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Road Safety Manual at Hazardous Spots

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Synopsis

In this Technical Note, examples of the accident analysis and road safety countermeasures at Hazardous Spots were collected and analyzed by road structure type, road environment and causal factor. The process of accident analysis and road safety countermeasure planning has been arranged. Road engineers can implement road safety countermeasures more effectively and efficiently referring to the road safety countermeasures studied according to causal factors.

Key Words: Causal factor, Road safety countermeasure, Hazardous Spot

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Introduction

While the number of traffic accident fatalities has tended to fall in recent years, the total number of accidents has continued rising. To improve road safety to halt this rise, accident prevention countermeasures (below called, "countermeasures") of various kinds are taken throughout Japan. But there are cases where such countermeasures do not necessarily reduce accidents. It is presumed that this happens because the countermeasures that are taken are not always necessarily appropriate to the causes of accidents.

This document was prepared by analyzing the causes of accidents at hazardous spots, collecting countermeasure cases, analyzing and studying causes of accidents and countermeasures taken in response to each cause for various road characteristics and accident types, and clarifying the process from the analysis of causes of accidents to the countermeasure proposal to systematically summarize the major countermeasures that have been studied and other countermeasures considered to be effective for each road characteristic and cause of accidents. Managers who actually take countermeasures in the field are expected to refer to this document to implement future countermeasures more efficiently and effectively.

Note that this manual is an English translation of the revised "Guideline for improving road safety at Hazardous Spots – from the point of view of infrastructure" (Technical Note of NILIM No. 165, March 2004). However, to more clearly define the guideline, Chapter 2 "Steps Relating to the Countermeasures" was extracted from the "Manual for Traffic Accident Prevention Countermeasures and Assessment" (September 2004, Traffic Bureau of the National Police Agency and Road Bureau of the Ministry of Land, Infrastructure and Transport)

Contents

Chapter 1 General

1.1 Purpose

In spite of the decreasing trend in the number of traffic accident fatalities in recent years, the situation remains serious as the number of traffic accidents is still increasing year on year. To improve road safety, various countermeasures to prevent traffic accidents have been taken around the country. However, not all of these countermeasures have proven successful in reducing the number of traffic accidents. It is therefore required to plan more effective countermeasures and to accurately assess their effects.

In view of this situation and to carry out countermeasures to prevent traffic accidents in the future more efficiently and effectively, this manual outlines the steps from planning to assessment of the countermeasures as well as precautions. It also shows examples of countermeasures taken to prevent traffic accidents, based on actual examples of traffic accidents that occurred at hazardous spots in order to analyze the causes, shows how these accidents are related to road structures and traffic environments ("road traffic environment"), and proposes the countermeasures. This manual also explains how to plan the countermeasures using the guideline.

1.2 Contents of this Manual

This manual consists of four chapters: Chapter 1, which explains the purpose of this manual, Chapter 2 "Steps Relating to the Countermeasures", Chapter 3 "Outline of the Guideline" and Chapter 4 "Countermeasure Planning".

Chapter 2 "Steps Relating to the Countermeasures" outlines the steps from planning the countermeasures to assessing their effects.

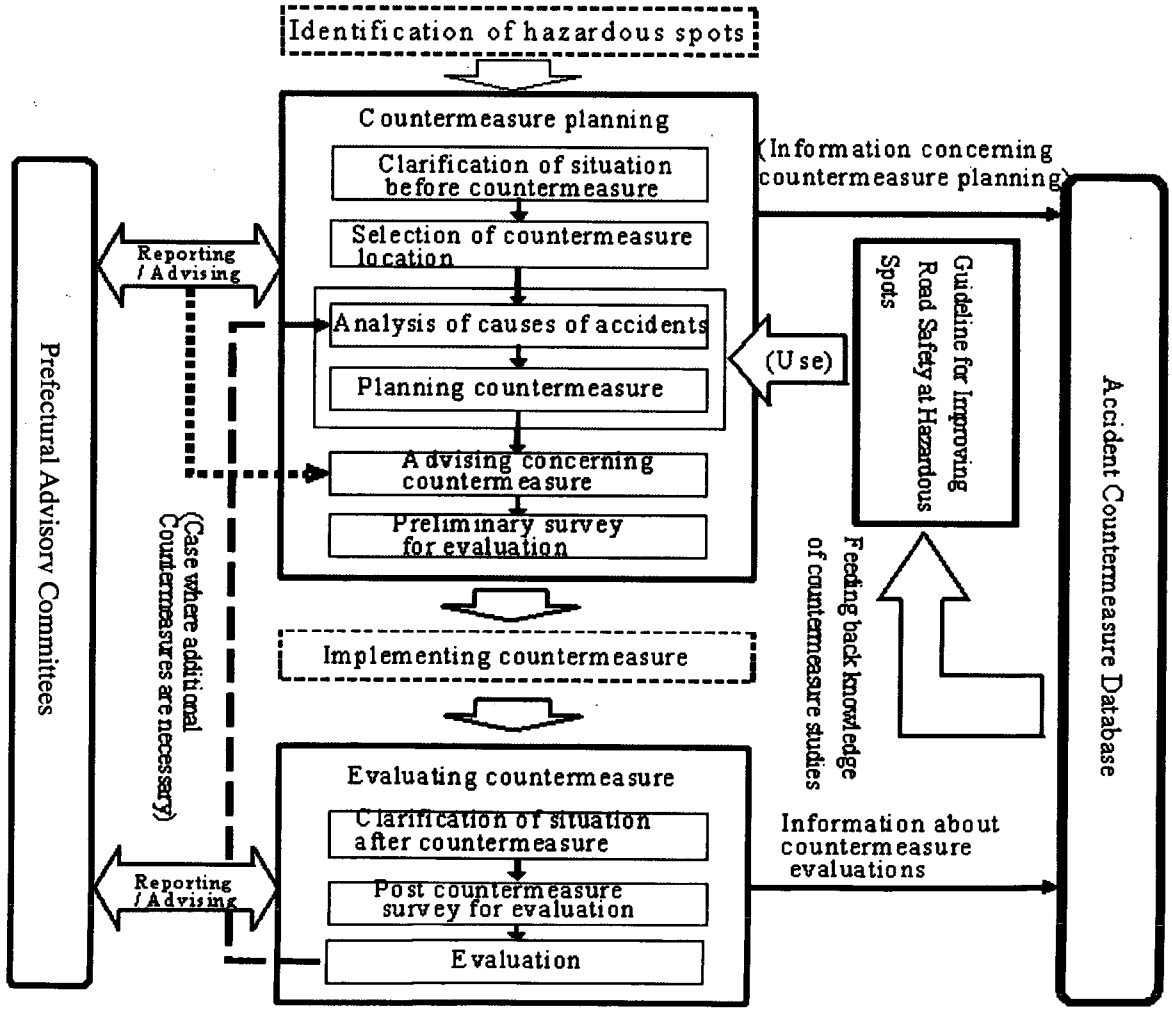
Chapter 3 "Outline of the Guideline" explains examples of countermeasures taken to prevent traffic accidents, including the analysis of past accidents and analysis of the examples of countermeasures. The data is particularly important for analyzing the causes of accidents and planning the countermeasures.

Chapter 4 "Countermeasure Planning" describes the steps from analyzing accidents to planning the countermeasures to prevent traffic accidents as well as applicable methods, using the examples of countermeasures.

Chapter 2 Steps Relating to the Countermeasures [1)]

To improve the effectiveness of traffic safety countermeasures and the efficiency of projects, it is important to plan countermeasures based on accurate analysis of accident causes. It is also important to build data and knowledge through these processes, in order to accurately assess the effect of the countermeasures taken, examine whether additional countermeasures are required, and feed back the knowledge gained from the assessment to the planning of future countermeasures.

For improving the effectiveness of countermeasures to be taken at candidate sites and the efficiency of projects, this manual includes Fig. 2.1, which shows the steps from planning and assessment of the countermeasures to the storage of data in the database, and provides general information about each process.



(Note 1) This chapter is extracted from the "Manual for Traffic Accident Prevention Countermeasures and Assessment" (pp. 3-5, September 2004, Traffic Bureau of the National Police Agency and Road Bureau of the Ministry of Land, Infrastructure and Transport).

(1) Planning of the Countermeasures

[1] Analysis of present conditions before the countermeasures are taken

Information about hazardous spots including road structures, traffic conditions, existing traffic safety facilities and how accidents are occurring should be gathered and analyzed before the countermeasures are taken, in order to understand the present conditions of the sites.

[2] Selection of candidate sites

Candidate sites should be selected from among hazardous spots whose present conditions before the countermeasures are taken were analyzed in [1]; different sites should be selected in each fiscal year to carry out countermeasures.

[3] Analysis of accident causes

Regarding the candidate sites selected in [2], accident causes should be evaluated based on the information about how accidents are occurring analyzed in [1]. Then, site investigation should be taken to check and identify accident causes in the sites.

[4] Planning of the countermeasures

A number of specific policies and countermeasures should be formulated to reduce or remove the accident causes identified in [3]. Then, the actual countermeasures to be taken should be finalized, considering the anticipated effect in preventing traffic accidents.

[5] Advice on the countermeasures to be taken

If necessary, advice from prefectural advisory committees should be reflected when analyzing accident causes and planning the countermeasures.

[6] Prior investigation for assessment

To ensure a comprehensive assessment of the countermeasures, assessment indices should be set up to assess the countermeasures and their effects, and conditions before the countermeasures are taken should be assessed according to the indices.

(2) Assessment of the countermeasures

[1] Analysis of present conditions after the countermeasures are taken

Information about the sites where the countermeasures have been taken including road structures, traffic conditions and how accidents are occurring after the countermeasures are taken as well as general information about the countermeasures taken should be gathered and analyzed in order to assess their effects.

[2] Post-investigation for assessment

The conditions after the countermeasures are taken should be investigated using the same method as that used for prior investigation in order to compare the conditions before and after the countermeasures are taken according to the assessment indices and to assess their effects.

[3] Implementation of assessment

The conditions before and after the countermeasures are taken should be compared using the

data gathered in [1] and [2] to assess their effects.

(3) Storage of data in the database

The data on all processes from the planning to assessment of the countermeasures and information such as examination results should be stored in the accident prevention countermeasures database in order to feed back the results of assessing the sites where the countermeasures were taken and knowledge gained through the assessment into future planning of traffic accident prevention countermeasures, and thus to improve the effectiveness and efficiency of the countermeasures.

Chapter 3 Outline of the Guideline

3.1 Characteristics of the Guideline

The Guideline was prepared by analyzing accidents and collecting countermeasure cases as part of the Emergency Countermeasure for Hazardous Spots Project[2)] conducted in 1996, analyzing causes of accidents and countermeasures taken in response to each cause for various road characteristics and accident types, and summarizing these results. The process from the analysis of causes of accidents to the countermeasure proposal was clarified to summarize the major countermeasures that have been studied and other countermeasures considered to be effective for each road characteristic and cause of accidents. This was done in order that managers who actually take countermeasures in the field can refer to this document to conduct studies of countermeasures in conformity with conditions in the field in order that they can reduce traffic accidents by implementing future countermeasures more effectively according to the causes of accidents.

One characteristic of the Guideline is that it was prepared based on the analysis of the causes of accidents at hazardous spots. It clarifies causes of accidents and countermeasures linked primarily to road and traffic environments so that road managers who implement countermeasures can use it easily.

It includes the Table of Causes of Accidents that can be used as a check list by managers implementing countermeasures to efficiently perform on-site diagnosis work.

Table 3.1.1 Characteristics of the Guideline

- Prepared based on cases at 557 hazardous spots throughout Japan
- Mainly clarifies causes of accidents and countermeasures from the perspective of the road traffic environment
- Provides the Table of Causes of Accidents useful for diagnosis work by managers implementing countermeasures

Because at this stage, the Guideline is an interim version prepared based on extremely limited data, there will probably be cases where it cannot be applied to actual accident sites. In the future, therefore, many more data will be collected and accumulated at the same time as the contents of the Guideline are expanded with reference to the views and criticisms of people who actually use it.

(Note 2) The Emergency Countermeasure for Hazardous Spots Project was performed by implementing priority countermeasures by selecting approximately 3,200 hazardous spots with a high degree of urgency on arterial roads throughout Japan.

3.2 Guideline preparation procedure

The Guideline was prepared as explained below (see Fig. 3.2.1).

(1) Clarifying existing study documents

Documents describing the analysis of causes of accidents and the study of the planning of countermeasures at 3,196 hazardous locations throughout Japan were organized to clearly record the causes of accidents, and 557 locations where charts of the state of accident occurrence were completed were selected to clarify the following information about each location.

[1] Road characteristics (uninterrupted flow or intersection, number of lanes, roadside environment etc.)

[2] Types of accidents (rear-end collisions, intersection collisions, head-on collisions etc.)

[3] Causes of accidents (causes of accidents in study documents prepared by managers implementing countermeasures)

(2) Deciding the road characteristics and accident types to be included

The road characteristics and types of roads to be included in the Guideline were decided as follows.

Because the Guideline was prepared using limited data, there are cases of rare road characteristics and infrequent types of accidents that are not included because it is impossible to perform a complete analysis of them.

A. Road characteristics included in the Guideline

Based on the results of the clarification of road characteristics mentioned in (1) above, it is hypothesized that the causes of accidents differ according to whether the location is uninterrupted flow or an intersection, its number of lanes, and roadside environment, and whether it is signaled or non-signaled, and 14 kinds for which data can be collected were included.

B. Types of accidents included in the Guideline

In the Guideline, types of accidents with common causes are clarified and unified based on the types of accidents defined in Accident Statistics Reports, and 9 types of accidents were finally included by removing those types whose causes are difficult to clarify.

(3) Preparing the Table of Causes of Accidents (Document 1)

The causes of accidents were organized by type of accident according to each road characteristic as explained in (2) above. Because it is impossible to fully analyze cases where there are few examples, causes of accidents that have been studied at hazardous spots were clarified based on data for the top 3 to 5 accident types so that the object of the study would be those accidents that account for between 70% and 80% of all accidents that occur for each road characteristic. Analyses of causes of accidents that have not been studied but are assumed to be linked to accidents were added.

(4) Preparing the Table of Countermeasures (Document 2)

The countermeasure goals and countermeasure work types corresponding to the causes of accidents in (3) above were clarified. The countermeasure goals and countermeasure work types to be included are those that have been studied and those that have not been studied but are considered to be effective.

(5) Preparing the Countermeasure Cases (Document 3)

From among the countermeasures in (4) above, "countermeasures that are difficult to interpret using only documents" and "important countermeasures" etc. were organized as specific cases based on the results of field surveys carried out at hazardous spots.

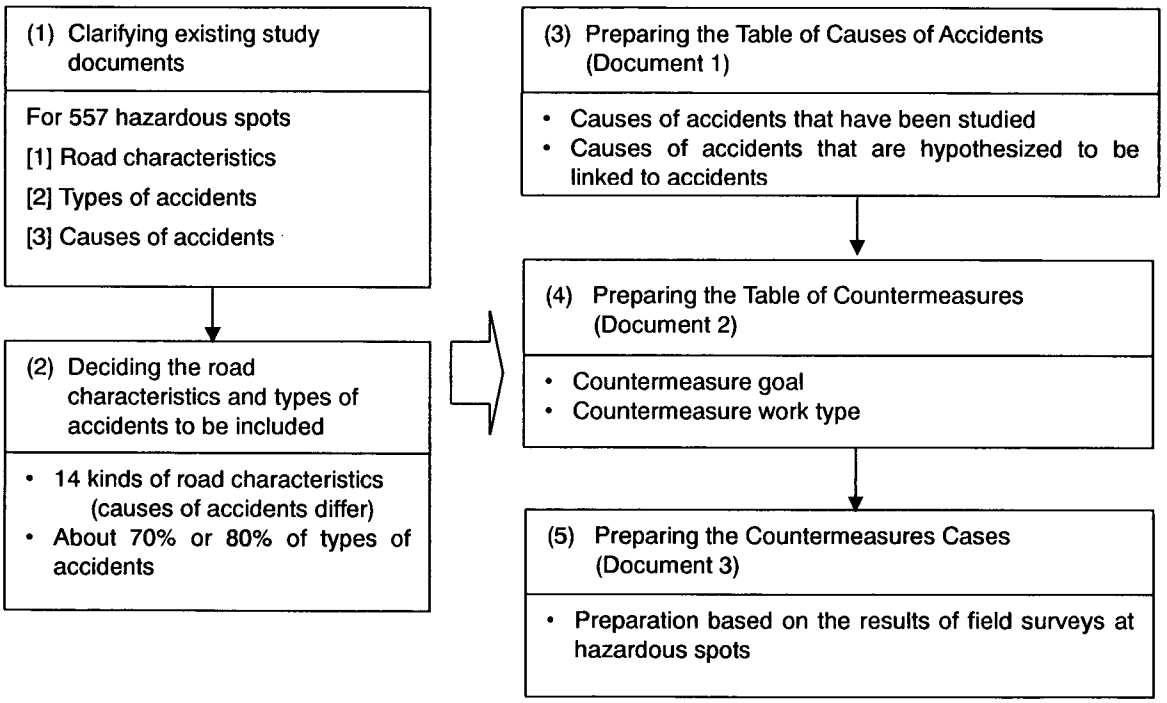


Figure 3.2.1 The Guideline Preparation Procedure Chart

Chapter 4 Countermeasure Planning

This chapter explains the specific work done to analyze the causes of accidents and study countermeasures using the Guideline. But because following this Guideline does not necessarily obtain appropriate causes of accidents and safety countermeasures, managers actually implementing countermeasures must study countermeasures best suited to local conditions with this Guideline as a reference.

The use of the Guideline is premised on the preliminary selection of locations where accidents occur frequently and other countermeasure study locations. Next the manager identifies road characteristics and the types of accidents that occur frequently at the location, and applies his findings to analyze the causes of accidents using Document 1 Table of Causes of Accidents and to select countermeasures suited to each countermeasures study location using Document 2 Table of Countermeasures.

Countermeasure planning and evaluation procedure

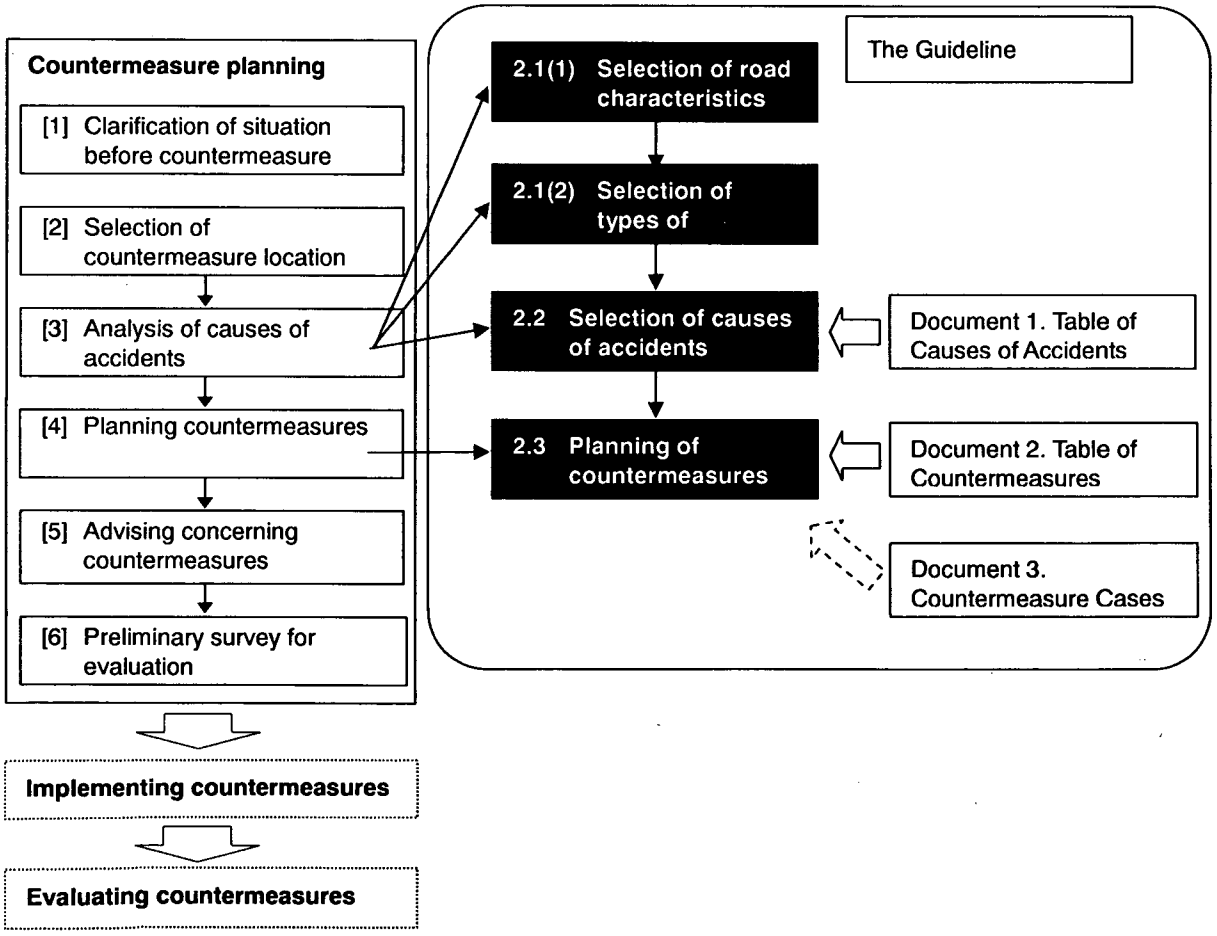


Figure 4.1 Method of Using the Guideline

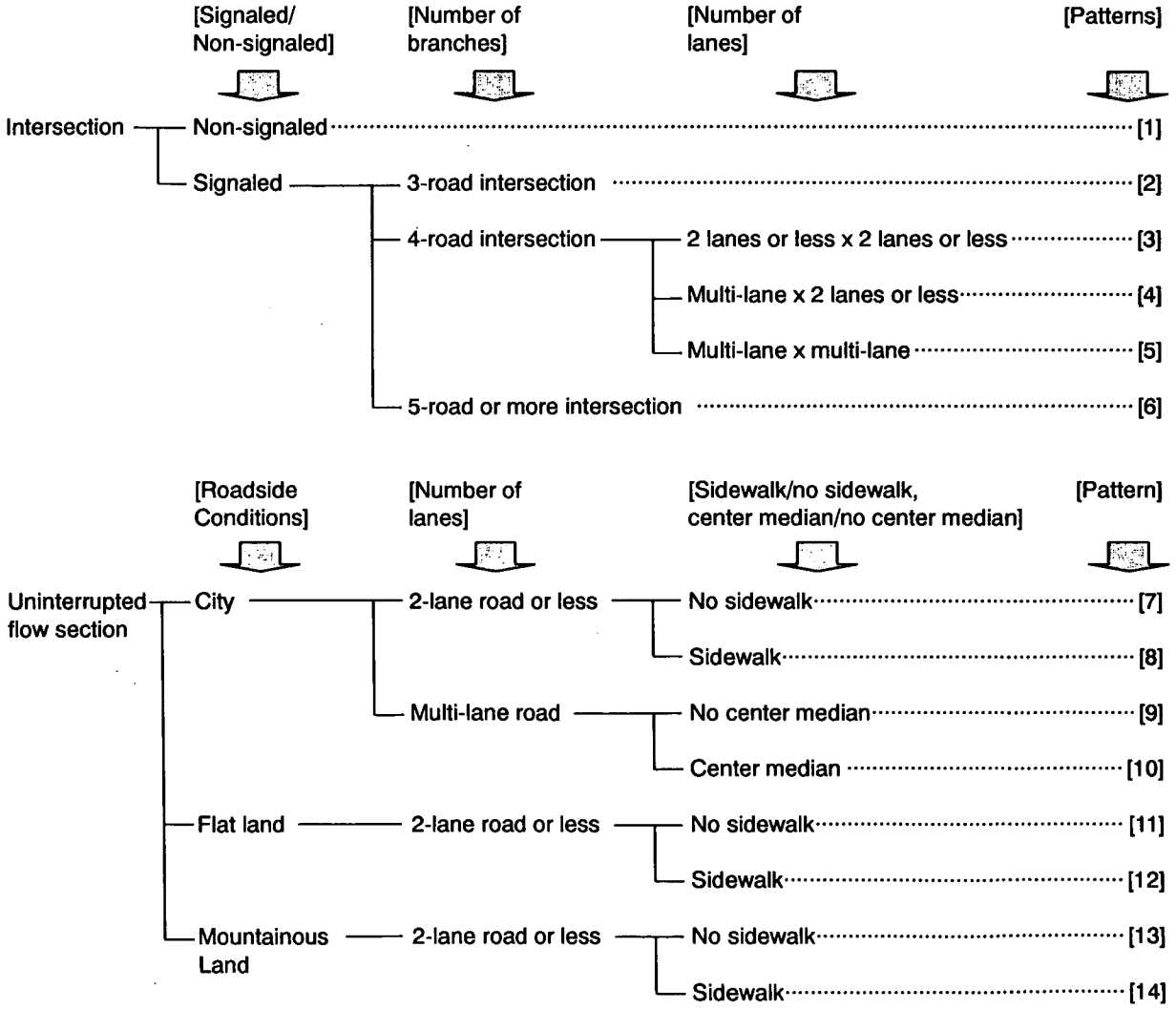
Beginning on the following page, the method of using the Guideline is described in detail beginning from the method of selecting road characteristics.

4.1 Prior preparations

(1) Selection of road characteristics

The first step in using the Guideline is to select road characteristics at the countermeasures study locations. The selection method is to select the pattern from among the 14 road characteristics shown below that corresponds to the countermeasures study location.

Because the road characteristics included are considered to be road characteristics limited to the 557 locations from among hazardous spots, there will be cases where the road characteristics corresponding to the countermeasures study location are not included. In this case reference should be made to other road characteristics. (For example, among uninterrupted flow section on flat land and on mountainous land, multi-lane roads are not included; they are studied with reference to multi-lane roads in cities.)



Note) the number of lanes is selected without including auxiliary lanes (right turn lane, etc.)

Figure 4.1.1 Chart used to Select Road Characteristics

(2) Selection of types of accidents

After the road characteristics of countermeasures study locations have been selected, next the types of accidents to be studied at the location are selected. The selection is done by selecting types from among the following types of accidents (see Fig. 4.1.2).

The purpose of this Guideline is to plan countermeasures focusing on the causes of accidents. For this reason, types of accidents with similar causes were clarified and integrated based on types of accidents defined in the Accident Statistic Reports to establish 12 types of accidents. The types of accidents included were finally set as 9 types by excluding types whose causes are difficult to clarify: "Other pedestrian – vehicle accidents," "When overtaking and passing," and "Other vehicle - vehicle accidents." The correspondence between the accident types defined in the Accident Statistics Reports and the types of accidents included in the Guideline is shown in Table 4.1.1.

The cases that are clarified and integrated are classified in the Accident Statistic Reports as rear-end collisions (while moving) and rear-end collisions (others), but these are unified because it is assumed there are no differences between their causes.

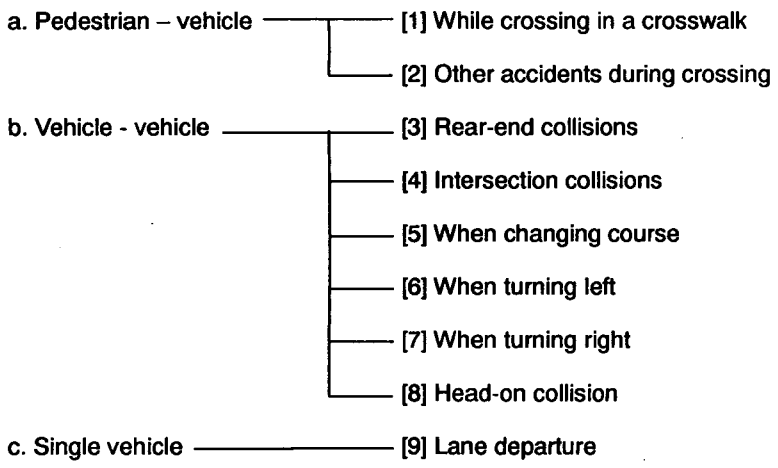


Figure 4.1.2 Chart Used to Select Types of Accidents

Table 4.1.1 Correspondence Between the Types of Accidents in the Statistics Report with those in the Guideline

Categorization of accident types in the Traffic Accident Statistical Reports			Categorization of accident types in the Guideline
Vehicle – vehicle accident	Head-on collision		[8] Head-on collision
	Collision when meeting and passing		
	Intersection collision		[4] Intersection collision
	Collision when overtaking and passing		* When overtaking and passing
	Collision when changing course		[5] When changing course
	Left turn collision		[6] During a left turn
	Right turn collision		[7] During a right turn
	Collision when turning around		
	Collision when crossing		* Other vehicle – vehicle accidents
	Collision when backing up		
	Others		
	Rear-end collision		[3] Rear-end collision
Single vehicle	Collision with parked vehicle		
	Collision with a structures		[9] Lane departure
	Road departure		
	Rolling		
	Others		
Pedestrian - vehicle	Crossing the road	Crosswalk	[1] Crossing in a crosswalk
		Near a crosswalk	
		Near a pedestrian bridge	[2] Crossing at other locations
		Others	
	Walking facing the traffic		* Other pedestrian – vehicle accidents
	Walking with their back to the traffic		
	Playing on the road		
	Working on the road		
	Stopped on the road		
	Others		

Note: * indicates accident types not considered by the Guideline

The types of accidents included in the Guideline include only the top 3 to 5 types for each road characteristic, because there were cases where adequate analysis could not be done to prepare the Guideline because the number of cases is small. There are, therefore, cases where types of accidents that should be studied are not included. In such a case, refer to other road characteristic cases included under this type of accident. For example, because right-turn accidents at non-signaled intersections are not included, reference will be made to a left turn accident at a signaled intersection of a road with 2 lanes or less and a road with 2 lanes or less.

The cases that are included are organized by road characteristics below in Table 4.1.2.

Table 4.1.2 Types of Accidents Included in the Guideline According to Road Characteristics

Road characteristics				Accident types included								
				Crossing in a crosswalk	Crossing at other locations	Rear-end collisions	Intersection collisions	While changing course	Turning left	Turning right	Head-on collision	Lane departure
Intersection	Non-signaled				○	○	○			○		
	Signaled	3-road intersection		○		○	○			○		
		4-road intersection	Intersection of roads with 2 lanes or less			○	○		○	○		
			Intersection of a multi-lane road with road with 2 lanes or less	○		○	○			○		
			Intersection of multi-lane roads			○	○		○	○		
		5-road or more intersection				○	○			○		
Uninterrupted flow section	City	2-lane or less	No sidewalks		○	○				○	○	○
			Sidewalks		○	○			○	○		○
		Multi-lane	No center median			○	○			○		
			Center median			○	○	○		○		
	Flat land	2-lane or less	No sidewalks		○	○					○	○
			Sidewalks		○	○					○	○
	Mountai-nous land	2-lane or less	No sidewalks			○					○	○
			Sidewalks			○					○	○

(3) Other preparations

Before using the Guideline, it is necessary to organize documents concerning past accidents and documents concerning the road traffic environment as preparation for selecting the causes of accidents.

For example, the answers to the questions—when, where, and in what way did the accident occur and who was involved—regarding the types of accidents selected in (2), are organized based on an integrated data base and a chart of the state of the occurrence of accidents.

4.2 Identification of causes of accidents

The causes of accidents are almost entirely human causes such as excessive speed or failure to confirm safety. But background factors contributing to the occurrence of traffic accidents includes cases where road traffic environments induce human causes, and these cases should be approached from the road side in order to prevent accidents. Causes of accidents included in the Guideline are, therefore, causes of accidents linked to road traffic environments.

(1) Structure of the Table of Causes of Accidents

Document 1 Table of Causes of Accidents is used to analyze the causes of accidents. The Table of Causes of Accidents is prepared by Road Characteristics described above in 3.1. This table was prepared by combining three topics: A. Accident occurrence process, B. Check points of road traffic environments that cause accidents, and C. Road traffic environments that cause accidents (see Table 4.2.1). The combinations identified by numbers (1-1, etc.) in the table are combinations of those that have already been studied at hazardous points or combinations that have not been studied but are considered to cause accidents as a result of other studies. The meaning of numbers (1-1 etc.) are combinations of check points of road traffic environment that cause accidents and reference numbers of road traffic environments that cause accidents (see Document 1), and are cause code numbers that correspond to Document 2. Table of Countermeasures

Because this document is a document studied and prepared based on limited cases, there may be combinations of items for which cause code numbers are not recorded, that are causes of accidents. Combinations for which no cause code number has been recorded should be confirmed in the field.

Table 4.2.1 Contents of the Table of Causes of Accidents

Item	Contents
A. Accident occurrence process	It records the processes resulting in the occurrence of accidents by road characteristics and by type of accident, and summarizes recognition and judgement errors of people involved in accidents.
B. Check points of road traffic environments that cause accidents	It summarizes important perspectives that should be considered concerning the presence/absence of traffic road environments that back up the processes resulting in the occurrence of accidents at the time of field surveys.
C. Road traffic environments that cause accidents	It summarizes road traffic environments concerning conditions that cause the check points in B.

(2) Methods of Using the Table of Causes of Accidents

The following is an explanation of the specific procedure used to select the causes of accidents using the Table of Causes of Accidents.

[Selecting the Causes of Accidents Using the Table of Causes of Accidents]

[1] In-office analysis (preliminary preparation) stage

The road characteristics at the countermeasures study location are clarified. Next the types of accidents that occur frequently at the location are identified and those that correspond are selected (For these steps, see 3.1 above).

[2] In-office analysis (selection of causes of accidents) step

The Table of Causes of Accidents matched to the road characteristics at the location is opened, documents concerning past accidents organized by 4.1 Prior Preparations (3) other preparations and documents concerning the road traffic environment are used to hypothesize the road traffic environment conditions related to the occurrence of accidents, then the candidate causes of accidents are selected from among the combinations of A. Accident occurrence process, B. Check points of road traffic environments that cause accidents, and C. Road traffic environments that cause accidents in the table. However, because the documents were studied and prepared based on limited cases, there is a possibility that there will be combinations for which cause code numbers are not recorded that are causes of accidents. If there are combinations without cause code numbers or items that are not listed on the Table of Causes of Accidents that are also considered to be causes, these are all selected.

[3] Field survey step

In the field, it is confirmed whether or not the causes of accidents hypothesized by the in-office analysis actual exist in the field. At the same time, a check is done to find out if there are no causes of accidents that might correspond to A. B. and C. on the Table of Causes of Accidents other than those hypothesized by the in-office analysis to select the causes of accidents that might exist. During this task, if there are presumed causes other than those in the Table of Causes of Accidents these are all selected.

However, because the causes of accidents are related in complex ways with the road traffic environment and human factors etc., judgements must be made fully in accordance with the road structure at the site and the state of accidents while conforming with the Guideline.

Specific examples of analysis done using the Table of Causes of Accidents are presented below.

< [1] Road characteristics selection >

This is a model case of the selection of the installation of warning signs and of advance warning signals as countermeasures at a signaled intersection of a 4-lane road and a 2-lane road where rear-end collisions occur frequently,

In this case, the road characteristics correspond to Pattern [4]: intersection, signaled, 4-road intersection, multi-lane x 2-lanes or less. So pattern [4] in Document 1 Table of Causes of Accidents (Document 1-7) is opened.

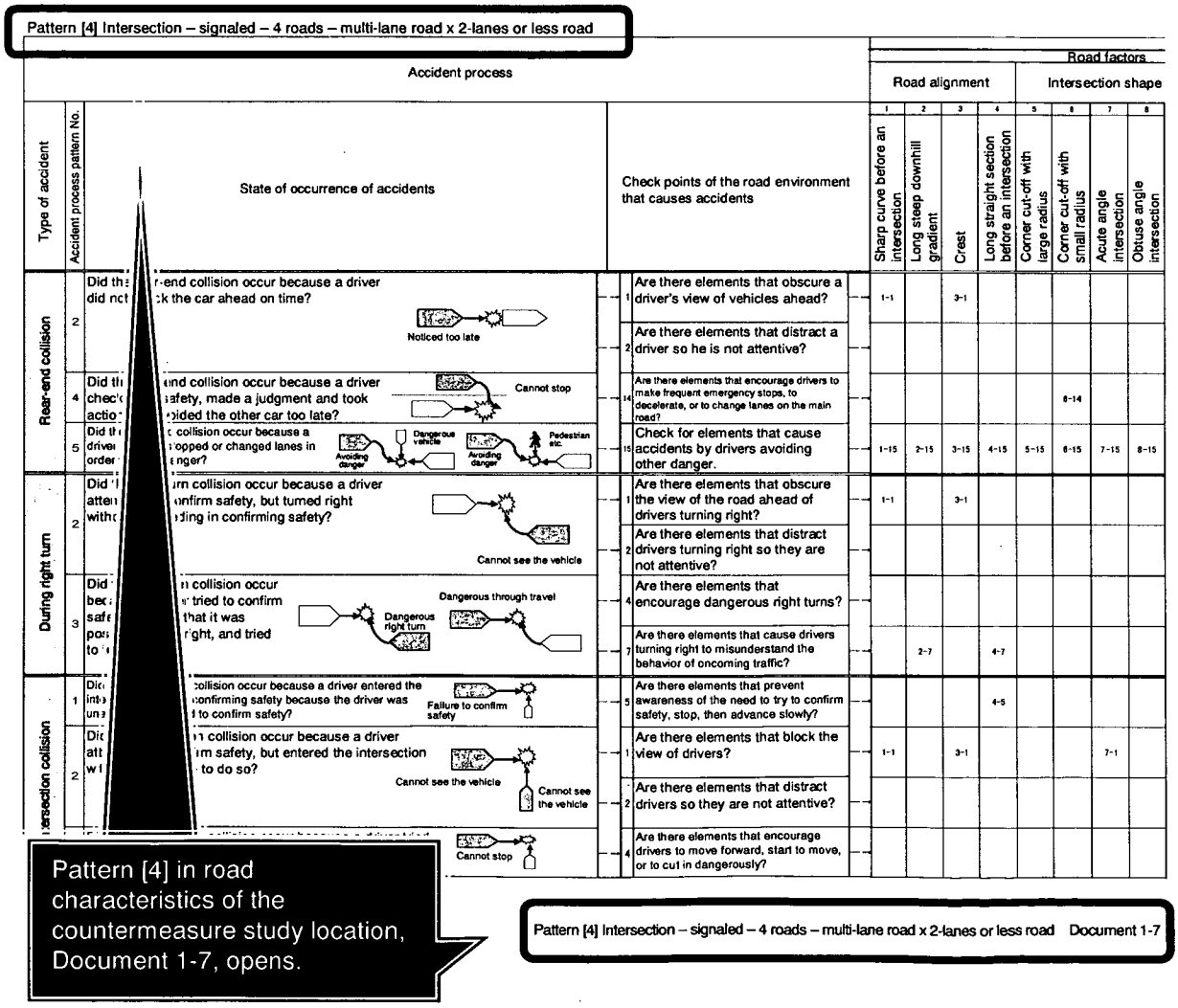


Figure 4.2.1 Example of the Selection of Road Characteristics

< [2] Selection of Type of Accident >

Because at this countermeasures study location, many rear-end collisions have occurred, location of the accident type, rear-end collisions in Document 1 Type of Accidents is viewed.

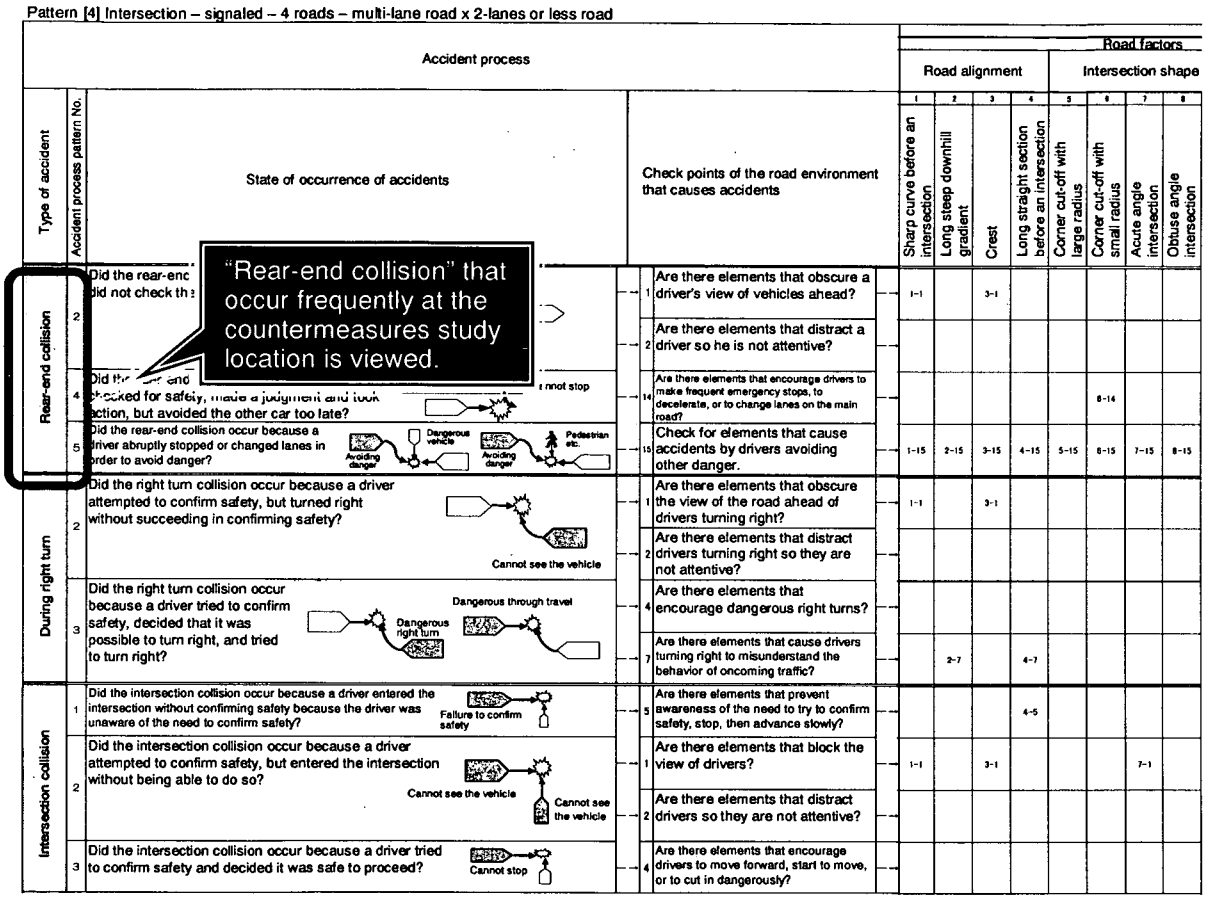


Figure 4.2.2 Example of the Selection of Type of Accident

< [3] Example of the selection of causes of accidents >

Based on the in-office analysis done using documents concerning past accidents that were organized at the preliminary preparation step and the documents concerning the road traffic environment, the combination of processes resulting in the occurrence of an accident "Did the rear-end collision occur because a driver did not check the car ahead on time?" and the road traffic environment check point, "Are there elements that obscure a driver's view of vehicles ahead?" was studied, to hypothesize that because there was definitely a sharp curve ahead of the intersection, the road environment that caused the accident was a "sharp curve".

Next, a field survey was performed with reference to items in the Table of Causes of Accidents confirming that the driver's vision of the road ahead was obscured by a "sharp curve before the intersection," and this is selected as the cause of the accident.

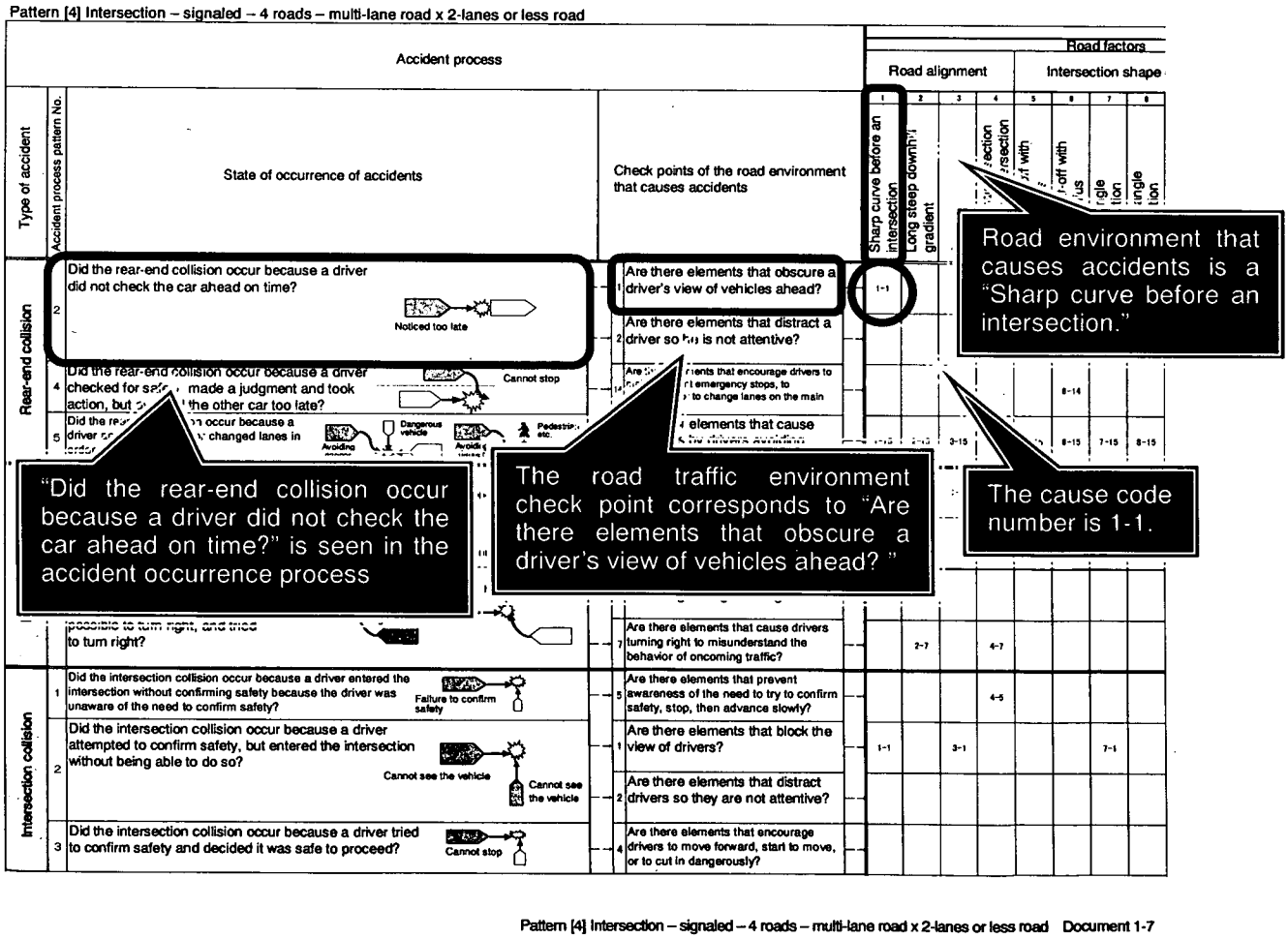


Figure 4.2.3 Example of the Selection of a Cause of an Accident

4.3 Planning countermeasures

Document 2 Table of Countermeasures is used to plan countermeasures. In this Guideline, the correspondence of causes of accidents with countermeasures is linked by cause code number ([ ]-[ ]) in the Table of Causes of Accidents. Therefore, countermeasures are planned by searching for the page in the Table of Countermeasures that include this cause code number based on the case code numbers of causes of accidents specified as stated above.

Four kinds of Tables of Countermeasures have been prepared: Table A and Table B for intersections and Table C and Table D for uninterrupted flow section. (see Fig. 4.3.1)

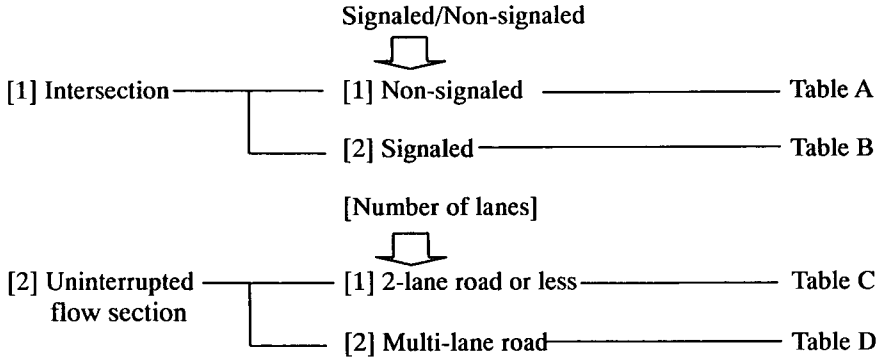


Figure 4.3.1 Table of Countermeasures

Document 2 Table of Countermeasures is used as follows to plan countermeasures.

< Procedure for Planning Countermeasures Using the Table of Countermeasures >

[1] When the Table of Countermeasures that match the road characteristics at the locations where countermeasures are implemented is opened and Document 1 Table of Causes of Accidents is used to select the causes of accidents, the page with the cause code number that is written on the Table of Causes of Accidents is searched.

[2] Because it includes the countermeasures goals and countermeasures work types that are considered to be effective against the causes of accidents, appropriate countermeasures are selected with reference to the state of the road environment, related types of accidents, and the precautions written on the right edge (precautions when selecting and implementing countermeasures). And because this document was studied and prepared based on limited cases, it does not necessarily cover all countermeasures, and if there are countermeasures that it does not include, these are selected.

However, because it is necessary to make judgments according to the state of each countermeasures study location in order to make the final selection of countermeasures, judgments must be made fully in accordance with the road structure and the state of accidents at the countermeasures study location, while conforming with the Guideline.

A specific example of countermeasure selection using the Table of Countermeasures is shown below.

< Example of use >

The countermeasure study location is a signaled right-angled intersection of a 4-lane road and a 2-lane road. In this case, the Table of Countermeasures used is Table B "Signaled Intersection".

Page 2-8 of the Document with the cause code number 1-1 of the specified causes of accidents is opened, "Alerting drivers to the intersection ahead and providing them with information" is selected as the appropriate countermeasures goals according to conditions at the site, and "Warning signs" and "Advance warning signals" are selected as the specific countermeasures work types.

Cause code	Planning the accident countermeasures						Case No.	Case page
		Countermeasure goal	Countermeasures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures			
1 – 1	1	Alert drivers to the intersection and provide information in advance	2102	Warning sign (201:Intersection ahead)				
			5108	Advance warning light				
	2	Reconstruct the road so the drivers attentiveness does not fall	1301	Alignment improvement	•This is studied only in cases where large scale improvement is possible; land and budget can be obtained etc.			
	3	Control signals so vehicles can stop safely	5117	responsiveness and	•This is studied only in cases where it is difficult after the above mented.			
	1	Control the movement of right-turn vehicl and through vehicles to keep them apart			aggressively multi-lane roads.			
2 – 7	1	Control the speed of through vehicles			road , and 5221 is a ermeasure.)			
			5304	Speed warning display boards				
			2105	Warning sign (208-2:Traffic signal ahead)				
			1404	Improving pavement (level difference pavement)			(9)	Document 3-9
	2	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	•This countermeasure should be aggressively implemented at intersections of multi-lane roads.			
			5102	Installing signals (arrow signals)				
3 – 1	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2105	Warning sign (208-2:Traffic signal ahead)	•This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.			
	1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	•This countermeasure should be aggressively implemented at intersections of multi-lane roads.			
			5102	Installing signals (arrow signals)				
	2	Control right turns by vehicles	5003	Prohibiting travel outside a designated direction	•This is studied when countermeasure 1 cannot be taken. (Countermeasure code 5003 is prohibiting right turns.)			
			5009	Prohibiting U-turns				

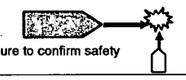
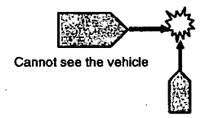
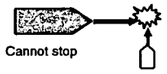
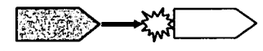
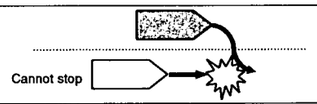
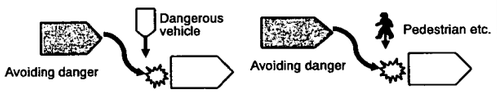
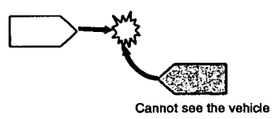
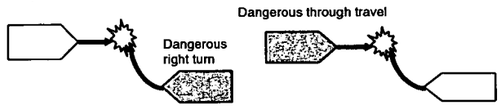
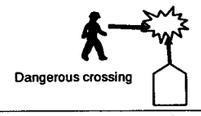
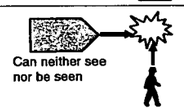
The accident countermeasures selected are "Warning sign" and "Advance warning light" to alert drivers.

Figure 4.3.2 Example of Planning Countermeasures

Document 1

Table of Causes of Accidents

Pattern (1) Intersection – non-signaled

Accident process							Road environments that cause accidents																					
							Road factors														Traffic environment factors							
							Road alignment				Intersection shape							Lanes/width			Accessories/structures							
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Sharp curve before an intersection	Long steep downhill gradient	Crest	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	Acute angle intersection	Obtuse angle intersection	Complexly shaped intersection	Drivers tend to drive fast in a large intersection	Long crossing distance for pedestrians and bicycles	Two or more right/left turn lanes	Narrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location with a pedestrian crosswalk	Dark intersection where pedestrians and parked vehicles are difficult to see	Poorly located and maintained trees etc. on the center median	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles turning right or left leave the right and left turning lanes
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5									13-5						19-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1		
			→	2	Are there elements that distract drivers so they are not attentive?	→									9-2										19-2			
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																						
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	1-1		3-1														17-1	18-1				
			→	2	Are there elements that distract a driver so he is not attentive?	→									9-2						15-2				19-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15	6-15	7-15	8-15	9-15	10-15	11-15		13-15	14-15	15-15	16-15	17-15	18-15	19-15	20-15	21-15	22-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	1-1		3-1														17-1			20-1		
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2			
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→										10-4											21-4	
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																		
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→											11-13											
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1									16-1	17-1			20-1		
			→	2	Are there elements that distract a driver so he is not attentive?	→					5-2			8-2											19-2			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

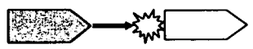
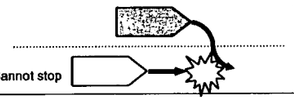
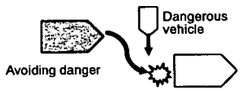
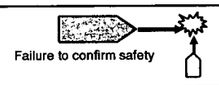
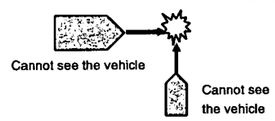
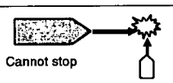
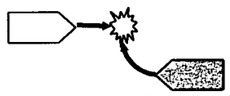
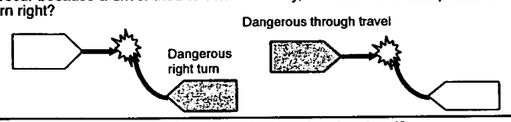
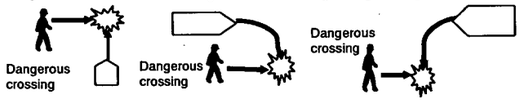
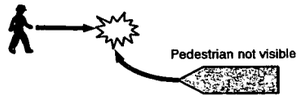
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (1) Intersection – non-signaled

Accident process							Road environments that cause accidents																		
							Traffic environment factors																		
							Accessories/ structure	Roadside environment							Road surface conditions		Signals					Congestion/ stopping	Others				
							23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Oncoming right turn vehicles stopping at inappropriate locations	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety?			→ 5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly? →							29-5	30-5									40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? Cannot see the vehicle / Cannot see the vehicle			→ 1	Are there elements that block the view of drivers? →		24-1														38-1					44-1
					→ 2	Are there elements that distract drivers so they are not attentive? →				26-2				30-2									40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? Cannot stop			→ 4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously? →																					
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? Noticed too late			→ 1	Are there elements that obscure a driver's view of vehicles ahead? →		24-1																			
					→ 2	Are there elements that distract a driver so he is not attentive? →								30-2									40-2	41-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? Cannot stop			→ 14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road? →				26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? Dangerous vehicle / Avoiding danger / Avoiding danger / Pedestrian etc.			→ 15	Check for elements that cause accidents by drivers avoiding other danger. →	23-15	24-15	25-15	26-15			29-15	30-15	31-15	32-15						38-15	40-15	41-15	42-15	43-15	44-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? Cannot see the vehicle			→ 1	Are there elements that obscure the view of the road ahead of drivers turning right? →	23-1															38-1					
					→ 2	Are there elements that distract drivers turning right so they are not attentive? →				26-2															42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? Dangerous through travel / Dangerous right turn			→ 4	Are there elements that encourage dangerous right turns? →																					
					→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic? →																					
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? Dangerous crossing			→ 13	Are there elements that encourage pedestrians to cross roads dangerously. →																38-13			42-13		
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? Can neither see nor be seen			→ 1	Are there elements that block the view of drivers? →		24-1	25-1													38-1					44-1
					→ 2	Are there elements that distract a driver so he is not attentive? →				26-2																	

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

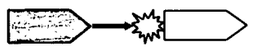
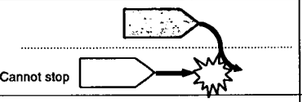
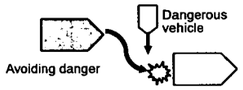
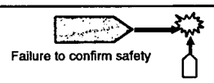
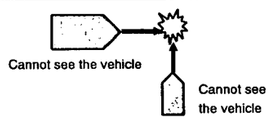
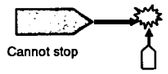
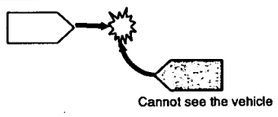
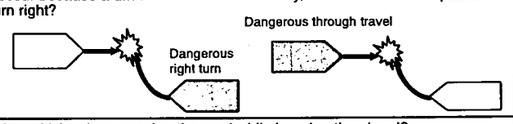
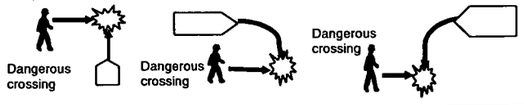
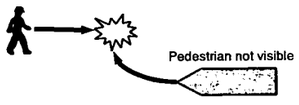
Pattern (2) Intersection – signaled – 3 roads

Accident process							Road environments that cause accidents																				
							Road factors													Traffic environment factors								
							Road alignment				Intersection shape							Lanes/width			Accessories/structures								
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Sharp curve before an intersection	Long steep downhill gradient	Crest	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	Acute angle intersection	Obtuse angle intersection	Complexly shaped intersection	Drivers tend to drive fast in a large intersection	Long crossing distance for pedestrians and bicycles	Two or more right/left turn lanes	Narrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location with a pedestrian crosswalk	Dark intersection where pedestrians and parked vehicles are difficult to see	Poorly located and maintained trees etc. on the center median	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles turning right or left leave the right and left turning lanes	Oncoming right turn vehicles stopping at inappropriate locations
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	1-1		3-1														17-1	18-1					
			→	2	Are there elements that distract a driver so he is not attentive?	→															15-2				19-2				
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-14	
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15	6-15	7-15	8-15	9-15	10-15	11-15			14-15	15-15	16-15	17-15	18-15	19-15	20-15	21-15	22-15	23-15
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5													19-5				
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1			
			→	2	Are there elements that distract drivers so they are not attentive?	→																			19-2				
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	1-1		3-1														17-1			20-1			23-1
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2									19-2				
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→																					21-4		
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																			
While crossing in a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→											11-13											
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there elements that block the view of drivers?	→			3-1													16-1	17-1	18-1		20-1			
			→	2	Are there elements that distract a driver so he is not attentive?	→					5-2			8-2	9-2	10-2									19-2				
			→	5	Are there elements that obscure the intersection?	→																							
			→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

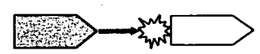
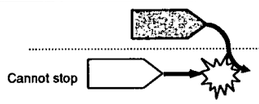
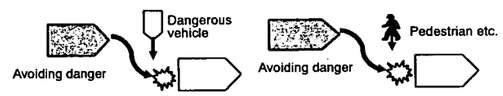
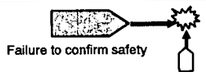
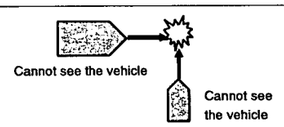
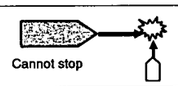
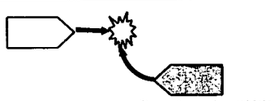
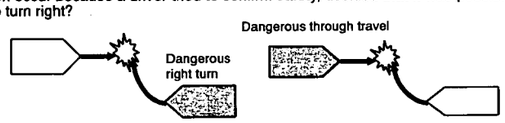
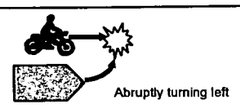
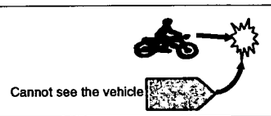
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (2) Intersection – signaled – 3 roads

Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Road environments that cause accidents: Traffic environment factors																		
							Accessories/structure		Roadside environment					Road surface conditions		Signals					Congestion/ stopping	Others				
							24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
							Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	24-1																		
			→	2	Are there elements that distract a driver so he is not attentive?	→							30-2			33-2						40-2	41-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→			26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	24-15	25-15	26-15			29-15	30-15	31-15	32-15	33-15	34-15	35-15	36-15	37-15	38-15	40-15	41-15	42-15	43-15	44-15
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→						29-5	30-5			33-5						40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	24-1														38-1					44-1
			→	2	Are there elements that distract drivers so they are not attentive?	→			26-2				30-2			33-2						40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→											34-4	35-4								
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→										33-1					38-1					
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→			26-2															42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→											34-4								
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→													36-7							
While crossing in a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→											34-13				38-13					
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there elements that block the view of drivers?	→	24-1	25-1													38-1					
			→	2	Are there elements that distract a driver so he is not attentive?	→			26-2							33-2							41-2			
			→	5	Are there elements that obscure the intersection?	→																40-5				
			→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→											34-4			37-4						

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code O–15), refer to other types of accidents.

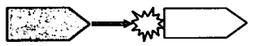
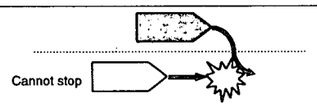
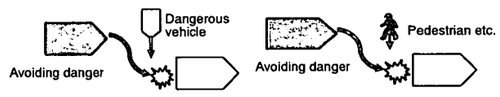
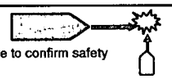
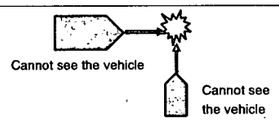
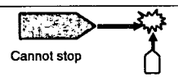
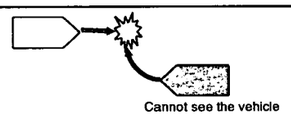
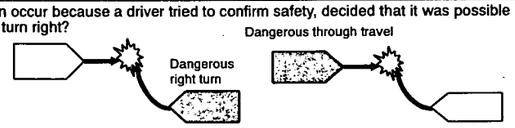
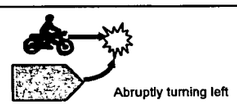
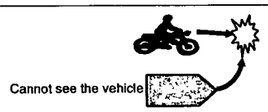
Pattern (3) Intersection – signaled – 4 roads – 2-lanes or less x 2-lanes or less

Accident process							Road environments that cause accidents																		
							Road factors														Traffic environment factors				
							Road alignment				Intersection shape							Lanes/width			Accessories/structures				
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Sharp curve before an intersection	Long steep downhill gradient	Crest	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	Acute angle intersection	Obtuse angle intersection	Complexly shaped intersection	Drivers tend to drive fast in a large intersection	Long crossing distance for pedestrians and bicycles	Two or more right/left turn lanes	Narrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location with a pedestrian crosswalk	Dark intersection where pedestrians and parked vehicles are difficult to see	Poorly located and maintained trees etc. on the center median	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles turning right or left leave the right and left turning lanes
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	1-1		3-1															18-1				
			→	2	Are there elements that distract a driver so he is not attentive?	→															15-2				19-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						6-14	7-14						14-14						19-14		21-14	22-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15		6-15	7-15	8-15	9-15					14-15	15-15			18-15	19-15	20-15	21-15	22-15
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5															19-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1											18-1		20-1		
			→	2	Are there elements that distract drivers so they are not attentive?	→																			19-2			
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																						
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	1-1		3-1																			
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2			
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→																					21-4	
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																		
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	6	Are there elements that encourage abrupt left turning?	→								8-6											19-6			
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that distract a driver so he is not attentive?	→																						

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

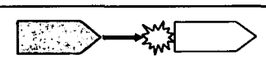
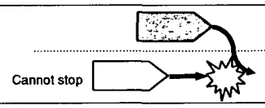
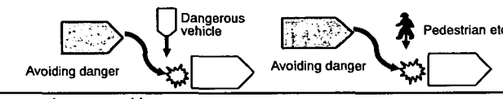
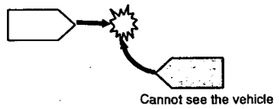
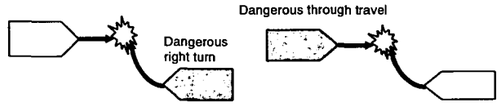
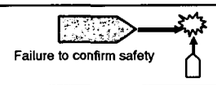
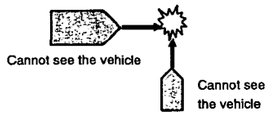
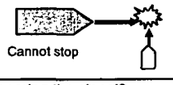
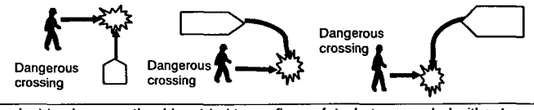
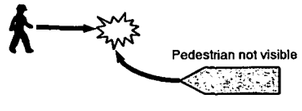
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (3) Intersection – signaled – 4 roads – 2-lanes or less x 2-lanes or less

Accident process							Road environments that cause accidents																				
							Traffic environment factors																				
							Accessories/ structure	Roadside environment						Road surface conditions			Signals					Congestion/ stopping	Others				
							23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Oncoming right turn vehicles stopping at inappropriate locations	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→		24-1																	
			→	2	Are there elements that distract a driver so he is not attentive?	→								30-2			33-2						40-2	41-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→				26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	23-15	24-15		26-15			29-15	30-15	31-15	32-15	33-15	34-15	35-15	36-15		38-15	40-15	41-15	42-15	43-15	44-15
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→							29-15	30-5			33-5						40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→		24-1													38-1						44-1
			→	2	Are there elements that distract drivers so they are not attentive?	→				26-2				30-2			33-2						40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→												34-4	35-4								
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	23-1										33-1					38-1					
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→																			42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→												34-4								
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→														36-7							
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	6	Are there elements that encourage abrupt left turning?	→							29-6													
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that distract a driver so he is not attentive?	→																				43-2	

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

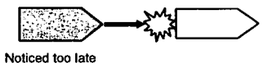
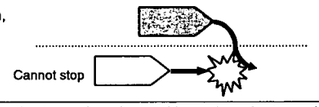
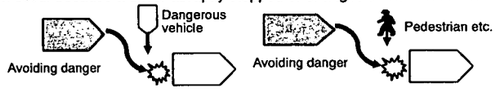
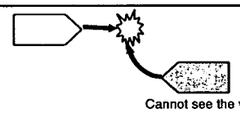
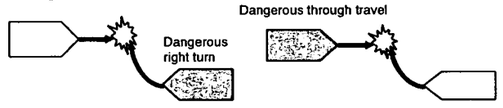
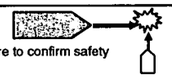
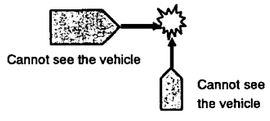
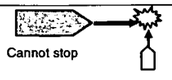
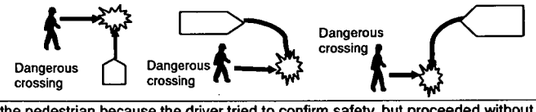
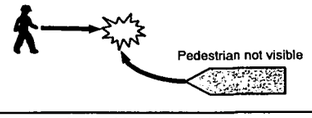
Pattern (4) Intersection – signaled – 4 roads – multi-lane road x 2-lane or less road

Accident process							Road environments that cause accidents																		
							Road factors														Traffic environment factors				
							Road alignment				Intersection shape							Lanes/width			Accessories/structures				
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
							Sharp curve before an intersection	Long steep downhill gradient	Crest	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	*Acute angle intersection*	Obtuse angle intersection	Complexly shaped intersection	Drivers tend to drive fast in a large intersection	Long crossing distance for pedestrians and bicycles	Two or more right/left turn lanes	Narrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location with a pedestrian crosswalk	Dark intersection where pedestrians and parked vehicles are difficult to see	Poorly located and maintained trees etc. on the center median	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles turning right or left leave the right and left turning lanes	Oncoming right turn vehicles stopping at inappropriate locations
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	1-1		3-1														17-1	18-1					
			→	2	Are there elements that distract a driver so he is not attentive?	→															15-2				19-2				
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						6-14			9-14					14-14					19-14		21-14	22-14	
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15	6-15	7-15	8-15	9-15	10-15	11-15			14-15	15-15	16-15	17-15	18-15	19-15	20-15	21-15	22-15	23-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	1-1		3-1														17-1			20-1			23-1
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2				
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→										10-4										21-4		
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																			
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5															19-5				
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1			
			→	2	Are there elements that distract drivers so they are not attentive?	→																			19-2				
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							
While crossing in a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→											11-13												
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there elements that block the view of drivers?	→			3-1													16-1	17-1	18-1		20-1			
			→	2	Are there elements that distract a driver so he is not attentive?	→					5-2			8-2	9-2	10-2									19-2				
			→	5	Are there elements that obscure the intersection?	→																							
			→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

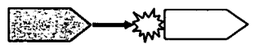
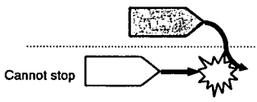
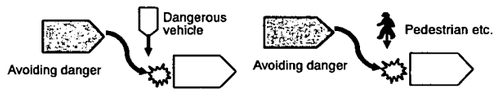
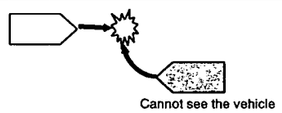
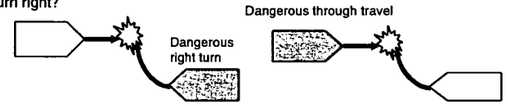
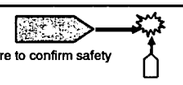
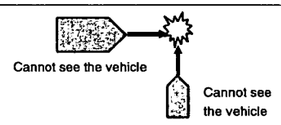
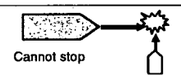
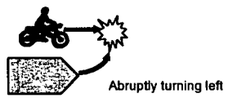
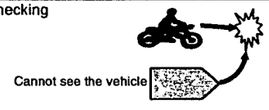
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (4) Intersection – signaled – 4 roads – multi-lane road x 2-lane or less road

Type of accident	Accident process pattern No.	State of occurrence of accidents	Check points of the road environment that causes accidents			Road environments that cause accidents: Traffic environment factors																		
						Accessories/structure		Roadside environment					Road surface conditions		Signals					Congestion/ stopping	Others				
						24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
						Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	24-1															40-2	41-2			
			→	2	Are there elements that distract a driver so he is not attentive?							30-2			33-2									
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?			26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	24-15	25-15	26-15			29-15	30-15	31-15	32-15	33-15	34-15	35-15	36-15	37-15	38-15	40-15	41-15	42-15	43-15	44-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?										33-1					38-1					
			→	2	Are there elements that distract drivers turning right so they are not attentive?			26-2															42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?											34-4								
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?													36-7						
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?						29-5	30-5			33-5						40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	24-1														38-1					44-1
			→	2	Are there elements that distract drivers so they are not attentive?			26-2				30-2			33-2						40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?											34-4	35-4							
While crossing in a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.											34-13				38-13					
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there elements that block the view of drivers?	24-1	25-1													38-1					
			→	2	Are there elements that distract a driver so he is not attentive?			26-2							33-2							41-2			
			→	5	Are there elements that obscure the intersection?																40-5				
			→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?											34-4			37-4						

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

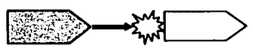
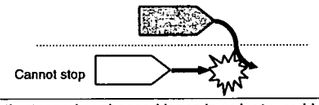
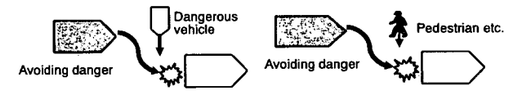
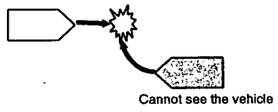
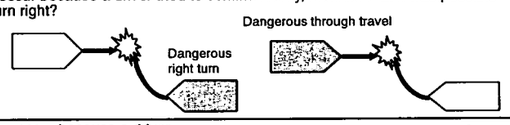
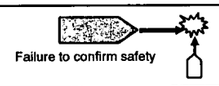
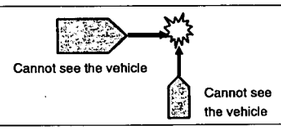
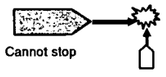
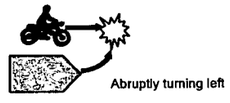
Pattern (5) Intersection – signaled – 4 roads – multi-lane road x multi-lane road

Accident process						Road environments that cause accidents																			
						Road factors														Traffic environment factors					
						Road alignment				Intersection shape							Lanes/width			Accessories/structures					
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environment that causes accidents		Sharp curve before an intersection	Long steep downhill gradient	Crest	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	Acute angle intersection	Obtuse angle intersection	Complexly shaped intersection	Drivers tend to drive fast in a large intersection	Long crossing distance for pedestrians and bicycles	Two or more right/left turn lanes	Narrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location with a pedestrian crosswalk	Dark intersection where pedestrians and parked vehicles are difficult to see	Poorly located and maintained trees etc. on the center median	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles turning right or left leave the right and left turning lanes
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead? →	1-1		3-1														17-1	18-1				
			→	2	Are there elements that distract a driver so he is not attentive? →															15-2				19-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road? →						6-14	7-14		9-14					14-14					19-14		21-14	22-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger. →	1-15	2-15	3-15	4-15		6-15	7-15	8-15	9-15	10-15		12-15		14-15	15-15		17-15	18-15	19-15	20-15	21-15	22-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right? →	1-1		3-1									12-1					17-1			20-1		
			→	2	Are there elements that distract drivers turning right so they are not attentive? →									9-2									19-2				
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns? →										10-4											21-4	
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic? →		2-7		4-7																	
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly? →				4-5														19-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers? →	1-1		3-1				7-1										17-1	18-1		20-1		
			→	2	Are there elements that distract drivers so they are not attentive? →																		19-2				
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously? →																						
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	6	Are there elements that encourage abrupt left turning? →								8-6											19-6			
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that distract a driver so he is not attentive? →																						

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

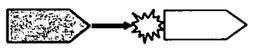
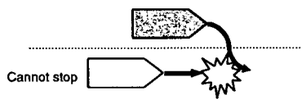
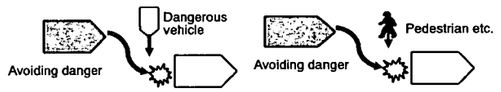
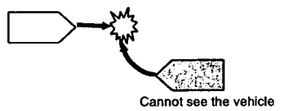
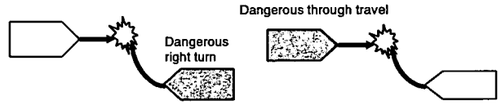
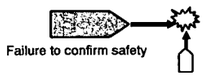
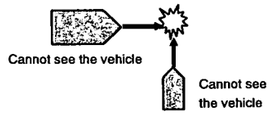
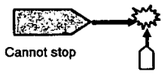
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (5) Intersection – signaled – 4 roads – multi-lane road x multi-lane road

Accident process							Road environments that cause accidents																		
							Traffic environment factors																		
							Accessories /structure	Roadside environment							Road surface conditions		Signals					Congestion/ stopping	Others				
							23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environment that causes accidents			Oncoming right turn vehicles stopping at inappropriate locations	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→		24-1																	
			→	2	Are there elements that distract a driver so he is not attentive?	→								30-2			33-2						40-2	41-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→				26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	23-15	24-15		26-15			29-15	30-15	31-15	32-15	33-15	34-15	35-15	36-15		38-15	40-15	41-15	42-15	43-15	44-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	23-1										33-1					38-1					
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→				26-2															42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→												34-4								
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→														36-7						
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→							29-5	30-5			33-5						40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→		24-1													38-1					44-1
			→	2	Are there elements that distract drivers so they are not attentive?	→				26-2				30-2			33-2						40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→												34-4	35-4							
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	6	Are there elements that encourage abrupt left turning?	→							29-6													
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that distract a driver so he is not attentive?	→																			43-2	

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

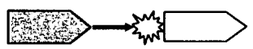
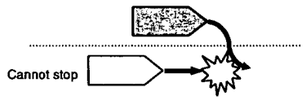
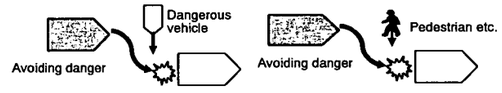
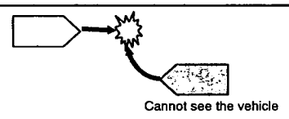
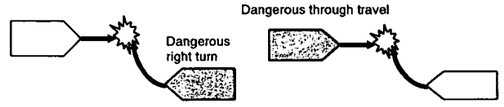
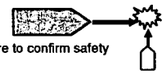
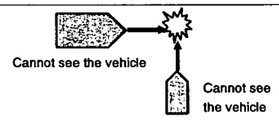
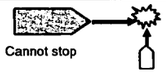
Pattern (6) Intersection – signaled – 5 roads or more

Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environment that causes accidents			Road environments that cause accidents: Road factors – Road alignment 1 Sharp curve before an intersection	2 Long steep downhill gradient	3 Crest	4 Long straight section before an intersection	Road factors – Intersection shape 5 Corner cut-off with large radius	6 Corner cut-off with small radius	7 Acute angle intersection	8 Obtuse angle intersection	9 Complexly shaped intersection	10 Drivers tend to drive fast in a large intersection	11 Long crossing distance for pedestrians and bicycles	Road factors – Lanes/width 12 Two or more right/left turn lanes	13 Narrow major road	14 Changing lane operation (through lane changes to a left or right turn lane)	Traffic environment factors – Accessories/structures 15 A bicycle crossing zone at a location with a pedestrian crosswalk	16 Dark intersection where pedestrians and parked vehicles are difficult to see	17 Poorly located and maintained trees etc. on the center median	18 Poorly located and maintained vegetation, signboards, etc. on the sidewalks	19 Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	20 Bridge piers and other structures	21 Same lanes used for right and left turn vehicles and for through vehicles	22 Vehicles turning right or left leave the right and left turning lanes
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→	1-1		3-1															17-1	18-1				
			→	2	Are there elements that distract a driver so he is not attentive?	→									9-2						15-2				19-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15		6-15	7-15		9-15					14-15	15-15		17-15	18-15	19-15	20-15	21-15	22-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	1-1		3-1													17-1			20-1		
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2									19-2			
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→																				21-4	
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																	
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5															19-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→	1-1		3-1			7-1											17-1	18-1		20-1		
			→	2	Are there elements that distract drivers so they are not attentive?	→									9-2									19-2			
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																					

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code O–15), refer to other types of accidents.

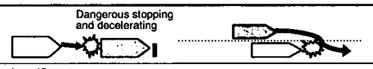
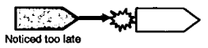
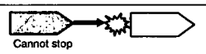
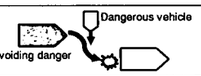
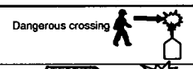
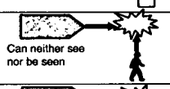
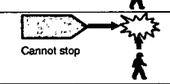
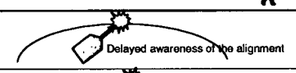
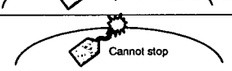
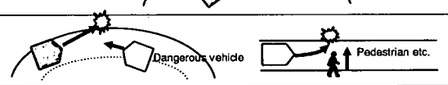
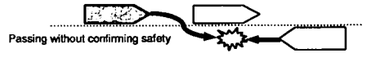
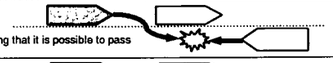
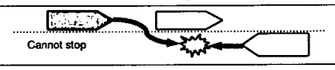
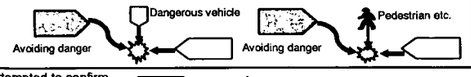
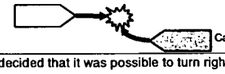
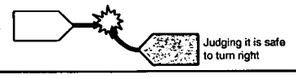
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (6) Intersection – signaled – 5 roads or more

Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Road environments that cause accidents: Traffic environment factors																		
							Accessories/ structure	Roadside environment							Road surface conditions		Signals					Congestion/ stopping	Others				
							23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	41	42	43	44
							Oncoming right turn vehicles stopping at inappropriate locations	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance or narrow street	Unclear roadside facility driveway exit/entrance or narrow street	Driveways of facilities along the roadside entering the intersection	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Poorly located signals that are difficult to see	Short time available for forward movement	Short clearance time	Signal phase operation that is difficult to understand (complex, time differences)	Deceleration and stopping of right and left turn vehicles on main road	Congested main road	Adjoining intersections	A railway crossing adjoining the intersection	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	2	Did the rear-end collision occur because a driver did not check the car ahead on time? 	→	1	Are there elements that obscure a driver's view of vehicles ahead?	→		24-1																	
			→	2	Are there elements that distract a driver so he is not attentive?	→								30-2			33-2						40-2	41-2			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→				26-14			29-14		31-14	32-14							40-14	41-14			44-14
	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	23-15	24-15		26-15			29-15	30-15	31-15	32-15	33-15	34-15	35-15	36-15		38-15	40-15	41-15	42-15	43-15	44-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there elements that obscure the view of the road ahead of drivers turning right?	→	23-1										33-1					38-1					
			→	2	Are there elements that distract drivers turning right so they are not attentive?	→				26-2															42-2	43-2	
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage dangerous right turns?	→												34-4								
			→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→														36-7						
Intersection collision	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was unaware of the need to confirm safety? 	→	5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→							29-5	30-5			33-5						40-5	41-5			
	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there elements that block the view of drivers?	→		24-1													38-1					44-1
			→	2	Are there elements that distract drivers so they are not attentive?	→				26-2				30-2			33-2						40-2	41-2		43-2	
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→												34-4	35-4							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

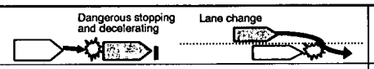
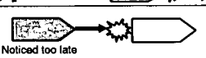
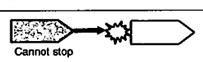
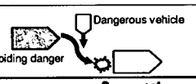
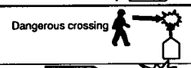
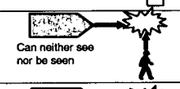
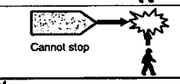
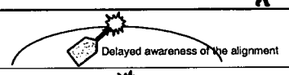
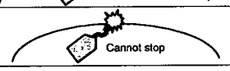
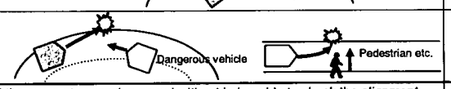
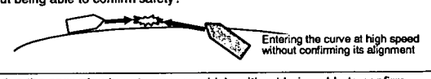
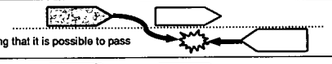
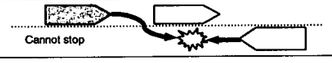
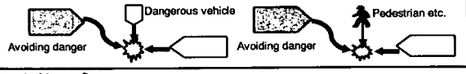
Pattern (7) Uninterrupted flow section – city – 2-lanes or less – No sidewalks

Accident process						Road environments that cause accidents																
						Road factors												Traffic environment factors				
						Road alignment					Intersection shape		Lanes/width					Accessories/structures				
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents			Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1																	
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																		
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15		4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→																		
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	→	1-1		3-1											13-1					19-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																		
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?	→					5-8													
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12										13-12	14-12				18-12	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles?	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	1-10		3-10															
		Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→											12-11							
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→		2-17		4-17														
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8													
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	→	1-1		3-1															19-1
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→																		
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→		2-7		4-7														

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code O–15), refer to other types of accidents.

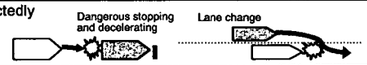
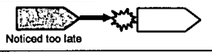
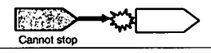
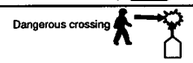
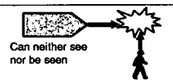
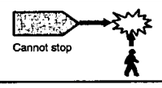
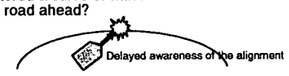
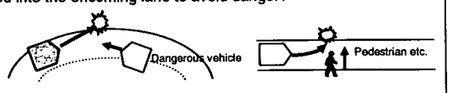
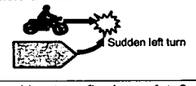
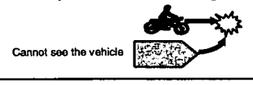
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (7) Uninterrupted flow section – city – 2-lanes or less – No sidewalks

Accident process						Road environments that cause accidents																	
						Traffic environment factors																	
						Roadside environment							Road surface conditions				Congestion/stopping		Others				
						20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→			22-14	23-14	24-14	25-15					34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	20-1						27-1										
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15		43-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→												35-13			41-13		43-13
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	→	20-1	21-1					27-1						35-1					43-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→																	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	→	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15		43-15
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→																	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles?	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	20-10																
		Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→																	43-11
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→																	
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15		43-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	→							27-1						35-1					
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→												34-4		37-4				
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→																		

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

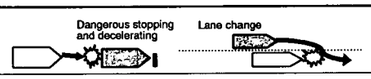
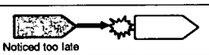
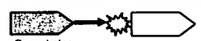
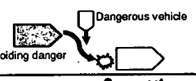
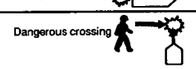
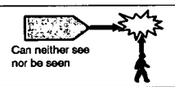
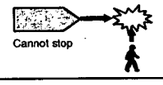
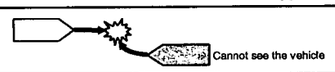
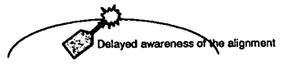
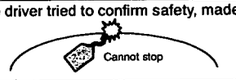
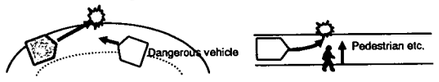
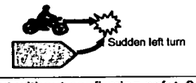
Pattern (8) Uninterrupted flow section – city – 2 lanes or less – sidewalks

Accident process							Road environments that cause accidents																
							Road factors												Traffic environment factors				
							Road alignment					Intersection shape		Lanes/width					Accessories/structures				
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1															16-1			
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15		13-15	14-15		16-15		18-15	19-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→																			
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	→	1-1		3-1										13-1						19-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	→	1-1		3-1																19-1
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→																			
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→		2-7		4-7															
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?	→					5-8														
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15		13-15	14-15		16-15		18-15	19-15
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	18	Are there elements that encourage abrupt left turns on the main road?	→																		18-18	
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that district drivers, making then inattentive?	→																			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

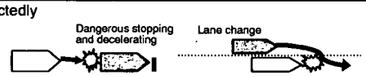
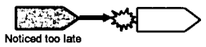
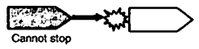
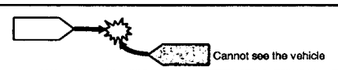
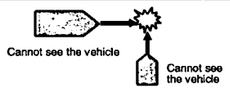
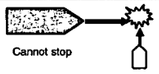
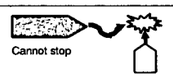
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (8) Uninterrupted flow section – city – 2 lanes or less – sidewalks

Accident process						Road environments that cause accidents																
						Traffic environment factors																
						Roadside environment							Road surface conditions				Congestion/stopping		Others			
						20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?			22-14	23-14	24-14	25-14					34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15	42-15	43-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.													35-13			41-13		43-13
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	20-1	21-1					27-1						35-1					43-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?							27-1						35-1					
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.												34-4		37-4				
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.																		
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?																		
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15	42-15	43-15
During a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? 	→	18	Are there elements that encourage abrupt left turns on the main road?						25-18												
	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? 	→	2	Are there elements that district drivers, making then inattentive?																42-2		

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

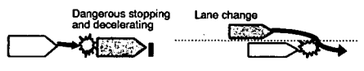
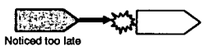
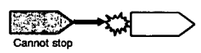
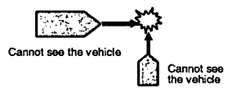
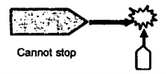
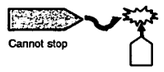
Pattern (9) Uninterrupted flow section – city – multiple lanes – no center median

Accident process						Road environments that cause accidents																	
						Road factors												Traffic environment factors					
						Road alignment					Intersection shape		Lanes/width					Accessories/structures					
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	1-1																		
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?																			
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	1-15	2-15	3-15	4-15				8-15	9-15	10-15	11-15					16-15		18-15	19-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	1-1		3-1																19-1
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.																			
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.		2-7		4-7															
Intersection collision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there any elements that block visibility?	1-1		3-1														16-1			19-1
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.																			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?																			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

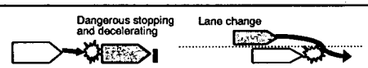
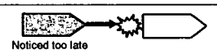
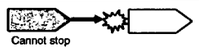
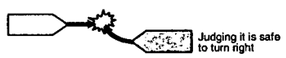
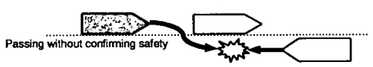
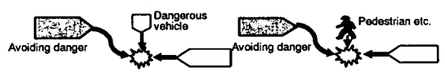
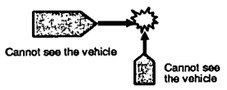
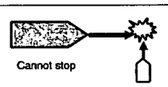
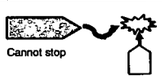
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (9) Uninterrupted flow section – city – multiple lanes – no center median

Accident process							Road environments that cause accidents																		
							Traffic environment factors																		
							Roadside environment							Road surface conditions				Congestion/stopping		Others				
							20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→			22-14	23-14	24-14	25-14						34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15				43-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	→							27-1						35-1					
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→												34-4		37-4				
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→																		
Intersection collision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there any elements that block visibility?	→	20-1						27-1											43-1
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→														37-4				
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code O–15), refer to other types of accidents.

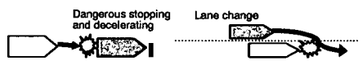
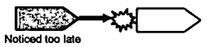
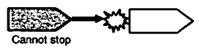
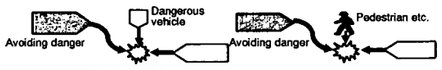
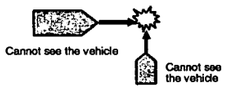
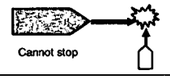
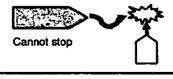
Pattern (10) Uninterrupted flow section – city – multiple lanes – center median

Accident process						Road environments that cause accidents																
						Road factors												Traffic environment factors				
						Road alignment					Intersection shape		Lanes/width					Accessories/structures				
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents			Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→							8-14	9-14	10-14	11-14					17-14	18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1													15-1	16-1			
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																		
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15				8-15	9-15	10-15	11-15					15-15	16-15	17-15	18-15	19-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?	→	1-1		3-1													15-1				19-1
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→																			
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→		2-7		4-7															
When changing course	5	Did the collision occur because a driver changed lanes without time to confirm safety? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→																	18-14	
		Did the vehicle hit the pedestrian, because it left its lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15				8-15	9-15	10-15	11-15					15-15	16-15	17-15	18-15	19-15
Intersection collision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there any elements that block visibility?	→	1-1		3-1													15-1	16-1				19-1
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→																			
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

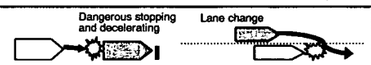
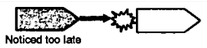
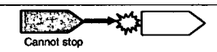
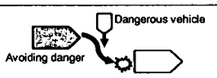
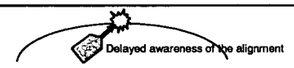
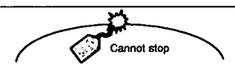
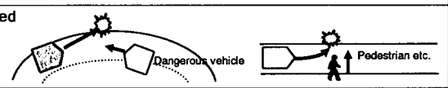
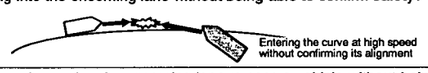
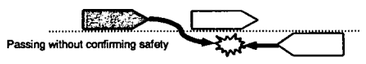
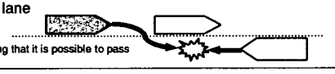
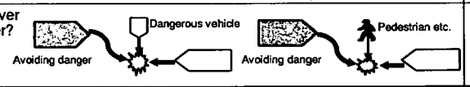
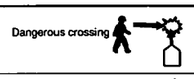
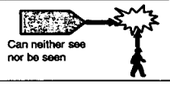
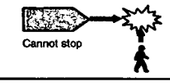
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (10) Uninterrupted flow section – city – multiple lanes – center median

Accident process						Road environments that cause accidents																
						Traffic environment factors																
						Roadside environment							Road surface conditions				Congestion/stopping		Others			
						20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?			22-14	23-14	24-14	25-14					34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15				43-15
During right turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety? 	→	1	Are there any elements that block visibility?							27-1						35-1					
	3	Did the right turn collision occur because a driver tried to confirm safety, decided that it was possible to turn right, and tried to turn right? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.												34-4		37-4				
			→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.																		
When changing course	5	Did the collision occur because a driver changed lanes without time to confirm safety? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?						25-14											
		Did the vehicle hit the pedestrian, because it left its lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15				43-15
Intersection collision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? 	→	1	Are there any elements that block visibility?	20-1						27-1											43-1
	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? 	→	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.														37-4				
	4	Did the rear-end collision occur because a driver checked for safety, made a judgment and took action, but avoided the other car too late? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

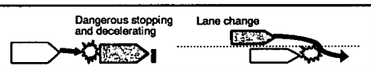
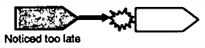
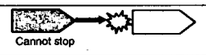
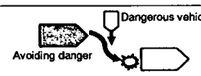
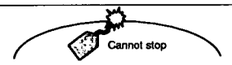
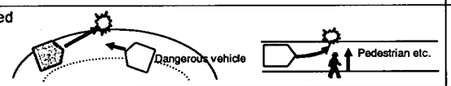
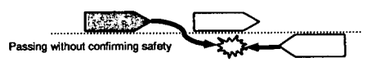
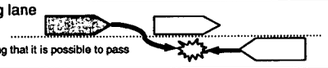
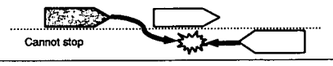
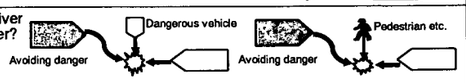
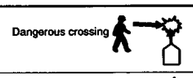
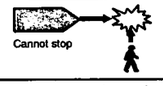
Pattern (11) Uninterrupted flow section – city – 2-lanes or less – no sidewalks

Accident process							Road environments that cause accidents																		
							Road factors													Traffic environment factors						
							Road alignment					Intersection shape		Lanes/width					Accessories/structures						
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1																		
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15					18-15	19-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?	→					5-8														
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15					18-15	19-15
Head-on collision		Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12										13-12	14-12				18-12	
	2	Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	1-10		3-10																
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→												12-11							
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→		2-17		4-17														
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8														
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15					18-15	19-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.	→																			
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	→	1-1		3-1										13-1						19-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

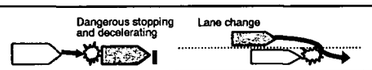
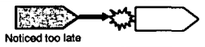
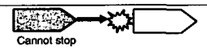
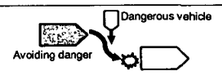
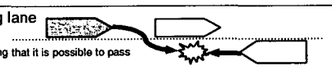
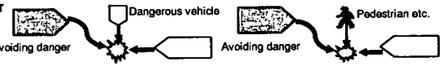
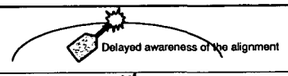
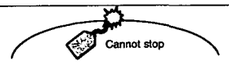
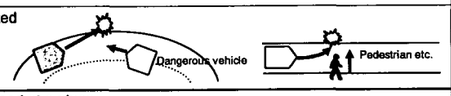
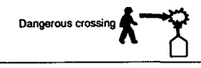
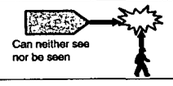
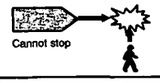
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (11) Uninterrupted flow section – city – 2-lanes or less – no sidewalks

Accident process						Road environments that cause accidents																		
						Traffic environment factors																		
						Roadside environment							Road surface conditions				Congestion/stopping		Others					
						20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?			22-14	23-14	24-14	25-14					34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?																	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to a driver's inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Are there any elements that cause danger avoidance type accidents?	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?																	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	20-10																
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?																	43-11
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?																	
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.													35-13			41-13		43-13
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	20-1	21-1					27-1						35-1					43-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

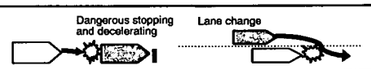
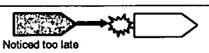
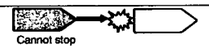
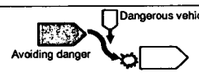
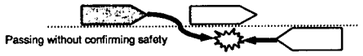
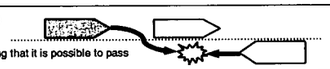
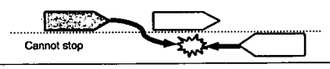
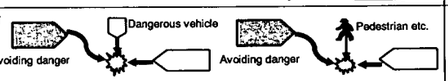
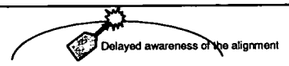
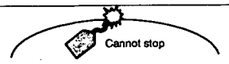
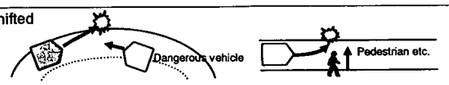
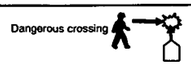
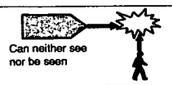
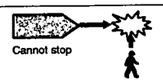
Pattern (12) Uninterrupted flow section – flat land – 2-lanes or less – sidewalks

Accident process						Road environments that cause accidents																
						Road factors												Traffic environment factors				
						Road alignment					Intersection shape		Lanes/width					Accessories/structures				
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	1-1																	
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?																		
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	1-12		3-12										13-12	14-12				18-12	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? *Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety?*	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	1-10		3-10																
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?												12-11							
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?		2-17		4-17														
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?					5-8													
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?					5-8													
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	1-15	2-15	3-15		5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.																			
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	1-1		3-1										13-1						19-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?																			

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code O–15), refer to other types of accidents.

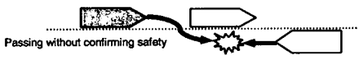
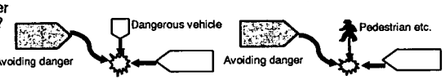
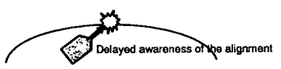
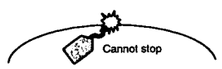
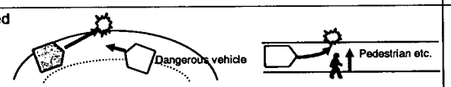
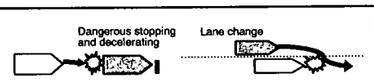
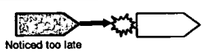
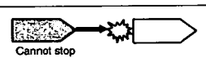
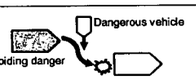
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (12) Uninterrupted flow section – flat land – 2-lanes or less – sidewalks

Accident process						Road environments that cause accidents																
						Traffic environment factors																
						Roadside environment							Road surface conditions				Congestion/stopping		Others				
						20	21	22	23	24	25	27	28	29	30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	Facilities that distract drivers	Heavily used roadside facility driveway exit/entrance	Heavily used narrow streets	Unclear roadside facility driveway exit/entrance or narrow street	Visibility reduced by sunlight in the morning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	Vehicles preparing to turn right or left stopping or decelerating on the main road	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	No crossing facilities at a location they are needed	Motorcycles weaving through vehicle traffic	On-street parking and stopped busses obstructing traffic movement
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?			22-14	23-14	24-14	25-14					34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?																		
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	20-10																	
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?																		43-11
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?																		
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?																		
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	20-15	21-15	22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
Other crossing	1	Did the vehicle hit the pedestrian crossing the road at a place where the driver did not know that pedestrians cross the road? 	→	13	Are there elements that encourage pedestrians to cross roads dangerously.													35-13			41-13		43-13
	2	Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian? 	→	1	Are there any elements that block visibility?	20-1	21-1					27-1						35-1					43-1
	4	Did the vehicle hit the pedestrian because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?								28-8	29-8	30-8	31-8							

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

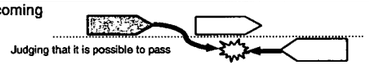
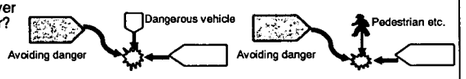
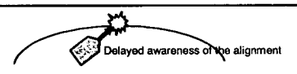
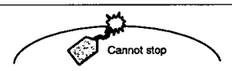
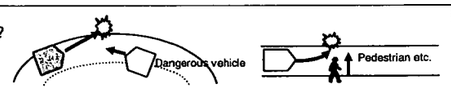
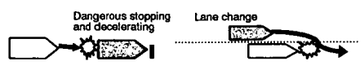
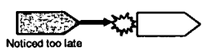
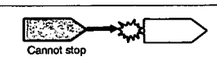
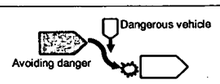
Pattern (13) Uninterrupted flow section – mountainous land – 2-lanes or less – no sidewalks

Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents		Road environments that cause accidents: Road factors – Road alignment: 1 Sharp curve	2 Long steep downhill gradient	3 Crest	4 Long straight section	5 Reverse cant	Intersection shape: 6 Corner cut-off with large radius	7 Obtuse angle intersection	Lanes/width: 8 Narrow lanes	9 Sudden decline of the number and width of lanes	10 Complex change of the number and width of lanes	11 Changing lane operation (through lane changes to a left or right turn lane)	12 Slow vehicles traveling in a section without a passing zone (lane)	Traffic environment factors – Accessories/structures: 13 Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	14 Optical guidance either not installed or inadequate (nighttime)	15 Poorly located and maintained trees etc. on the center median	16 Poorly located and maintained trees, signboards, etc. on the sidewalks	17 Negligently cut center median	18 Inappropriately located traffic signs with unsuitable contents (unclear and complex)	19 Bridge piers and other structures
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12									13-12	14-12				18-12	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	1-10		3-10															
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→												12-11							
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→		2-17		4-17														
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8													
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8													
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1																	
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																		
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

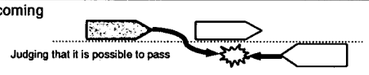
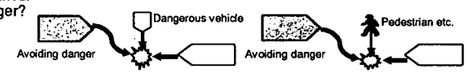
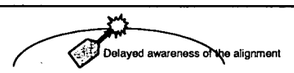
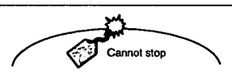
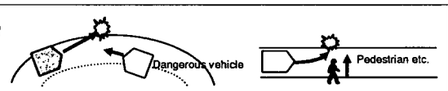
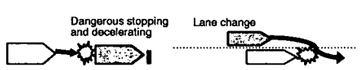
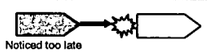
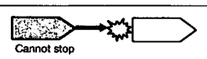
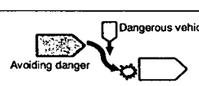
* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (13) Uninterrupted flow section – mountainous land – 2-lanes or less – no sidewalks

Accident process						Road environments that cause accidents																
						Traffic environment factors																
						Roadside environment							Road surface conditions				Congestion/stopping		Others				
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents	20 Obstructions to vision on the road sides (buildings, walls, etc.)	21 Rows of bright structures lining the roadway	22 Facilities that distract drivers	23 Heavily used roadside facility driveway exit/entrance	24 Heavily used narrow streets	25 Unclear roadside facility driveway exit/entrance or narrow street	27 Visibility reduced by sunlight in the morning and in the west	28 Deteriorated road surface paving (ruts and cracks)	29 Poor drainage	30 Deposited mud or sand	31 Road surface icing	34 Vehicles preparing to turn right or left stopping or decelerating on the main road	35 Congested main road	37 Heavy traffic on the main road	40 Many pedestrians or cyclists on and around the sidewalks and shoulders	41 No crossing facilities at a location they are needed	42 Motorcycles weaving through vehicle traffic	43 On-street parking and stopped busses obstructing traffic movement
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment? →																		
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle? →	20-10																	
			→	11	Are there any elements that encourage frequent passing in the oncoming lane? →																		43-11
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles? →																		
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle? →								28-8	29-8	30-8	31-8							
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger. →	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15					43-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment? →																		
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle? →								28-8	29-8	30-8	31-8							
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger. →	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15					43-15
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road? →			22-14	23-14	24-14	25-14						34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility? →	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle? →								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger. →	20-15		22-15	23-15	24-15	25-15	27-15	28-15	~~29-15~~	30-15	31-15	34-15	35-15					43-15

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

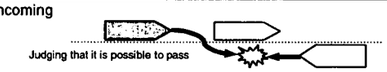
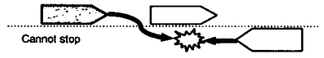
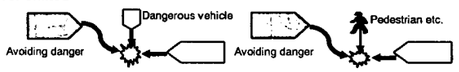
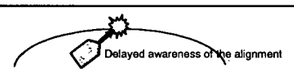
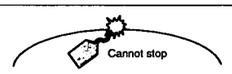
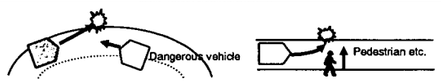
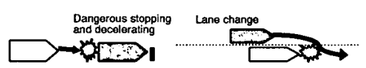
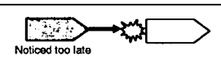
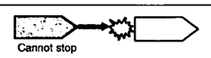
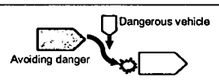
Pattern (14) Uninterrupted flow section – mountainous land – 2-lanes or less – sidewalks

Accident process						Road environments that cause accidents																
						Road factors												Traffic environment factors				
						Road alignment					Intersection shape		Lanes/width					Accessories/structures				
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents			Sharp curve	Long steep downhill gradient	Crest	Long straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Narrow lanes	Sudden decline of the number and width of lanes	Complex change of the number and width of lanes	Changing lane operation (through lane changes to a left or right turn lane)	Slow vehicles traveling in a section without a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Optical guidance either not installed or inadequate (nighttime)	Poorly located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Bridge piers and other structures
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12										13-12	14-12				18-12	
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	1-10		3-10															
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→												12-11							
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→		2-17		4-17														
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8													
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15		16-15		18-15	
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12						9-12	10-12			13-12	14-12				18-12	
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→					5-8													
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15		16-15		18-15	
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14	9-14	10-14	11-14						18-14	
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	1-1														16-1			
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→																		
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	1-15	2-15	3-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15		16-15		18-15	

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

* Although causes of accidents are recorded for road environments that cause accidents, there are cases where the columns below them are all empty columns. This has been done so that the contents can be expanded by accumulating future data and obtaining the views of users of this manual.

Pattern (14) Uninterrupted flow section – mountainous land – 2-lanes or less – sidewalks

Type of accident	Accident process pattern No.	State of occurrence of accidents			Check points of the road environment that causes accidents			Road environments that cause accidents: Traffic environment factors: Roadside environment: 20 Obstructions to vision on the road sides (buildings, walls, etc.)	21 Rows of bright structures lining the roadway	22 Facilities that distract drivers	23 Heavily used roadside facility driveway exit/entrance	24 Heavily used narrow streets	25 Unclear roadside facility driveway exit/entrance or narrow street	27 Visibility reduced by sunlight in the morning and in the west	Road surface conditions: 28 Deteriorated road surface paving (ruts and cracks)	29 Poor drainage	30 Deposited mud or sand	31 Road surface icing	Congestion/stopping: 34 Vehicles preparing to turn right or left stopping or decelerating on the main road	35 Congested main road	Others: 37 Heavy traffic on the main road	40 Many pedestrians or cyclists on and around the sidewalks and shoulders	41 No crossing facilities at a location they are needed	42 Motorcycles weaving through vehicle traffic	43 On-street parking and stopped busses obstructing traffic movement
Head-on collision	2	Did the head-on collision occur because a driver entered the curve at excessive speed without being able to check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? 	→	12	Are there any elements that make it difficult to understand the alignment?	→																			
		Did the head-on collision occur because a driver changed to the oncoming lane to pass a vehicle without being able to confirm safety from oncoming vehicles? Did the head-on collision occur because a driver entered the oncoming lane when passing without being able to confirm safety? 	→	10	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	20-10																	
			→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→																		43-11
	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? 	→	17	Are there any elements that encourage drivers to pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?	→																		
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15					43-15
Lane departure	2	Did the vehicle leave its lane colliding with an object, because it entered a curve or narrow road section at excessive speed without being able to confirm the alignment of the road ahead? 	→	12	Are there any elements that make it difficult to understand the alignment?	→																		
	4	Did the vehicle leave its lane colliding with an object because the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15					43-15
Rear-end collision	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? 	→	14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→			22-14	23-14	24-14	25-14						34-14	35-14					43-14
	2	Did the collision occur because of delayed awareness of the vehicle ahead? 	→	1	Are there any elements that block visibility?	→	20-1						27-1											
	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? 	→	8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8						
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? 	→	15	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15		22-15	23-15	24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-14					43-15

* Accident process pattern No. 5 is an accident that occurs when a driver has made an emergency stop or lane change to avoid danger, and it is difficult to hypothesize causes of this type of accident. So for this countermeasure (Cause code ○–15), refer to other types of accidents.

Document 2

Table of Countermeasures

Table A

Intersection – Non-signaled

Table A Intersection – Non-signaled

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
1-1	Sharp curve before an intersection	Noticing intersection too late.	●	●	●		●		1	Alert drivers to the intersection and provide information in advance.	2102	Warning sign (201:Intersection ahead)			
									2	Reconstruct the road so drivers' attentiveness does not fall.	1301	Alignment improvement	• It improves the alignment before the intersection. • This is studied only in cases where large scale improvement is possible; land and budget can be obtained etc.		
									3	Control signals so vehicles can stop safely.	5101	Installing signals (normal signals)	• Its introduction is studied only when the intersection is still hard to see after the above countermeasures are taken.		
											5117	Controlling vehicle responsiveness and dilemma responsiveness			
		<Through vehicle> Notices the oncoming right-turn vehicle too late. <Right-turn vehicle> Notices the oncoming through vehicle too late.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart.	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
2-7	Long steep downhill gradient	<Right turn vehicle> Misunderstands the behavior of the through vehicle.			●				1	Control the speed of through vehicles.	1601	Road surface indicators (road surface deceleration indicators)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection. (Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
											5221				
											5304	Speed warning display boards			
											2102	Warning sign (201:Intersection ahead)			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart.	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
3-1	Crest	Notices intersection too late.	●	●	●		●	●	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers.	2102	Warning sign (201:Intersection ahead)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
		<Through vehicle> Notices the oncoming right-turn vehicle too late. <Right-turn vehicle> Notices the oncoming through vehicle too late.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart.	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
									2	Control right turns by vehicles.	5003	Prohibiting travel outside a designated direction	• This is studied when countermeasure 1 cannot be taken. (countermeasure code 5003 is prohibition of right turns)		
											5009	Prohibiting U-turns			
4-5	Long straight section before an intersection	Notices intersection too late.	●						1	Alert drivers to the intersection	5016	Stopping before entering intersection			
											5212	Internally illuminated traffic signs	• Case where a stop before crossing sign is already installed		
											5222	Large signs and high-brightness signs			
											5224	Cantilever and gate type signs			
											5103	Installing signals (1 light flashing)	• For small intersections		
											1610	Intersection center indicator (intersection rivets)			
											1611	Intersection center indicator (self light-emitting intersection rivets)			
											2501	Roadside mirrors			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
											2102	Warning sign (201:Intersection ahead)			
											1609	Intersection center indicator (cross, T-mark)			
											1603	Channelizing strip	• At a convergence (Countermeasure code 1603 is a road administrator s countermeasure, and 5217 is a Public safety commission's countermeasure.)		
											5217				
4-7	Long straight section before an intersection	<Right turn vehicle> Misunderstands the behavior of the oncoming through vehicle.			●				1	Control the speed of through vehicles	1601	Road surface indicators (road surface deceleration indicators)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection. (Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
											5221				
											5304	Speed warning display boards			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
											2102	Warning sign (201:Intersection ahead)			
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart.	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
5-2	Corner cut-off with large radius	Speed increases in the outlet of the intersection so surrounding sidewalks are easily overlooked.					●	●	1	Control the speed of moving vehicles.	1104	Alignment improvement (reducing cut-off corner diameter)	• The three countermeasures should be implemented together. • In a case where there is a crosswalk	(1)	Document 3-1
											5017	Stopping lane (moving it forward)			
											5037	Crosswalk (moving it forward)		(12)	Document 3-12
											5036	Crosswalk (new)	• In a case where there is a crosswalk		
6-14	Corner cut-off with small radius	<Right/left turn vehicles> It is easy to stop abruptly or decelerate on the main road when turning to the left or right.		●					1	Alert drivers.	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									2	Encourage vehicles performing emergency stops or emergency deceleration to stop or decelerate outside the driving lanes	1109	Left turn lane (new)			
									3	Remove elements that cause emergency stops and deceleration and lane changes on the main road.	1103	Alignment improvement (increasing cut-off corner diameter)			
											1111	Installing left turn channelizing strip	• Countermeasure in a case where land can be obtained.		
7-1	Acute angle intersection	<Left turn vehicle> Visibility of the street around the left corner is poor	●				●		1	Restore the normal shape of the intersection (acute angle intersection)	1105	Alignment improvement (improving intersection angle)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control the traffic to keep two vehicles or a vehicle and a pedestrian apart	5101	Installing signals (normal signals)			
											5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied along with the above countermeasures at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
									4	Keep pedestrians out of the traffic	1711	Bollards	• This is studied at locations of frequent accidents caused by pedestrians entering traffic lanes.		
											1404	Improving pavement (level difference pavement)			
7-14	Acute angle intersection	<Right and left turn vehicles> It is easy to stop or decelerate abruptly on the main road when starting to turn left or right.		●					1	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes on the road	1105	Alignment improvement (improving intersection angle)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									4	Cause vehicles abruptly stopping or decelerating to stop or decelerate outside the traffic lanes on the main road	1109	Left turn lane (new)	• This is studied in cases where left turn traffic is heavy.		
											1107	Right turn lane (new)	• This is studied aggressively in cases where right turn traffic is heavy.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
8-2	Obtuse angle intersection	<Left turn vehicle> Attention is inadequate because drivers turn left at high speed without slowing down.					●	●	1	Restore the normal shape of the intersection (acute angle intersection)	1105	Alignment improvement (improving intersection angle)			
									2	Control the speed of moving vehicles	1401	Coloring the inside of the intersection	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
											1402	Improving pavement (coloring the lanes)			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
									3	Control the traffic to keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
											5110	Improvement of the signal phase (adding pedestrian phase)			
9-2	Complexly shaped intersection	Drivers are distracted or inattentive.	●	●	●		●	●	1	Stabilize unstable driving courses inside the intersection	1604	Guide line	• This is studied in cases where the line of motion of the main traffic flow bends (Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's countermeasure.)		
											5220				
											1207	Center median tip indicator (obstruction indicator light etc.)	• This is studied in cases where the line of motion of the main traffic flow bends • Cases where there is center median		
									2	Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									3	Simplify the shape of the intersection	1105	Alignment improvement (improving intersection angle)			
											1106	Alignment improvement (others)			
									4	Simplify the flow of the traffic	5002	One way traffic	• This is applied to the direction with relatively low traffic volume.		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
9-14	Complexly shaped intersection	Drivers become confused about their course, abruptly slowing down or stopping, or changing lanes on the main road.		●					1	Stabilize unstable driving courses inside the intersection	1604	Guide line	• This is studied in cases where the line of motion of the main traffic flow bends. (Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's countermeasure.)		
											5220				
											1207	Center median tip indicator (obstruction indicator light etc.)	• This is studied in cases where the line of motion of the main traffic flow bends. • Cases where there is center median		
									2	Provide information (traffic sign, signboard) in advance	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									3	Cause vehicles abruptly stopping or decelerating to stop or decelerate outside the traffic lanes on the main road	1109	Left turn lane (new)	• This is studied only in cases where there is heavy left turn traffic.		
											1107	Right turn lane (new)	• This is aggressively studied in cases where there is heavy right turn traffic.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
									4	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes on the road	1105	Alignment improvement (improving intersection angle)			
											1106	Alignment improvement (others)			
10-4	Drivers tend to drive fast in a large intersection	Drivers turn right by slipping through a gap with the oncoming lane among the multiple lanes.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
11-13	Long crossing distance for pedestrians and bicycles	There are factors that encourage pedestrians to cross when it is dangerous.					●		1	Clearly indicate where people cross the road	5036	Crosswalk (new)			
											5101	Installing signals (normal signals)	• Implemented where there is heavy traffic.		
											5120	Pedestrian use lights			
13-5	Narrow major road	At locations where drivers must confirm safety and stop or decelerate, drivers cannot sense these needs.	●						1	Inform drivers of the intersection and that the road ahead is a major road	5016	Stopping before entering intersection			
											5212	Internally illuminated traffic signs	• Case where "Stop before entering" signs are already installed		
											5222	Large signs and high-brightness signs			
											5224	Cantilever and gate type signs			
											5103	Installing signals (1 light flashing)			
											1610	Intersection center indicator (intersection rivets)			
											1611	Intersection center indicator (self-light emitting intersection rivets)			
											2501	Roadside mirrors			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
											2102	Warning sign (201:Intersection ahead)			
											1609	Intersection center indicator (cross, T-mark)			
											1603	Channelizing strip	• Case of a convergence (Countermeasure code 1603 is a road administrator's countermeasure, and 5217 is a Public safety commission's countermeasure.)		
											5217				
14-14	Changing lane operation (through lane changes to a left or right turn lane)	Confused about the traveling direction, drivers stop or decelerate abruptly or change lanes on the major road.		●					1	Provide information in advance	5215	Warning of lane use control			
15-2	A bicycle crossing zone at a location with a pedestrian crosswalk.	The pedestrian bridge causes drivers to mistakenly believe that cyclists do not cross the road here, so they are not attentive to cyclists in the bicycle crossing zone.		●					1	Modify the pedestrian bridge so cyclists can use it and close the bicycle crossing zone	1803	Improvement of grade-separated crossing facilities (installing a slope etc.)			
											2304	Pedestrian – cyclist use fence (to prevent crossing)			
									2	Arouse drivers' attention	2116	Signs and indicators not legally required (letters, symbols, arrows)	• "Watch out for bicycles crossing" (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control traffic to keep vehicles apart	5101	Installing signals (normal signals)	• Intersection with both grade-separated crossing facility and road level crossing facility (crosswalk). • This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
											5110	Improvement of the signal phase (adding pedestrian phase)			

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
16-1	Dark intersection where pedestrians and parked vehicles are difficult to see	It is difficult to see pedestrians and parked cars.					●	●	1	Improve drivers' ability to see the intersection	2001	Road lighting (new)	• This is studied in the case of high nighttime accident rate.		
											2002	Road lighting (enlargement, moving)			
									2	Control traffic to keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• This should be studied at locations with high pedestrian demand and ocations with many people handicapped in traffic (children, elderly etc.)		
											5110	Improvement of the signal phase (adding pedestrian phase)			
									3	Separate lines of motion of vehicles and pedestrians on different levels	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied only when the crossing pedestrian traffic is high.		
17-1	Poorly located and maintained trees etc. on the center median	<Right and left turn vehicles> It is difficult for drivers turning right or left to see oncoming through traffic and pedestrians crossing the road. <Through vehicles> It is difficult for drivers to see vehicles on the curve.	●	●	●		●	●	1	Remove elements that reduce drivers' ability to see the intersection	1305	Rearranging vegetation	• This is related to rear-end collisions on curves. • This is checked first at locations with a center median and vegetation.		
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control traffic to keep vehicles apart	5101	Installing signals (normal signals)	• This is related to rear-end collisions on curves.		
											5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
18-1	Poorly located and maintained trees, signboards, etc. on the sidewalks	<Left turn vehicles> It is difficult for drivers turning left to see pedestrians entering the crosswalk. <Through vehicles> It is difficult for drivers to see vehicles on the curve.	●	●				●	1	Remove elements that reduce drivers' ability to see the intersection	1305	Rearranging vegetation	• This is related to rear-end collisions on curves.		
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control traffic to keep vehicles apart	5101	Installing signals (normal signals)	• This is related to rear-end collisions on curves.		
											5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
19-2	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Drivers become confused about the direction, becoming distracted and inattentive, resulting in them overlooking oncoming vehicles or pedestrians.	●	●	●		●	●	1	Revise complex indicator content	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasures should be studied at continuous intersections.		
									2	Revise unclear indicator content	1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)	• This is studied in the case of high nighttime accident rate. (Countermeasure codes 1605 and 1606 are road administrator's countermeasures, and 5213 and 5225 are Public safety commission's countermeasures.)		
											5213	Road indicators (high brightness)			
											1605	Road surface indicators (enlarging, increasing brightness)			
											5225				
									3	Revise the location of traffic signs and road surface indicators	5215	Warning of lane use control	• These are installed before the intersection so that drivers can change course safely after checking their direction after countermeasures are taken.		
19-5	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	They do not notice the intersection in time.	●						1	Revise complex indicator content	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasures should be studied at continuous intersections.		
19-14	Inappropriate locations and contents of signs and road surface indicators (unclear, complex)	Encourages emergency stopping, deceleration, and lane changing on the main road by drivers who are confused about their course		●					1	Revise the contents of complex indicators	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasures should be studied at the location of continuous intersections.		
									2	Revise the contents of unclear indicators	1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)	• This is installed before the intersection so that drivers can change their course safely after checking their course direction based on this countermeasure. (Countermeasure codes 1605 and 1606 are road administrator's countermeasures, and 5213 and 5225 are Public safety commission's countermeasures.)		
											5213	Road indicators (high brightness)			
											1605	Road surface indicators (enlarging, increasing brightness)			
											5225				
											5215	Warning of lane use control			
20-1	Bridge piers and other structures	Lowers drivers' ability to see oncoming through vehicles and pedestrians	●		●		●	●	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)			
									2	Control the movement of vehicles to keep them apart	5101	Installing signals (normal signals)	• This should be studied along with the above countermeasures at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
											5110	Improvement of the signal phase (adding a pedestrian phase)			

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
21-4	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles waiting to turn left or right turn when it is dangerous to do so, because they are blocking the progress of through vehicles that are following them.			●				1	Separate right-turn and left-turn vehicles from following through vehicles to prevent dangerous right and left turns	1109	Left turn lane (new)	• This is studied only when there is heavy left turn traffic.		
											5038	Crosswalk (set back)	• One vehicle stopping space is placed before the crosswalk around the left corner. • This is studied in a case where a vehicle turning left obstructs a following through vehicle because a pedestrian or pedestrians are crossing in the crosswalk.		
											1107	Right turn lane (new)	• This is studied aggressively in a case where there is right turn traffic.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5102	Installing signals (arrow signals)	• This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
									3	Control traffic to keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• This should be studied along with the above countermeasures at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
											5110	Improvement of the signal phase (adding pedestrian phase)			
21-14	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles waiting to turn left or right block the progress of through traffic that is following them, causing drivers to abruptly stop, decelerate, or change lanes.		●					1	Separate right and left turn vehicles from through vehicles	1107	Right turn lane (new)	• This is studied aggressively in a case where there is right turn traffic.		
											1109	Left turn lane (new)	• This is studied only in a case where left turn traffic is heavy.		
											5101	Installing signals (normal signals)	• This is studied in a case where there are left and right turn lanes, but vehicles stray out of these lanes into the main road obstructing through vehicles.		
											5102	Installing signals (arrow signals)			
											1108	Right turn lane (lengthening, widening)	• This is studied in a case where there are left and right turn lanes, but vehicles stray out of these lanes into the main road obstructing through vehicles	(2)	Document 3-2
											1110	Left turn lane (lengthening, widening)	• This is studied in a case where "adjusting the green signal time" cannot resolve the problem.		
22-14	Vehicles turning right or left leave the right and left turning lanes	Vehicles waiting to turn left or right block the progress of following through traffic, causing drivers to abruptly stop, decelerate, or change lanes.		●					1	Guarantee that right and left turn lanes are long enough to hold left and right turn vehicle demand	1110	Left turn lane (lengthening, widening)	• This is studied only in a case where left turn traffic is heavy.		
											1108	Right turn lane (lengthening, widening)	• This is studied aggressively in a case where there is right turn traffic.	(2)	Document 3-2
23-1	Oncoming right turn vehicles stopping at inappropriate locations	<Right turn vehicle> Driver does not notice oncoming vehicles on time.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5101	Installing signals (normal signals)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
24-1	Obstructions to vision on the road sides (buildings, walls, etc.)	Obstructs drivers' view.	●	●			●	●	1	Remove elements that obstruct drivers view	3104	Setting back roadside facilities and buildings	• Case where rear-end collisions occur where there is a curve before an intersection.		
											1304	Removal of obstructions (facilities, signboards)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• Case where rear-end collisions occur where there is a curve before an intersection. (Countermeasure code 2116 is a road administrator's countermeasure and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control traffic to keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • Case where rear-end collisions occur where there is a curve before an intersection.		
											5110	Improvement of the signal phase (adding a pedestrian phase)	• This should be studied along with the above countermeasures at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
25-1	Rows of bright structures lining the roadway	Obstructs drivers' view.					●	●	1	Control traffic to keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5124	Direction control type signal lights	• This should be studied along with the above countermeasures at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
26-2	Facilities that distract drivers	Drivers are distracted or inattentive.	●		●		●	●	1	Arouse attentiveness	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• "Be careful to look to the side" (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
26-14	Facilities that distract drivers.	Drivers abruptly stop or decelerate on the main road when they are distracted by the facilities.		●					1	Arouse attentiveness	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• "Be careful to look to the side" (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
29-5	Driveways of facilities along the roadside approaching the intersection	Drivers are aware of the intersection, but they do not pay attention to exits from facilities before the intersection, colliding with emerging vehicles.	●						1	Change stopping locations to prevent cars from entering the main road before stop line	5018	Stopping line (pulled back)			
29-14	Roadside facility driveways exiting into the intersection	<Through vehicles> A driver traveling in the main road who intends to stop at the stop line of the intersection doesn't notice a vehicle emerging from a driveway before the intersection on time, and is forced to make an emergency stop, deceleration, or lane change. <Motorcycle following after a left turn> The driver of a vehicle thought he was turning left into the intersection, but turns left into a roadside driveway obstructing a motorcycle following his vehicle.		●		●			1	Move roadside facility driveways	3101	Concentrating facility entrances by moving them outside the main road			
									2	Arouse attentiveness	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• "Watch for Cars Entering the Road" (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control signals at roadside facility driveways	5101	Installing signals (normal signals)	• This is studied aggressively in a case where a driveway to a roadside facility is linked in a cross form to a T-shaped intersection		
30-2	Visibility reduced by sunlight in the morning and in the west	Drivers are inattentive, because they cannot confirm the intersection (or confirm it on time) because of the sunlight.	●	●					1	Arouse attentiveness	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
30-5	Visibility reduced by sunlight in the morning and in the west	Drivers are unaware of or cannot check the intersection because of the sunlight.	●						1	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
											1401	Coloring the inside of the intersection			
											1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
31-14	Deteriorated road surface paving (ruts and cracks)	When a driver unexpectedly loses control of the steering wheel, the driver abruptly stops or decelerates on the main road.		●					1	Perform continuous road surface maintenance	1408	Road surface maintenance	• At locations of heavy traffic by large vehicles, it is necessary to perform continuous road surface indicator maintenance.		
32-14	Poor Drainage	When a driver unexpectedly loses control of the steering wheel, the driver abruptly stops or decelerates on the main road.		●					1	Remove elements that prevent control of vehicles	1405	Improving paving (drainage pavement)	• Drainage systems must be modified as necessary.	(8)	Document 3-8
											1408	Road surface maintenance			
									2	Give advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
38-1	Congested main road	A driver's view of an oncoming motorcycle is obstructed.	●		●		●	●	1	Prevent weaving traffic	1501	Narrowing the shoulder			
38-13	Congested main road	Because pedestrians can easily cross congested lanes where vehicles are stopped, pedestrians are encouraged to cross the road.					●	●	1	Keep vehicles and pedestrians apart	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together. • This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
											2304	Pedestrian – cyclist use fence (to prevent crossing)			
40-2	Adjoining intersections	A driver sees the signal on the adjoining intersection, failing to notice the first intersection.	●	●					1	Prevent drivers from noticing adjacent signaled intersections	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
40-5	Adjoining intersections	A driver is distracted by the adjacent intersection, failing to notice the intersection the driver should notice.	●					●	1	Prevent drivers from noticing adjacent signaled intersections	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
											2102	Warning signs (201:Intersection ahead)			
40-14	Adjoining intersections	Confused by the signal on the adjoining intersection, a driver stops at an intersection where it is not necessary to stop.		●					1	Prevent drivers from noticing adjacent signaled intersections	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
41-2	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver fails to notice the intersection the driver should notice.	●	●				●	1	Provide advance information about the locational relationship of the railway crossing and intersection	2102	Warning signs (201:Intersection ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Control traffic by signals	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5115	Improving signal phase (operates linked to railway crossing)			
41-5	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver notices the intersection where he must stop too late, forcing him to abruptly stop or decelerate.	●						1	Provide advance information about the locational relationship of the railway crossing and intersection	2102	Warning signs (201:Intersection ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Control traffic by signals	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5115	Improving signal phase (operates linked to railway crossing)			

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
41-14	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver stops at an intersection where it is not necessary to stop.		●					1	Provide advance information about the locational relationship of the railway crossing and intersection	2102	Warning signs (201:Intersection ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Control traffic by signals	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5115	Improving signal phase (operates linked to railway crossing)			
42-2	Crossing facilities that do not satisfy crossing demand	Because pedestrians cross at locations where drivers are unaware of the crossing, they are not careful about pedestrians.			●				1	Clearly indicate that there are pedestrians crossing	5036	Crosswalk (new)			
											2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									2	Make it easier for drivers to see pedestrians	2001	Road lighting (new)			
											2002	Road lighting (enlargement, moving)			
42-13	Crossing facilities that do not satisfy crossing demand	At a location where there is no crossing, pedestrians cross through gaps between vehicles.					●		1	Prevent pedestrians from crossing dangerously	5101	Installing signals (normal signals)	• The two countermeasures should be implemented together.		
											5120	Installing pedestrian use lights			
									2	Separate the lines of motion of the vehicle and pedestrian at different levels	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• The introduction of this countermeasures should be studied only where there is heavy pedestrian traffic.		
43-2	Motorcycles and cyclists weaving through traffic	Weaving vehicles easily enter a driver's dead angle so he is not attentive to them.	●		●	●			1	Prohibit weaving traffic	1501	Narrowing the shoulder			
									2	Separate motorcycles from positions where left turn vehicles stop	5020	Two-step stop lines	• This should be implemented at locations where motorcycles etc. become entangled in vehicle traffic turning left immediately after a light turns green.		
44-1	On-street parking and stopped busses obstructing traffic movement	<Vehicles driving on the main road> It expands drivers' dead angle delaying their awareness of vehicles and pedestrians that that suddenly appear on the road. <Vehicle entering the main road and pedestrians crossing it> Drivers enter the main road while still unable to confirm vehicles on the main road.	●				●		1	Make parked cars park off the main road	2704	Bus bay			
											2703	Parking zone			
									2	Remove cars parked on the main road	5022	Prohibiting parking	• It is necessary (for a Public safety commission) to strength regulations (restrictions)		
44-14	On-street parking and stopped busses obstructing traffic movement	Cars parked or stopped busses that drivers on the main road are not very aware of cause vehicles on the main road to abruptly stop, decelerate, or change lanes.		●					1	Make parked cars park off the main road	2704	Bus bay			
											2703	Parking zone			
									2	Remove cars parked on the main road	5022	Prohibiting parking	• It is necessary (for a Public safety commission) to strength regulations (restrictions)		

Table B

Intersection – Signaled

Table B Intersection – Signaled

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
1-1	Sharp curve before an intersection	Delayed awareness of the intersection	●	●	●		●		1	Alert drivers to the intersection and provide information in advance	2102	Warning sign (201:Intersection ahead)			
											5108	Advance warning light			
									2	Reconstruct the road so the drivers attentiveness does not fall	1301	Alignment improvement	• The alignment before the intersection is improved. • This is studied only in cases where large scale improvement is possible; land and budget can be obtained etc.		
									3	Control signals so vehicles can stop safely	5117	Controlling vehicle responsiveness and dilemma responsiveness	• This is studied only in cases where it is difficult to notice the intersection even after the above countermeasure has been implemented.		
		<Through vehicle> Driver's awareness of an oncoming right turn vehicle is delayed. <Right turn vehicle> Driver's awareness of an oncoming through vehicle is delayed.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
2-7	Long steep downhill gradient	<Right turn vehicle> Driver misunderstands the behavior of the oncoming through vehicles.			●				1	Control the speed of through vehicles	1601	Road surface indicators (road surface deceleration indicators)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
											5221				
											5304	Speed warning display boards			
											2105	Warning sign (208-2:Traffic signal ahead)			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
3-1	Crest	Delayed awareness of the intersection	●	●	●		●	●	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2105	Warning sign (208-2:Traffic signal ahead)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
		<Through vehicle> Driver's awareness of an oncoming right turn vehicle is delayed. <Right turn vehicle> Driver's awareness of an oncoming through vehicle is delayed			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
									2	Control right turns by vehicles	5003	Prohibiting travel outside a designated direction	• This is studied when countermeasure 1 cannot be taken. (Countermeasure code 5003 is prohibiting right turns.)		
											5009	Prohibiting U-turns			
4-5	Long straight section before an intersection	Delayed awareness of the intersection	●						1	Alert drivers to the intersection	2105	Warning sign (208-2:Traffic signal ahead)			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
											1401	Coloring the inside of the intersection	• Only the area inside the intersection is colored.		
											1402	Improving pavement (coloring lanes)		(7)	Document 3-7
									2	Control signals so vehicles can stop safely	5117	Controlling vehicle responsiveness and dilemma responsiveness			
4-7	Long straight section before an intersection	<Right turn vehicle> Driver misunderstands the behavior of the oncoming through vehicle.			●				1	Control the speed of through vehicles	1601	Road surface indicators (road surface deceleration indicators)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection. (Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
											5221				
											5304	Speed warning display boards			
											1404	Improving pavement (level difference pavement)		(9)	Document 3-9
											2105	Warning sign (208-2:Traffic signal ahead)			
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
5-2	Corner cut-off with large radius	As vehicles accelerate out of the intersection, their drivers easily overlook nearby pedestrians.					●	●	1	Control the speed of moving vehicles	1104	Alignment improvement (reducing cut-off corner diameter)	• The three countermeasures should be implemented together.	(1)	Document 3-1
											5017	Stopping lane (moving it forward)			
											5037	Crosswalk (moving it forward)		(12)	Document 3-12
									2	Provide grade separation of the lines of motion of vehicles and pedestrians	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied only when the pedestrian traffic is adequately high.		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures							
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
6-14	Corner cut-off with small radius	<Left and right turn vehicles> Drivers tend to abruptly stop or decelerate on the main road as they begin their left or right turn.		●					1	Alert drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• Signs such as, "Be Careful about Rear-end Collisions with Cars Turning Right" are displayed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									2	Encourage vehicles performing emergency stops or emergency deceleration to stop or decelerate outside the driving lanes	1109	Left turn lane (new)	• This is studied only in the case of heavy left turn traffic.		
									3	Remove elements that cause emergency stops and deceleration and lane changes on the main road	1103	Alignment improvement (increasing cut-off corner diameter)			
											1111	Installing left turn channelizing strip			
7-1	Acute angle intersection	<Left turn vehicle> Visibility of the road on the left is reduced.	●				●		1	Change the shape of the intersection to a normal shape (right-angled intersection)	1105	Alignment improvement (improving intersection angle)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Control the movement of traffic to keep two vehicles or a vehicle and a pedestrian apart	5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
									4	Keep pedestrians out of traffic	1711	Bollards	• This is studied in cases of many accidents caused by pedestrians being entangled in vehicle traffic.		
											1404	Improving pavement (level difference pavement)			
7-14	Acute angle intersection	<Left and right turn vehicles> Drivers tend to abruptly stop or decelerate on the main road before turning right or left.		●					1	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes on the main road	1105	Alignment improvement (improving intersection angle)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									3	Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									4	Cause vehicles abruptly stopping or decelerating to stop or decelerate outside the traffic lanes on the main road	1109	Left turn lane (new)	• This is studied only in cases where left turn traffic is heavy.		
											1107	Right turn lane (new)	• This is studied aggressively in cases where there is right turn traffic.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
8-2	Obtuse angle intersection	<Left turn vehicles> They are inattentive, because they turn left at high speed without decelerating.					●	●	1	Restore the normal shape of the intersection (right-angle intersection)	1105	Alignment improvement (improving intersection angle)			
									2	Control the speed of moving vehicles	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection	(9)	Document 3-9
											1401	Coloring the inside of the intersection			
											1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
									3	Control the traffic to keep vehicles and pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
8-6	Obtuse angle intersection	<Left turn vehicles> They are inattentive, because they turn left at high speed without decelerating				●			1	Restore the normal shape of the intersection (right-angle intersection)	1105	Alignment improvement (improving intersection angle)			
									2	Control the speed of left turn vehicles	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
											1401	Coloring the inside of the intersection			
											1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
9-2	Complexly shaped intersection	Drivers are distracted and inattentive.	●	●	●		●	●	1	Stabilize unstable driving courses inside the intersection	1604	Guide line	• This is studied in cases where the line of motion of the main traffic flow bends. (Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's countermeasure.)		
											5220				
											1207	Center median tip indicator (obstruction indicator light etc.)	• This is studied in cases where the line of motion of the main traffic flow bends. • This is studied in cased where there is a center median.		
									2	Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									3	Simplify the shape of the intersection	1105	Alignment improvement (improving intersection angle)			
											1106	Alignment improvement (others)			
									4	Simplify the flow of the traffic	5002	One way traffic	• This is applied in the direction of relatively light traffic.		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
9-14	Complexly shaped intersection	Drivers tend to become confused about their course, abruptly stopping, decelerating, or changing lanes on the main road.		●					1	Stabilize unstable driving courses inside the intersection	1604	Guide line	• This is studied in cases where the line of motion of the main traffic flow bends. (Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's countermeasure.)		
											5220				
											1207	Center median tip indicator (obstruction indicator light etc.)	• This is studied in cases where the line of motion of the main traffic flow bends. • This is studied in cases where there is a center median.		
									2	Provide information (traffic sign, signboard) in advance	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									3	Cause vehicles abruptly stopping or decelerating to stop or decelerate outside the traffic lanes on the main road	1109	Left turn lane (new)	• This is studied only in cases where there is heavy left turn traffic.		
											1107	Right turn lane (new)	• This is studied aggressively in cases where there is right turn traffic.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
									4	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes on the road	1105	Alignment improvement (improving intersection angle)			
											1106	Alignment improvement (others)			
10-2	Drivers tend to drive fast in a large intersection	As vehicles accelerate out of the intersection, their drivers easily overlook nearby pedestrians.						●	1	Reduce the size of the intersection to control the speed of moving vehicles	5037	Crosswalk (moving it forward)	• The two countermeasures should be implemented together.	(12)	Document 3-12
											5017	Stopping lane (moving it forward)			
									2	Control traffic to keep vehicles apart and keep vehicles and pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
									3	Provide grade separation of the lines of motion of vehicles and pedestrians	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied when the crossing pedestrian traffic is high.		
10-4	Drivers tend to drive fast in a large intersection	Drivers tend to turn right dangerously through gaps between oncoming vehicles on multiple lanes.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
11-13	Long crossing distance for pedestrians and bicycles	Because the signal waiting time is too long, pedestrians tend to try and cross dangerously when the lights change.						●	1	Reduce the crossing distance	5039	Crosswalk (making it right-angles to sidewalk)	• This is studied at intersection where roads intersect diagonally.		
											1113	Installing a traffic island		(3)	Document 3-3
									2	Reduce pedestrians' impatience in other ways	5121	Waiting time indicator and voice function equipped push button			
											1703	Expanding the sidewalk and waiting area	• This is studied in cases where the sidewalks are filled with pedestrians waiting for the light to change.		
									3	Provide grade separation of the lines of motion of vehicles and pedestrians	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied when the crossing pedestrian traffic is high.		
12-1	Two or more right/left turn lanes	<Right turn vehicle> Drivers' awareness of oncoming through traffic is delayed.			●				1	Control traffic to keep vehicles and pedestrians apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multi-lane roads.		
											5102	Installing signals (arrow signals)			
14-14	Changing lane operation (through lane changes to a left or right turn lane)	Drivers become confused about their course, abruptly slowing down or stopping, or changing lanes on the main road.		●					1	Provide information in advance	5215	Warning of lane use control			
15-2	A bicycle crossing zone at a location with a pedestrian crosswalk.	The pedestrian bridge causes drivers to mistakenly believe that cyclists do not cross the road here, so they are not attentive to cyclists in the bicycle crossing zone.		●					1	Modify the pedestrian bridge so cyclists can use it and close the bicycle crossing zone	1803	Improvement of grade-separated crossing facilities (installing a slope etc.)	• Introduction of this measure should be studied only when the crossing pedestrian traffic is high.		
											2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be implemented together.		
									2	Arouse drivers' attention	2116	Signs and indicators not legally required (letters, symbols, arrows)	• Signs such as, "Beware of crossing bicycles" are studied.		
											5216		(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									3	Control traffic to keep vehicles apart	5110	Improvement of the signal phase (adding pedestrian phase)	• Intersection with both grade-separated crossing facility and road level crossing facility (crosswalk). • This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
16-1	Dark intersection where pedestrians and parked vehicles are difficult to see	It is difficult to see pedestrians and parked cars.					●	●	1	Improve drivers' view of the intersection	2001	Road lighting (new)	• This is studied in the case of high nighttime accident rate.		
											2002	Road lighting (enlargement, moving)			
									2	Control traffic to keep vehicles and pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)			
									3	Separate lines of motion of vehicles and pedestrians on different levels	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied only when the crossing pedestrian traffic is high.		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
17-1	Poorly located and maintained trees etc. on the center median	<Right and left turn vehicles> It is difficult for drivers turning right or left to see oncoming through traffic and pedestrians crossing the road. <Through vehicles> It is difficult for drivers to see vehicles ahead on the curve.	●	●	●		●	●	1	Remove elements that lower drivers' ability to see the intersection	1305	Rearranging vegetation	• This is related to rear-end collisions on curves. • This is checked first at locations with a center median and vegetation.		
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									3	Control traffic to keep vehicles apart	5110	Improvement of the signal phase (adding pedestrian phase)	• This is related to rear-end collisions on curves. • This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
18-1	Poorly located and maintained vegetation, signboards, etc. on the sidewalks	<Left turn vehicles> It is difficult for drivers turning left to see pedestrians entering the crosswalk. <Through vehicles> It is difficult for drivers to see vehicles ahead on the curve.	●	●				●	1	Remove elements that lower drivers' ability to see the intersection	1305	Rearranging vegetation	• This is related to rear-end collisions on curves. • This is studied first at locations with a center median and vegetation.		
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									3	Control traffic to keep vehicles apart	5110	Improvement of the signal phase (adding pedestrian phase)			
19-2	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Drivers become confused about their course, becoming distracted and inattentive, resulting in them overlooking oncoming vehicles, pedestrians, or signals.	●	●	●		●	●	1	Revise complex indicator content	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasures should be studied at continuous intersections.		
									2	Revise unclear indicator content	1606 5213 1605 5225	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness) Road indicators (high brightness) Road surface indicators (enlarging, increasing brightness)	• This is installed before intersections so that drivers can change course safely after this countermeasures has let them confirm their course direction. (Countermeasure codes 1605 and 1606 are road administrator's countermeasures, and 5213 and 5225 are Public safety commission's countermeasures.)		
									3	Revise the location of traffic signs and road surface indicators	5215	Warning of lane use control	• These are installed before the intersection so that drivers can change course safely after checking their direction after the countermeasure is taken.		
19-5	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	They do not notice the intersection in time.	●						1	Revise complex indicator content	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasure should be studied at continuous intersections.		
19-6	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Drivers turn left abruptly.				●			1	Revise the location of signs and road surface indicators	5215	Warning of lane use control	• This is installed before the intersection so that drivers can change course safely after confirming their course thanks to this countermeasure.		
19-14	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Drivers become confused about their course, abruptly slowing down or stopping, or changing lanes on the main road.		●					1	Revise complex indicator content	2111	Revising the content of traffic guidance signs (simplification etc.)	• The application of this countermeasure should be studied at continuous intersections.		
									2	Revise unclear indicator content	1606 5213 1605 5225	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness) Road indicators (high brightness) Road surface indicators (enlarging, increasing brightness)	• This is installed before the intersection so that drivers can change course safely after confirming their course thanks to this countermeasure. (Countermeasure codes 1605 and 1606 are road administrator's countermeasures, and 5213 and 5225 are Public safety commission's countermeasures.)		
									3	Revise the location of traffic signs and road surface indicators	5215	Warning of lane use control	• This is installed before the intersection so that drivers can change course safely after confirming their course thanks to this countermeasure.		
20-1	Bridge piers and other structures	Visibility of oncoming vehicles and pedestrians is reduced.	●		●		●	●	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									2	Control traffic to keep vehicles apart	5110	Improvement of the signal phase (adding a pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures							
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
21-4	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles waiting to turn left or right tend to make dangerous left or right turns, because they obstruct the movement of following cars.			●				1	Separate left and right turn vehicles from through vehicles that are following them to prevent dangerous left and right turns	1109	Left turn lane (new)	• This shall be studied only when there is heavy left turn traffic.		
											5038	Crosswalk (set back)	• One vehicle stopping space is placed before the crosswalk around the left corner. • This is studied in a case where one vehicle turning left obstructs a following through vehicle because a pedestrian or pedestrians are crossing in the crosswalk.		
											1107	Right turn lane (new)	• This is studied aggressively in a case where there is right turn traffic.		
											1108	Right turn lane (lengthening, widening)		(2)	Document 3-2
									2	Control the movement of right-turn vehicles and through vehicles to keep them apart.	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
									3	Control traffic to keep vehicles and pedestrians apart.	5110	Improvement of the signal phase (adding pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
21-14	Same lanes used for right and left turn vehicles and for through vehicles	Vehicles waiting to turn left or right block the progress of following through traffic, causing drivers to abruptly stop, decelerate, or change lanes on the main road.		●					1	Separate right and left turn vehicles from through vehicles	1107	Right turn lane (new)	• This is studied aggressively in a case where there is right turn traffic.		
											1109	Left turn lane (new)	• This is studied only in a case where left turn traffic is heavy.		
											5102	Installing signals (arrow signals)	• This is studied in a case where there are left and right turn lanes, but vehicles stray out of these lanes into the main road, obstructing through vehicles.		
											5112	Improving the signal phase (adjusting green time)			
											1108	Right turn lane (lengthening, widening)	• This is studied in a case where there are left and right turn lanes, but vehicles stray out of these lanes into the main road, obstructing through vehicles • This is studied in a case where "adjusting the green signal time" cannot resolve the problem.	(2)	Document 3-2
											1110	Left turn lane (lengthening, widening)			
22-14	Vehicles turning right or left leave the right and left turning lanes	Vehicles waiting to turn left or right block the progress of following through traffic, causing drivers to abruptly stop, decelerate, or change lanes on the main road.		●					1	Guarantee that right and left turn lanes are long enough to hold left and right turn vehicle demand	1108	Right turn lane (lengthening, widening)	• This is studied aggressively in a case where there is right turn traffic.	(2)	Document 3-2
											1110	Left turn lane (lengthening, widening)	• This is studied only in a case where left turn traffic is heavy.		
23-1	Oncoming right turn vehicles stopping at inappropriate locations	<Right turn vehicle> Driver does not notice oncoming vehicles on time.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows)	• Signs such as "Beware of vehicles turning right" and "Beware of through vehicles" are installed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
24-1	Obstructions to vision on the road sides (buildings, walls, etc.)	Obstructs drivers' view.	●	●			●	●	1	Remove elements that obstruct drivers view	3104	Setting back roadside facilities and buildings	• This is studied in cases of rear-end collisions on curves before intersections.		
											1304	Removal of obstructions (facilities, signboards)			
									2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• This is studied in cases of rear-end collisions on curves before intersections. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									3	Control traffic to keep vehicles and pedestrians apart	5110	Improvement of the signal phase (adding a pedestrian phase)	• This is studied in cases of rear-end collisions on curves before intersections. • This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
25-1	Rows of bright structures lining the roadway	Obstructs drivers' view.					●	●	1	Control traffic to keep vehicles and pedestrians apart.	5110	Improvement of the signal phase (adding a pedestrian phase)	• This should be studied at locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.).		
26-2	Facilities that distract drivers	Drivers are distracted or inattentive	●		●		●	●	1	Arouse attentiveness	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• A sign, "Be careful to look to the side" is installed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
26-14	Facilities that distract drivers	Drivers abruptly stop or decelerate on the main road when they are distracted by the facilities.		●					1	Arouse attentiveness	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• A sign, "Be careful to look to the side" is installed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Countermeasures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
29-5	Driveways of facilities along the roadside enter the intersection	Drivers are aware of the intersection, but they do not pay attention to exits from facilities before the intersection, colliding with emerging vehicles.	●						1	Change stopping locations to prevent cars from entering the main road before the stop line	5018	Stopping line (pulled back)			
29-6	Driveways of facilities along the roadside enter the intersection	The driver of a vehicle thought he was turning left into the intersection, but turns left into a roadside driveway obstructing a motorcycle following his vehicle.				●			1	Change stopping locations to prevent cars from entering the main road before the stop line	5018	Stopping line (pulled back)			
29-14	Driveways of facilities along the roadside enter the intersection	<Through vehicles> A driver traveling in the main road who intends to stop at the stop line of the intersection doesn't notice a vehicle emerging from a driveway before the stop line on time, and is forced to make an emergency stop, deceleration, or lane change. <Motorcycle following after a left turn> The driver of a vehicle thought he was turning left into the intersection, but turns left into a roadside driveway obstructing a motorcycle following his vehicle.		●		●			1	*Move the roadside facility driveway*	3101	Concentrating facility entrances by moving them outside the main road			
									2	Arouse attentiveness	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• Signs such as "Beware of emerging vehicles" are installed (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
									3	Control signals at roadside facility driveways	5101	Installing signals (normal signals)	• This is studied aggressively in a case where a driveway to a roadside facility is linked in a cross form to a T-shaped intersection.		
30-2	Visibility reduced by sunlight in the morning and in the west	A driver cannot confirm a signal (on time) because of sunlight, failing to drive in conformity with the signal (the driver may ignore the signal).	●	●					1	Improve the visibility of signal lights	5119	Replace signal lights with LED light sources			
30-5	Visibility reduced by sunlight in the morning and in the west	Drivers are unaware of or cannot check the intersection because of the sunlight.	●						1	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
											1401	Coloring the inside of the intersection	• Roadside conditions are considered because level difference pavement is noisy.		
											1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
									2	Arouse attentiveness	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
31-14	Deteriorated road surface paving (ruts and cracks)	When a driver unexpectedly loses control of the steering wheel, the driver abruptly stops or decelerates on the main road.		●					1	Perform continuous road surface maintenance	1408	Road surface maintenance	• At locations of heavy traffic by large vehicles, it is necessary to perform continuous road surface indicator maintenance.		
32-14	Poor drainage	When a driver unexpectedly loses control of the steering wheel, the driver abruptly stops or decelerates on the main road.		●					1	Remove elements that prevent control of vehicles	1405	Improving paving (drainage pavement)	• Drainage systems must be modified as necessary.	(8)	Document 3-8
											1408	Road surface maintenance			
									2	Give advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
33-1	Poorly located signals that are difficult to see	Drivers cannot confirm a signal (on time), failing to drive in conformity with the signal (the driver may ignore the signal).			●				1	Move or expand signals to improve their visibility	5107	Improve the location of signals			
											5106	Increase the number of signals	• When moving existing signals does not resolve the problem, increasing their number and installing warning signals are studied.		
											5108	Advance warning light			
											2105	Warning sign (208-2:Traffic signal ahead)			
									2	Improve the visibility of signal lights	5118	Enlarging signal lights		(11)	Document 3-11
33-2	Poorly located signals that are difficult to see	When a driver simultaneously sees signals in different phases, the driver is distracted and inattentive.	●	●				●	1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance	• This is studied when there are continuous intersections.		
											5124	Direction control type signal lights	• This is studied in a case where a side road intersects and traffic on the parallel road is controlled by a different signal.		
33-5	Poorly located signals that are difficult to see	At a location where a driver must confirm safety, stop, and move slowly, the driver is unaware of these needs.	●						1	Move or expand signals to improve their visibility	5107	Improve the location of signals			
											5106	Increase the number of signals	• When moving existing signals does not resolve the problem, increasing their number and installing warning signals are studied.		
											5108	Advance warning light			
											2105	Warning sign (208-2:Traffic signal ahead)			
									2	Improve the visibility of signal lights	5118	Enlarging signal lights		(11)	Document 3-11
34-4	Short time available for forward movement	Because the green time or green arrow time is short, drivers advance or cut in dangerously.	●		●			●	1	Lengthen the time vehicles can move	5112	Improving the signal phase (adjusting green time)			
											5104	Installing signals (responsive type)	• This countermeasure can effectively allot the green time at the intersection of a road with heavy traffic and an extremely small road.		
									2	Increase the number of lanes	1504	Increasing the number of lanes (normal road)	• This countermeasure is studied if it is possible for the number of lanes in the entrances to the intersection to be the same as on the incoming side.		
											1505	Increasing the number of lanes (exclusive small-sized vehicle road)			
											1703	Expanding sidewalk waiting spaces	• This countermeasure is studied in a case where pedestrians waiting for a signal fill the sidewalk.		

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Countermeasures code table number	*Countermeasure work type on the* countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
									3	Grade separate the lines of motion of vehicles	1101	Grade separated intersection (normal road)			
											1102	Grade separated intersection (exclusive small-sized vehicle road)			
34-13	Short time available for forward movement	Because the pedestrian green time is short, pedestrians cross dangerously.						●	1	Lengthen the time vehicles can move	5112	Improving the signal phase (adjusting *green time*)			
									2	Take other measures to prevent pedestrian impatience	5121	Waiting time indicator and voice function equipped push button			
									3	Grade separate the lines of motion of pedestrians and vehicles	1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied only when the crossing pedestrian traffic is high.		
35-4	Short clearance time	Many vehicles try to pass through the intersection as the signals change, resulting in them driving through dangerously.	●						1	Allow leeway when signals change	5113	Improving the signal phase (lengthening clearance time)			
									2	Reduce the size of the intersection	5037	Crosswalk (moving it forward)	• These two countermeasures should be implemented together.	(12)	Document 3-12
											5017	Stopping lane (moving it forward)	• In a case where left turn traffic is heavy, it is not a good countermeasure (because it encourages the situation in 21-14).		
36-7	Signal phase operation is difficult to understand (complex, time differences)	Driver misunderstands the behavior of an oncoming through vehicle.			●				1	Control the movement of right-turn vehicles and through vehicles to keep them apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
									2	Provide variable speed signal phases	5211	Auxiliary signs (time difference type signal phase)			
		Drivers are not careful about the intersection.	●					●	1	Restore normal signal phases	5111	Improving the signal phase (ending nighttime flashing)	• These two countermeasures should be implemented together.		
											5104	Installing signals (responsive type)			
37-4	Deceleration and stopping of right and left turn vehicles on main road	Vehicles waiting to turn left or right turn when it is dangerous to do so, because they are blocking the progress of through vehicles following them.						●	1	Separate left and right turn vehicles from through vehicles following them to prevent dangerous left and right turns	1109	Left turn lane (new)	• This is studied only in case where there is heavy left turn traffic.		
											5038	Crosswalk (set back)	• One vehicle stopping space is placed before the crosswalk around the left corner. • This is studied in a case where one vehicle turning left obstructs a following through vehicle because a pedestrian or pedestrians are crossing the crosswalk.		
											1107	Right turn lane (new)	• This is studied aggressively in a case where there is right turn traffic.		
											1108	Right turn lane (*lengthening, widening*)		(2)	Document 3-2
									2	Control traffic to keep vehicles apart	5114	Improving the signal phases (separating left or right turn from through traffic)	• This countermeasure should be aggressively implemented at intersections of multiple lane roads.		
											5102	Installing signals (arrow signals)			
38-1	Congested main road	Drivers' view of motorcycles weaving through traffic is obstructed.	●		●		●	●	1	Prevent weaving traffic	1501	Narrowing the shoulder			
38-13	Congested main road	Because pedestrians can easily cross congested lanes with stopped cars, the pedestrians try to cross.					●	●	1	Keep vehicles and pedestrians apart	2304	Pedestrian – cyclist use fence (to prevent crossing)			
											1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)	• Introduction of this measure should be studied only when the crossing pedestrian traffic is high.		
40-2	Adjoining intersections	A driver inadvertently sees the signal on an adjoining intersection, overlooking the signal the driver should observe	●	●					1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
									3	Provide advance information about a series of signaled intersections	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
40-5	Adjoining intersections	Drivers are distracted by the adjacent intersection, failing to notice the intersection the drivers should notice.	●					●	1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
											2105	Warning sign (208-2:Traffic signal ahead)			
									3	Provide advance information about a series of signaled intersections	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
40-14	Adjoining intersections	Confused by the signal on an adjoining intersection, drivers stop at an intersection where it is not necessary to stop.		●					1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
									2	Alert drivers to the intersection	1404	Improving pavement (level difference pavement)	• This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
									3	Provide advance information about a series of signaled intersections	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			

Accident occurrence process and causes			Type of accident concerned						Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Left turn	Other crossing	Crossing at crosswalk		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
41-2	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver fails to notice the intersection the driver should notice.	●	●				●	1	Provide advance information about the relationship of the locations of the railway crossing and the signals	2105	Warning sign (208-2:Traffic signal ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Link the railway crossing and intersection signals	5115	Improving signal phase (operates linked to railway crossing)	• This countermeasure should be introduced when an intersection with heavy traffic adjoins a railway crossing that is closed frequently.		
									3	Separate the lines of motion of vehicles and the lines of motions of vehicles and railway trains with railway crossings and plane intersections.	1101	Grade separated intersection (normal road)	• This is a radical countermeasure that should definitely be introduced if it is possible to obtain land and budget.		
											1102	Grade separated intersection (exclusive small-sized vehicle road)			
41-5	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver notices the intersection where he must stop too late, forcing him to abruptly stop or decelerate.	●						1	Provide advance information about the relationship of the locations of the railway crossing and the signals	2105	Warning sign (208-2:Traffic signal ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Link the railway crossing and intersection signals	5115	Improving signal phase (operates linked to railway crossing)	• This countermeasure should be introduced when an intersection with heavy traffic adjoins a railway crossing that is closed frequently.		
									3	Separate the lines of motion of vehicles and the lines of motions of vehicles and railway trains with railway crossings and plane intersections.	1101	Grade separated intersection (normal road)	• This is a radical countermeasure that should definitely be introduced if it is possible to obtain land and budget.		
											1102	Grade separated intersection (exclusive small-sized vehicle road)			
41-14	A railway crossing adjoining the intersection	Distracted by the adjacent railway crossing, a driver stops at an intersection where it is not necessary to stop.		●					1	Provide advance information about the relationship of the locations of the railway crossing and the signals	2105	Warning sign (208-2:Traffic signal ahead)			
											2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
									2	Link the railway crossing and intersection signals	5115	Improving signal phase (operates linked to railway crossing)	• This countermeasure should be introduced when an intersection with heavy traffic adjoins a railway crossing that is closed frequently.		
									3	Separate the lines of motion of vehicles and the lines of motions of vehicles and railway trains with railway crossings and plane intersections	1101	Grade separated intersection (normal road)	• This is a radical countermeasure that should definitely be introduced if it is possible to obtain land and budget.		
											1102	Grade separated intersection (exclusive small-sized vehicle road)			
42-2	No crossing facilities at a location they are needed	Because pedestrians cross at locations where drivers are unaware of the crossing, they are not careful about pedestrians.			●				1	Clarify that pedestrians are crossing the road	5036	Crosswalk (new)			
											2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
											5216				
									2	Take measures so drivers see pedestrians more easily	2001	Road lighting (new)			
											2002	Road lighting (enlargement, moving)			
43-2	Motorcycles and cyclists weaving through traffic	Weaving traffic tends to be in a driver's dead angle so the driver does not notice it.	●		●	●			1	Prevent weaving traffic	1501	Narrowing the shoulder			
									2	Separate the stopping positions of motorcycles from left turn vehicles	5020	Two-step stop lines	• This should be implemented at locations where accidents occur frequently by vehicles entangled immediately after the green light in particular.		
44-1	On-street parking and stopped busses obstructing traffic movement	<Vehicle driving on the main road> The driver's dead angle widens delaying the driver's awareness of pedestrians and vehicles that appear unexpectedly. <Vehicle entering the main road, pedestrian crossing the road> The pedestrian enters (or crosses) the main road without being able to confirm if there are vehicles on the main road.	●				●		1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
											2703	Parking zone			
									2	Remove vehicles stopped on the main road	5022	Prohibiting parking	• It is necessary (for a Public safety commission) to strength regulations (restrictions)		
44-14	On-street parking and stopped busses obstructing traffic movement	Cars parked or stopped busses that drivers on the main road are not very aware of cause vehicles on the main road to abruptly stop, decelerate, or change lanes.		●					1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
											2703	Parking zone			
									2	Remove vehicles stopped on the main road	5022	Prohibiting parking	• It is necessary (for a Public safety commission) to strength regulations (restrictions)		

Table C

Uninterrupted flow – 2-lane road or less

Table C Uninterrupted flow – 2-lane road or less

Accident occurrence process and causes			Type of accident concerned								Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
1-1	Sharp curve	Visibility of vehicles ahead and pedestrians is poor.	●		●	●		●			1	Alert drivers to and provide information about conditions at locations where visibility is poor	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• This is studied in a case where there are obstructions inside a curve. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
											2	Construct roads that do not reduce a driver's ability to see the road ahead	1301	Alignment improvement			
1-10	Sharp curve	Drivers enter the oncoming lane to pass where it is difficult to confirm safety.		●							1	Take physical measures to prevent passing in the oncoming lane	1202	Center median (post cones)			
													1201	Center median (separation)			
											2	Add passing lanes	1506	Climbing lane, yield lane	• Its installation is studied for locations such as long rising slopes where there tends to be slow moving vehicles.		
													1507	Passing lane			
1-12	Sharp curve	Drivers enter a curve at high speed without confirming the alignment ahead on time.		●						●	1	Remove elements that make it difficult for drivers to confirm the alignment	1305	Rearranging vegetation	• This is studied in a case where there are obstructions inside a curve.		
													1304	Removal of obstructions (facilities, signboards)			
													3104	Setting back roadside facilities and buildings			
											2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers and encourage deceleration	2103	Warning signs (202 – 206: bends, curves, winding road)	• This is studied in a case where there are obstructions inside a curve.		
													2202	Approaching oncoming vehicle indicator device	(Countermeasure code 2202 is a road administrator's countermeasure, and 5303 is a Public safety commission's countermeasure.) • Introduction of this measure should not be studied only when the oncoming traffic is high.		
													5303				
													2401	Visual guidance indicators (new)			
													2402	Visual guidance indicators (expansion, moving)			
													2404	Self-illuminated visual guidance indicators	• This is studied in a case where there are obstructions inside a curve. • This is studied in cases where nighttime accidents are particularly frequent.	(10)	Document 3-10
2-7	Long steep downhill gradient	<Right turn vehicle> Drivers misunderstand the behavior of oncoming through vehicles.				●					1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
													1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
													1601	Road surface indicators (road surface deceleration indicators)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
													5221				
											2	Prohibit right turns and right turn crossing	5003	Prohibiting travel outside a designated direction	• Its implementation should be studied along with the prohibition of right turns and vehicle crossing and the installation of post cones on center medians. (Countermeasure code 5003 is prohibition of right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
2-17	Long steep downhill gradient	<Passing vehicles> Drivers misunderstand the behavior of oncoming through vehicles.		●							1	Prohibit passing in the oncoming lane	5005	Prohibiting driving on the right side in order to pass a vehicle			
													5218	Road indicators (road rivets, and vibration devices)			
													1202	Center median (post cones)			
3-1	Crest	Visibility of vehicles ahead and of pedestrians is poor.	●			●		●			1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 52161 is a Public safety commission's countermeasure.)		
													5216				
													2101	Warning signs (general)			
											2	Prohibit right turns and right turn crossing	5003	Prohibiting travel outside a designated direction	• Its implementation should be studied along with the prohibition of right turns and vehicle crossing and the installation of post cones on center medians. (Countermeasure code 5003 is prohibition of right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
3-10	Crest	It is difficult to confirm safety when passing in the oncoming lane.		●							1	Prohibit passing in the oncoming lane	5005	Prohibiting driving on the right side in order to pass a vehicle			
													5218	Road indicators (road rivets, and vibration devices)			
													1202	Center median (post cones)			
3-12	Crest	It is difficult to confirm the alignment.		●						●	1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2103	Warning signs (202 – 206: bends, curves, winding road)			

Accident occurrence process and causes			Type of accident concerned								Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
4-7	Long straight section	<Right turn vehicle> Drivers misunderstand the behavior of oncoming through vehicles.				●					1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
													1402	Improving pavement (coloring lanes)		(7)	Document 3-7
													1601	Road surface indicators (road surface deceleration indicators)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
													5221				
											2	Prohibit right turns and right turn crossing	5003	Prohibiting travel outside a designated direction	• Its implementation should be studied along with the prohibition of right turns and vehicle crossing and the installation of post cones on center medians. (Countermeasure code 5003 is prohibition of right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
4-17	Long straight section	Drivers pass dangerously in conditions where it is easy to misunderstand the behavior of oncoming vehicles.		●							1	Take physical measures to prevent passing in the oncoming lane	1201	Center median (separation)			
													1202	Center median (post cones)			
5-8	Reverse cant	A vehicle is uncontrollable.		●						●	1	Remove elements that make vehicles uncontrollable	1303	Improving cant and lateral gradient			
8-14	Narrow lanes	Drivers abruptly stop or decelerate on the main road.			●						1	Eliminate narrowing sections of roads	1503	Widening lanes	• It is aggressively studied if it is possible to obtain land and budget.		
9-12	Sudden decline of the number and width of lanes	Slow to notice the decline of number of lanes or narrowing on the road ahead, drivers do not decelerate in time and stray from their lane.								●	1	Indicate a reduction of the number of lanes or road width in advance	2108	Warning sign (212: narrowing road)	• Several are installed far enough in advance to allow drivers to safely decelerate and change lanes.		
													2107	Warning sign (211: reduction of lanes)			
9-14	Sudden decline of the number and width of lanes	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Provide advance information about the reduction of number of lanes and road width	2108	Warning sign (212: narrowing road)	• Several are installed far enough in advance to allow drivers to safely decelerate and change lanes.		
													2107	Warning sign (211: reduction of lanes)			
10-12	Complex change of the number and width of lanes	Drivers unable to respond to a complex change in the number or width of lanes, depart their lane.								●	1	Fundamentally improve conditions that cause complex change of the number of lanes and road width	1301	Alignment improvement	• This improvement should be made in a case where it is possible to obtain land and budgets.		
											2	Temporarily improve conditions that cause complex change of the number of lanes and road width	1602	Road surface indicators (stabilization of the number of lanes and width using zebra indicators)			
10-14	Complex change of the number and width of lanes	Drivers unable to respond to a complex change in the number or width of lanes, abruptly stop, decelerate, or change lanes on the main road.			●						1	Fundamentally improve conditions that cause complex change of the number of lanes and road width	1301	Alignment improvement	• This improvement should be made in a case where it is possible to obtain land and budgets.		
											2	Temporarily improve conditions that cause complex change of the number of lanes and road width	1602	Road surface indicators (stabilization of the number of lanes and width using zebra indicators)			
11-14	Changing lane operation (through lane changes to a left or right turn lane)	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Provide advance warning of change of lane operation and the type of change	5215	Warning of lane use control	• It is installed not directly before the intersection, but at a location that lets driver change lanes safely.		
12-11	Slow vehicles traveling in a section without a passing zone (lane)	Drivers pass in the oncoming lane.		●							1	Provide physical measures to prevent passing in the oncoming lane	1202	Center median (post cones)			
													1201	Center median (separation)			
											2	Add lanes for passing	1506	Climbing lane, yield lane	• Its installation is studied for locations such as long rising slopes where there tends to be slow moving vehicles.		
													1507	Passing lane			
13-1	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	Drivers ability to see pedestrians is reduced.						●			1	Guarantee appropriate brightness to improve visibility	2001	Road lighting (new)	• Its use at a location where pedestrian – vehicle accidents occur frequently at night should be studied,		
													2002	Road lighting (enlargement, moving)			
											2	Install crossings where they are needed	5036	Crosswalk (new)	• Signals should, as necessary, also be installed on the vehicle side so that pedestrian can cross safely using a push button.		
											3	Prohibit pedestrians from jay-walking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• It is studied in a case where there is a nearby crosswalk.		

Accident occurrence process and causes			Type of accident concerned								Planning the accident countermeasures					
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
13-12	Dark intersection where pedestrians, parked vehicles, and the alignment are difficult to see	It is difficult to understand the alignment.		●						●	1	Guarantee appropriate brightness to improve visibility	2001	Road lighting (new)	• Its use at a location where single vehicle accidents and front-end collisions occur frequently at night should be studied. (Countermeasure codes 1606 and 1607 are road administrator's countermeasures, and 5213 and 5218 are Public safety commission's countermeasures.)		
													2002	Road lighting (enlargement, moving)			
											2	Install safety equipment so that it is easy to understand the alignment	1203	Center median (road rivets, chatter bars)			
													2401	Visual guidance indicators (new)			
													2402	Visual guidance indicators (expansion, moving)			
													2403	Visual guidance indicators (enlarging)			
													2404	Self-illuminated visual guidance indicators		(10)	Document 3-10
													1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)		(6)	Document 3-6
													5213	Road indicators (high brightness)		(6)	Document 3-6
											3	Install safety equipment so that it is easy to sense a lane departure	1607	Lines showing the sides, centers, and boundaries of traffic lanes (road rivets, vibration devices)		(6)	Document 3-6
													5218	Road indicators (road rivets, and vibration devices)		(6)	Document 3-6
14-12	Optical guidance either not installed or inadequate (nighttime)	It is difficult to understand the alignment.		●						●	1	Install safety equipment so that it is easy to understand the alignment	1203	Center median (road rivets, chatter bars)	• Its use at a location where single vehicle accidents and front-end collisions occur frequently at night should be studied.		
													2401	Visual guidance indicators (new)			
													2402	Visual guidance indicators (expansion, moving)			
													2403	Visual guidance indicators (enlarging)			
													2404	Self-illuminated visual guidance indicators		(10)	Document 3-10
													1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)	(Countermeasure code 1606 is a road administrator's countermeasure, and 5213 is a Public safety commission's countermeasure.)		
													5213	Road indicators (high brightness)			
16-1	Poorly located and maintained trees, signboards, etc. on the sidewalks	<Vehicles entering the main road from the road side and narrow roads> It is difficult for their drivers to check for vehicles on the main road. <Through vehicles traveling on the main road> It is difficult for drivers to check vehicles ahead on curves.	●		●						1	Remove elements that obstruct visibility	1305	Rearranging vegetation	• This is related to rear-end collisions on curves.		
											2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
18-12	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Drivers cannot correctly understand the alignment ahead because the locations and contents of traffic signs are inappropriate.		●						●	1	Revise the location and contents of traffic signs	2103	Warning signs (202 – 206: bends, curves, winding road)	• This countermeasure is studied first (including revising the contents of traffic signs).		
											2	Introduce highly visible traffic signs	2113	Large traffic signs and high brightness traffic signs	• This is studied in a case where warning signs are already installed.		
													2114	Internally illuminated traffic signs	• This is studied in a case where warning signs are already installed. • This should be introduced where particularly frequent accidents occur at night.		
18-14	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Drivers become confused about what action to take, abruptly stopping, decelerating, and changing lanes on the main road.			●				●		1	Revise the location and contents of traffic signs	2103	Warning signs (202 – 206: bends, curves, winding road)	• This countermeasure is studied first (including revising the contents of traffic signs).		
											2	Introduce highly visible traffic signs	2113	Large traffic signs and high brightness traffic signs	• This is studied in a case where warning signs are already installed.		
													2114	Internally illuminated traffic signs	• This is studied in a case where warning signs are already installed. • This should be introduced where particularly frequent accidents occur at night.		

Accident occurrence process and causes			Type of accident concerned									Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
18-18	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	A driver does not notice a narrow side street he plans to turn left into on time, and makes a sharp turn to the left.					●				1	Make narrow roads more conspicuous	1608	Lines showing the sides, centers, and boundaries of traffic lanes (others)	• Installed on lines showing the outside of lanes.		
													2102	Warning sign (201:Intersection ahead)			
											2	Introduce highly visible traffic signs	2113	Large traffic signs and high brightness traffic signs	• Installed in cases where warning traffic signs are already installed.		
													2114	Internally illuminated traffic signs	• Installed in cases where warning traffic signs are already installed. • Its introduction is studied in cases where nighttime accidents are particularly frequent.		
19-1	Bridge piers and other structures	It obstructs drivers' view.				●					1	Prohibit right turns and U-turns on roads with 2 lanes or less	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5009	Prohibiting U-turns			
		It obstructs drivers' view	●					●			2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• This is related to rear-end collisions on curves (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
20-1	Obstructions to vision on the road sides (buildings, walls, etc.)	It obstructs drivers' view.	●		●			●			1	Remove elements that obstruct visibility	1304	Removal of obstructions (facilities, signboards)	• It is studied for rear-end collisions and other crossing accidents in cases where there is a curve. • It is taken as a priority countermeasure whenever possible.		
											2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• It is studied for rear-end collisions and other crossing accidents in cases where there is a curve. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
21-1	Rows of bright structures lining the roadway	It is difficult to see pedestrians in crosswalks on the roadway, obstructing drivers' vision.						●			1	Provide road traffic signs that do not lower drivers' ability to see the road	2001	Road lighting (new)	• This is studied in cases where pedestrian crossing accidents are particularly frequent at night.		
													2002	Road lighting (enlargement, moving)			
22-14	Facilities that distract drivers	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Arouse drivers' attention	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
23-14	Heavily used roadside facility driveway exit/entrance	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Reduce facility driveway exits/entrances on the main road	3101	Concentrating facility entrances by moving them outside the main road	• At locations with a series of roadside facilities with parking area entrances, they are concentrated as much as possible.		
											2	Separate vehicles entering or exiting roadside facilities from vehicles on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility. • A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
24-14	Heavily used narrow roads	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Separate vehicles entering or exiting narrow roads from vehicles on the main road	1509	Frontage road	• This countermeasure should be taken if there will be no problem guaranteeing land and budget.		
											2	Reduce vehicles decelerating to enter narrow side roads from the main road	5002	One way traffic			
25-14	Unclear roadside facility driveway exit/entrance or narrow roads	Drivers abruptly stop, decelerate, or change lanes on the main road.			●				●		1	Make narrow side roads more conspicuous	1608	Lines showing the sides, centers, and boundaries of traffic lanes (others)	• Installation of lines marking the outside of the lanes		
													2102	Warning sign (201:Intersection ahead)			
											2	Separate vehicles entering or leaving roadside facilities and narrow roads from vehicles on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility. • A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
25-18	Unclear roadside facility driveway exit/entrance or narrow roads	A driver does not notice a narrow side street he plans to turn left into on time, and makes a sharp turn to the left.					●				1	Make narrow roads more conspicuous	1608	Lines showing the sides, centers, and boundaries of traffic lanes (others)	• Installation of lines marking the outside of the lanes		
													2102	Warning sign (201:Intersection ahead)			
											2	Separate vehicles entering or exiting roadside facilities from vehicles on the main road	1508	Additional lanes for roadside facility use			
													1509	Frontage road			

Accident occurrence process and causes			Type of accident concerned									Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
27-1	Visibility reduced by sunlight in the morning and in the west	It obstructs drivers' view.	●		●	●		●			1	Arouse drivers attention	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• Signs such as "Be careful of the western sun" are displayed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
											2	Guarantee visibility	2601	Glare prevention boards on center medians	• This is installed in a case where head lamps of oncoming vehicles reduce visibility.		
28-8	Deteriorated road surface paving (ruts and cracks)	Drivers cannot control their vehicles	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	1408	Road surface maintenance			
											2	Provide advance warning of a section where vehicle control is difficult	2106	Warning signs (209: Slippery)			
											3	Stabilize vehicle control	1403	Improving pavement (slip-proof pavement)			
													1406	Improving pavement (grooving pavement)			
29-8	Poor drainage	Drivers cannot control their vehicles	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	1405	Improving paving (drainage pavement)		(8)	Document 3-8
													1408	Road surface maintenance			
											2	Provide advance warning of a section where vehicle control is difficult	2106	Warning signs (209: Slippery)			
30-8	Deposited mud or sand	Drivers cannot control their vehicles.	●	●	●			●		●	1	Provide advance warning of a section where vehicle control is difficult	2106	Warning signs (209: Slippery)			
31-8	Road surface icing	Vehicles are uncontrollable	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	2802	Snow and cold countermeasures (road heating)			
													2801	Snow and cold countermeasures (spreading anti-icing agent)			
											2	Provide advance information about the road surface	2201	Road information boards	• Signs such as "Icy Road Ahead" are displayed. • Its installation before sections where the road surface fluctuates abruptly such as those approaching mountains should be studied.		
34-4	Vehicles preparing to turn right or left stopping or decelerating on the main road	Vehicles turning right into a roadside facility or narrow side road advance dangerously.				●					1	Prohibit right turns	1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction	• Right turns are prohibited.		
													5007	Prohibiting vehicle crossing			
											2	Separate vehicles entering/exiting roadside facilities and narrow roads from vehicles on the main road	1508	Additional lanes for roadside facility use	• The addition of lanes is studied where there is a large roadside facility. • A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4
34-14	Vehicles preparing to turn right or left stopping or decelerating on the main road	Vehicles turning right or left into a roadside facility or narrow side road abruptly stop, decelerate, or change lanes on the main road			●						1	Prohibit right turns	1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction	• Right turns are prohibited.		
													5007	Prohibiting vehicle crossing			
											2	Separate vehicles entering/exiting roadside facilities and narrow roads from vehicles on the main road	1508	Additional lanes for roadside facility use	• The addition of lanes is studied where there is a large roadside facility. • A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4
35-1	Congested main road	Congestion causes pedestrians to jaywalk and blocks visibility between drivers of vehicles turning right from facilities and narrow roads and drivers of vehicles on the main road. The ability of drivers of vehicles turning right from the main road to see oncoming weaving motorcycles is reduced.				●		●			1	Prohibit right turns	1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction	• Right turns are prohibited.		
													5007	Prohibiting vehicle crossing			
											2	Prevent weaving	1501	Narrowing the shoulder			
											3	Prevent jaywalking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be implemented together.		
													5035	Prohibition on pedestrian crossing			
35-13	Congested main road	Congestion shortens the actual crossing distance, encouraging pedestrians to jaywalk and obscuring the vision of drivers of vehicles on the main road.						●			1	Prevent jaywalking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be implemented together.		
													5035	Prohibition on pedestrian crossing			
											2	Prevent weaving	1501	Narrowing the shoulder			

Accident occurrence process and causes			Type of accident concerned								Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
35-14	Congested main road	Congestion occurs, causing drivers on the main road at the rear end of the congestion to abruptly stop, decelerate, or change lanes.			●						1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers.	2299	Other road information provision systems	• A signboard warning of the end of congestion is installed. • It should be studied in particular in cases where congestion occurs around a curve or in a tunnel. (Countermeasure code 2299 is a road administrator's countermeasure, and 5399 is a Public safety commission's countermeasure.)		
													5399	Others			
													2116	Signs and indicators not legally required (letters, symbols, arrows)	• Signs such as "Warning! Congestion Ahead" are displayed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
37-4	Heavy traffic on the main road	Drivers drive dangerously into the main road from roadside facilities and narrow roads.	●			●					1	Separate vehicles emerging from roadside facilities and narrow side roads from vehicles on the main road	1508	Additional lanes for roadside facility use			
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4
											2	Change the location where traffic flows into the main road	3102	Guiding vehicles entering the main road to the signal stopping point	• Wide area improvements are studied.		
41-13	No crossing facilities at a location they are needed	Pedestrians cross dangerously outside the crosswalks.						●			1	Change the locations of crossings according to crossing demand	5036	Crosswalk (new)	• This countermeasure should be implemented according to crossing demand.		
													5120	Installing pedestrian use lights			
													1801	Constructing grade-separated crossing (pedestrian bridge, pedestrian tunnel)			
											2	Prevent jaywalking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be implemented together.		
													5035	Prohibition on pedestrian crossing			
											3	Arouse drivers' attention	2104	Warning signs (208: School, Kindergarten, Nursery School, etc.)	• This measure should be studied if there is a school, kindergarten, nursery school, or other facility with many small children on the roadside.		
													1699	Other section lines and road surface lines	• Introduction of school zones and silver zones.		
42-2	Motorcycles weaving through vehicle traffic	Drivers turning left are non-attentive.					●				1	Prevent weaving	1501	Narrowing the shoulder			
43-1	On-street parking and stopped busses obstructing traffic movement	Driver's vision is obstructed.	●					●			1	Cause stopping vehicles to stop outside the main road lanes	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-11	On-street parking and stopped busses obstructing traffic movement	Drivers pass in the oncoming lane.		●							1	Cause stopping vehicles to stop outside the main road lanes	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-13	On-street parking and stopped busses obstructing traffic movement	Pedestrians are encouraged to jaywalk						●			1	Cause stopping vehicles to stop outside the main road lanes	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
											3	Prohibit jaywalking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be studied together.		
													5035	Prohibition on pedestrian crossing			
43-14	On-street parking and stopped busses obstructing traffic movement	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Cause stopping vehicles to stop outside the main road lanes	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			

Table D

Uninterrupted flow – Multi-lane road

Table D Uninterrupted flow – Multi-lane road

Accident occurrence process and causes			Type of accident concerned									Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
1-1	Sharp curve	Drivers have difficult seeing vehicles ahead and pedestrians crossing the road.	●		●	●		●			1	Alert drivers to and provide information about conditions at locations where visibility is poor	2116	Signs and indicators not legally required (letters, symbols, arrows)	• This is studied in a case where there is an obstruction on the inside of a curve. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
											2	Construct roads that do not reduce a driver's view ahead	1301	Alignment improvement			
2-7	Long steep downhill gradient	<Right turn vehicle> Drivers misunderstand the behavior of oncoming through vehicles.				●					1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
													1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
													1601	Road surface indicators (road surface deceleration indicators)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
													5221				
											2	Prohibit right turns and right turn crossings	5003	Prohibiting travel outside a designated direction	• The implementation of a prohibition on right turns, prohibition on vehicle crossing, and placing post cones on the center median should be studied together. (Countermeasure code 5003 is prohibiting right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
3-1	Crest	Drivers have difficult seeing vehicles ahead and pedestrians crossing the road.	●			●		●			1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
													2101	Warning signs (general)			
											2	Prohibit right turns and right turn crossing	5003	Prohibiting travel outside a designated direction	• The implementation of a prohibition on right turns, prohibition on vehicle crossing and placing post cones on the center median should be studied together. (Countermeasure code 5003 is prohibiting right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
4-7	Long straight section	<Right turn vehicle> Drivers misunderstand the behavior of oncoming through vehicles.				●					1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
													1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
													1601	Road surface indicators (road surface deceleration indicators)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
													5221				
											2	Prohibit right turns and right turn crossing	5003	Prohibiting travel outside a designated direction	• The implementation of a prohibition on right turns, prohibition on vehicle crossing, and placing post cones on the center median should be studied together. (Countermeasure code 5003 is prohibiting right turns)		
													5007	Prohibiting vehicle crossing			
													1202	Center median (post cones)			
8-14	Narrow lanes	Drivers abruptly stop or decelerate on the main road.			●						1	Eliminate narrowing of the road	1503	Widening lanes	• It is aggressively implemented if it is possible to guarantee land and budget.		
9-14	Sudden decline of the number and width of lanes	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Provide advance indication of a reduction of the number of lanes or road width	2108	Warning sign (212: narrowing road)	• Several are installed far enough in advance to allow drivers to safely decelerate and change lanes.		
													2107	Warning sign (211: reduction of lanes)			
10-14	Complex change of the number and width of lanes	Drivers unable to respond to a complex change in the number or width of lanes, abruptly stop, decelerate, or change lanes on the main road.			●						1	Fundamentally improve conditions that cause frequent change of the number of lanes and road width	1301	Alignment improvement	• It should be improved in case where it is possible to guarantee land and budget		
											2	Temporarily improve conditions that cause frequent change of the number of lanes and road width	1602	Road surface indicators (stabilization of the number of lanes and width using zebra indicators)			
11-14	Changing lane operation (through lane changes to a left or right turn lane)	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Provide advance warning of change of lane operation and the type of change	5215	Warning of lane use control	• It is installed at a location that allows vehicles to change lanes safely instead of immediately before the intersection		
15-1	Poorly located and maintained trees etc. on the center median	<Vehicles turning right from roadsides or narrow roads into the main road> The ability to see the main road is obscured. <Vehicles turning right from the main road> The drivers' ability to see oncoming through vehicles is reduced. <Through vehicles on the main road> It s difficult to check the stopping or deceleration behavior of vehicles ahead on curves	●		●	●					1	Remove elements that obstruct visibility	1305	Rearranging vegetation	• It is studied in a case where there is a center median with vegetation constructed on a multi-lane road • Near openings, t is grass or other low vegetation that reduces visibility.		
											2	Prohibit right turns and U-turns on multi-lane roads	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • It is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5009	Prohibiting U-turns			

Accident occurrence process and causes			Type of accident concerned								Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
16-1	Poorly located and maintained trees, signboards, etc. on the sidewalks	<Vehicles entering the main road from the roadside or from narrow roads> It is difficult for them to check for vehicles on the main road. <Through vehicles on the main road> It s difficult to check vehicles ahead on curves.	●		●						1	Remove elements that obstruct visibility	1305	Rearranging vegetation	• This is related to rear-end collisions on curves		
											2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows)	• This is related to rear-end collisions on curves (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
17-14	Negligently cut center median	Drivers on the main road abruptly stop, decelerate, or change lanes, because vehicles cut in from openings in the center median at places where drivers on the main road do not expect this to happen. (Drivers on the main road have to pay attention to too many things at the same time.)			●						1	Close openings so that the number of things drivers on the main road must pay attention to is low	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • It is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5007	Prohibiting vehicle crossing			
18-14	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Confused about what action to take, drivers abruptly stop, decelerate, or change lanes on the main road.			●				●		1	Revise the locations and contents of traffic signs	2103	Warning signs (202 – 206: bends, curves, winding road)	• Revising the content of the warning signs is studied.		
											2	Introduce highly visible traffic signs	2113	Large traffic signs and high brightness traffic signs	• This is studied in cases where warning signs are already installed.		
													2114	Internally illuminated traffic signs	• This is studied in cases where warning signs are already installed. • This should be introduced at locations where accidents occur particularly frequently at night.		
19-1	Bridge piers and other structures	It obstructs drivers view.				●					1	Prohibit right turns and U-turns on multi-lane roads	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • This is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5009	Prohibiting U-turns			
		It obstructs drivers view.	●					●			2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• This is related to rear-end collisions on curves (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
20-1	Obstructions to vision on the road sides (buildings, walls, etc.)	It obstructs drivers view.	●		●			●			1	Remove elements that obstruct visibility	1304	Removal of obstructions (facilities, signboards)	• This is studied in a case where rear-end collisions and other accidents during crossing occurs on curves. • It is taken as a priority countermeasures whenever possible.		
											2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• This is studied in a case where rear-end collisions and other accidents during crossing occurs on curves. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
22-14	Facilities that distract drivers	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Arouse the attention of drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
23-14	Heavily used roadside facility driveway exit/entrance	Drivers abruptly stop, decelerate, or change lanes on the main road			●						1	Reduce the number of facility entrances/exits on the main road	3101	Concentrating facility entrances by moving them outside the main road	• This is highly concentrated at locations where there are a row of roadside facilities with entrance/exit driveways.		
											2	Separate vehicles entering/exiting roadside facilities from roads on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
24-14	Heavily used narrow roads	Drivers abruptly stop, decelerate, or change lanes on the main road.			●						1	Separate vehicles entering/exiting roadside facilities from roads on the main road	1509	Frontage road	• This countermeasure should be taken when there will be no problem guaranteeing land and budget		
											2	Reduce the number of vehicles decelerating to enter a narrow road from the main road	5002	One way traffic			
25-14	Unclear roadside facility driveway exit/entrance or narrow road	Drivers abruptly stop, decelerate, or change lanes on the main road			●				●		1	Increase the visibility of narrow roads	1608	Lines showing the sides, centers, and boundaries of traffic lanes (others)	• Installing lines marking the outsides of lanes.		
													2102	Warning sign (201:Intersection ahead)			
											2	Separate vehicles entering/exiting roadside facilities from roads on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			

Accident occurrence process and causes			Type of accident concerned									Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
											3	Prevent the concentration of traffic on facility side lanes	5010	Prohibiting changes of course	• It should be possible to change lanes from lanes from the roadside to lanes from the center median (arranging two lines: broken white lines and yellow lines).		
27-1	Visibility reduced by sunlight in the morning and in the west	It obstructs drivers view	●		●	●		●			1	Arouse attention	2116	Signs and indicators not legally required (letters, symbols, arrows, etc.)	• Signs such as "Beware of the Western Sun" are displayed (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
											2	Guarantee visibility	2601	Glare prevention boards on center medians	• This is installed in a case where head lamps of oncoming vehicles reduce visibility.		
28-8	Deteriorated road surface paving (ruts and cracks)	Vehicles become uncontrollable	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	1408	Road surface maintenance			
											2	Provide advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
											3	Stabilize the control of vehicles	1403	Improving pavement (slip-proof pavement)			
													1406	Improving pavement (grooving pavement)			
29-8	Poor drainage	Vehicles become uncontrollable	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	1405	Improving paving (drainage pavement)		(8)	Document 3-8
													1408	Road surface maintenance			
											2	Provide advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
30-8	Deposited mud or sand	Vehicles become uncontrollable.	●	●	●			●		●	1	Provide advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
31-8	Road surface icing	Vehicles become uncontrollable	●	●	●			●		●	1	Remove elements that make vehicles uncontrollable	2802	Snow and cold countermeasures (road heating)			
													2801	Snow and cold countermeasures (spreading anti-icing agent)			
											2	Provide information about the road surface in advance	2201	Road information boards	• Signs such as, "Road Surface Frozen Ahead" etc. are displayed. • Its installation before sections where the road surface fluctuates abruptly such as those approaching mountains should be studied.		
34-4	Vehicles preparing to turn right or left stopping or decelerating on the main road	Vehicles turning right into roadside facilities or narrow streets, travel dangerously.				●					1	Prohibit right turns	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed • It is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5007	Prohibiting vehicle crossing			
											2	Separate vehicles entering/exiting roadside facilities from roads on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4
34-14	Vehicles preparing to turn right or left stopping or decelerating on the main road	Vehicles turning right into a roadside facility or narrow street abruptly stop, decelerate, or change lanes on the main road.			●						1	Prohibit right turns	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • This is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5007	Prohibiting vehicle crossing			
											2	Separate vehicles entering/exiting roadside facilities and narrow streets from vehicles on the main road	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4

Accident occurrence process and causes			Type of accident concerned									Planning the accident countermeasures						
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Head-on	Rear end	Right turn	Left turn	Other crossing	When changing course	Lane departure		Countermeasure goal	Counter-measures code table number	Countermeasure work type on the countermeasure code table	Precautions when selecting and implementing countermeasures	Case No.	Case page
35-1	Congested main road	Congestion encourages pedestrians to jaywalk and blocks visibility between drivers of vehicles turning right from facilities and narrow roads and drivers of vehicles on the main road. The ability of drivers of vehicles turning right from the main road to see oncoming weaving motorcycles is reduced.				●		●			1	Prohibit right turns	1208	Openings in the center median (closing them etc.)	• Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right, reducing safety, as many openings in the center median as possible should be closed. • This is studied in cases where there is an intermittent center median on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
													1202	Center median (post cones)			
													5003	Prohibiting travel outside a designated direction			
													5007	Prohibiting vehicle crossing			
											2	Prevent weaving	1501	Narrowing the shoulder			
											3	Prevent jaywalking	2304	Pedestrian – cyclist use fence (to prevent crossing)	• The two countermeasures should be implemented together.		
													5035	Prohibition on pedestrian crossing			
35-14	Congested main road	Congestion occurs, causing drivers on the main road at the rear end of the congestion to abruptly stop, decelerate, or change lanes.			●						1	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers	2299	Other road information provision systems	• A signboard warning of the end of congestion is installed. • It should be studied in particular in cases where congestion occurs around a curve or in a tunnel. (Countermeasure code 2299 is a road administrator's countermeasure, and 5399 is a Public safety commission's countermeasure.)		
													5399	Others			
													2116	Signs and indicators not legally required (letters, symbols, arrows)	• Signs such as "Warning! Congestion Ahead" are displayed. (Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
													5216				
37-4	Heavy traffic on the main road	Drivers drive dangerously into the main road from roadside facilities and narrow roads.	●			●					1	Separate vehicles exiting roadside facilities and narrow roads from vehicles on the main road	1508	Additional lanes for roadside facility use			
													1509	Frontage road			
													1204	Center median (new center zebra)		(4)	Document 3-4
											2	Change the location where traffic flows into the main road	3102	Guiding vehicles entering the main road to the signal stopping point	• Wide area improvements are studied.		
43-1	On-street parking and stopped busses obstructing traffic movement	Drivers' view of the road ahead is obstructed.	●					●			1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-14	On-street parking and stopped busses obstructing traffic movement	Drivers abruptly stop, decelerate, and change lanes on the main road.			●						1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
													2703	Parking zone			
											2	Remove vehicles stopped on the main road	5022	Prohibiting parking			

Document 3

Countermeasure Cases

Countermeasure Cases summarizes the contents of countermeasures and precautions to be followed when implementing them based on implementation of countermeasures at hazardous spots.

[Road Administrator's Countermeasures]

Road Structure

Center median

Road surface indicators and lane markings

Pavement

Others

[Public Safety Commission's Countermeasures]

Signals

Road surface indicators

Countermeasure name	(1) Reducing the radius of corner cut-offs	Purpose	Restricting speed

<Countermeasure locations>

Locations where the cut-off radius is large so that vehicles turn left at high speed.

<Content of the countermeasure>

Reducing the speed of vehicles turning left by extending the corner cut-off, lowering the area of the intersection.

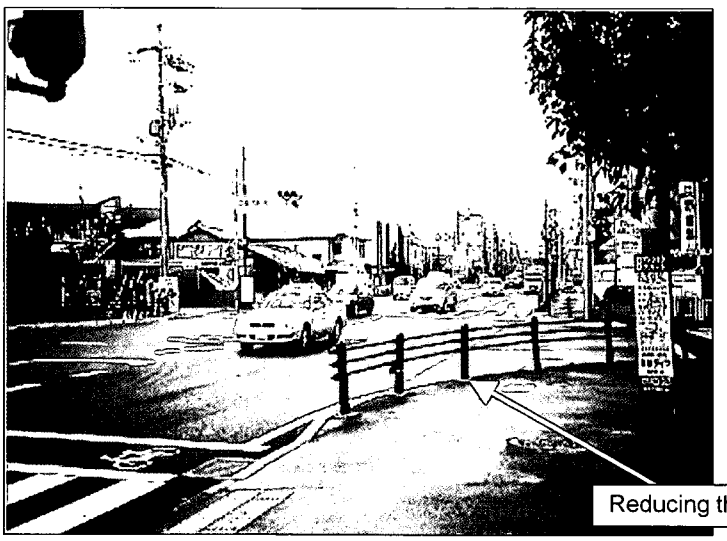
<Precautions>

Sharply reducing the radius of a corner cut-off obstructs the smooth movement of vehicles turning left, cutting the traffic capacity of the intersection.

<Major types of accidents targeted>

Pedestrian crossing a crosswalk when a vehicle is turning right

<Countermeasure photographs>



* Top and bottom photographs: Kyoto National Highway Office, National Highway 24, Takedakubocho, Fushimi-ku, Kyoto-shi, Kyoto-fu (263366k)

Countermeasure name	(2) Increasing right-turn traffic lanes (to 2 lanes)	Purpose	Increasing traffic capacity

<Countermeasure locations>

Locations where the right turn demand is high so drivers wait a long time to turn right.

<Content of the countermeasure>

Increasing the capacity of the intersection to handle right turns by increasing the right-turn traffic lanes to prevent dangerous right turns by shortening waiting time.

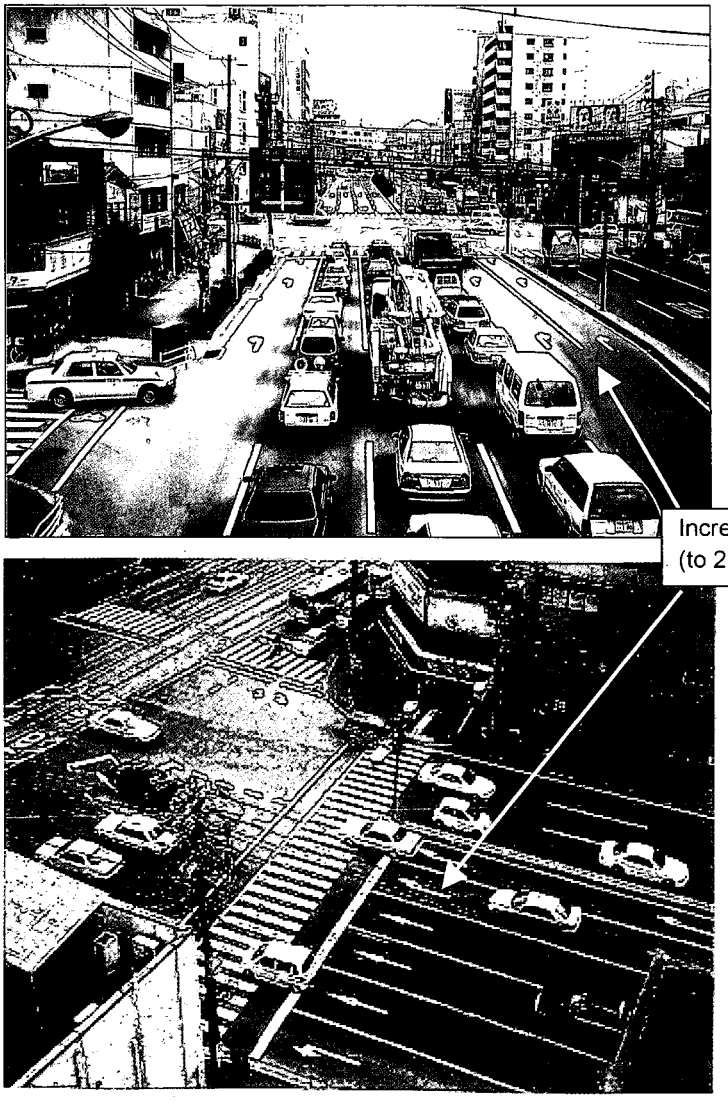
<Precautions>

It there are two or more right turn lanes, if a vehicle in the outside right turn lane is waiting to start turning right, the driver of a vehicle in the inside right turn lane has difficulty seeing oncoming through vehicles. Therefore, when implementing this countermeasure, it should be studied along with the installation of right turn traffic – through traffic separation signals to separate vehicles turning right from vehicles traveling straight through.

<Major types of accidents targeted>

Pedestrian crossing a crosswalk when a vehicle is turning right

<Countermeasure photographs>



* Top and bottom photographs: Hiroshima National Highway Office, National Highway 2, Funairihonmachi, Naka-ku, Hiroshima-shi, Hiroshima-ken (343108k)

Countermeasure name	(3) Installing traffic islands	Purpose	Guiding vehicles

<Countermeasure locations>

Locations where the course that vehicles travel is unclear because it is a large intersection
Or, locations where pedestrian crossing distance is long

<Content of the countermeasure>

Smoothing the movement of vehicles through an intersection by clarifying the course each travels by installing a channelizing island. Installing a channelizing island protects pedestrians and, by shortening the crossing distance, reduces the possibility of contact between vehicles and pedestrians.

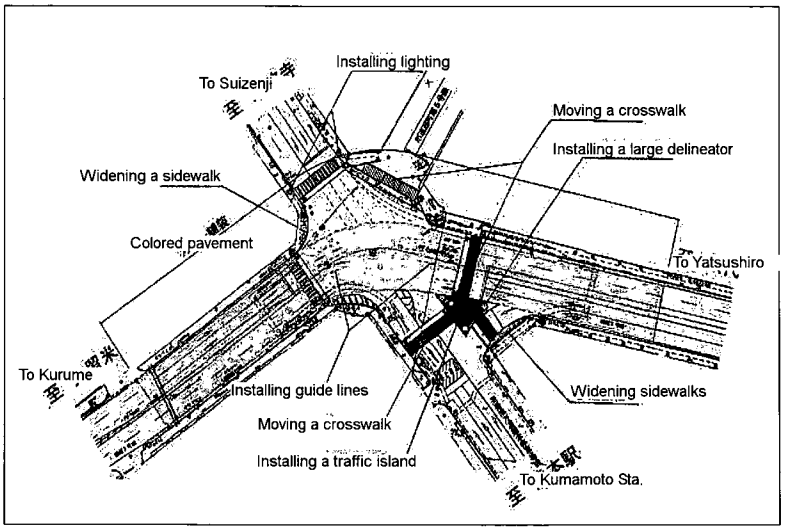
<Precautions>

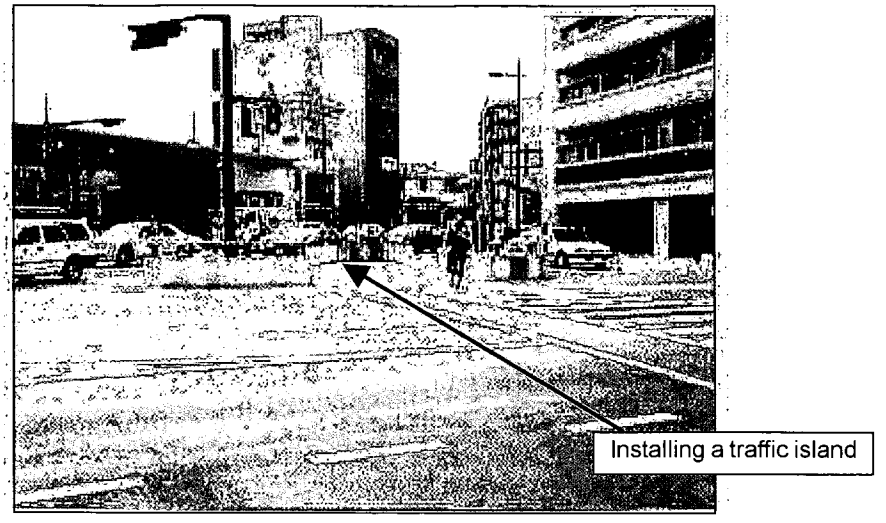
In a right turn channel or other section with a small radius of curvature, the channel tends to be wide to account for the turning radius of large vehicles and they tend to pass through the channel parallel to a small vehicle. Therefore zebra markings must be applied to narrow the channel.

<Major types of accidents targeted>

Pedestrians crossing a crosswalk when a vehicle is turning right or turning left

<Countermeasure photographs>





* Photograph: Kumamoto National Highway Office, National Highway 3, 2 Mukaemachi, Kumamoto-shi, Kumamoto-ken (433170k)

Countermeasure name	(4) Installing a central zebra zone	Purpose	Others

<Countermeasure locations>

Locations where right turn vehicles frequently obstruct through vehicles following them

<Content of the countermeasure>

Installing a zebra zone in the center to guarantee adequate space for right turn vehicles to stop before turning into a roadside facility or narrow side road in order to prevent them from obstructing following through vehicles. And to prevent drivers from making dangerous right turns in response to pressure from following through vehicles.

<Precautions>

To provide the width for a center zebra zone, it is necessary to narrow the traffic lanes or shoulders.

<Major types of accidents targeted>

Rear-end collision while a vehicle is turning right

<Countermeasure photographs>

* Top and bottom photographs: Kagoshima National Highway Office, National Highway 225, Kamifukumotocho, Kagoshima-shi, Kagoshima-ken (463106t)

Countermeasure name	(5) Installing guide lines (right turn and through traffic guide lines)	Purpose	Guiding vehicles

<Countermeasure locations>

Locations of intersections with large surface area so that the driving courses inside the intersections are unstable

<Content of the countermeasure>

Indicating courses that vehicles should travel inside an intersection with broken lines to stabilize the courses that vehicles follow. And clearly showing the locations where vehicles preparing to turn right wait for oncoming through vehicles to pass through (right turn stop lines) to keep right turn vehicles and through vehicles apart.

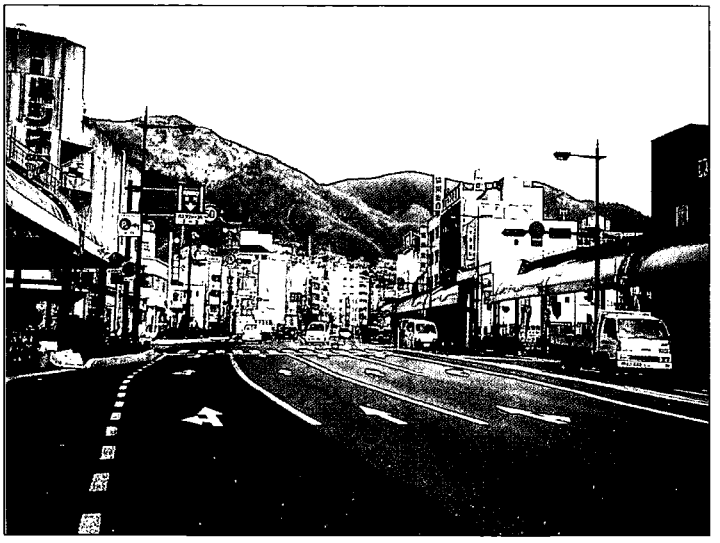
<Precautions>

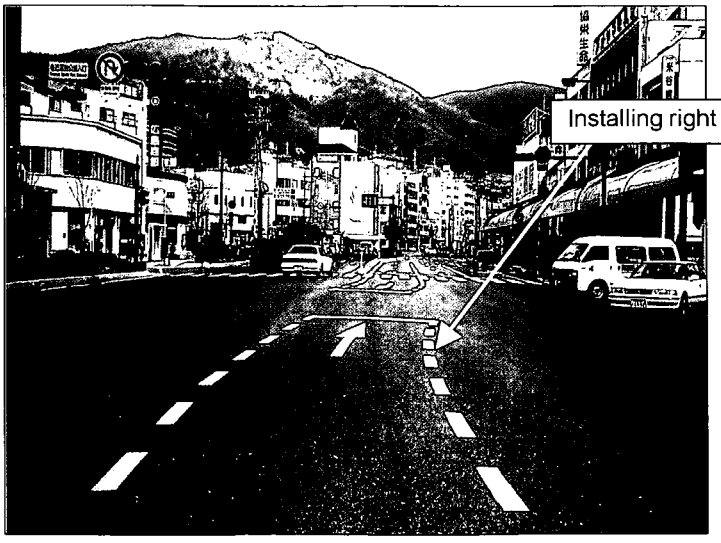
Because there are locations where the locations of guide lines are displaced from the actual driving course, when installing guide lines, they are installed in conformity with actual conditions so that drivers will not follow difficult courses.

<Major types of accidents targeted>

Rear-end collision when a vehicle is turning right

<Countermeasure photographs>





* Top and bottom photographs; Hiroshima National Highway Office, National Highway 185, 4 Hondori, Kure-shi, Hiroshima-ken (343136k)

Countermeasure name	(6) Increasing the brightness of lane markings (producing vibration)	Purpose	Preventing lane departures and guiding drivers' line of vision

<Countermeasure locations>

Locations such as sharp curves where vehicles may stray into the oncoming traffic lanes

Locations such as long straight road sections where drivers tend to drive inattentively or to fall asleep at the wheel.

<Content of the countermeasure>

Installing uneven protrusions on the surfaces of lines in the center of lanes and along the edges of lanes so that when the tires run on the lane markers, they make a noise that alerts the driver. The protrusions also guide the line of sight of drivers by reflecting the light from their headlamps at night and during rainy weather (when the road surface is wet).

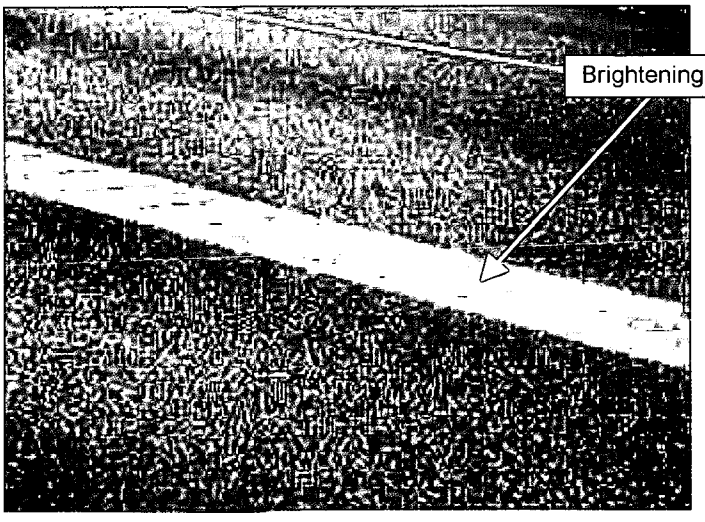
<Precautions>

Because this measure causes noise along with vibration, it is necessary to make a complete study when implementing it in a residential district.

<Major types of accidents targeted>

Lane departure, head-on collisions, collisions when passing

<Countermeasure photographs>



* Top and bottom photographs: Nanbu National Highway Office, National Highway 58, Onna, Onna-son, Kunigami-gun, Okinawa-ken (473105t)

Countermeasure name	(7) Coloring road surface pavement	Purpose	Arousing attention

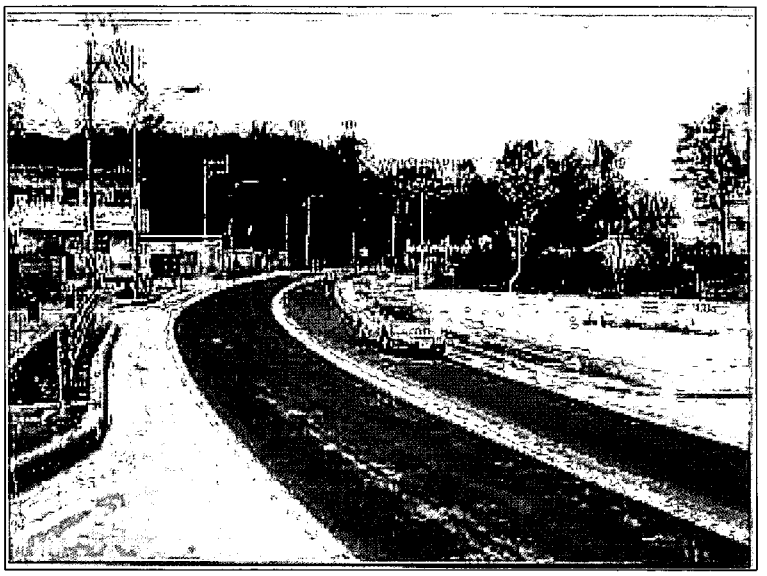
<Countermeasure locations>
Locations such as steep curves where there is a high probability of accidents occurring frequently

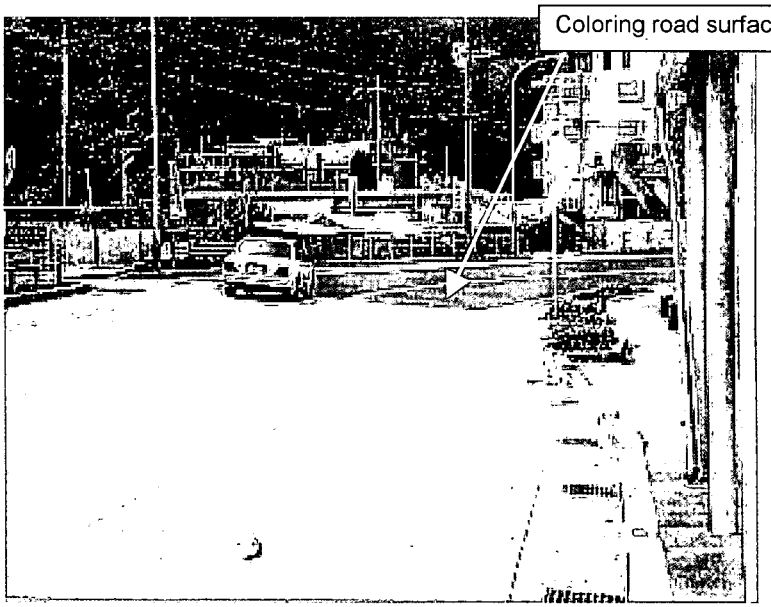
<Content of the countermeasure>
Increase drivers' awareness of danger by arousing their attention by coloring the road surface pavement.

<Precautions>
At locations where traffic is heavy and locations where the view of the road ahead is obscured, even if the road surface pavement at a hazardous spot is colored, drivers do not notice this countermeasure on time. In this case, it should be taken in advance of the hazardous spot.

<Major types of accidents targeted>
Head-on collisions caused by lane departures

<Countermeasure photographs>





* Top and bottom photographs: Nanbu National Highway Office, National Highway 58, Nakama, Onna-son, Kunigami-gun, Okinawa-ken (473103t)

Countermeasure name	(8) Introducing drainage pavement	Purpose	Preventing puddles

<Countermeasure locations>

Locations where puddles form easily on the road surface and the pavement markings are difficult to see during rainfall

Locations on long straight sections and others where spraying occurs easily because drivers travel at high speed

<Content of the countermeasure>

Drainage pavement has a surface course made of a pavement use asphalt mixture with a large void ratio that improves drainage properties to prevent the formation of puddles on the surface of roads during rainfall, thereby clarifying lane markers etc. by preventing puddles from reflecting the light of headlamps during the night and improving visibility by preventing spray during high speed traffic.

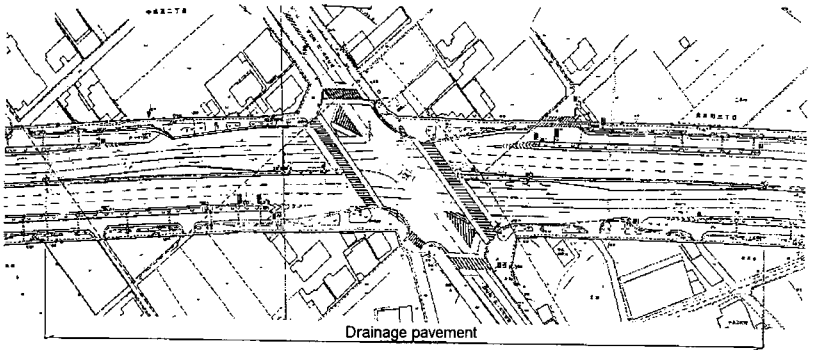
<Precautions>

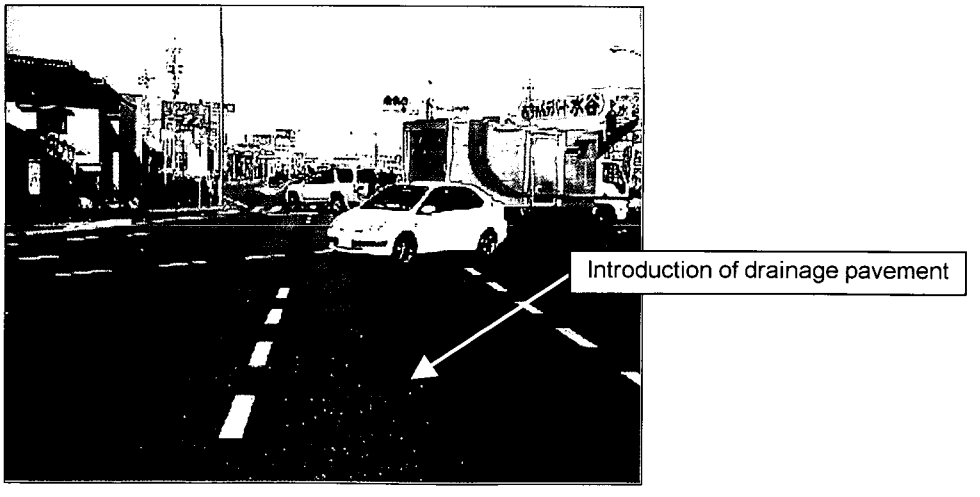
There is a danger that plugging (by waste material etc.) of voids in drainage pavement may lower its performance so the road surface must be thoroughly maintained (cleaned etc.).

<Major types of accidents targeted>

Lane departures, head-on collisions, rear-end collisions

<Countermeasure photographs>





* Photograph: Nagoya National Highway Office, National Highway 22, 3-chome, Nakashimadori, Ichinomiya-shi, Aichi-ken (233147k)

Countermeasure name	(9) Introducing level difference pavement	Purpose	Controlling speed and arousing attention

<Countermeasure locations>

Locations on long descending grades where it is easy to drive too fast

Locations such as long straight road sections where drivers tend to drive inattentively or to fall asleep at the wheel

<Content of the countermeasure>

Installing thin protrusions on the road surface vibrates vehicles (drivers) arousing their attention and slowing their driving speed.

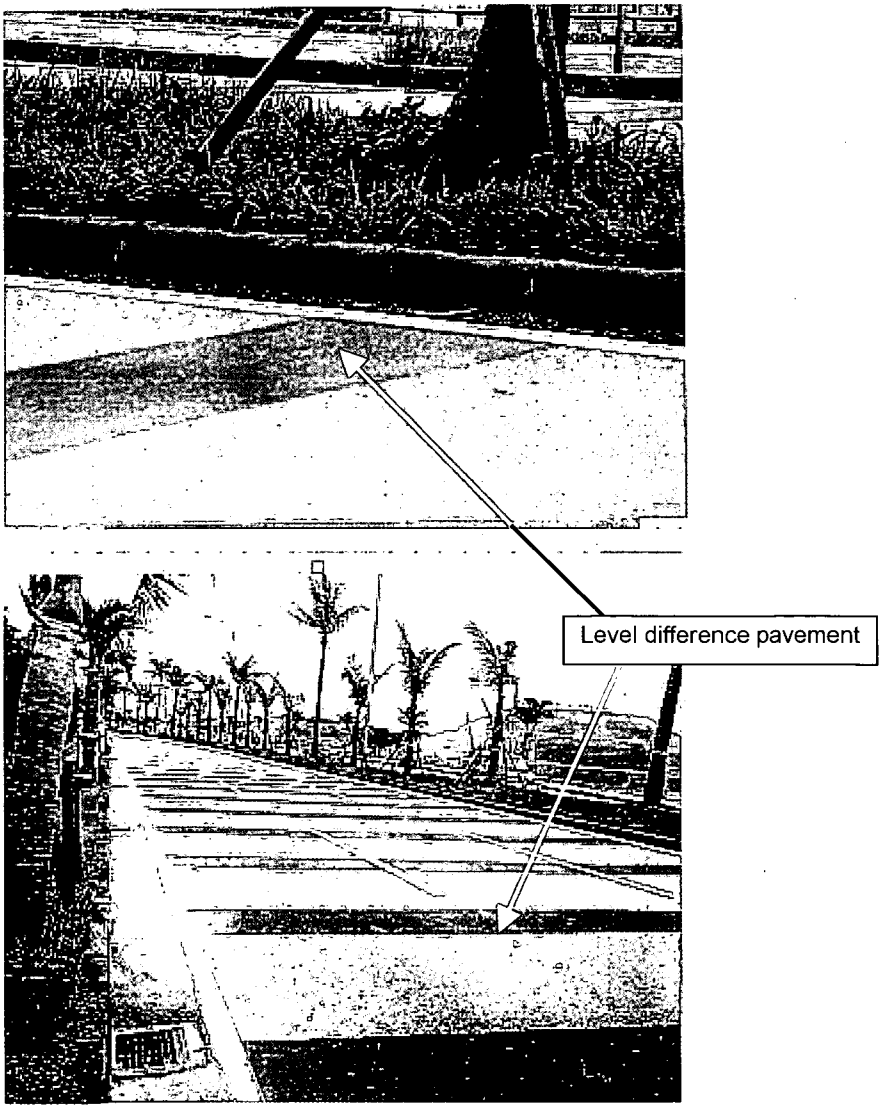
<Precautions>

Because these thin layers of pavement cause noise along with vibration, it is necessary to make a complete study when implementing it in a residential district.

<Major types of accidents targeted>

Lane departures, head-on collisions, rear-end collisions

<Countermeasure photographs>



* Top and bottom photographs: Nanbu National Highway Office, National Highway 329, Noguni, Kadena-cho, Nakagami-gun, Okinawa-ken (473101t)

Countermeasure name	(10) Installing self-illuminated line of sight guidance beacons	Purpose	Guiding drivers' line of sight and controlling their speed

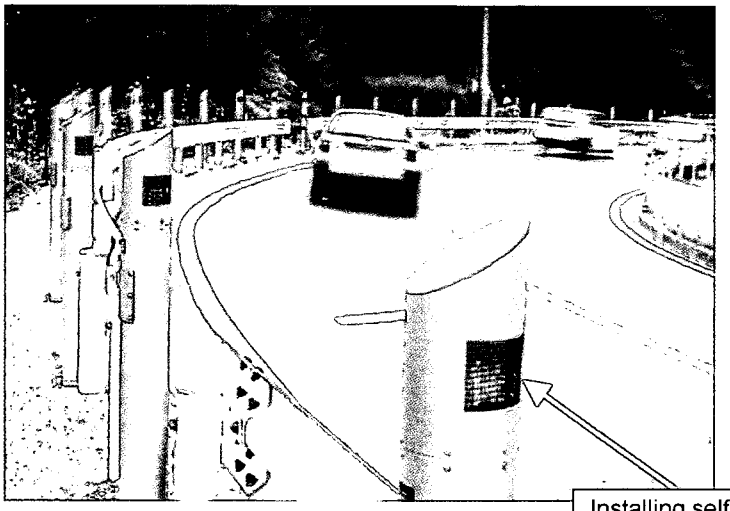
<Countermeasure locations>
Locations such as sharp curves where it is difficult to understand road alignment
Locations where drivers travel at high speed even though it is a sharp curve

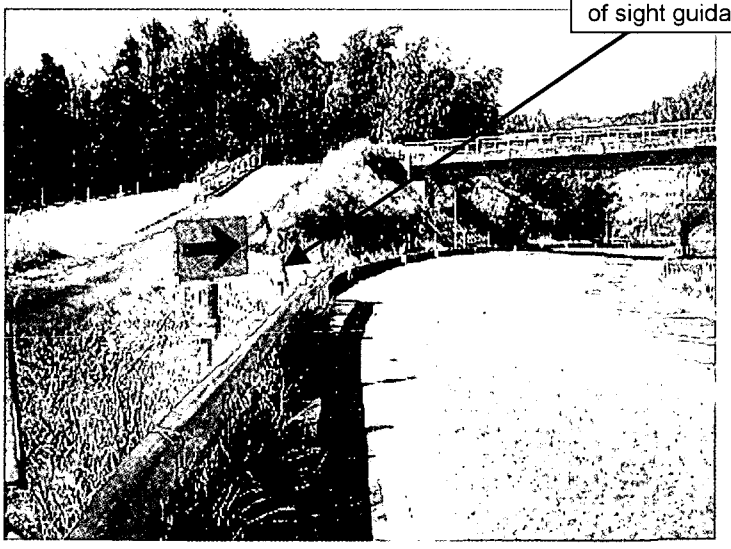
<Content of the countermeasure>
Flashing line of sight guidance beacons (self-illuminated) along the flow of vehicles to show drivers the alignment on curves. Setting the speed of the flow of flashing lights at an appropriate speed also controls vehicle speed.

<Precautions>
Sharply reducing the radius of a corner cut-off obstructs the smooth movement of vehicles turning left, cutting the traffic capacity of the intersection.

<Major types of accidents targeted>
Head-on collisions caused by lane departures

<Countermeasure photographs>





* Top and bottom photographs: Shizuoka National Highway Office, National Highway 1, from 246 Saruyama, Sasaharashinden to 339-3 Kurasawa, Tsukaharashinden in Mishima-shi, Shizuoka-ken (223103t)

Countermeasure name	(11) Enlarging signal lights	Purpose	Improving visibility and arousing attention

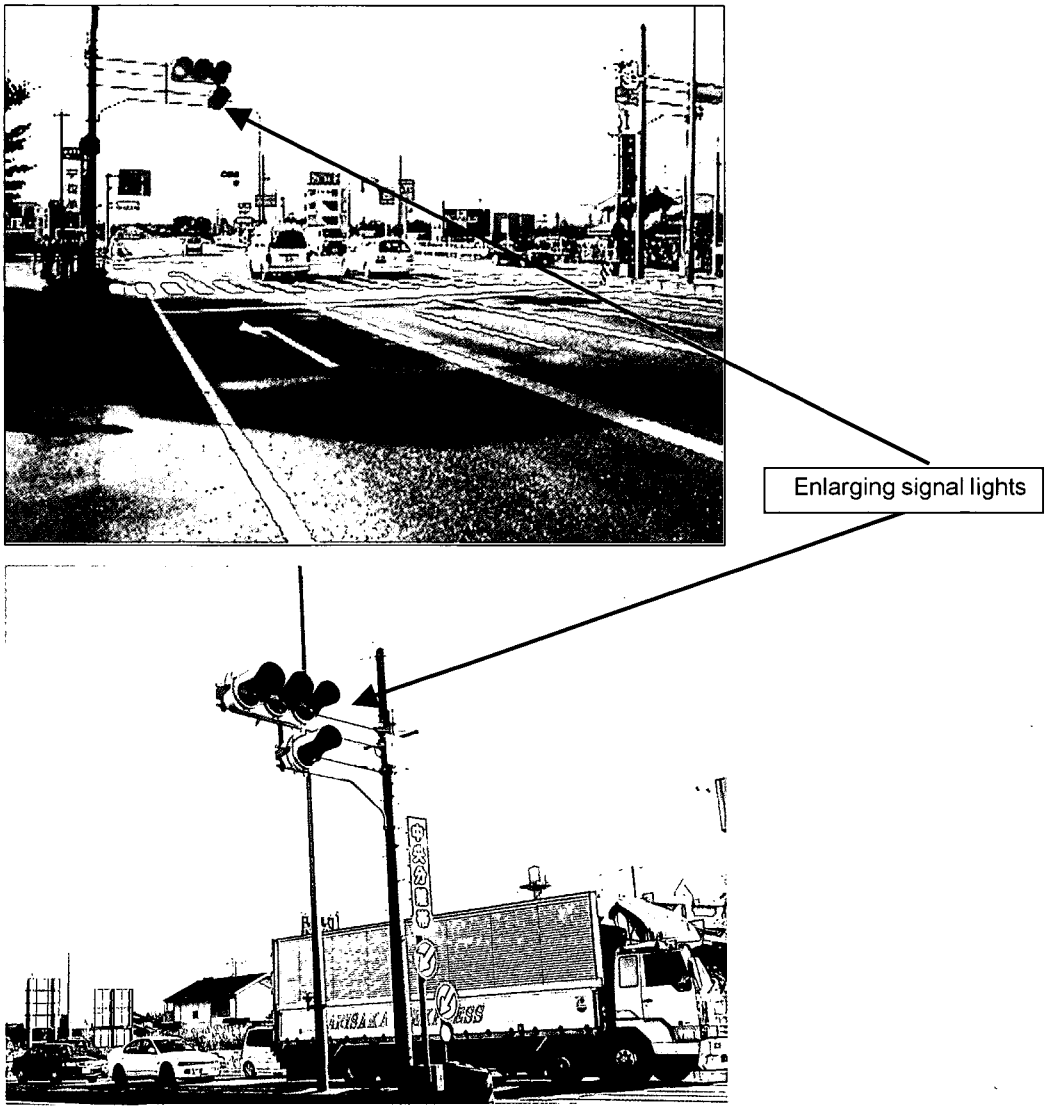
<Countermeasure locations>
Locations where signals are easily overlooked
Locations where bad driving actions such as ignoring signals is seen

<Content of the countermeasure>
Installing larger signals lights than normal increases visibility of the signals and emphasizes the priority right to advance (end of the red signal, etc.) to arouse the attention of drivers.

<Precautions>
Generally the green, yellow, and red signal lights are enlarged, but there are cases where only the red signal lights are enlarged.

<Major types of accidents targeted>
Intersection collisions, rear-end collisions

<Countermeasure photographs>



* Top and bottom photographs: Gifu National Highway Office, National Highway 258, Wagoshinmachi, Ogaki-shi, Gifu-ken (213175t)

Countermeasure name	(12) Moving a crosswalk forward	Purpose	Improving visibility

<Countermeasure locations>

Locations such as intersections with poor visibility where it is difficult for drivers of vehicles turning right to check for people crossing in the crosswalk.

<Content of the countermeasure>

Shifting a crosswalk towards the center of the intersection improves the ability of drivers turning left and turning right to see pedestrians crossing in the crosswalk.

<Precautions>

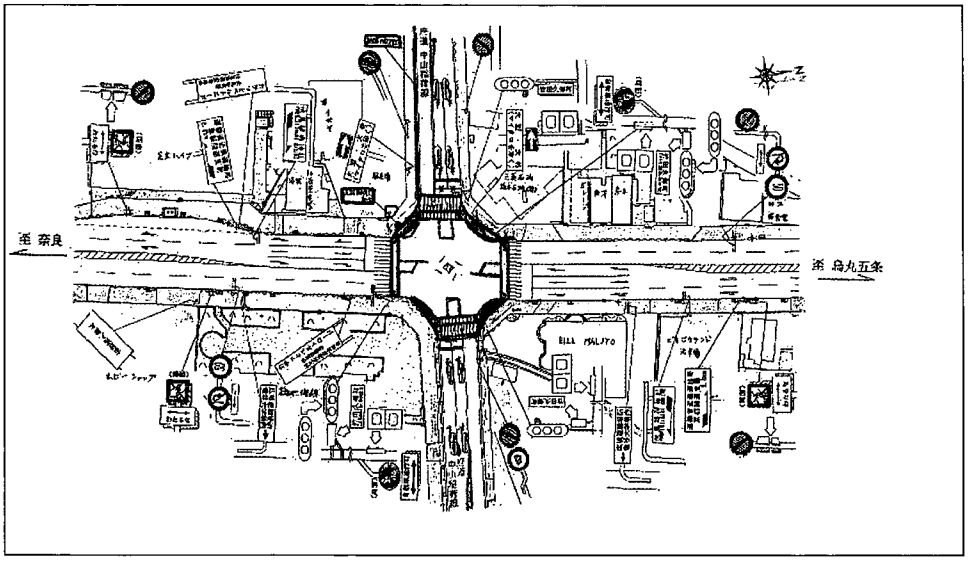
There is concern that if the crosswalk is moved forward to far, when a left turn vehicle is waiting for pedestrians to cross before turning left, it will hold up vehicles following it.

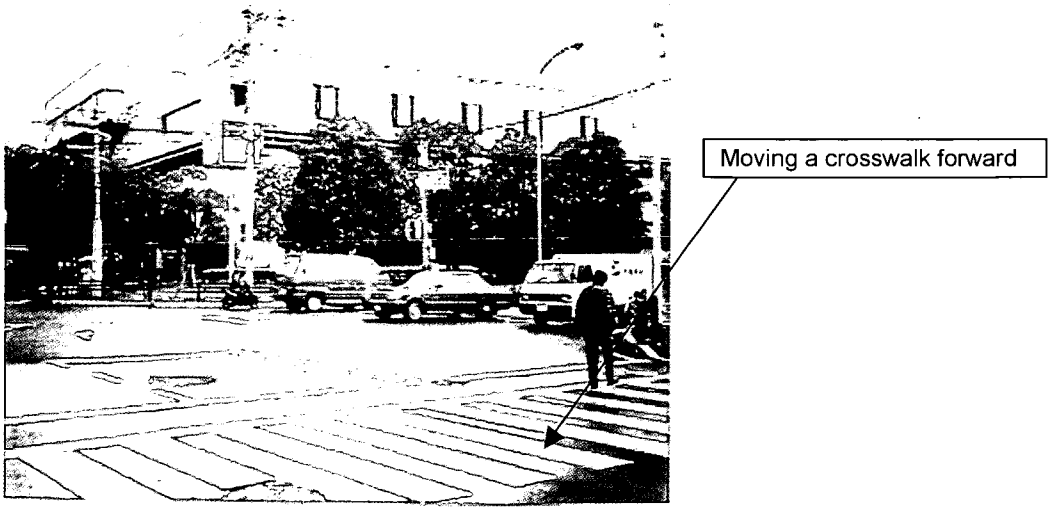
And because there is also concern that because the place where the driver of a vehicle turning left or right first sees pedestrians is close to the place where the vehicle must be stopped, drivers will be unable to stop safely after first seeing pedestrians, colliding with them. For these reasons, crosswalks must not be moved forward very far.

<Major types of accidents targeted>

While a pedestrian is crossing a crosswalk when a vehicle is turning left

<Countermeasure photographs>





* Photograph: Kyoto National Highway Office, National Highway 24, Takedakubocho, Fushimi-ku, Kyoto-shi, Kyoto-fu (263306k)

TECHNICAL NOTE of N I L I M

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