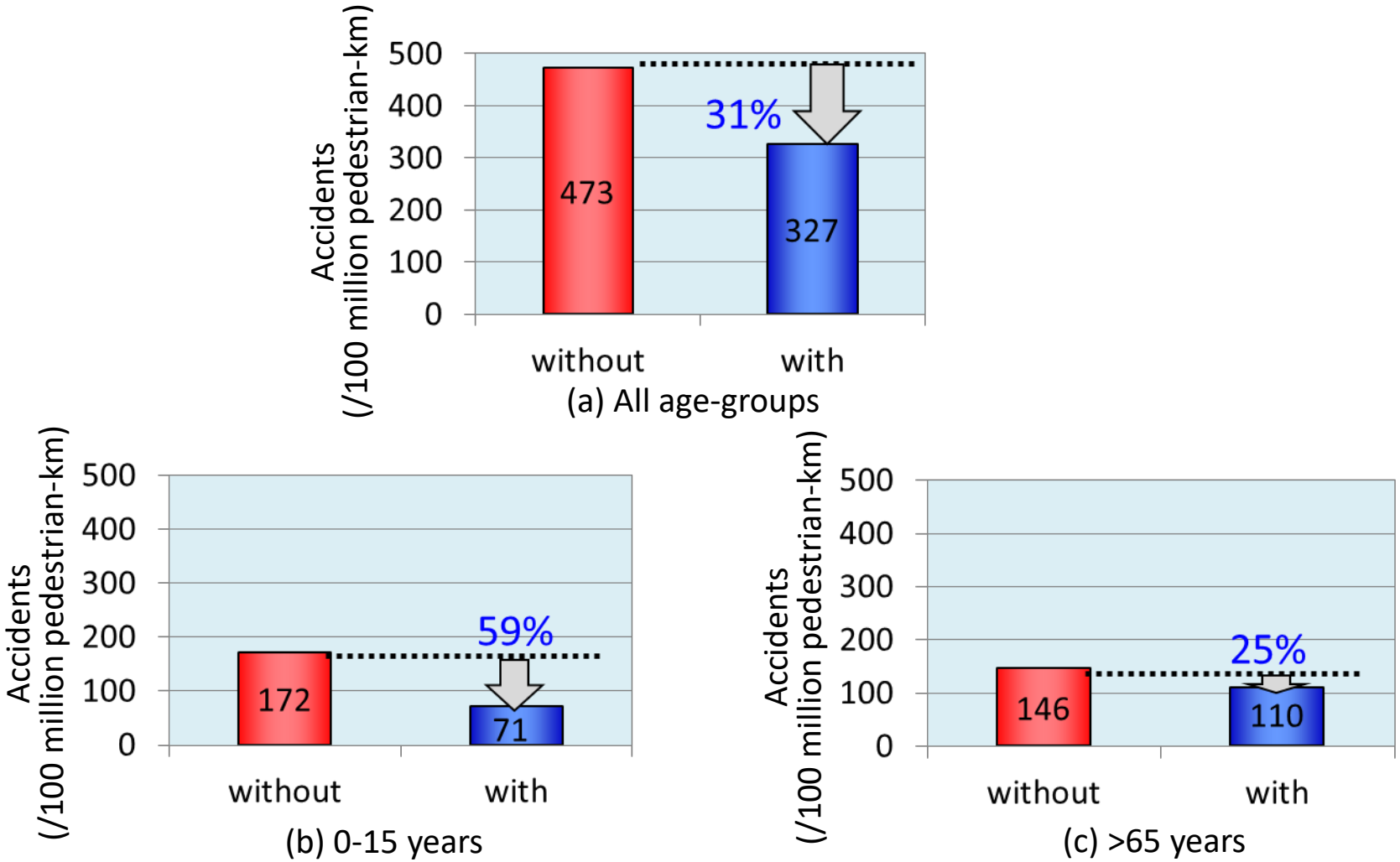


Fig.- 4 The Effectiveness of Sidewalk Construction on 2-lane roads (Accident data : 2000-2003)

1970～1980 Fundamental Traffic Safety Program

- The installation of road lightings were more effective against vehicle-pedestrian and head-on collisions.

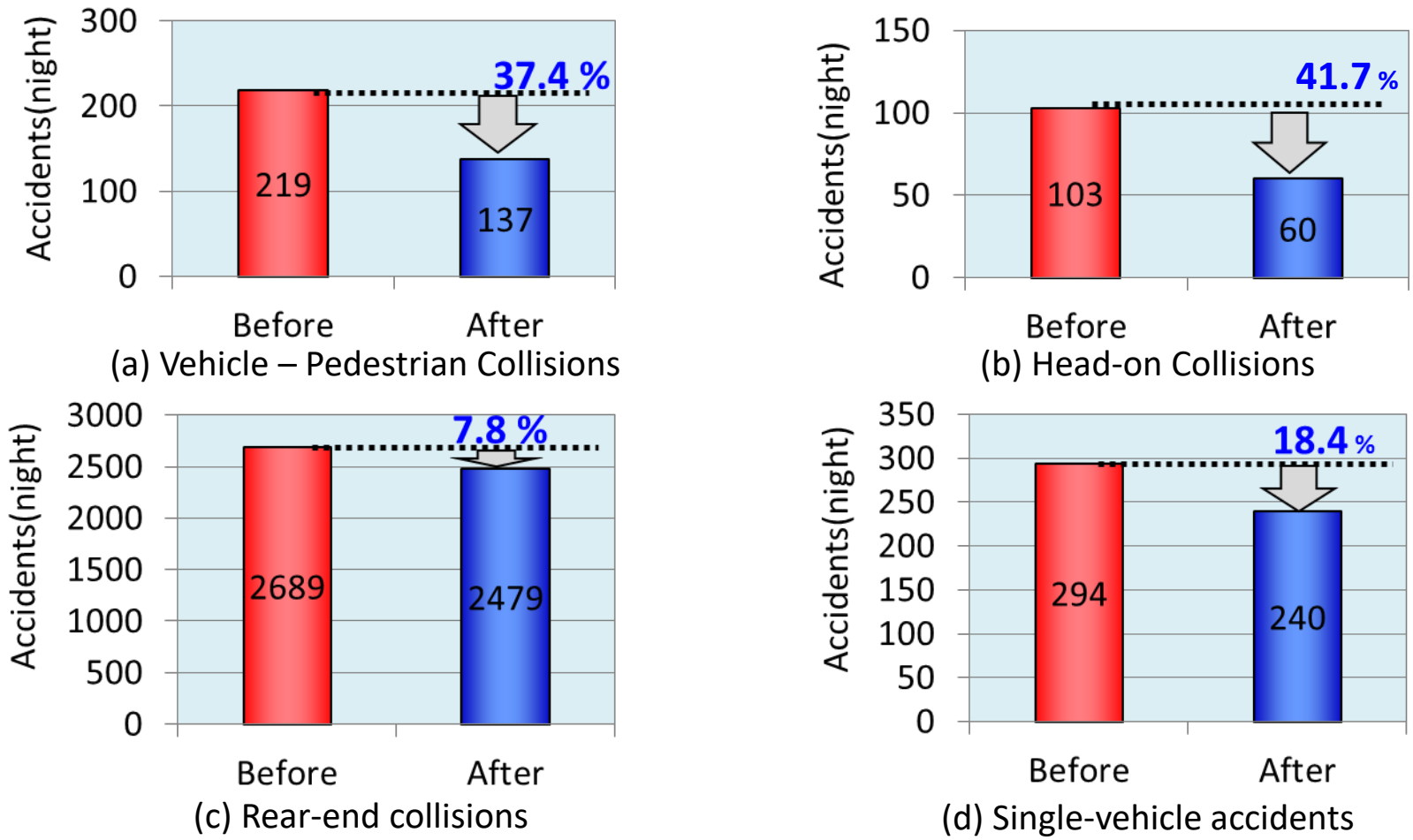
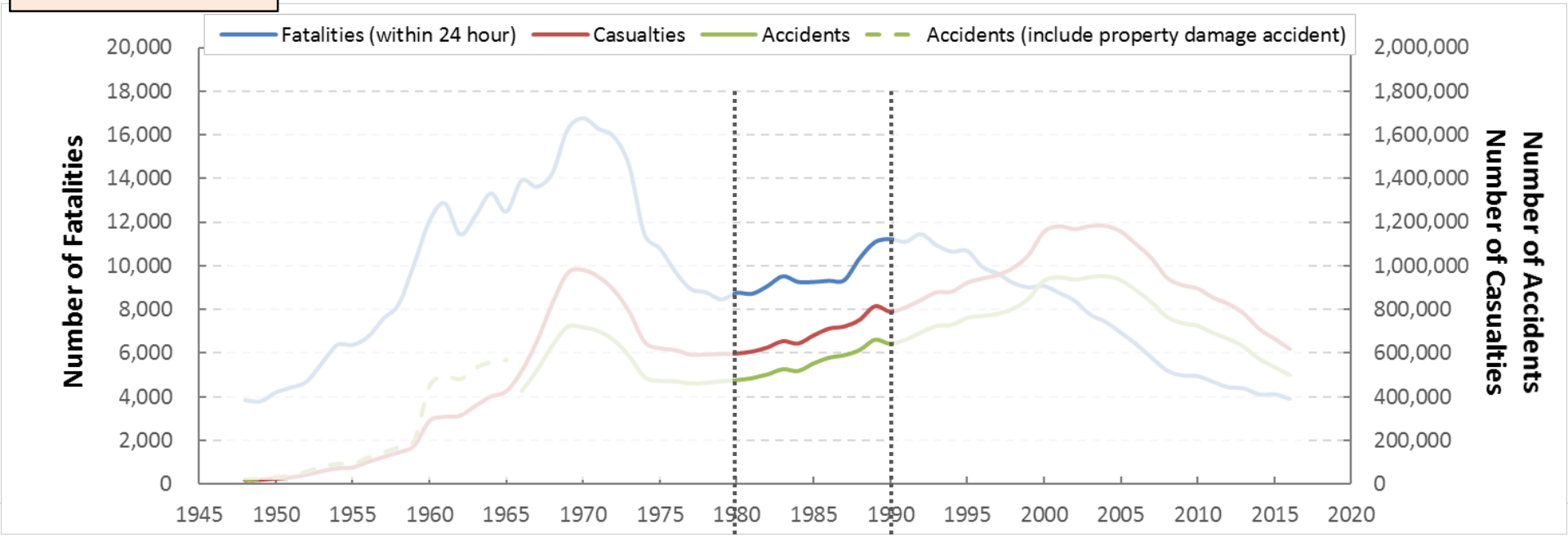


Fig.-5 The Effectiveness of Road Lighting Installation on Non-intersections

1980～1995

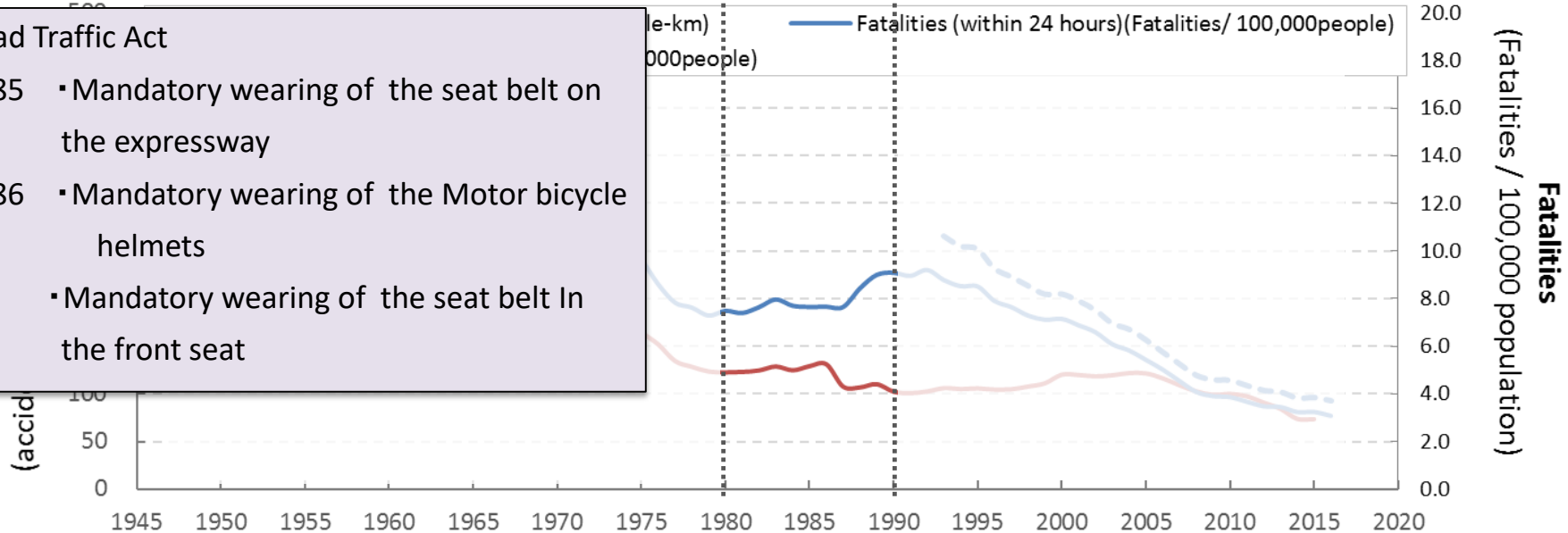


Road Traffic Act

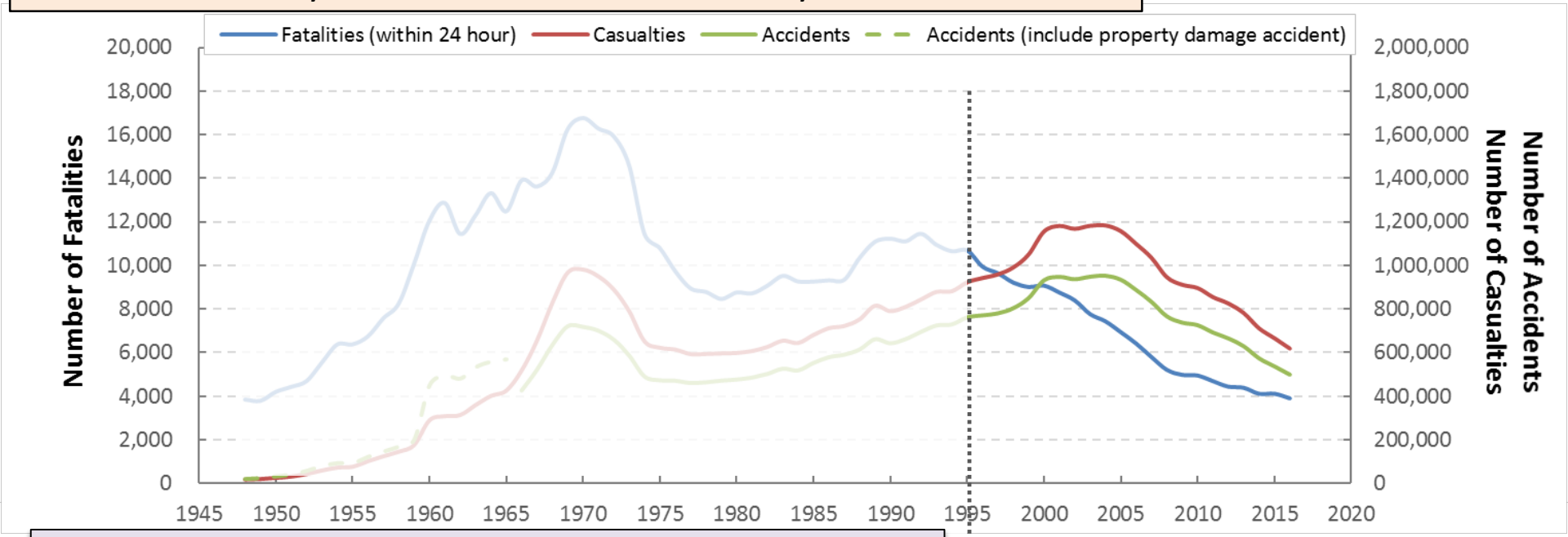
1985 ・Mandatory wearing of the seat belt on the expressway

1986 ・Mandatory wearing of the Motor bicycle helmets

・Mandatory wearing of the seat belt In the front seat



1995～ Start of Systematic Process in road safety countermeasures



Road Traffic Act

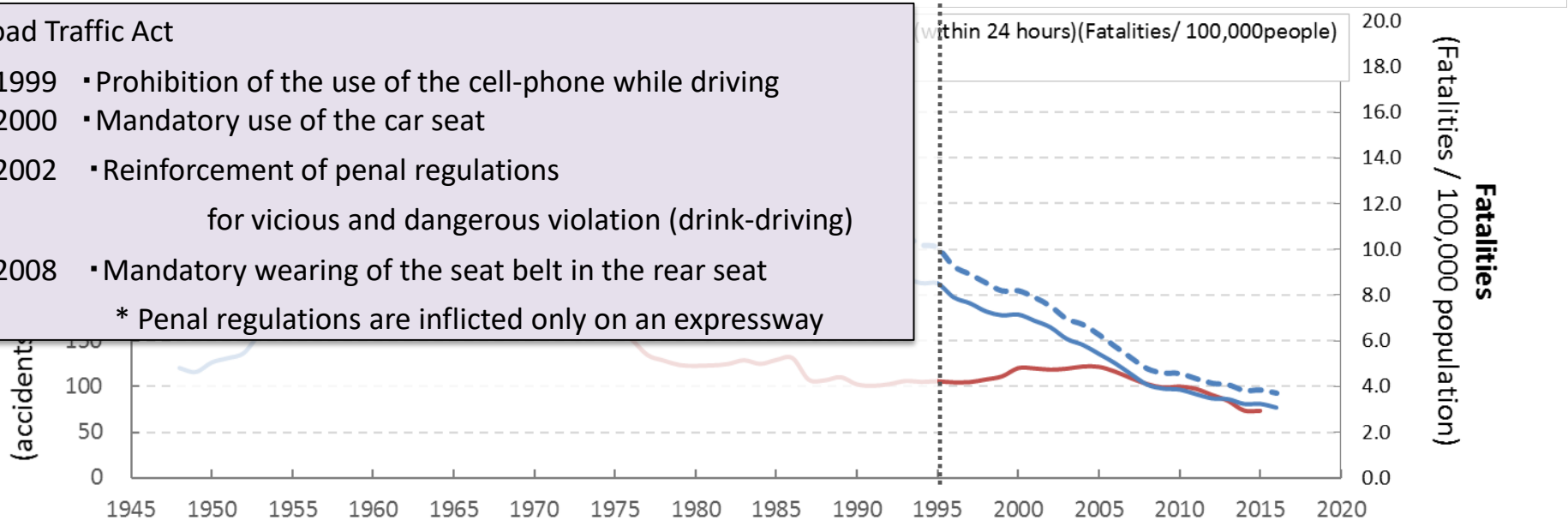
1999 ・Prohibition of the use of the cell-phone while driving

2000 ・Mandatory use of the car seat

2002 ・Reinforcement of penal regulations for vicious and dangerous violation (drink-driving)

2008 ・Mandatory wearing of the seat belt in the rear seat

* Penal regulations are inflicted only on an expressway



- 69% of all accidents on arterial roads are concentrated on 20% of all arterial road sections.

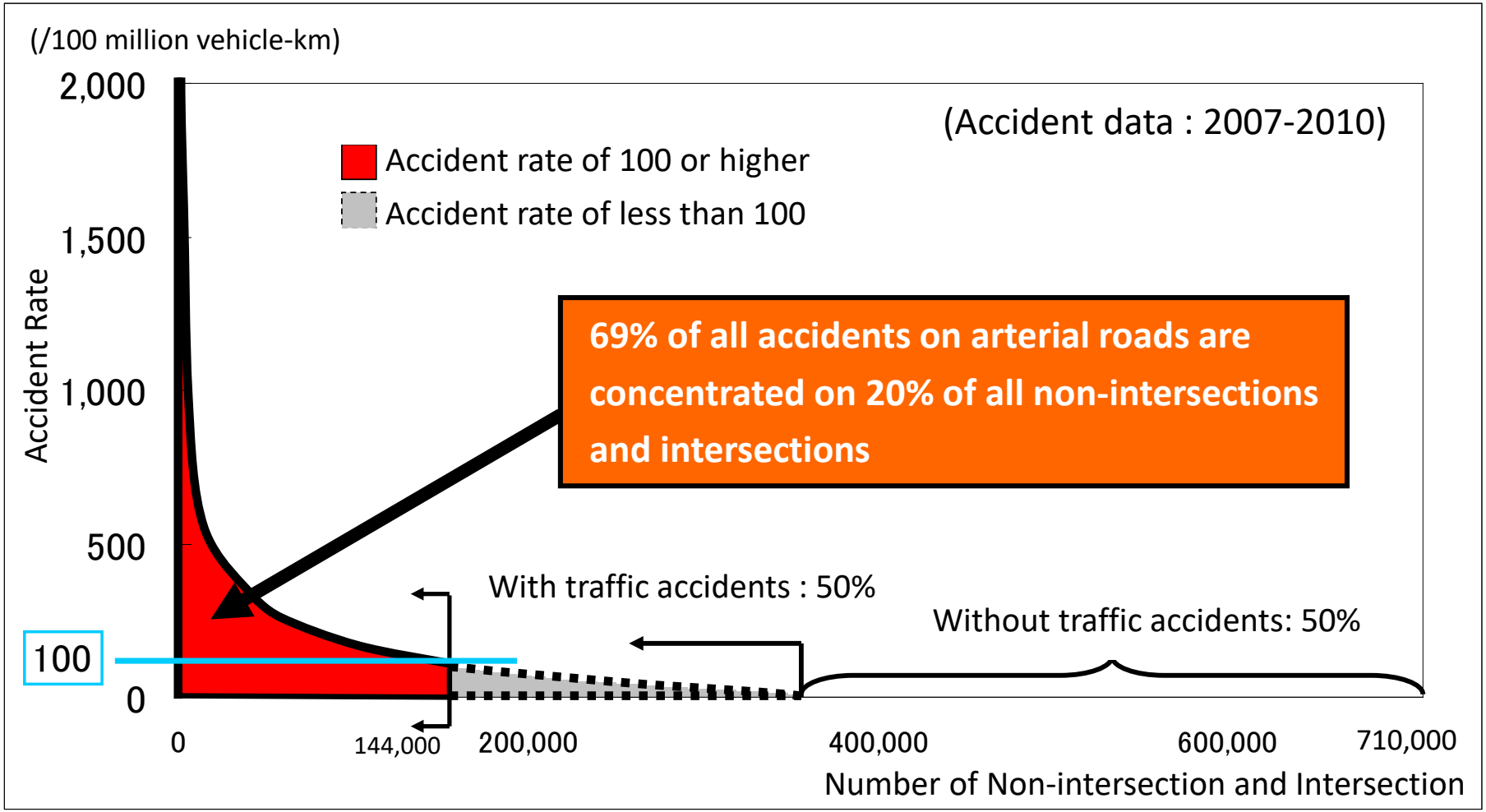
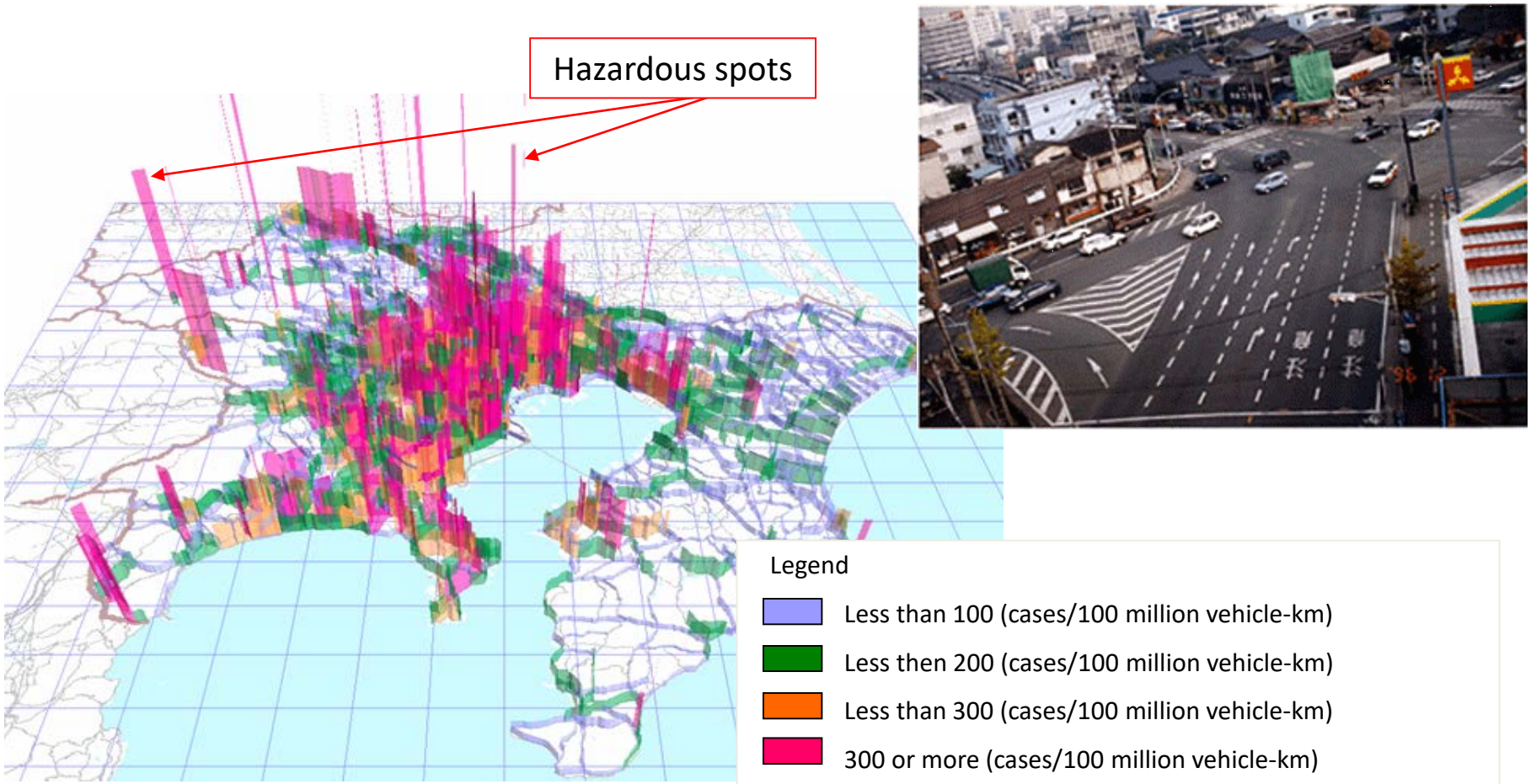


Fig.-7 Ranking Curve of Sections based on Accident Rate

Arterial Roads: Accidents are concentrated at specific locations

Implementation of focused road traffic environment countermeasures for hazardous spots (black spots)



Hazardous Spots

Year (Designate)	Number of Spot	Period of Measure
1996	3,196	1996-2002
2003	3,956	2003-2007
2008	3,396	2008-2011
2012	3,490	2012-2016
2017	3,125	2017-2021

≪Criteria in 2017≫

- **1,000 or more accidents/billion vehicle km**
- **100 or more serious accidents/billion vehicle-km**
- **10 or more fatal accidents/billion vehicle-km**

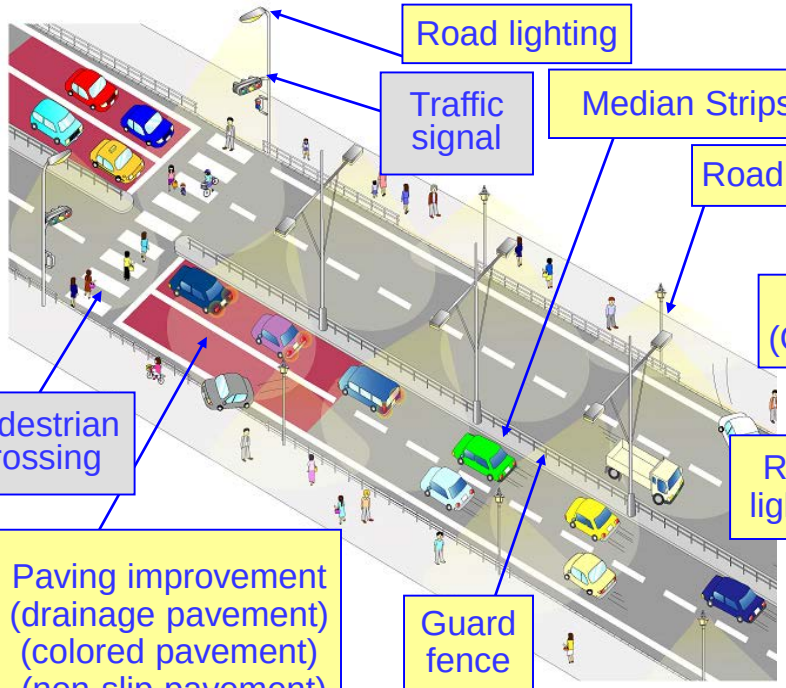
All of the three above are satisfied.

Identify the spots

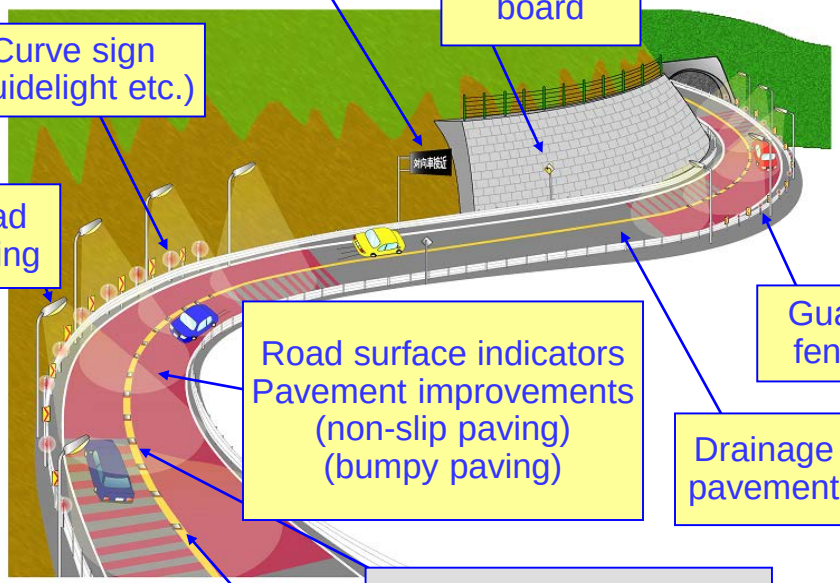
Integrated Database of Road Traffic Census and Accident

➢ Traffic safety projects implemented by road administrators and public safety commissions (non-interasections)

Urban roads



Rural mountainous roads

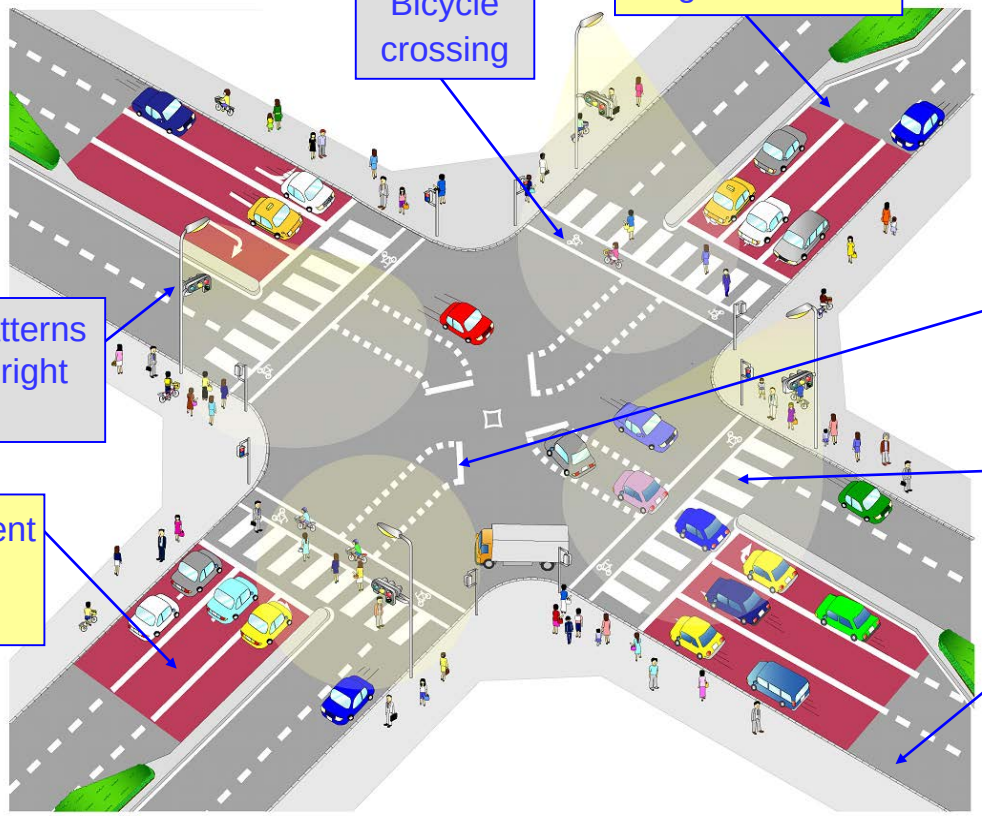


Legend

measure : taken by road administrators

measure : taken by public safety commissions

- Traffic safety projects implemented by road administrators and public safety commissions (roads with intersections)



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measure : taken by road administrators

measure : taken by public safety commissions

Example of preventive countermeasures against traffic accidents on arterial roads

- Road lighting

- Separate traffic signals for pedestrians and vehicles

- Median strips

- Colored pavement

Example of preventive countermeasures against traffic accidents on arterial roads

●Rumble strips

Source: Website CERI (Civil Engineering Research Institute for Cold Region)
http://www2.ceri.go.jp/rumble/eng/index.html

●Curve sign

●Level difference pavement (bumpy paving)

Example of preventive countermeasures against traffic accidents on arterial roads

●Approaching oncoming car indicator device

●Median strips (post cones)

●Median strips (zebra marking)

History of road safety measures

	Financial Year	Target	Actual
1st Program	1971 – 1975	Number of pedestrian fatalities: half of the current estimate of 8,000	1975: 3,732
2nd Program	1976 – 1980	Number of fatalities: half of the current estimate of 16,765	1980: 8,760
3rd Program	1981 – 1985	Number of fatalities: no more than 8,000	1985: 9,261
4th Program	1986 – 1990	Number of fatalities: no more than 8,000	1990: 11,227
5th Program	1990 – 1995	Number of fatalities: no more than 10,000	1995: 10,679
6th Program	1996 – 2000	Number of fatalities: no more than 10,000 in 1997 no more than 9,000 in 2000	1997: 9,640 2000: 9,066
7th Program	2001 – 2005	Number of fatalities: no more than 8,466	2005: 6,871
8th Program	2006 - 2010	Number of fatalities: no more than 5,500	2008: 5,115 2009: 4,914
9th Program	2011 - 2015	Number of fatalities no more than 3,000	2015 4,117

➢ The 65 or more years age-group fatalities per population is more than other age-groups, furthermore this group is many compared with other countries.

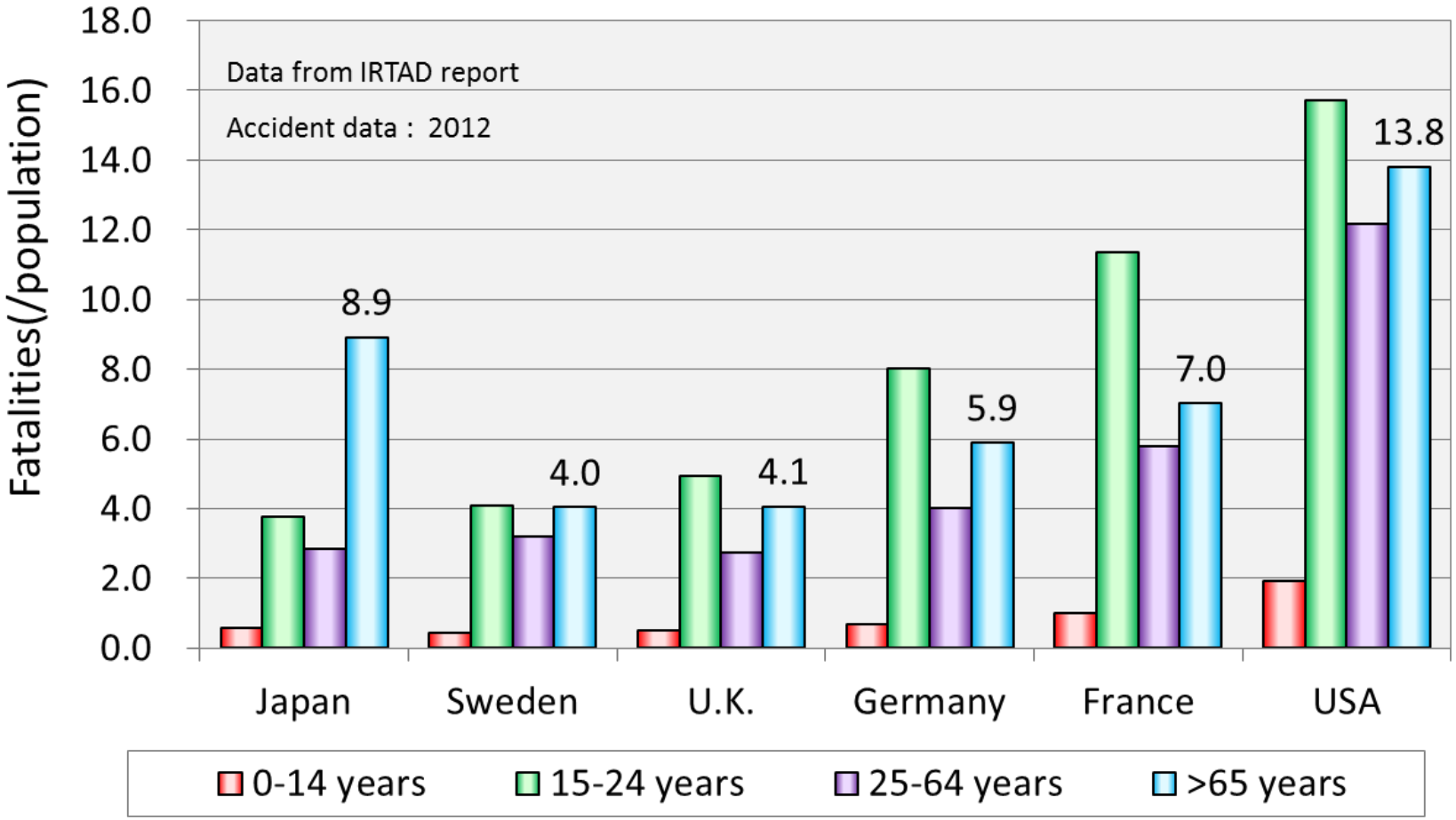


Fig. -8 Fatalities by Age-group per Population

- The proportion of pedestrian and cyclist fatalities is about half, this is very high compared to other countries.

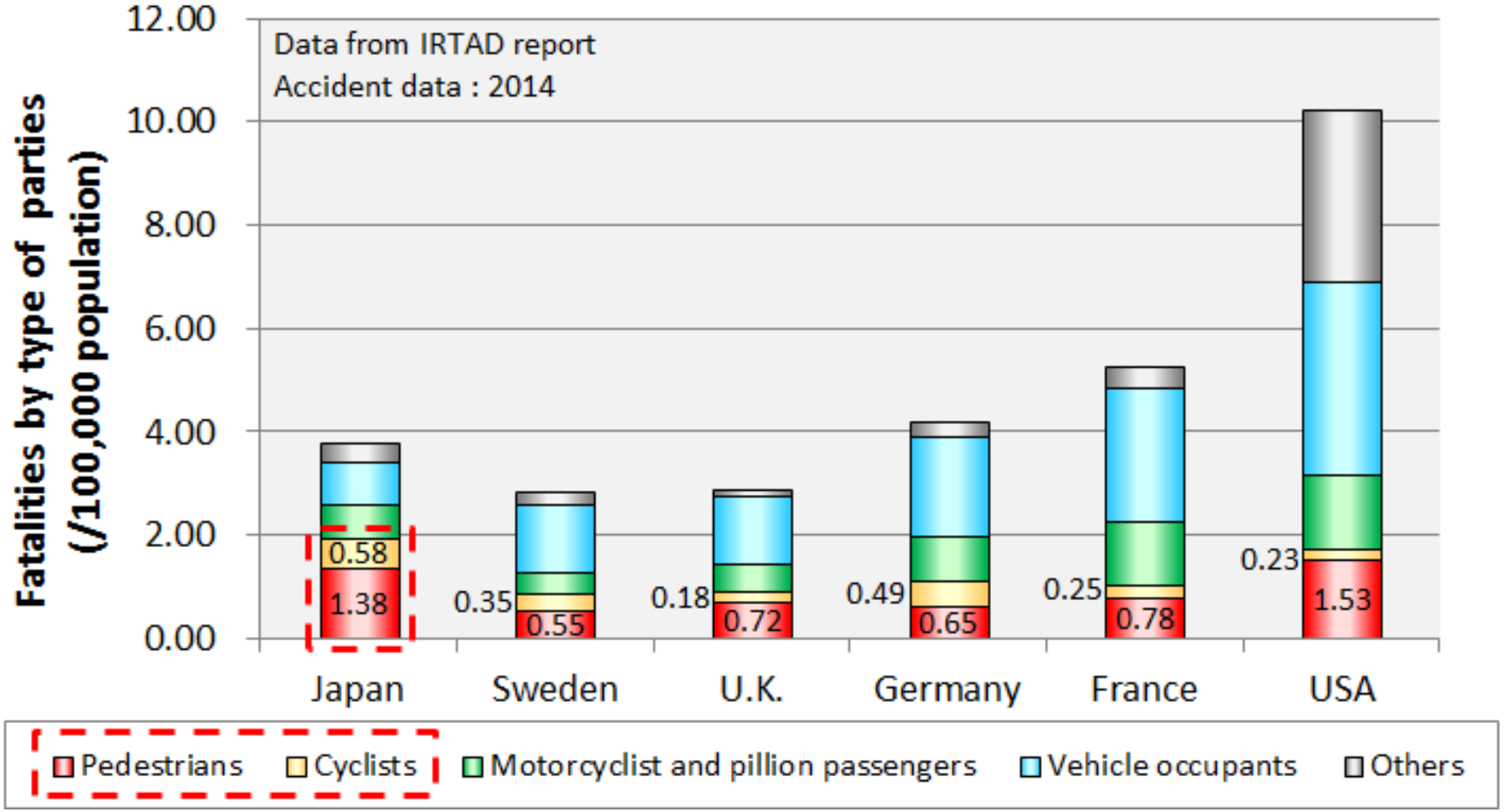


Fig. -9 Fatalities by Type of Parties per Population

- Bicycle-bicycle and bicycle-pedestrian accidents only in 2011 increased compared to 2001, they are about 1.5 times.

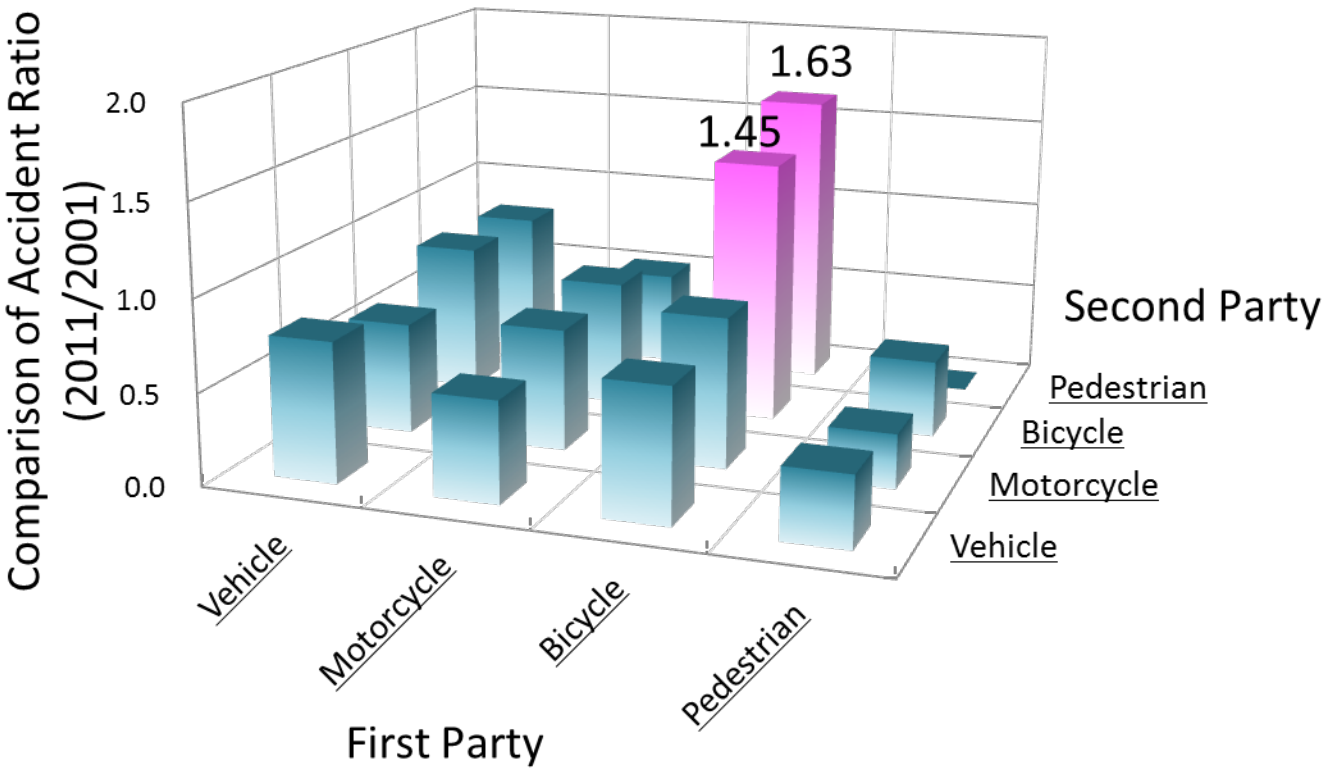
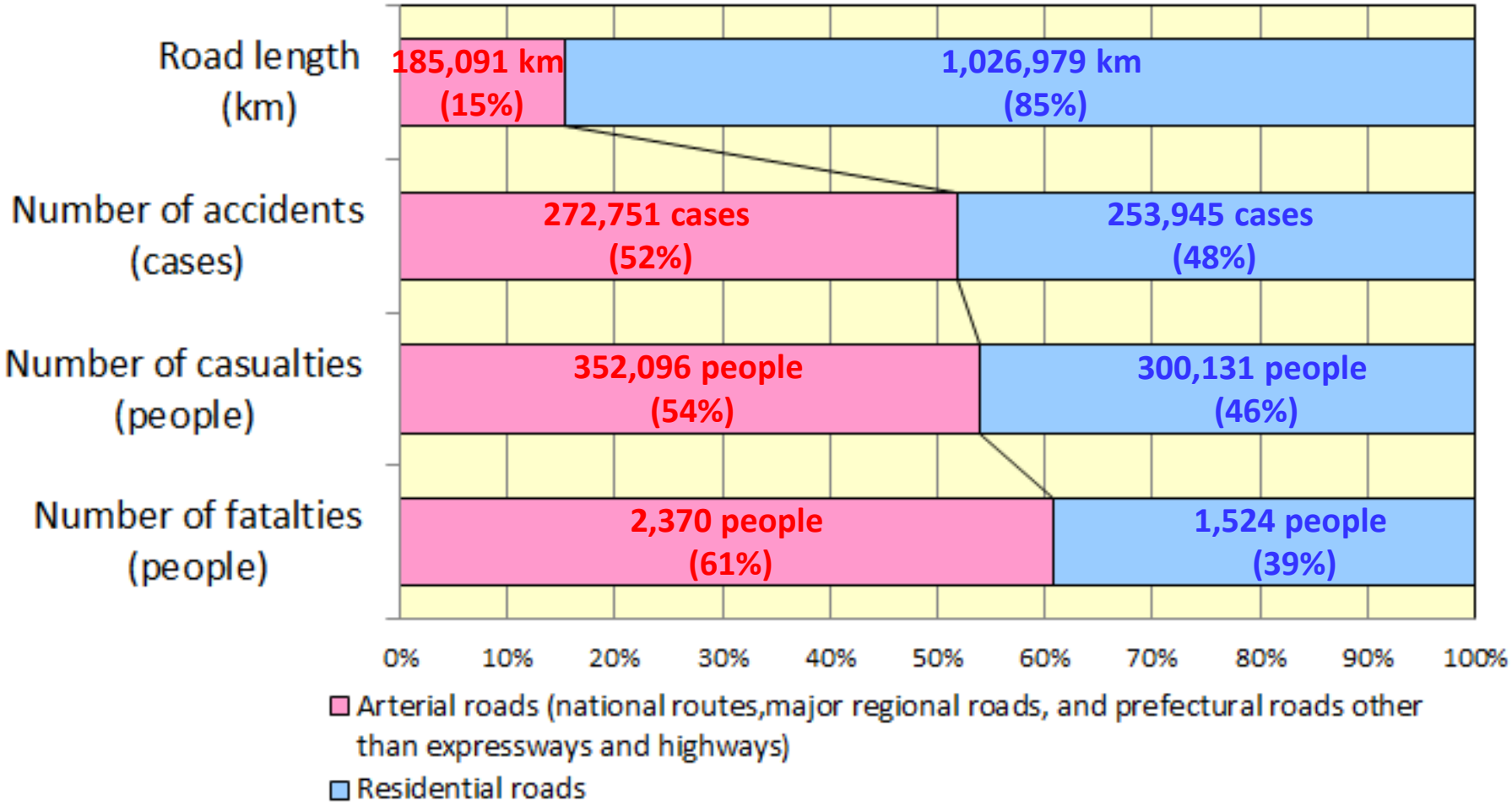


Fig. -10 Ratio Fatalities by Type of Parties

Arterial roads and residential roads



* Road length is based on the Annual Report on Road Statistics (2015)
* Number of accident is based on the Annual Report on Traffic Accident Statistics (2015)
* Number of fatalities is 24 hours fatality

◆Target of Road Traffic Safety

Achieving a "Society with No Traffic Accidents"

1. To "achieving the world's safest road traffic "by lowering the number of 24-hour fatalities to 2,500 or less by 2020.
   *Roughly 3,000 when this 2,500 is multiplied by the ratio of 24-hour fatalities and 30-day fatalities during 2015
2. To lower the number of casualties to 500,000 or less by 2020.

◆Countermeasure for road safety

Viewpoints

1. Scope of priority response to reduce the harm caused by traffic accidents
   Ensuring the safety of **the elderly and children**, **pedestrians and cyclists**, on **community Roads**
2. Priority issues to create an environment with fewer accidents.
   ① Promoting the use of advanced technologies
   ② Promoting carefully planned measures based on actual traffic conditions, etc.
   ③ Promoting traffic safety measures encompassing entire regions.

Measures to be taken

① Improving road traffic environments
② Comprehensive implementation of traffic safety awareness initiatives
③ Securing safe driving
④ Ensuring vehicle safety
⑤ Maintaining road traffic order
⑥ Enhancing rescue and emergency services
⑦ Promoting victim support, including a more appropriate compensation system
⑧ Enhancing R&D and study activities

Example of Traffic Barriers

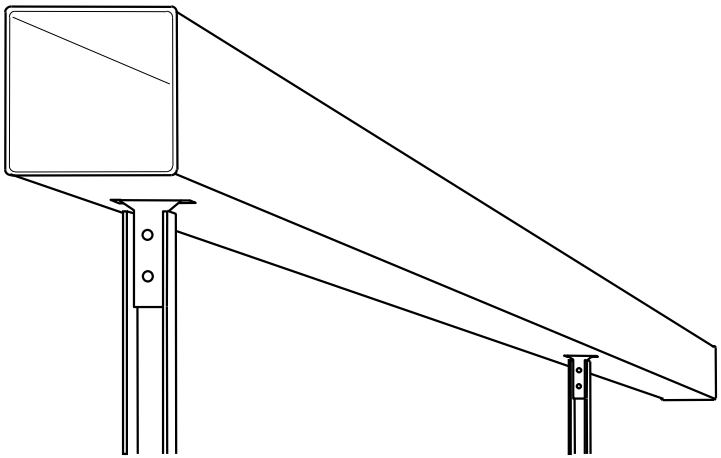
Median Barrier

Guard Rail

Example of Traffic Barriers

Median Barrier

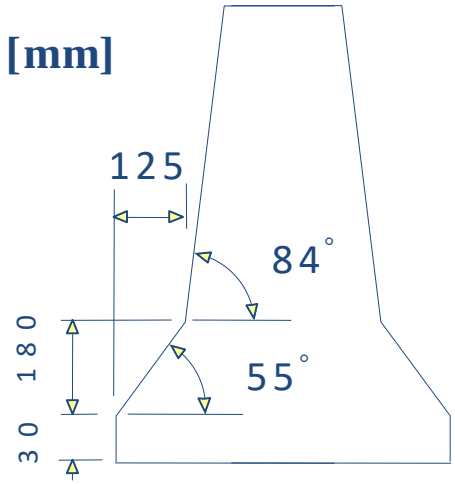
Box Beam



Example of Traffic Barriers

Median Barrier

Concrete Traffic Barrier



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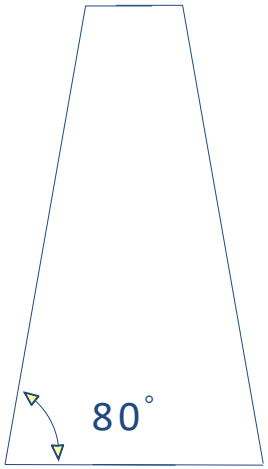


S type

Example of Traffic Barriers

Roadside Barrier

Guard Rail

Example of Traffic Barriers

Roadside Barrier

Guard Pipe

Example of Traffic Barriers

Roadside Barrier

Guard Cable

Example of Traffic Barriers

Roadside Barrier

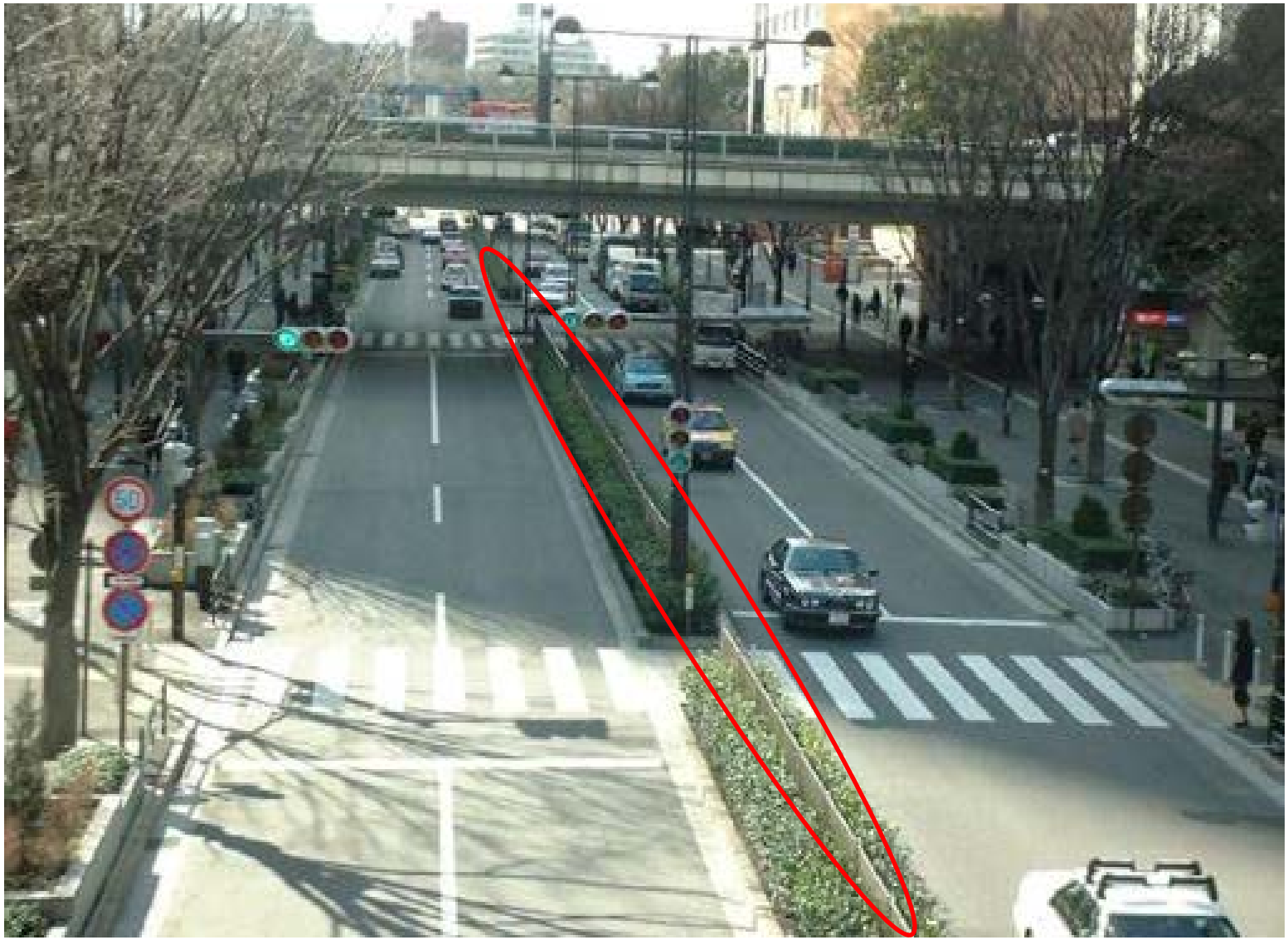
Bridge Railing

Consideration of Scenery
-Problem-

Consideration of Scenery
-Guard Pipe with Slim Members-

Consideration of Scenery
-Timber Rail-

Median Strips (Example 1)



Median Strips (Example 2)

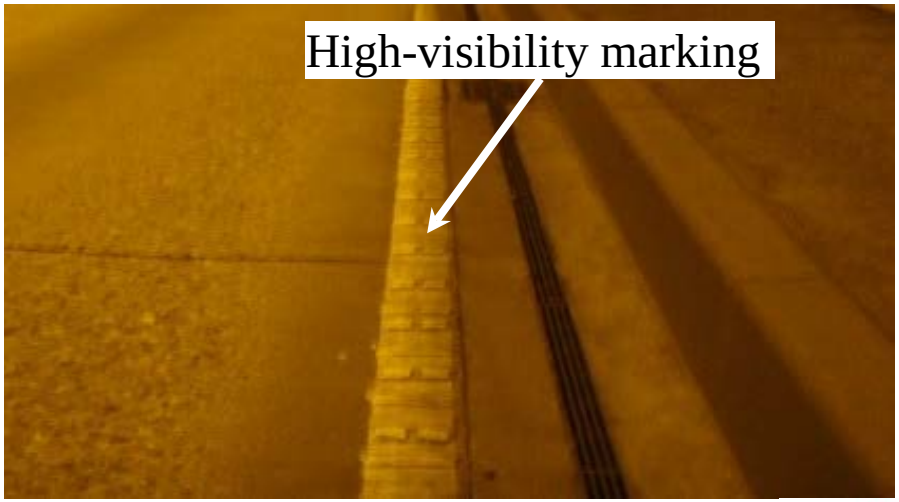
Sidewalk

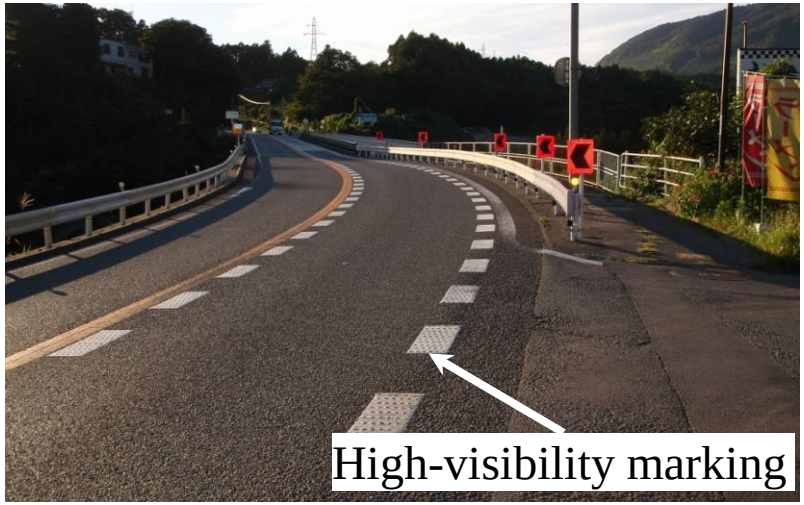
Bicycle paths and bicycle lanes

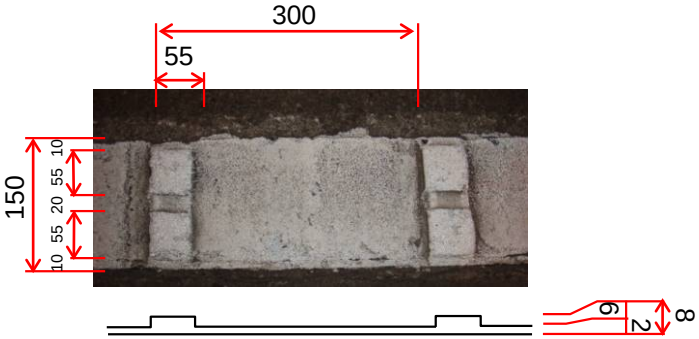
Separate pedestrian and vehicle traffic signals

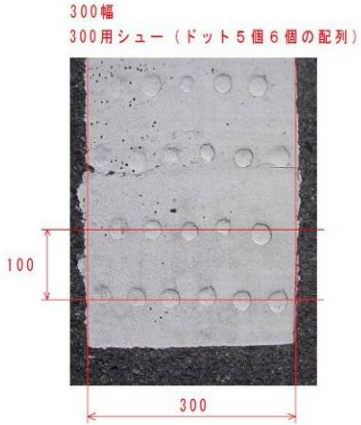
High-visibility Markings

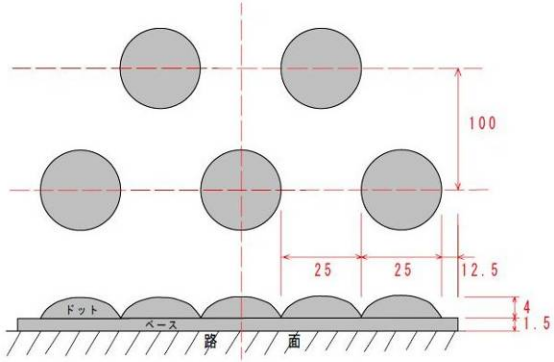
- Running off the lane prevented by vibration and sound caused by projections on the marking







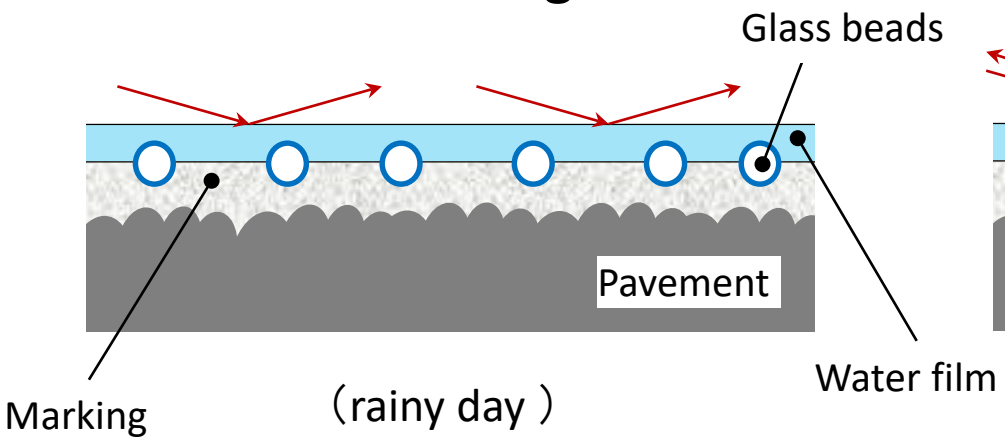




High-visibility Markings

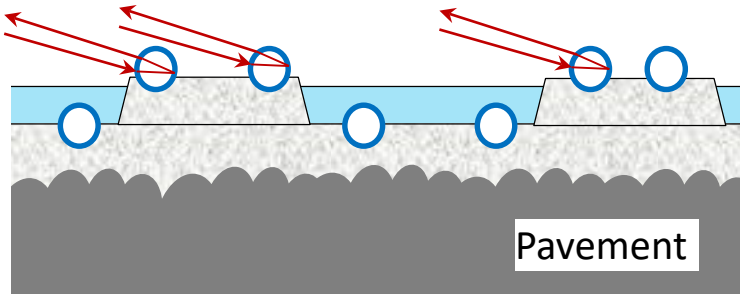
- High retroreflective performance for headlights even in the rainy nighttime

【 Normal marking 】

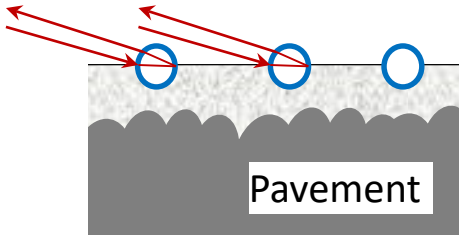


（rainy day ）

【 High visibility marking 】



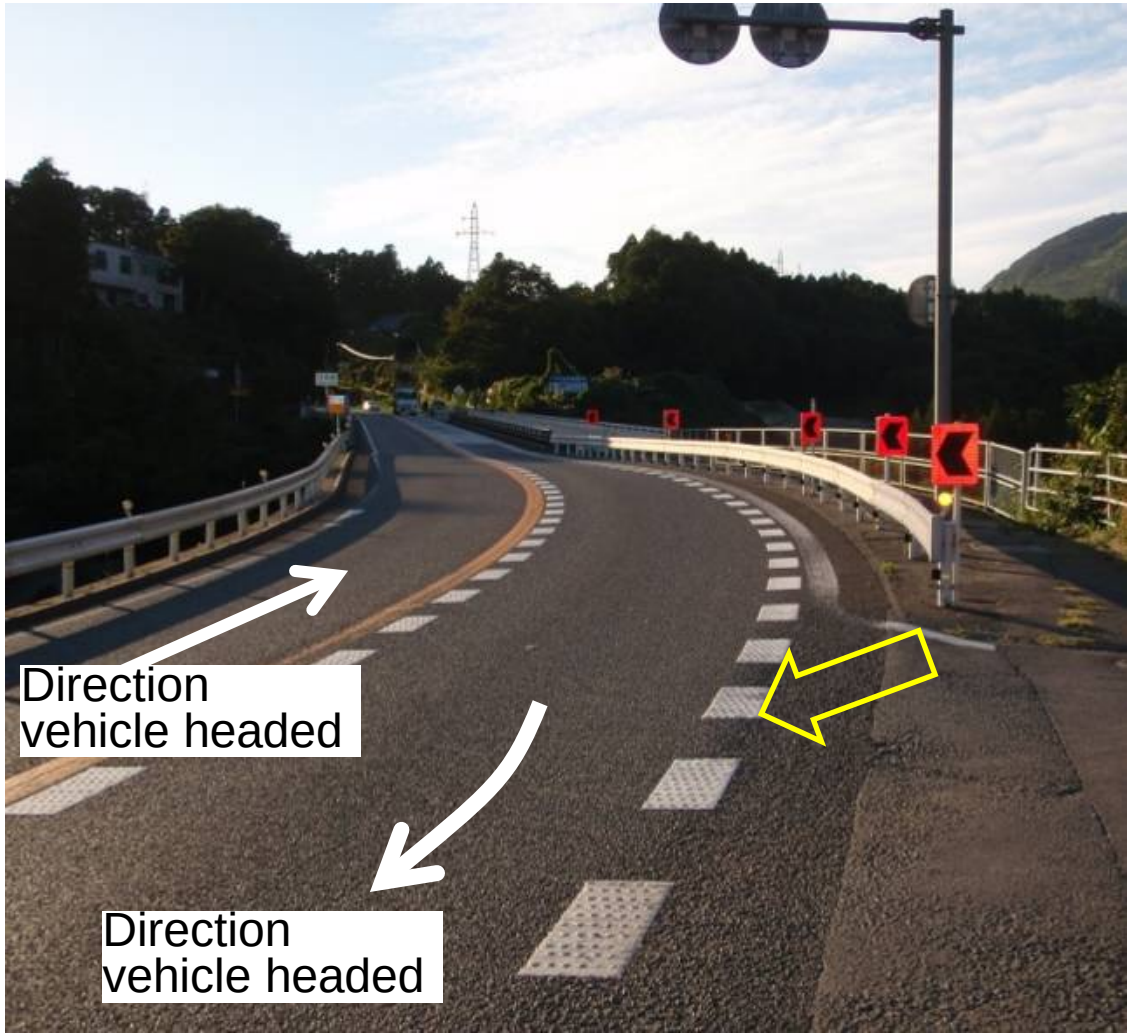
（rainy day ）



（fine day ）

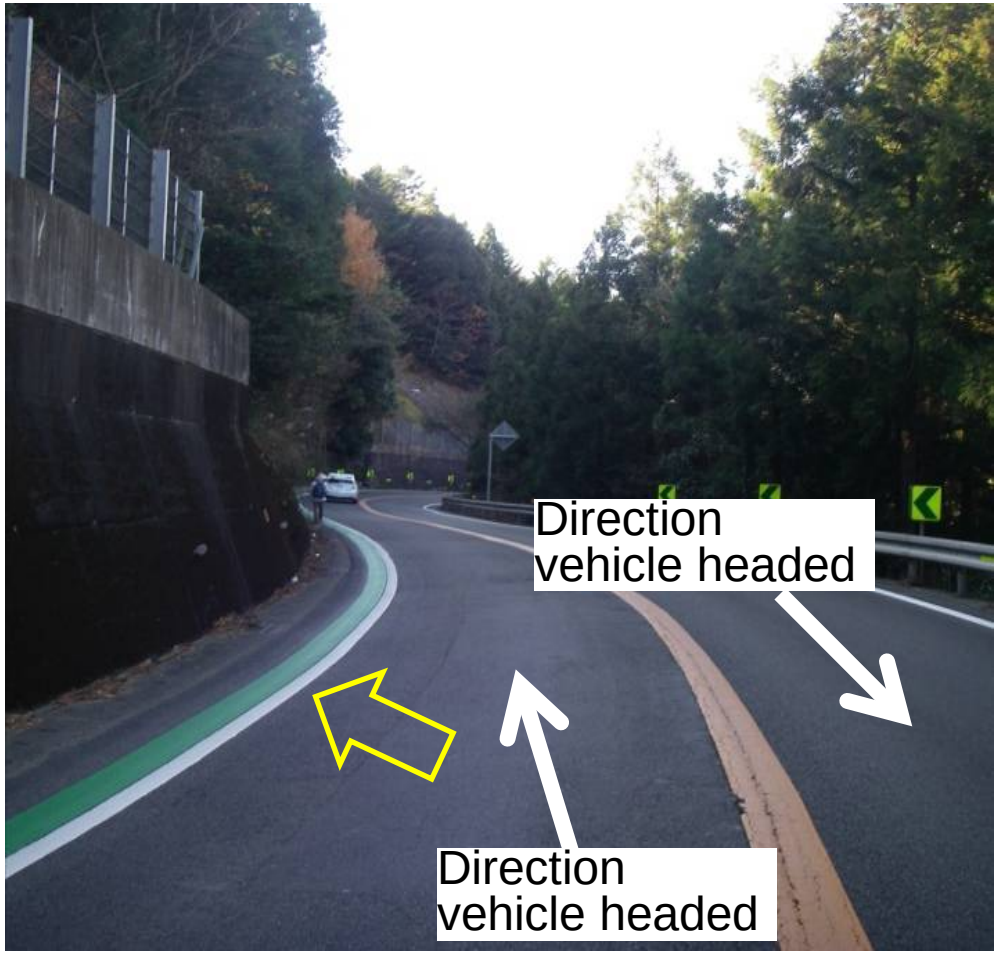
High-visibility Markings (Example 1)

- Curved section in the suburb
- Radius of curve 135 meter
- Gradient 5.6%
- Prevention of running off the road due to over speed

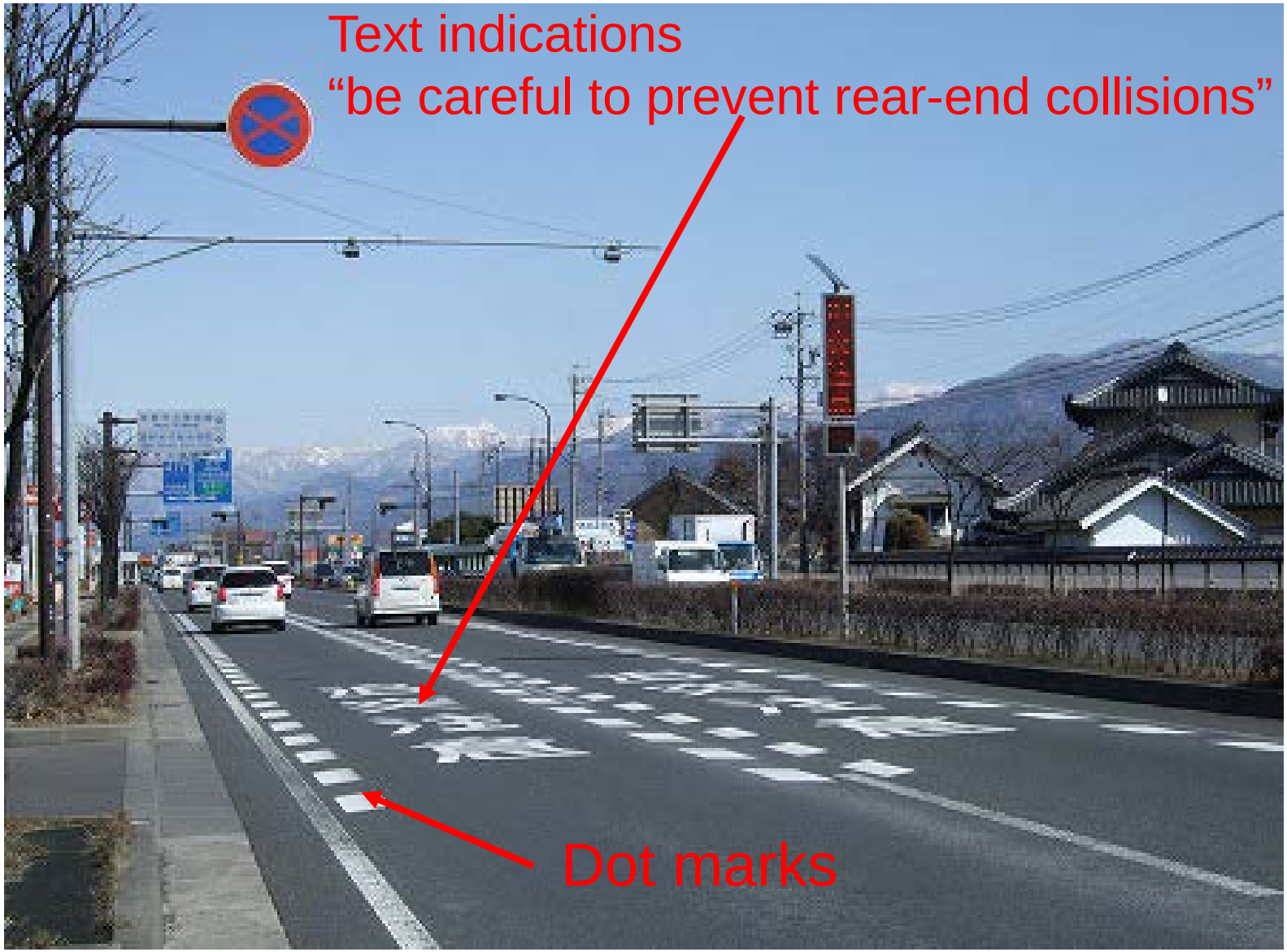


High-visibility Markings (Example 2)

- Curved section in suburb
- Provided in the section without sidewalk
- Prevention of vehicle to pedestrian accident

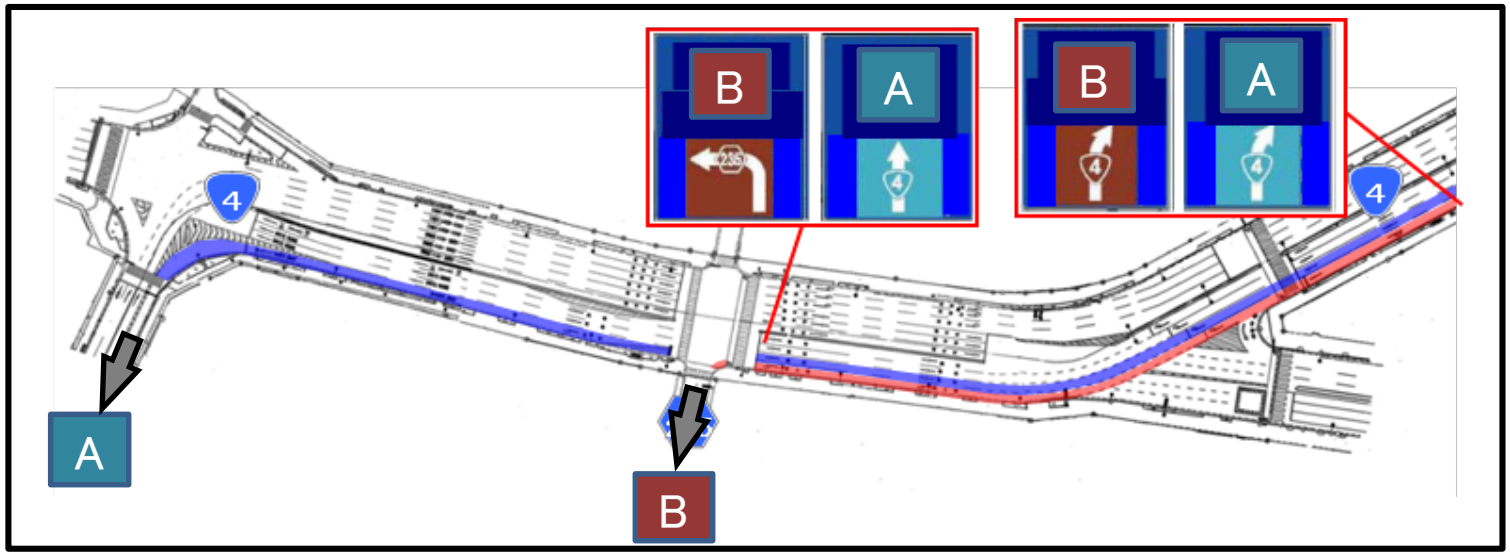


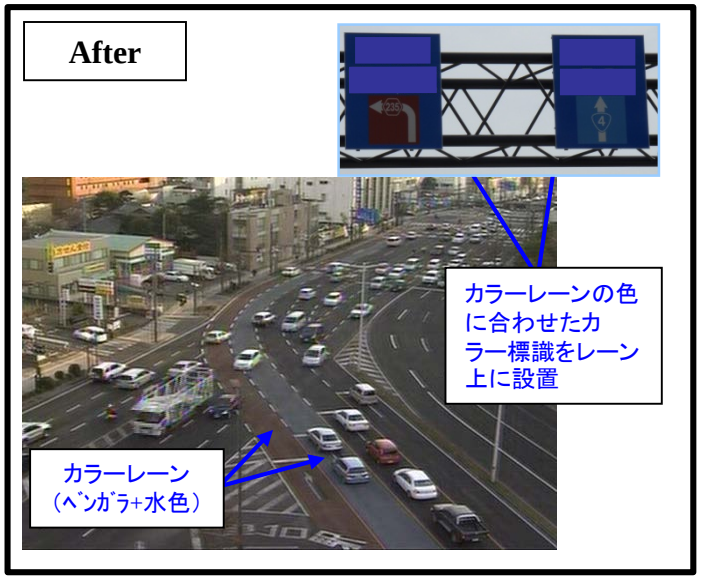
Road Marking



Colored Pavement

Colored Pavement -Interlocking with the direction signs-

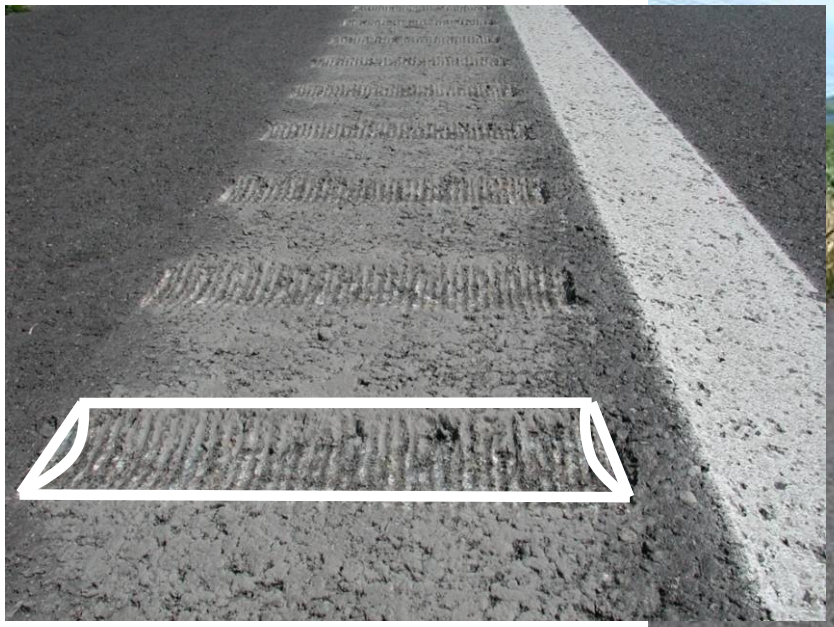




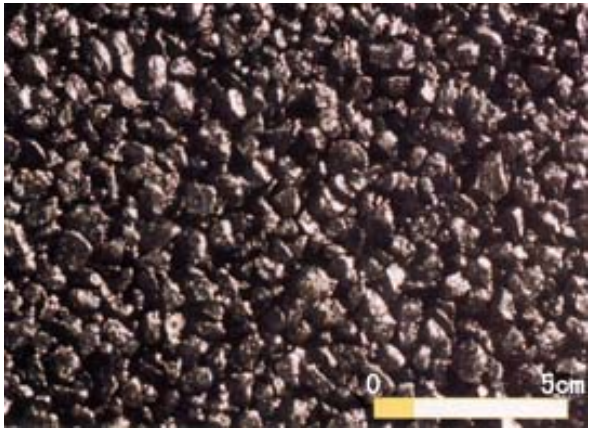
Speed Bumps

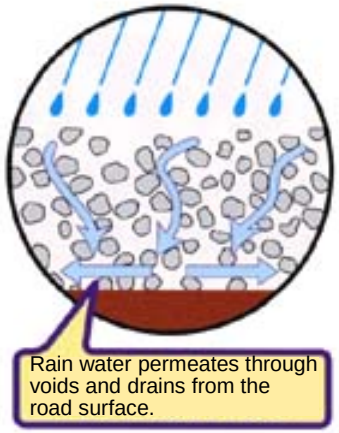
Rumble Strips

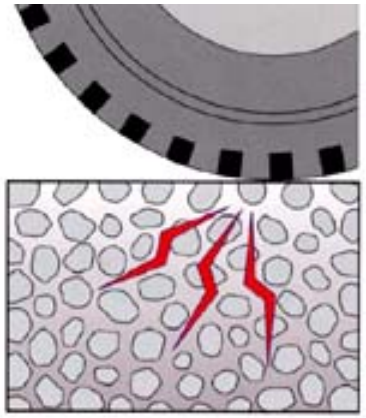
- Running off the road prevented by vibration and sound caused by grooves



Porous Pavement

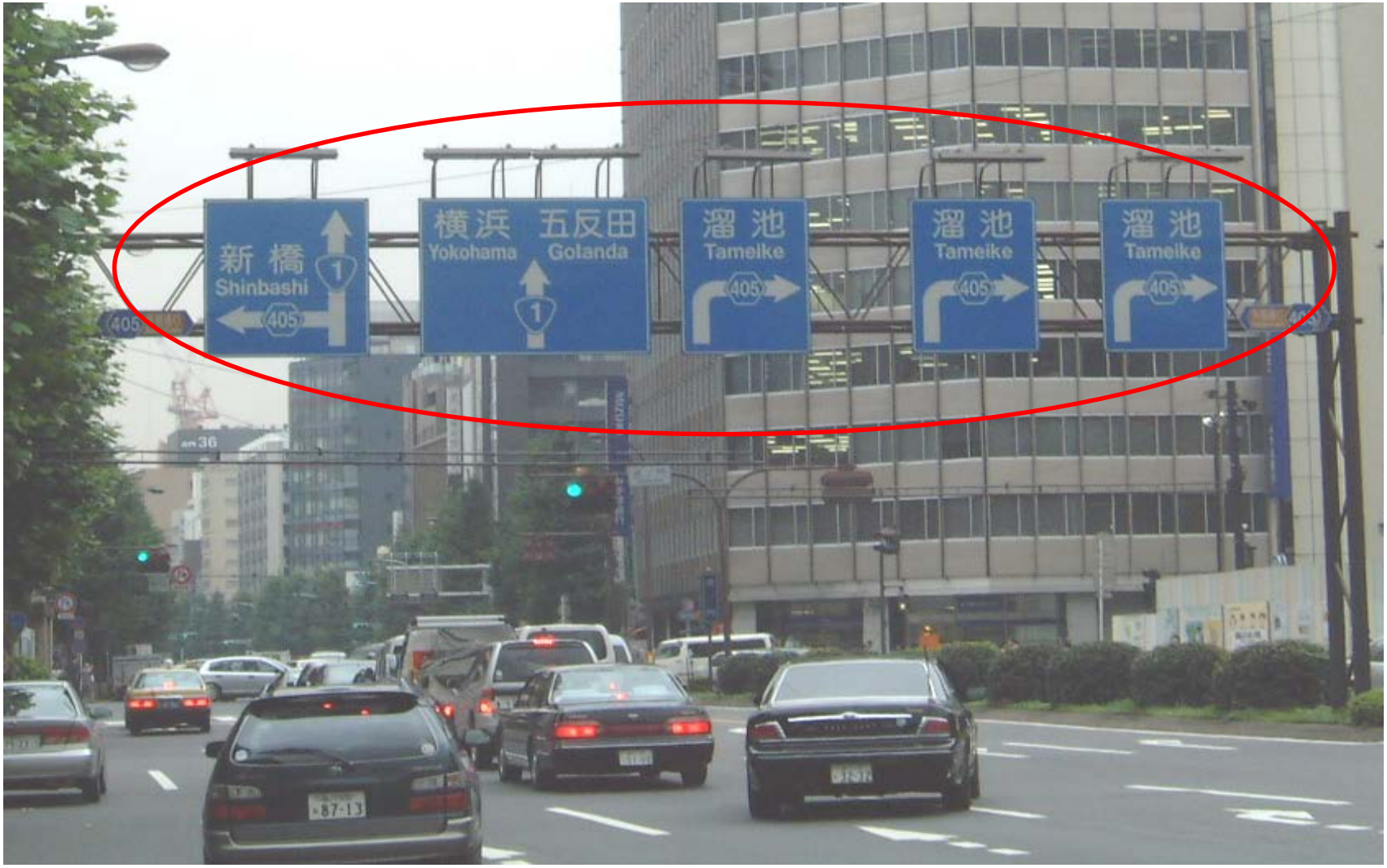






Air escapes through voids and the road noise decreases.

Road Signs (Guide Signs)



Warning Signs

Regulatory Signs

Indicator Signs

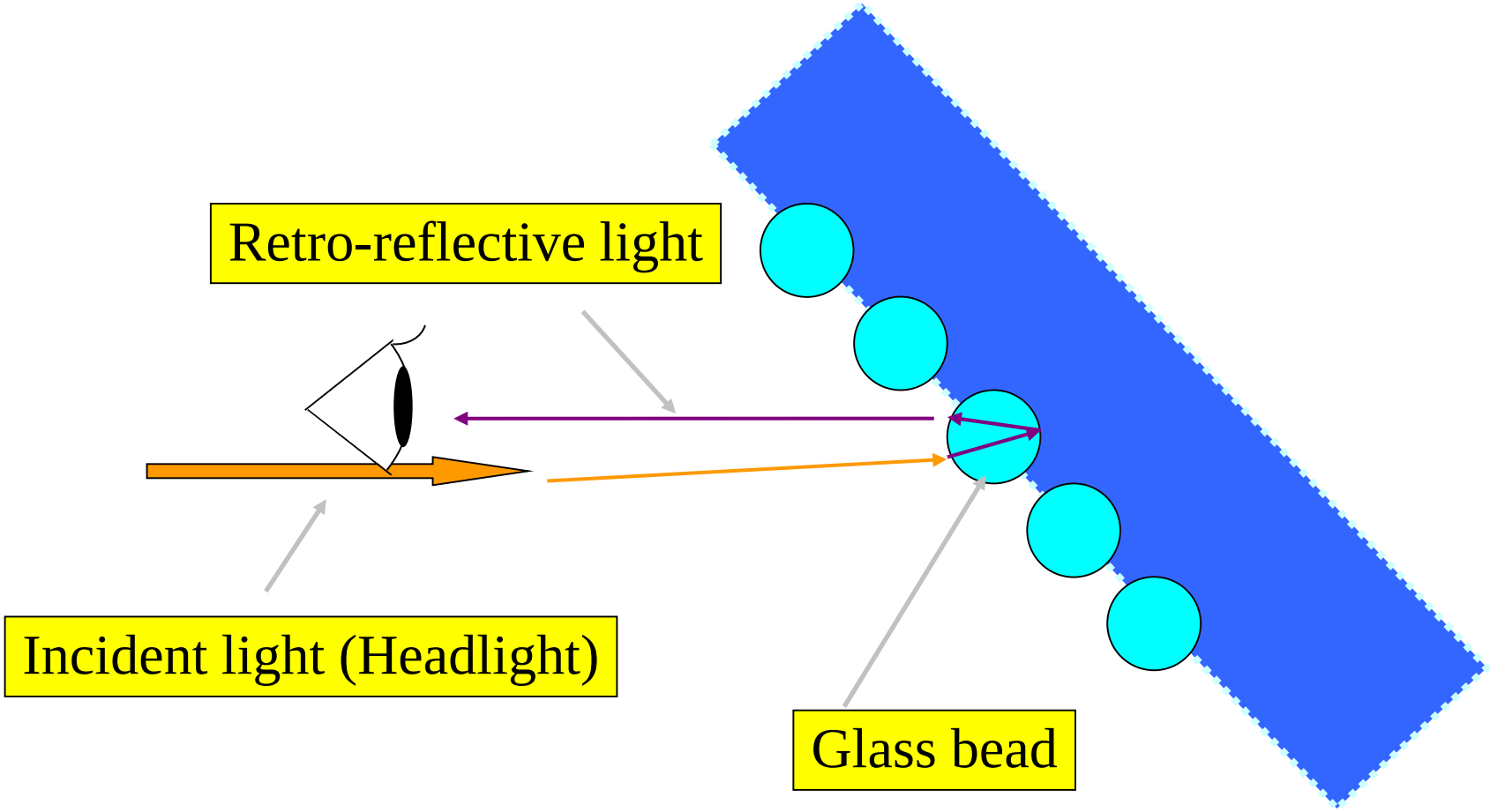
Auxiliary Signs

Types of Signs and Comprehension

Illustration type

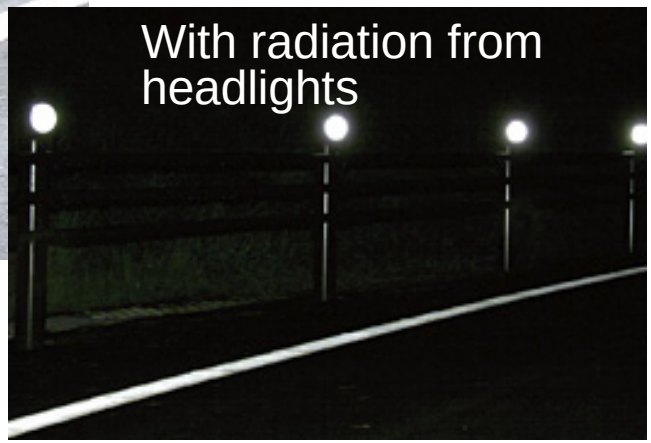
Stack-up type

Visibility at Night



Appearance at Night

Delineator



Photograph by SEKISUI JUSHI Corporation

Delineator

- Self-lighting delineator

- Self-lighting road studs

Photograph by SEKISUI JUSHI Corporation

Delineator

Self-lighting linear delineator

Self-lighting obstruction warning light

Photograph by SEKISUI JUSHI Corporation

Curve Sign

Rubber Pole

Rubber Pole for Reducing the radius of the corners

(the corner cut is reduced using zebra markings or rubber poles)

Road Studs

Approaching oncoming car indicator device

Right turn lane (Example1)

Right turn lane (Example2)

Right turn direction marking

Reflective Mirrors

Glare Prevention Plates

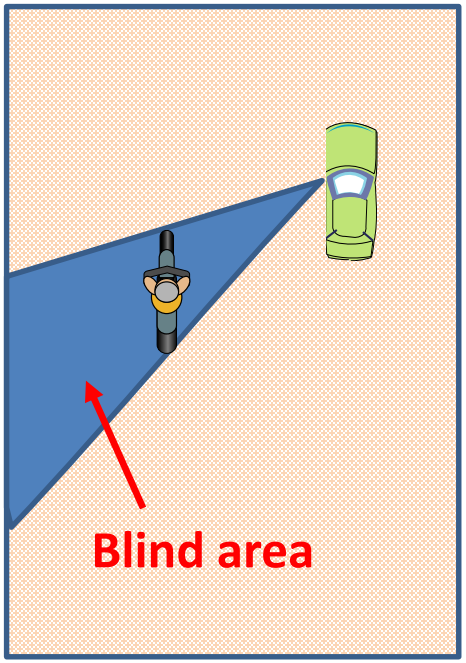
Crash Attenuators

Attenuator Barrels /Sand Attenuators

Fixed Impact Attenuators

Example of an impact attenuator with a bellows structure

Stop Line for Motorized 2-wheels



Narrowing the width of the shoulder