Systematic Process of Road Safety Countermeasures

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1. Process of traffic safety countermeasures
2. Collection of basic data
3. Analysis of accident factors
   - Planning of countermeasures
4. Implementation of countermeasures
5. Evaluation of countermeasures

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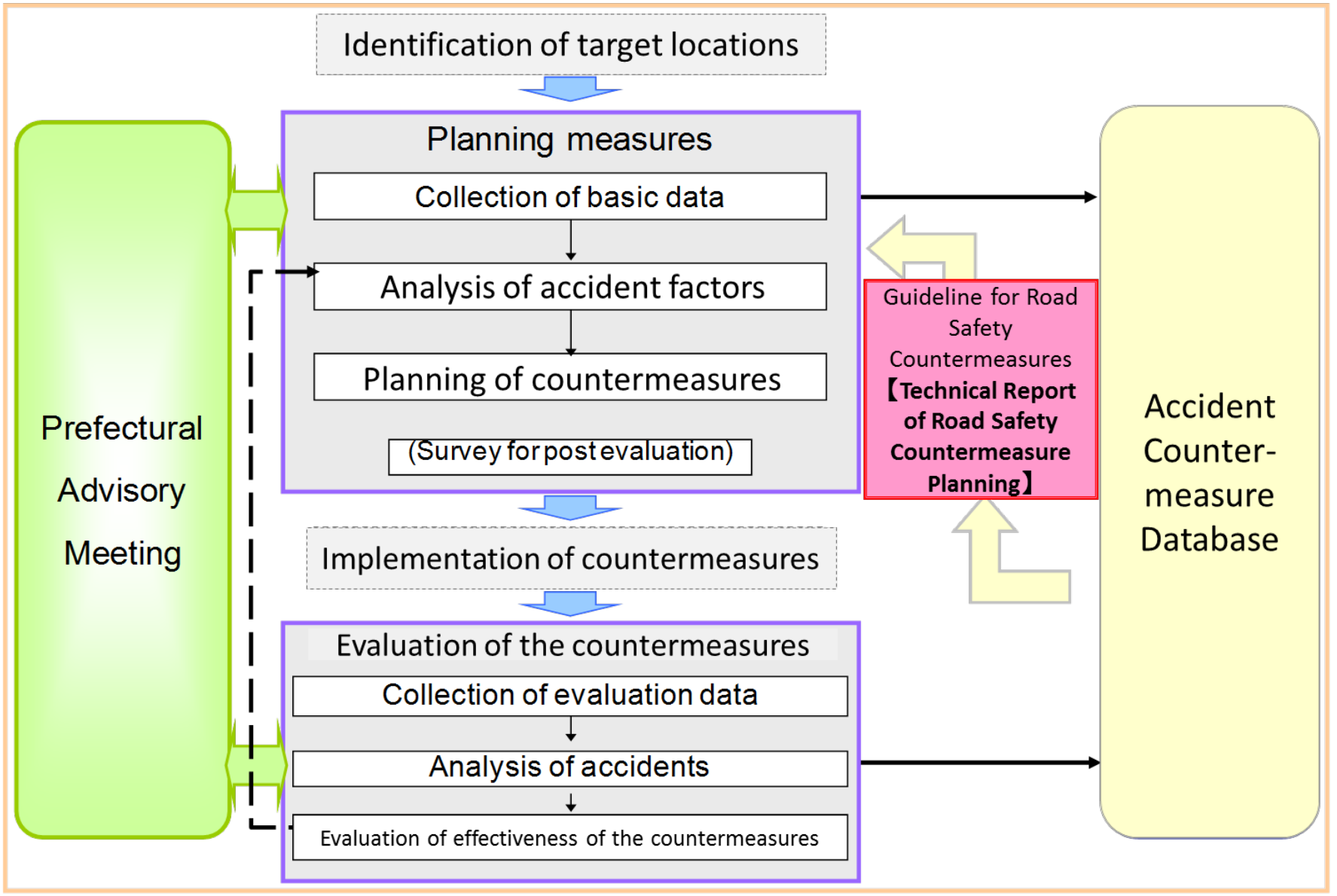
1. Process of traffic safety countermeasures

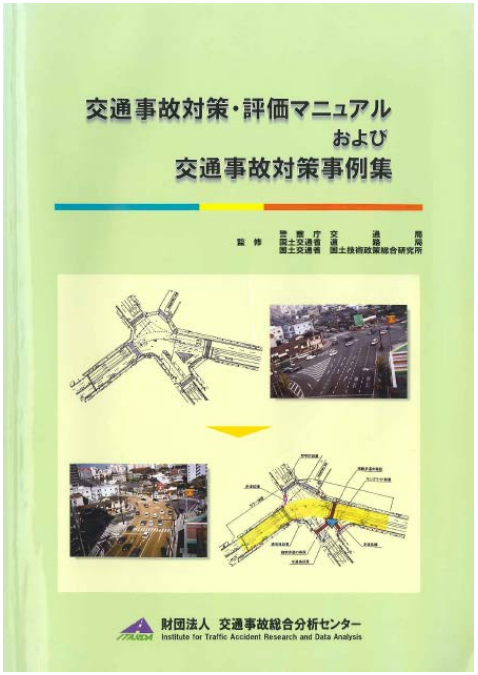
Flow of planning and evaluation countermeasures shown in the Manual



1. Process of traffic safety countermeasures

Traffic Safety Measures and Evaluation Manual

- Systematically organizing the procedures and points to keep in mind for the planning and evaluation of traffic safety countermeasures.
- Organizing the data necessary for planning countermeasures, examination, collection method of data, and points to keep in mind for examination.



"Traffic Safety Measures and Evaluation Manual"

and

"Guideline for Improving Road Safety at Hazardous Spots"

Procedure of traffic safety countermeasures shown in the manual

Part.1 Traffic Safety Measures and Evaluation Manual		Part.2 Guideline for Improving Road Safety at Hazardous Spots	
Chapter.1	Introduction	Chapter.1	Summary of this example
Chapter.2	Procedure of countermeasures	Chapter.2	Usage of this example
Chapter.3	Drafting of countermeasures	Document.1	List of the accident factor
Chapter.4	List of countermeasures	Document.2	List of countermeasures
Chapter.5	Accumulation to accident countermeasures database	Document.3	Example of countermeasures

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2. Collection of basic data

Collection and management of accident data

Local Police Station

Local Police Headquarters

investigation

daily fatalities report
monthly accidents report

ITARDA※1

National Police Agency

every 3 months

call

quick estimation report

Daily fatalities report (ITARDA web)
Monthly traffic accidents statistics (NPA web)

Accident

※1 Abbreviation of "Institute for Traffic Accident Research and Data Analysis "

2. Collection of basic data

Contents of accident data to collect

■ Each accident data include minimum 67 items

- Environment;

  number of the people involved, date, time, weather, road surface, road environments, type of accident, etc…

- Road User information; (include passenger information)

  user type, driving qualification and experience, head light, vehicle speed, traveling direction, damage part, drink driving, pedestrian's reflector, violation, behavior, mobile phone use, navigation use, gender, age, nationality, occupation, residence, injury level, seatbelt/CRS/helmet use, air bags, injury condition, main injury body part, vehicle part inflicting injury, etc…

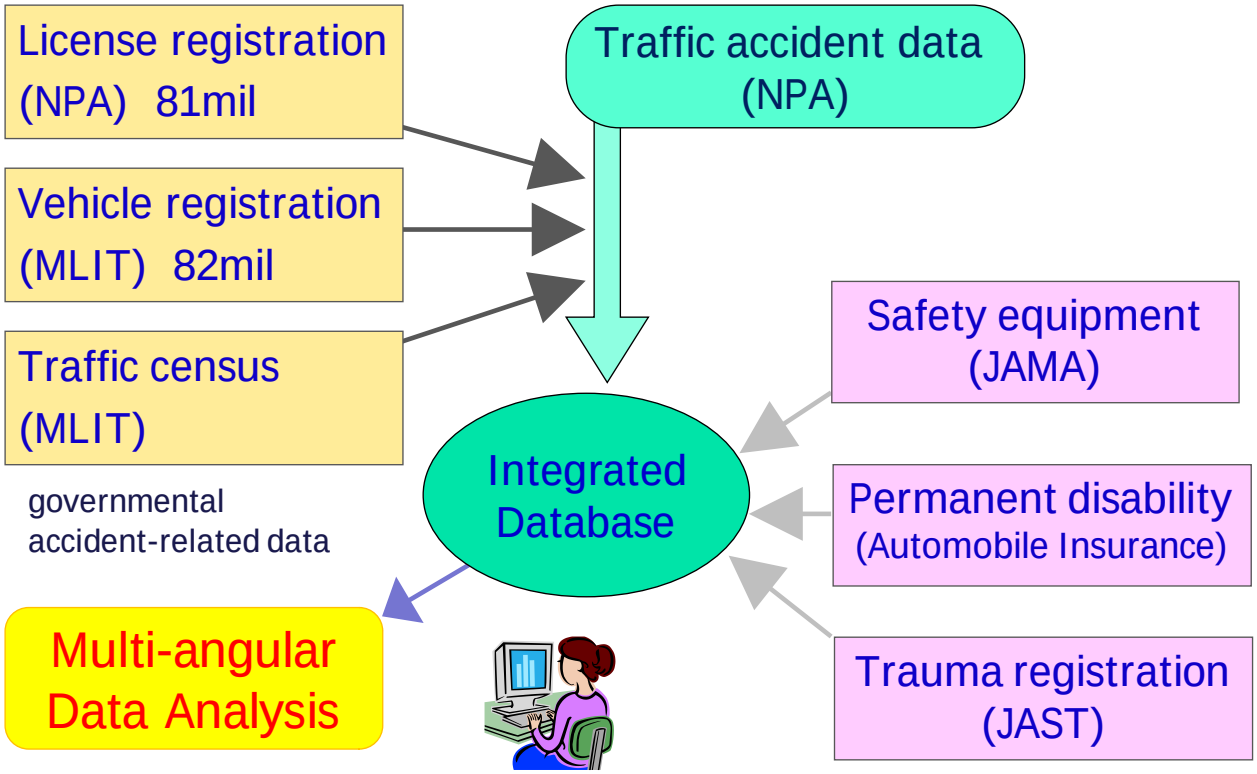
- Additional in expressway accident

  road segment, structure, curve radius, cross slope, accident type, number of involved vehicle, traffic hindrance, travel distance, etc…

2. Collection of basic data

Institute for Traffic Accident Research and Data Analysis (ITARDA)

- Non-profit foundation established in 1992
- Achievement of safe traffic society
- Activities 1.Collect and manage the traffic accident-related data
  2.Independent In-depth investigation
  3.Comprehensive and scientific research and analysis human factors, traffic environment, vehicles
  4.Disseminate knowledge about traffic accidents, and ideas about traffic safety



2. Collection of basic data

Integrated Traffic Accident Database

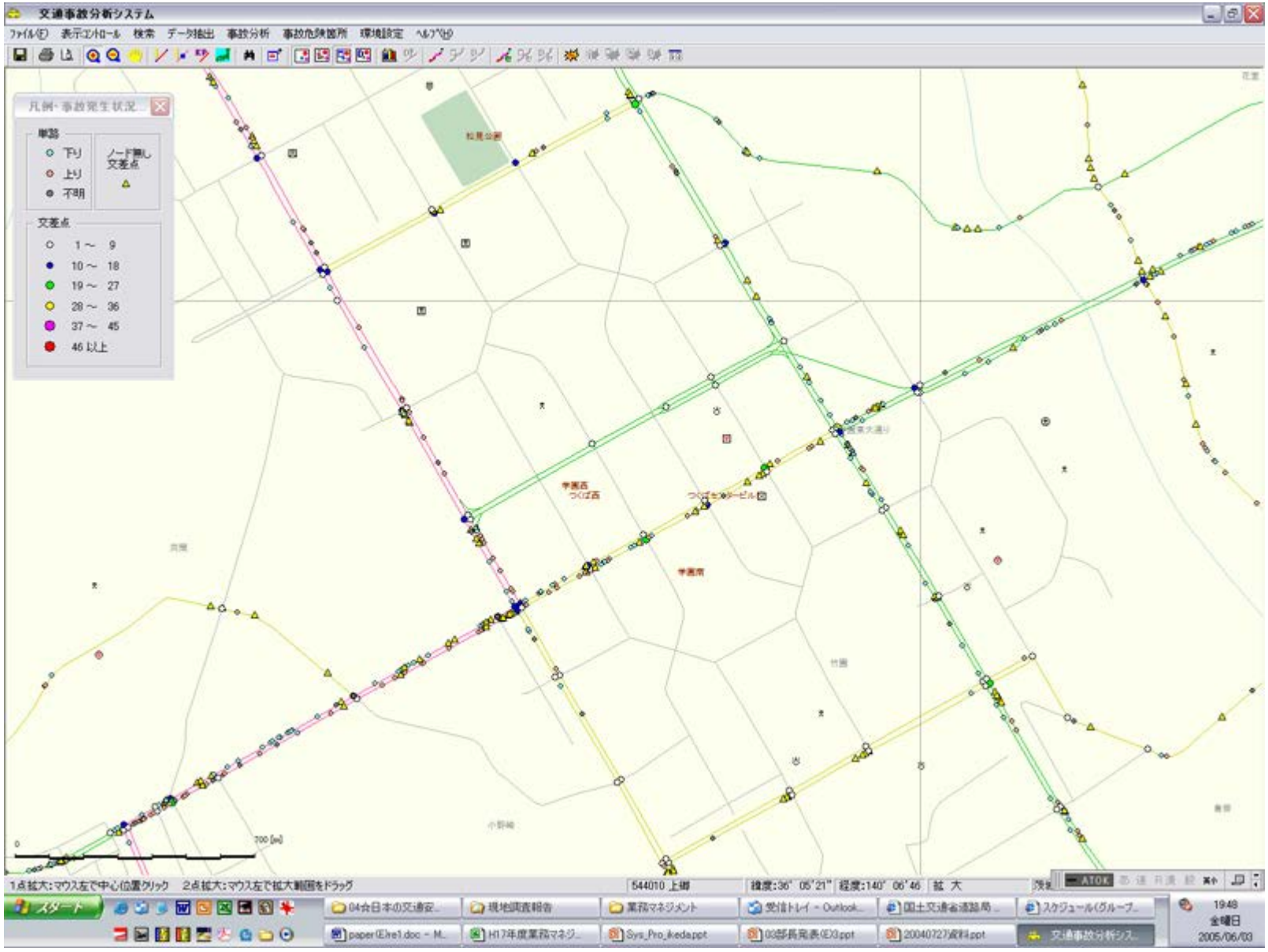
Contain

- All accidents on arterial road except Property Damage Only accident

- Data about accident and driver/pedestrian same as Traffic Accident Statistical Data
- Detailed spot where the accident occurs
- Traffic volume of each type of vehicle
- Road side situation
- Detailed situation about road, traffic safety facilities and so on

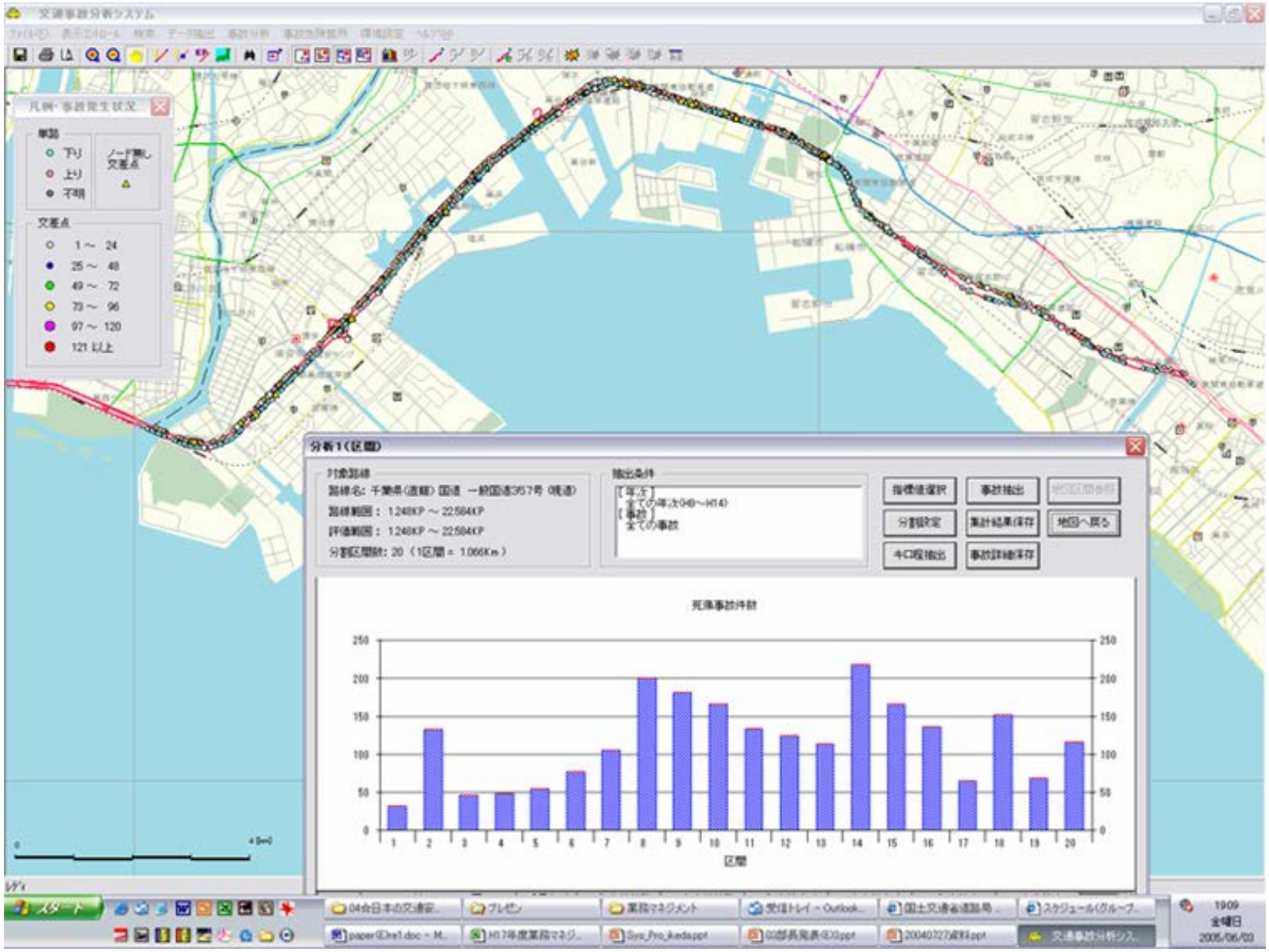
2. Collection of basic data

Integrated Traffic Accident Database



2. Collection of basic data

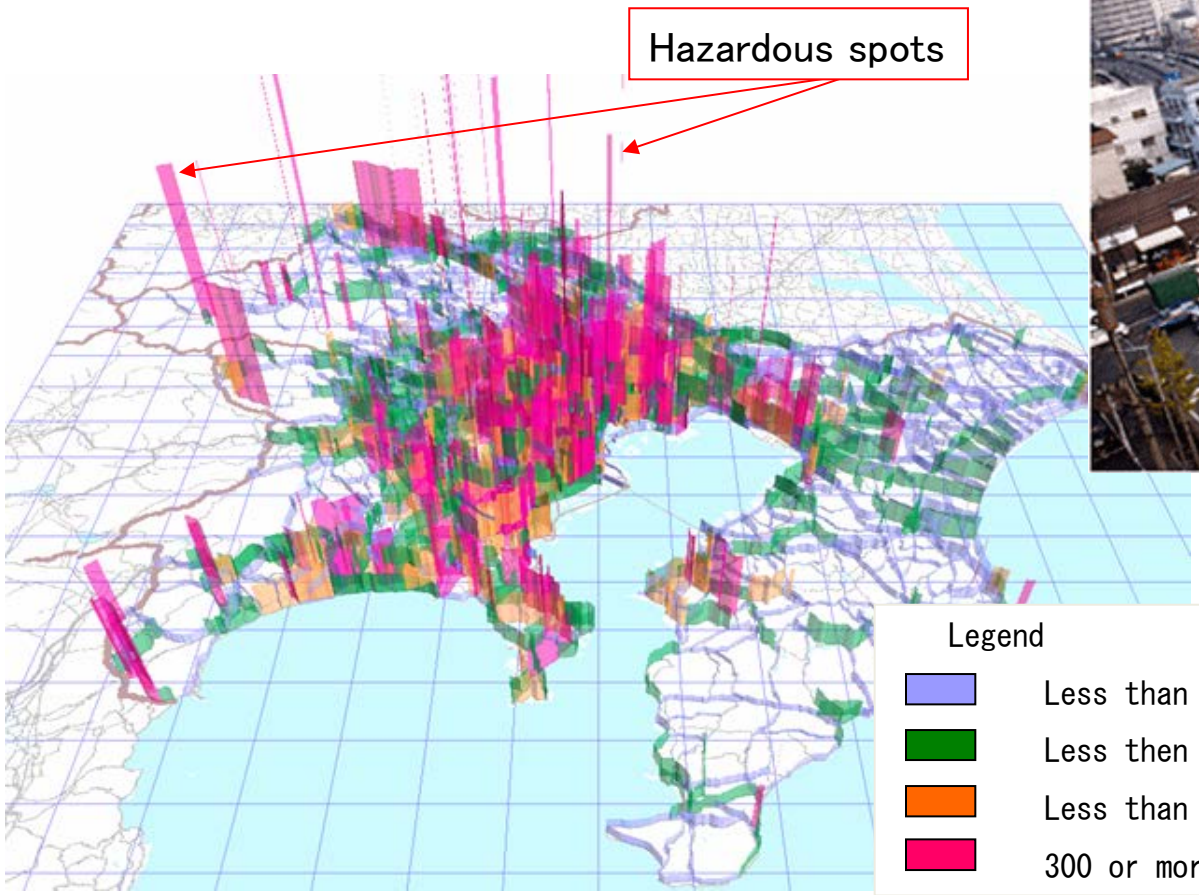
Integrated Traffic Accident Database



2. Collection of basic data

Arterial Roads: Accidents are concentrated at specific locations.

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

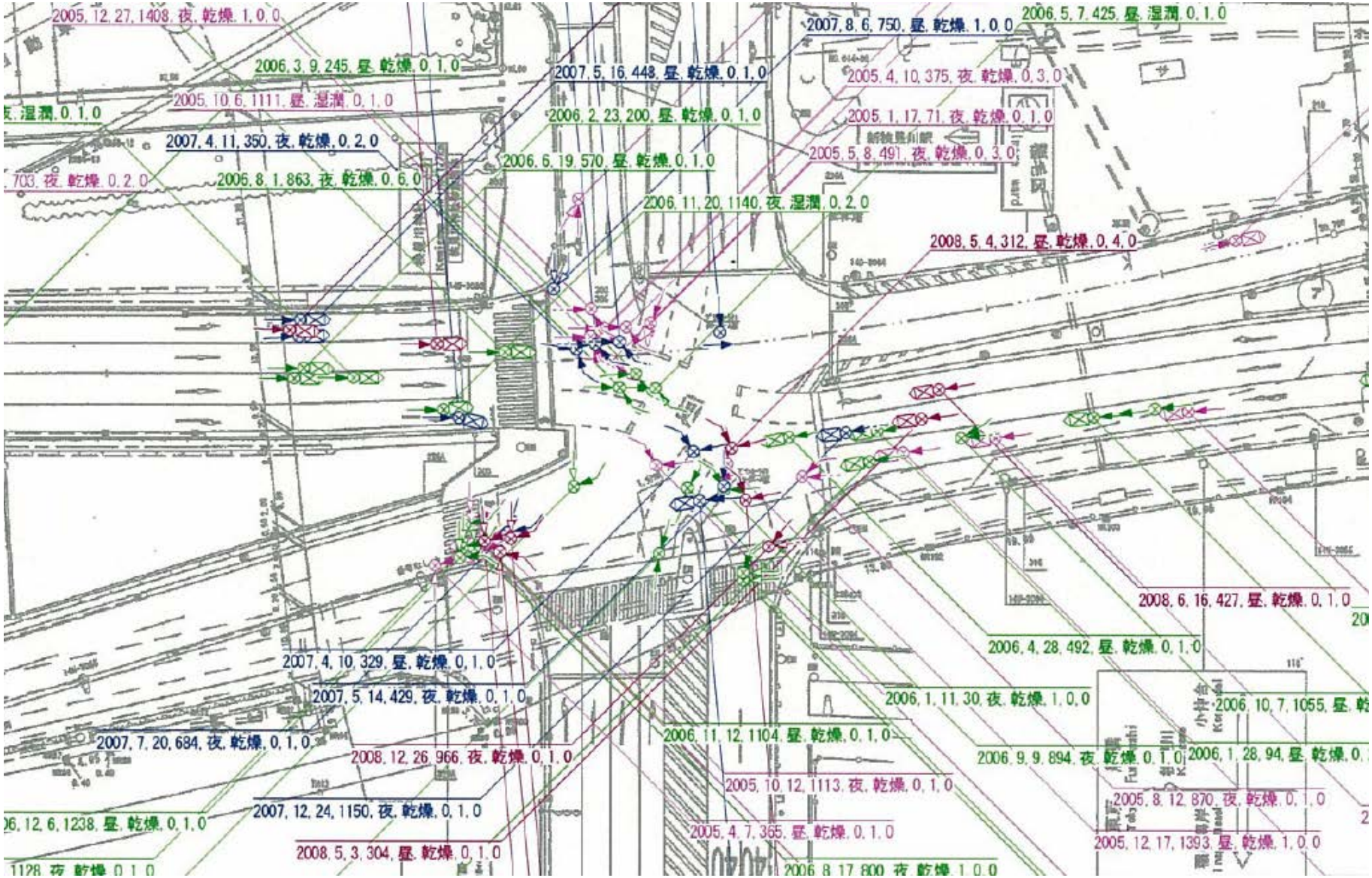


Legend

- Less than 100 (cases/100 million vehicle-km)
- Less then 200 (cases/100 million vehicle-km)
- Less than 300 (cases/100 million vehicle-km)
- 300 or more (cases/100 million vehicle-km)

2. Collection of basic data

Collision diagram



2. Collection of basic data

Collection of detailed information such as the road environment by field works

Example) Viewpoint of the field work

a) Sight distance
- Is the prospect of the intersection secured enough?
- Is the pedestrian crossing(pedestrian, bicycle) at the position that it is easy to look at from a driver?

b) Road surface
- Is there not the point affecting the runs of the car such as a wheel track or an irregularity?
- Does the drainage of the sidewalk function enough?

c) Road marking・Traffic sign
- Are the indication contents easy to understand a mark and the road surface indication?
  In addition, is the setting place appropriate?
- Do you not confuse a driver for there being too much number of the setting of the road sign?

d) Traffic behavior
- Is there a big gap between the speed limit and actual speeds?
- Are vehicle lanes blocked by automobiles turning right and turning left?
- Is there road congestion ahead?
- At intersections, is there interference between automobiles or between automobiles, bicycles and pedestrians?

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3. Analysis of accident factors・Planning of countermeasures

Guideline for Improving Road Safety at Hazardous Spots

Past countermeasures studies at hazardous spot

Guideline for Road Safety Countermeasures

(Guideline for Improving Road Safety at Hazardous Spots)

Road situation | Type of accident | Accident factor

Countermeasures

Effective countermeasures based on the Guideline

3. Analysis of accident causes・Planning of countermeasures

Guideline for Improving Road Safety at Hazardous Spots

Step1 : Selection of road structure type to be studied.

Intersection – signal installed
– multi-lane road * 2-lanes or less

Step3-1 : Selection of Accident Occurrence Process based on Collision Diagram

Step3-2 : Identification of the caused factors and selection corresponding Measure Code

Step2 : Selection of the repetitive accident type

Accident Type	Accident occurrence process	Road traffic environment check points	alignment				Feature of Intersection			
			1 Sharp curve before an intersection	2 Steep long downhill section	3 Crest	4 Long straight section before intersection	5 Large corner cut radius	6 Small corner cut radius	7 Acute angle intersection	8 Obtuse angle intersection
Rear-end collision	Inadequate awareness of confirming safety → Failure to stop			2-7		4-7				
	Inadequate confirmation → Delayed confirmation	Isn't there an obstruction that blocked the driver's vision?	1-1		3-1			6-14		
		Isn't there an object that made drivers inattentive?								
Right turn collision	Inadequate awareness of confirming safety			2-7		4-7				
	Inadequate confirmation → Not seen		1-1		3-1					
	Misjudgment → Impossible right turn / Judged a right turn possible → Impossible going straight ahead									

3. Analysis of accident causes・Planning of countermeasures

Guideline for Improving Road Safety at Hazardous Spots

Step4-1 : Select the code designated

Step4-2 : Select measures from the list corresponded code

Refer to measure samples on the listed page

Measure code			Objective		Measures	Important Notice for selecting and implementing measures	page
1	-	1	1	Provide information of an intersection ahead	Install a warning sign e.g. indicating an intersection		
			2	Improve road structures to provide necessary visibility	Alignment improvement	Improve the alignment just before the intersection Study in cases where it is possible to implement large scale improvement	136
			3	Control a traffic light so that vehicles can stop safely			137
			4	Control vehicles turning right and oncoming to prevent them from simultaneous entering the intersection			138

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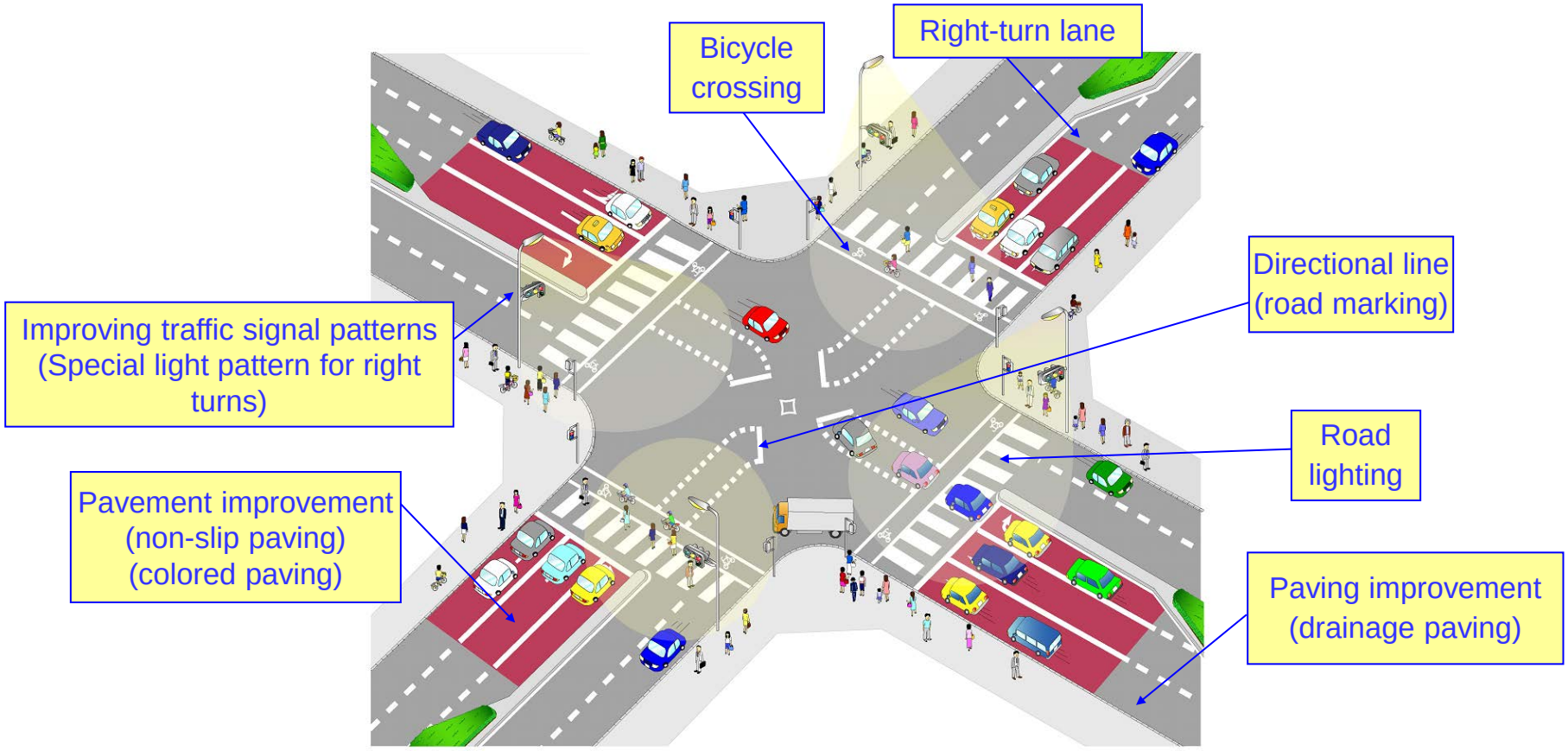
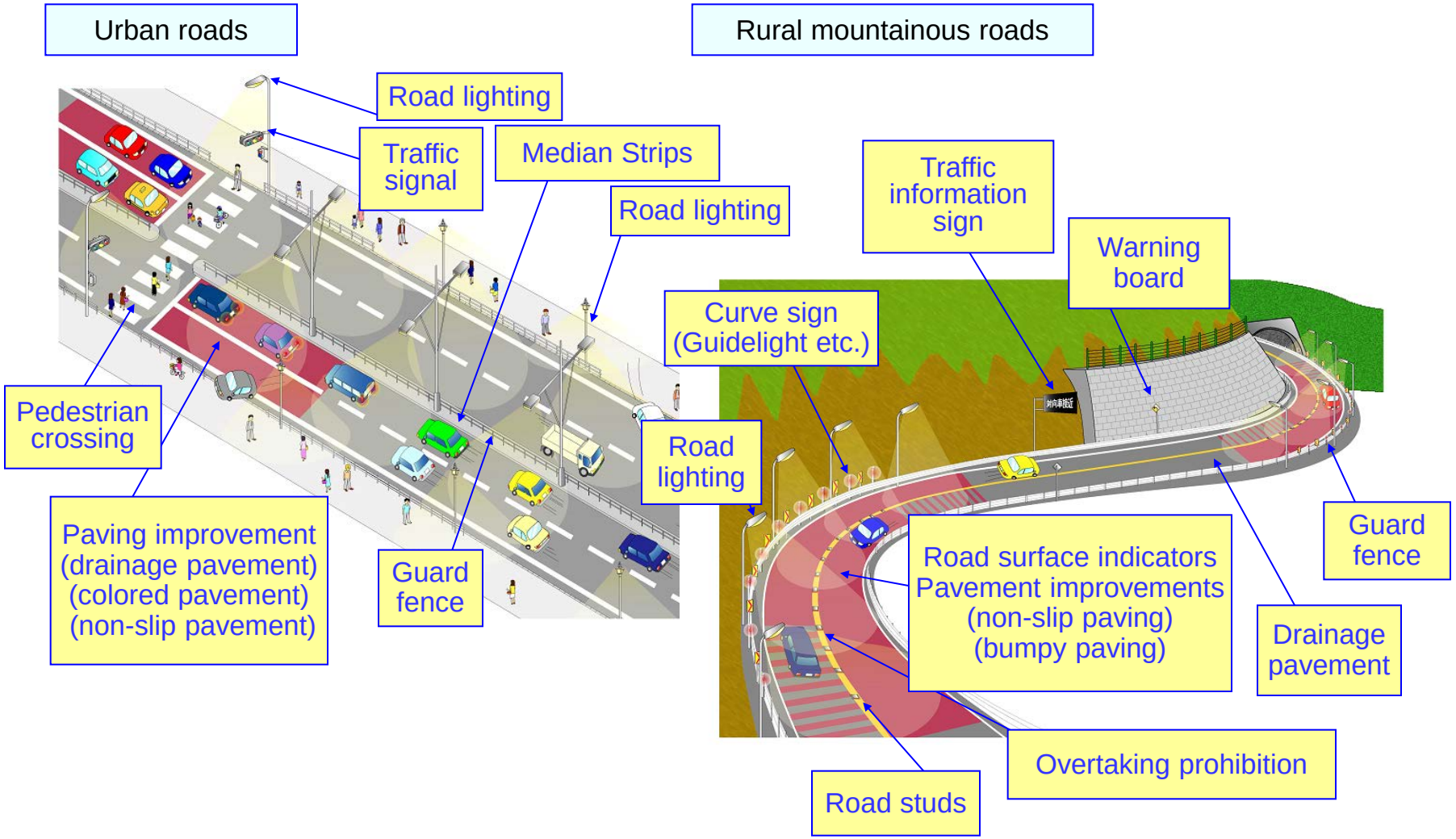
4. Implementation of countermeasures

Traffic safety projects implemented by road administrators and public safety commissions (intersection)



4. Implementation of countermeasures

Traffic safety projects implemented by road administrators and public safety commissions (road section)



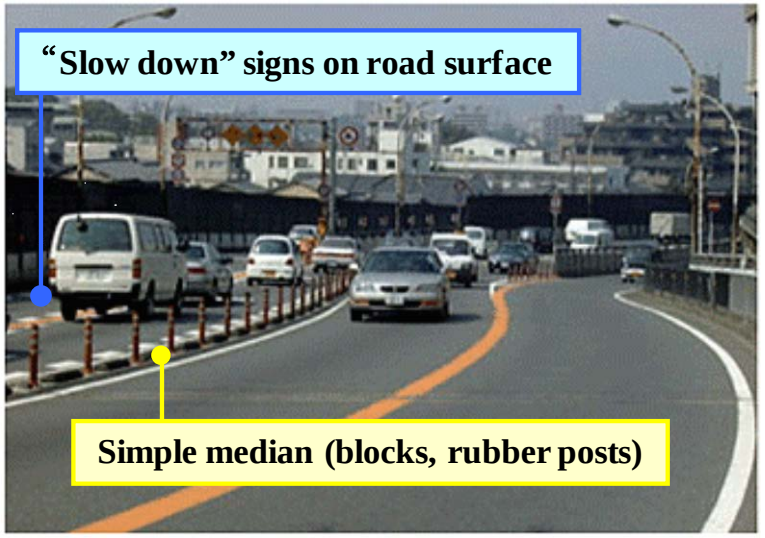
4. Implementation of countermeasures

Efforts to prevent traffic accidents

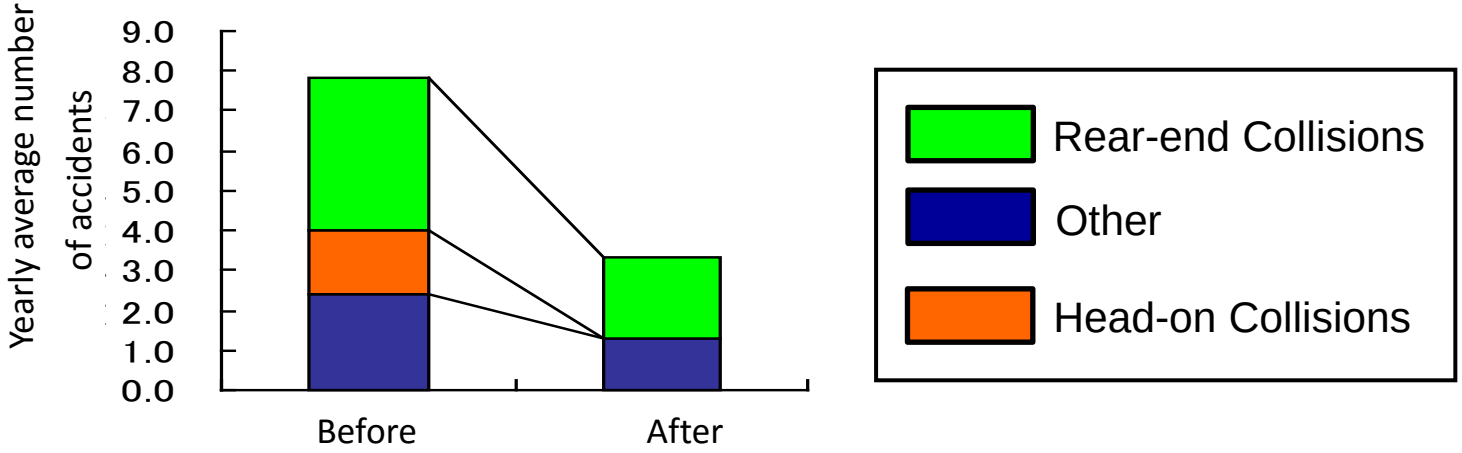
- **Measures to prevent traffic accidents at a road section**

Before

After



- **Number of accidents at the road section before and after the measures were taken**



**Source: Ministry of Land, Infrastructure, Transport and Tourism

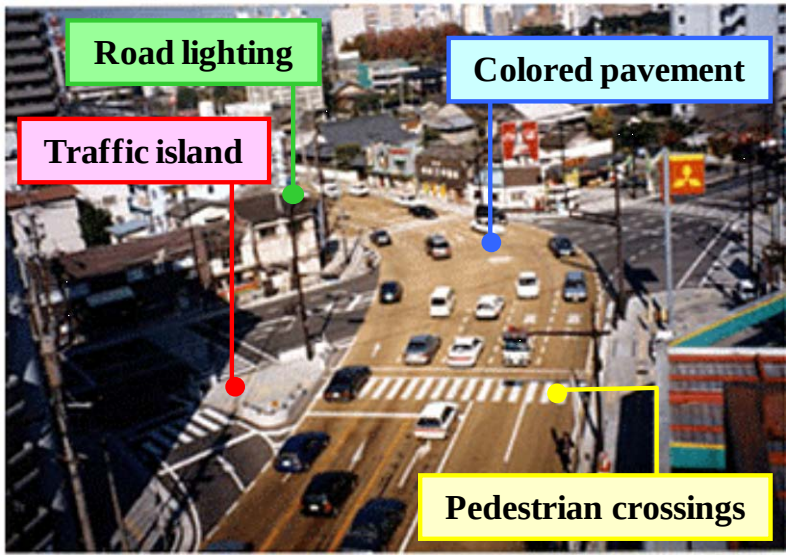
4. Implementation of countermeasures

Efforts to prevent traffic accidents

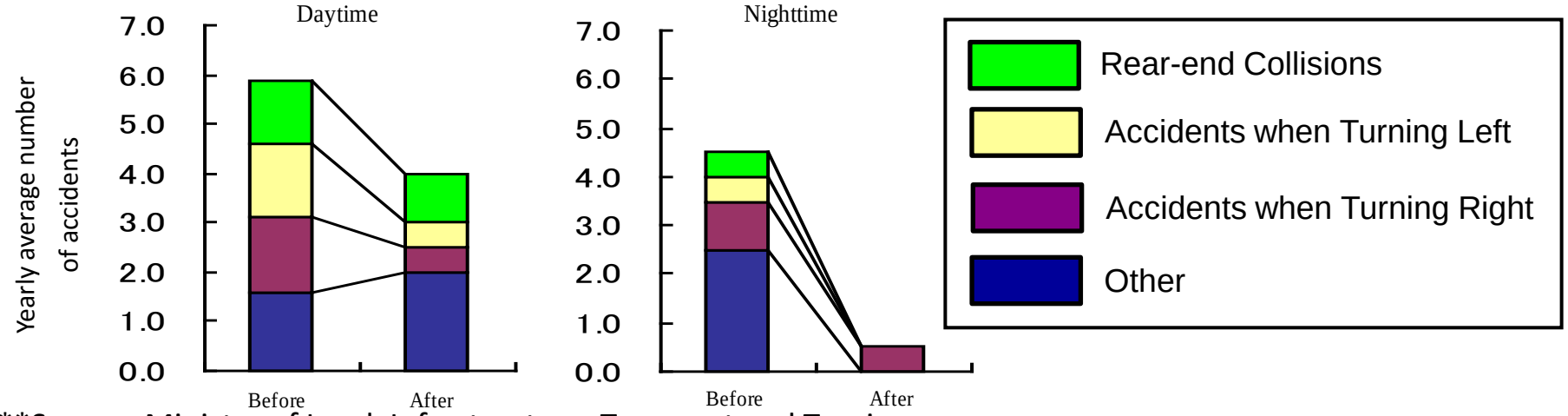
- **Measures to prevent traffic accidents at an intersection**

Before

After



- **Number of accidents at the intersection before and after the countermeasures were taken**



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5. Evaluation of the countermeasures

Evaluation of the measures

1) Evaluation based on accident data

- This can directly and quantitatively clarify the effectiveness of a countermeasure.
- It takes time to accumulate accident data.
- The occurrence of traffic accidents fluctuates seasonally and from year to year.
- It is necessary to collect at least one year of accident data (about 4 years for an appropriate evaluation).
- It is necessary to also study accident patterns focused on countermeasure selection time in order to evaluate the effectiveness of a countermeasure.

2) Evaluation based on traffic behavior

- This can evaluate the effectiveness of countermeasures, which cannot be clarified by traffic accident data; reducing opportunities for mutual interference between automobiles for example.
- This can clarify whether or not countermeasure effectiveness is manifest without waiting to accumulate traffic accident data.

3) Evaluation based on questionnaires

- This qualitatively compares change of consciousness of road users passing through the object location after the execution of the countermeasure to evaluate the countermeasure
- It can evaluate from the perspectives of road users, by improving feelings of security while passing through the same location after the countermeasure.