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Road Safety Manual at Hazardous Spots

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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)





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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.

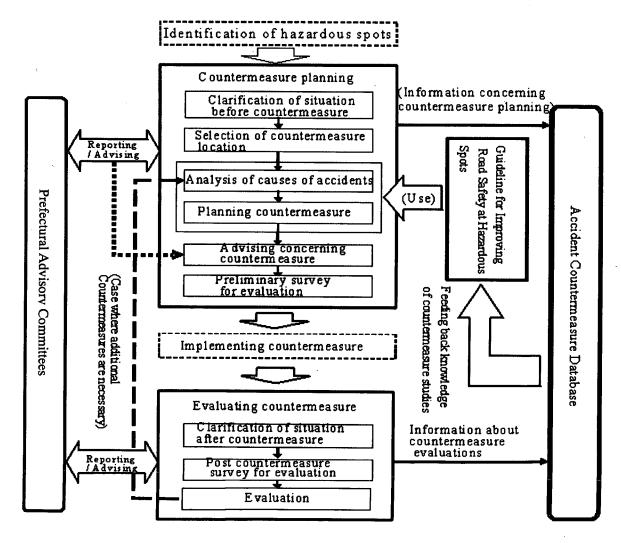
Chapter 3 "Outline of the Guideline" explains examples of countermeasures taken to prevent traffic accidents, including the analysis of past accidents and analysis of the examples of countermeasures. The data is particularly important for analyzing the causes of accidents and planning the countermeasures.

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 Project²⁾ 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.

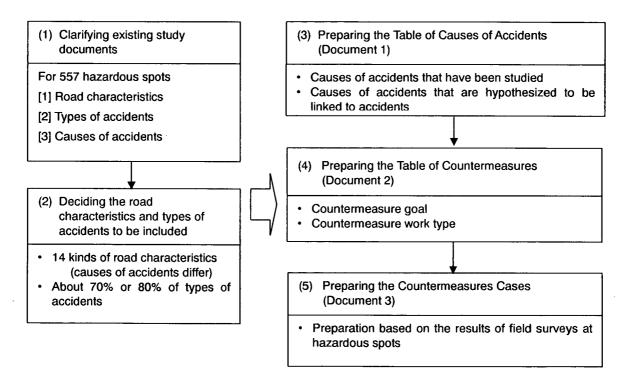


Figure 3.2.1 The Guideline Preparation Procedure Chart

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

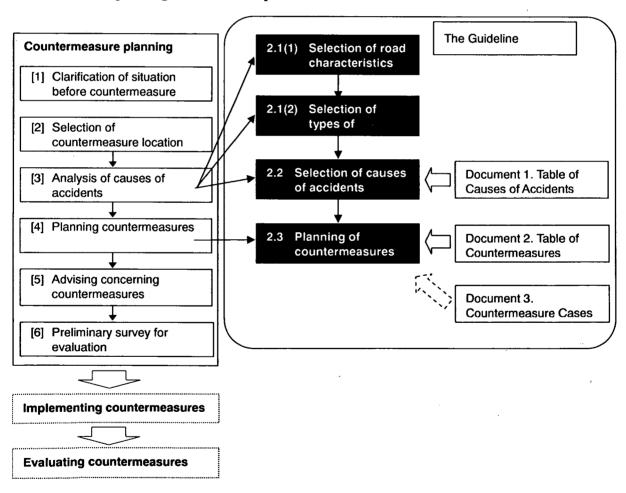


Figure 4.1 Method of Using the Guideline

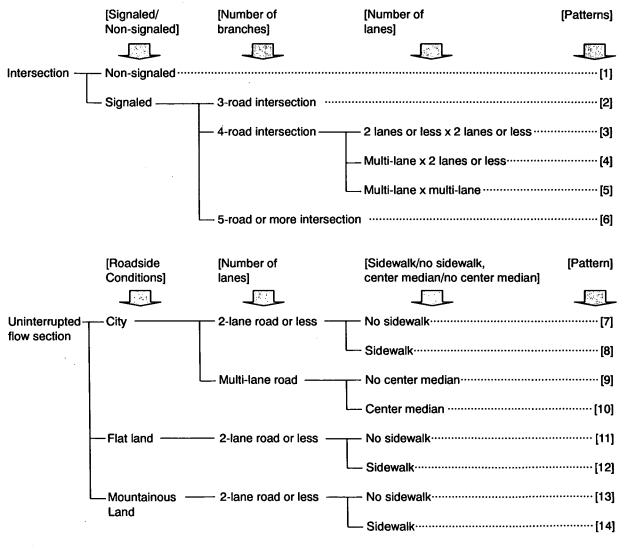
Beginning on the following page, the method of using the Guideline is described in detail beginning from the method of selecting road characteristics.

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.

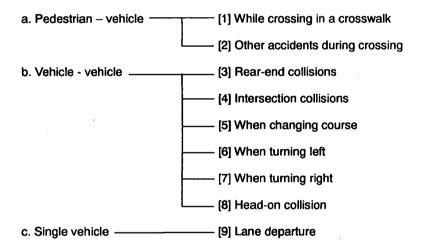


Figure 4.1.2 Chart Used to Select Types of Accidents

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

		accident types Statistical Reports	Categorization of accident types in the Guideline
	Head-on co	llision	[8] Head-on collision
	Collision w	hen meeting and passing	
	Intersection	collision	[4] Intersection collision
	Collision w	hen overtaking and passing	* When overtaking and passing
	Collision w	hen changing course	[5] When changing course
Vehicle – vehicle	Left turn co	llision	[6] During a left turn
accident	Right turn c	collision	[7] During a right turn
	Collision w	hen turning around	
	Collision w	hen crossing	
	Collision w	hen backing up	* Other vehicle – vehicle accidents
	Others		
	Rear-end co	llision	[3] Rear-end collision
	Collision w	ith parked vehicle	[5] Rear-end consists
	Collision w	ith a structures	
Single vehicle	Road depar	ture	[9] Lane departure
	Rolling		[7] Lane departure
	Others		
		Crosswalk	[1] Crossing in a crosswalk
	Crossing	Near a crosswalk	[1] Clossing in a closswark
	the road	Near a pedestrian bridge	[2] Crossing at other locations
		Others	[2] Clossing at other locations
Pedestrian -	Walking fac	cing the traffic	
vehicle	Walking wi	th their back to the traffic	
	Playing on	the road	Other pedestrian – vehicle accidents
	Working on	the road	Other pedestrian - venicio accidents
	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

					1	Accio	lent	types	incl	luded	1	
		Roa	nd characteristics	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
	Non-signa	led			0	0	0			0		
_		3-road inters	ection	0,		0	0			0		
ctior			Intersection of roads with 2 lanes or less			0	0		0	0		
Intersection	Signaled	4-road intersection	Intersection of a multi-lane road with road with 2 lanes or less	0		0	0			0		
			Intersection of multi-lane roads			0	0		0	0		
		5-road or mo	ore intersection			0	0			0		
		2-lane or	No sidewalks		0	0				0	0	0
ction	City	less	Sidewalks		0	0			0	0		0
w se	City	Multi-lane	No center median			0	0			0		
d file		IVIUILI-IAIIC	Center median			0	0	0		0		
Uninterrupted flow section	Flat land	2-lane or	No sidewalks		0	0					0	0
nterr	I lat land	less	Sidewalks		0	0		<u> </u>			0	0
Unir	Mountai-	2-lane or	No sidewalks			0					0	0
	nous land	less	Sidewalks			0					0	

(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.

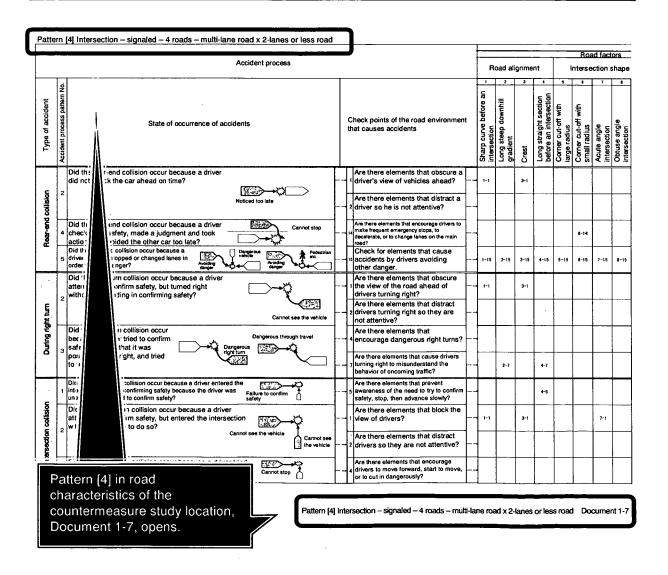


Figure 4.2.1 Example of the Selection of Road Characteristics

< [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.

		Accident process				R	oad al	ignme	nt	-	Roa	ed fac	
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environmen hat causes accidents	t	Sharp curve before anintersection	Long steep downhill gradient	,	Long straight section before an intersection	Corner cut-off with large radius	Corner cut-off with small radius	Acute angle intersection	Obtuse angle
Ę	Acc	"Rear-end collision" that occur frequently at the		Are there elements that obscure a driver's view of vehicles ahead?	<u> </u>	- Sha	Lor	Y Crest	Lor	Cor	Sms	Acu	ð
r-end callision	4	countermeasures study location is viewed.	:	Are there elements that distract a driver so he is not attentive? Are there elements that encourage drivers to make frequent emergency stops, to							8-14		
Rear	5	action, but avoided the other car too late? Did the rear-end collision occur because a triver abunulty stopped or changed lanes in order to avoid danger? Protection of the control of t		decelerate, or to change lanes on the main road? 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-
F	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety?		Are there elements that obscure the view of the road ahead of drivers turning right? Are there elements that distract	-	1-1		3-1					
During right turn	_	Cannot see the vehicle Did the right turn collision occur because a driver tried to confirm Dangerous through travel	:	drivers turning right so they are not attentive? Are there elements that encourage dangerous right turns?				-					
ð	3	safety, decided that it was possible to turn right?		Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?			2-7		4-7				
_	1	Did the intersection collision occur because a driver entered the intersection without confirming safety because the driver was failure to confirm a safety?		Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?					4~5				Г
tion callision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so? Camot see the vehicle Cannot see		Are there elements that block the view of drivers? Are there elements that distract		1-1		3-1				7-1	F
Intersection	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed?	- 2	drivers so they are not attentive? Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	 								

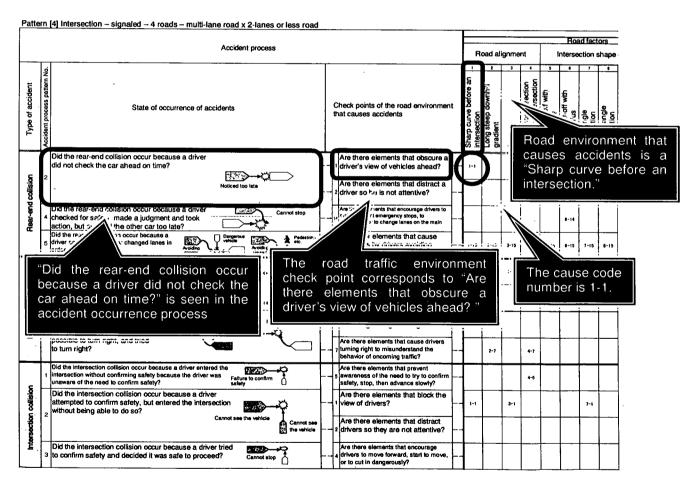
Pattern [4] Intersection - signaled - 4 roads - multi-lane road x 2-lanes or less road Document 1-7

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.



Pattern [4] Intersection - signaled - 4 roads - multi-lane road x 2-lanes or less road Document 1-7

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)

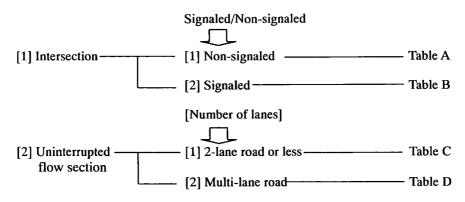


Figure 4.3.1 Table of Countermeasures

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.

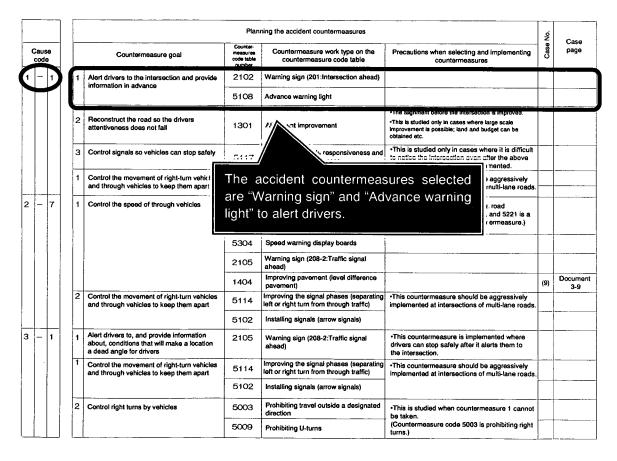


Figure 4.3.2 Example of Planning Countermeasures

Document 1

Table of Causes of Accidents

		1 (1) Intersection – non-signaled												Roa	d enviro	nments t	that cau	se accid	dents								(1/2
		Accident process			-	F	Road ali	gnment					factors section s	shape			La	nes/wid	ith	 				nment fa s/structu			—
							2	3	4	5	6	7	8	9	10	11		13	14	15	16	17		19		21	22
Type of accident	Accident process pattern No.	State of occurrence of accidents	c	heck points of the road environment that causes accidents		Sharp curve before an intersection	ong steep downhill gradient	Drest	ong straight section before an ntersection	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 neesection	Long crossing distance for pedestrians and bicycles	Iwo or more right/left turn lanes	Varrow 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 regetation, signboards, etc. on the sidewalks	nappropriately located traffic signs and oad surface indicators with unsuitable contents (unclear and complex)	3ridge piers and other structures	Same lanes used for right and left turn rehicles and for through vehicles	Vehicles turning right or left leave the
	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? Failure 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	1	,	
n collision		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	→ 1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1		
Intersection co	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers so they are not attentive?	→					ī				9-2										19-2			
	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?	→																						
		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			,	
c	2	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→									9-2						15-2				19-2			
ear-end collisio	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?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-1
Re	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	→ 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	22-1
-		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		
lht turn	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2			
During right turn	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	→ 4	Are there elements that encourage dangerous right turns?	→										10-4						:					21-4	
	3	Dangerous right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																		
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.												11-13											
Other cro	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		
	1 -	nor be seen		Are there elements that distract a driver so	1 7		1				1	1	1									1		1	1	1	1

^{*} 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.

		(1) Intersection – non-signaled										-				vironmer raffic env				3							2/2)
		Accident process					Accessories/ structure			Roadsi	ide envi	ronmen	t			surface itions			Signal	S		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		Chec	ck 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
	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?	→	- 10	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			
n collision	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	→		Are there elements that block the view of drivers?	→		24-1	4													38-1					44-1
Intersection co	2	Cannot see the vehicle	→	2 1	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	→	11	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→	,													:							
	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															-				
5	2	Noticed too late	→	2	Are there elements that distract a driver so he is not attentive?	→								30-2									40-2	41-2			
Rear-end collisi	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
α	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	→	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
		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															38-1					
right turn	2	Cannot see the vehicle	→	2	Are there elements that distract drivers turning right so they are not attentive?	→				26-2															42-2	43-2	
During rig		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	→		Are there elements that encourage dangerous right turns?	→						;								-		•					
	3	Dangerous right turn	→	7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→																					
ossing		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		
Other cr		Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian?	→		Are there elements that block the view of drivers?	→		24-1	25-1													38-1		_			44-1
	-	nor be seen	-	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.

		(2) Intersection - Signaleu - 3 Toaus			T							Road	factors	F	Road en	vironme	nts that	cause	accider	nts		7	raffic en	vironm	ent fact	ors	<u>\</u>	=
		Accident process			þ			gnment				Inters	section s	,		1 44		nes/wid		<u> </u>			Access	ories/st	tructures	s		
			1	i		1	2	3	4	5	6	7	8	9	10_	11	12	13	14	15	16	17 ci	18	19	20	21	22	23 ta
Type of accident	Accident process pattern No.	State of occurrence of accidents		heck 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	1 9	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	5 I +⊇	Same lanes used for right and left turn vehicles and for through vehicles	\$ <u>a</u>	Oncoming right turn vehicles stopping a inappropriate locations
		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	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→															15-2				19-2				
r-end collision	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?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-14	
Rea	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? Dangerous vehicle Avoiding 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
	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? Failure to confirm safety	→ 5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5	i						i								19-5				
collision		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			
Intersection colli	2	Cannot see the vehicle Cannot see the vehicle	→ 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? Cannot stop	→ 4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							
		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	ļ		20-1			23-1
right turn	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2				
During riç		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	→ 4	Are there elements that encourage dangerous right turns?	→																					21-4		
	3	Dangerous right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	-		2-7		4-7																			
crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? Dangerous crossing Dangerous crossing	→ 1:		→											11-13												
gina		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			
ossin		A	→ 2	Are there elements that distract a driver so he is not attentive?	→					5-2			8-2	9-2	10-2									19-2	2			
While cr	2	Pedestrian not visible	-→ ;	Are there elements that obscure the intersection?																								
5			→	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.

		(2) Intersection – signaled – 3 roads		<u> </u>									Road	environm				nts							(2/2)
		Accident process		(Accessorie	es/structure	<u> </u>	Roads	side envir	onment			Traffic e	Tivironini		Signals	- <u></u>		Congestion/			Others		
				1		24	25	26	27			30	cond 31	itions 32	33	34	35		37	stopping 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 ca accidents	uses	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)		Poorly located signals that are difficult to see	Short time available for forward movement		Signal phase operation that is difficult to understand (complex, time differences)	1	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
	2	Did the rear-end collision occur because a driver did not check the car ahead on time?	→	Are there elements that obscure a driver view of vehicles ahead?	→	24-1																			
۔		Noticed too late	→		→							30-2			33-2						40-2	41-2			
Rear-end collisio	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	→ 1	Are there elements that encourage drive to make frequent emergency stops, to decelerate, or to change lanes on the moroad?				26-14			29-14		31-14	32-14							40-14	41-14			44-14
Res	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? Dangerous vehicle Avoiding danger	→ 1	Check for elements that cause accidents 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
	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? Failure to confirm safety	→	Are there elements that prevent awaren of the need to try to confirm safety, stop, then advance slowly?	ess →						29-5	30-5			33-5						40-5	41-5			
ection collision	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	→	Are there elements that block the view of drivers? Are there elements that distract drivers	→	24-1														38-1					44-1
Intersecti		Cannot see the vehicle	→	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? Cannot stop	→	Are there elements that encourage drive to move forward, start to move, or to cut dangerously?	rs in →											34-4	35-4								
		Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety?	→	Are there elements that obscure the vier the road ahead of drivers turning right?	v of →										33-1					38-1					
right turn	2	Cannot see the vehicle	→	Are there elements that distract drivers turning right so they are not attentive?	→			26-2															42-2	43-2	
During ri	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	→	Are there elements that encourage dangerous right turns?	→											34-4									
		Dangerous right turn	→	Are there elements that cause drivers turning right to misunderstand the beha of oncoming traffic?	vior →													36-7	,						
crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? Dangerous crossing Dangerous crossing	→	Are there elements that encourage pedestrians to cross roads dangerously	→								:			34-13	3			38-13					
crossing in a crossw		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 drivers? Are there elements that distract a driver		24-1	25-1										-	-	-	38-1			-	-	<u> </u>
	,	★	→	he is not attentive? Are there elements that distract a diversity he is not attentive?				26-2			-			-	33-2	<u> </u>		-			<u> </u>	41-2	_	-	-
While	-	Pedestrian not visible	→	5 intersection? Are there elements that encourage driv					ļ							-		-			40-5	-	+	-	1
			→	4 to move forward, start to move, or to cudangerously?		<u></u>										34-4			37-4				<u></u>		

^{*} 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.

		(3) Intersection – signaled – 4 roads – 2-lanes of less x 2-												Roa	ad enviro	nments	that ca	use acc	idents	1		T-#					•/ - /
		Accident process					Road a	lignmen	t				factors section	shape			L	anes/w	idth					nment fa s/structur			
						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	C	heck 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	t te	Inappropriately located traffic signs and road surface indicators with unsuitable contents (unclear and complex)	Bridge piers and other structures		Vehicles turning right or left leave the right and left turning lanes
		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	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→															15-2	!			19-2			
ar-end collision	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?	→						6-14	7-14							14-14	•				19-14		21-14	22-14
Rea	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	→ 15		→	1-15	2-15	3-15	4-15		6-15	7-15	8-15	9-15					14-15	5 15-18	5		18-15	19-15	20-15	21-15	22-15
	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			
collision		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		
Intersection	2	Cannot see the vehicle Cannot see the vehicle	→ 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? Cannot stop	→ 4	,	→																						
	1 1	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																			
E	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2			L
During right turn		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	→ 4		→																					21-4	
	3	right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																		
left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? Abruptly turning left	→ (Are there elements that encourage abrupt left turning?	→								8-6											19-6			
During a l		Did the collision occur while the driver turned left after checking for safety but without confirming safety? Cannot see the vehicle	→ .:	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 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.

		Assided areas			\vdash		-	-					F		rironmen affic env											
		Accident process				cessories/			Roadsi	ide envi	ironmen	l		Road	surface litions			Signals	3		Congestion/ stopping			Others		
	T				1	23	24	25	26	27	28	29	30	31	32	33	34	35		37	38	40	41	42	43	44
Type of accident	Accident process pattern No.	State of occurrence of accidents	Cł	neck points of the road environment that causes accidents	and the second purpose, the second purpose, the second purpose of the second purpose, the second purpose of th	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	ng the	No crossing facilities at a location they are needed	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
		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	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive? →									30-2			33-2						40-2	41-2			
r-end collision	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
Rear	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	→ 15	Check for elements that cause accidents by drivers avoiding other danger. →		23-15	24-15		26-15	- Andrews		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
	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			
collision		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	→ 1	Are there elements that block the view of drivers?			24-1														38-1			i i		44-1
Intersection colli	١ ٢	Cannot see the vehicle	→ 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? Cannot stop	→ 4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously? →	,									-		1	34-4	35-4								
		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					
1	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive? →																				42-2	43-2	
rit tdoir ocian C		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? →													34-4									
	3		→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic? →	•														36-7							
and the soil	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? Abruptly turning left	→ 6	Are there elements that encourage abrupt left turning? →	•		-	-				29-6					-									
c ciri	5 I	Did the collision occur while the driver turned left after checking for safety but without confirming safety? Cannot see the vehicle	→ 2	Are there elements that distract a driver so he is not attentive? →	*	·						ļ.													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 O-15), refer to other types of accidents.

		(4) Intersection – signaled – 4 roads – multi-lane road x 2			T									F	Road en	vironme	ents that	t cause	accide	nts								(1/2)
		Accident process			F		le heaf	ignmen					factors ection :	shane			1.	anes/wi	idth					nvironme sories/str				
	1				\pm	1	2	3		5	6	7	8	9	10	11	12		14	15	16			19			22	23
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environment that causes accidents		harp curve before an intersection	ong steep downhill gradient	vest	ong straight section before an ntersection	comer cut-off with large radius	corner cut-off with small radius	cute angle intersection	Obtuse angle intersection	complexly shaped intersection	Drivers tend to drive fast in a large intersection	ong crossing distance for pedestrians ind bicycles	wo or more right/left turn lanes	larrow major road	Changing lane operation (through lane changes to a left or right turn lane)	Abicycle 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	oorly located and maintained egetation, signboards, etc. on the idewalks	nappropriately located traffic signs and oad surface indicators with unsuitable ontents (unclear and complex)	dridge piers and other structures	Same lanes used for right and left turn vehicles and for through vehicles	ehicles turning right or left leave the ght and left turning lanes	Oncoming right turn vehicles stopping tinappropriate locations
		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	<u>.</u> =				<u> </u>		<u> </u>	- "	F		0.8	3	<u> 11.0</u>	17-1	18-1	= = 0		100 >		0.8
	2	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→															15-2	_			19-2		-		
-end collision	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?	→ 1	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	
Rear	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	→ 1	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
		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								i.						17-1			20-1			23-1
turn	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→							ļ ———		9-2										19-2				
During right		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	→ 2	Are there elements that encourage dangerous right turns?	→			_							10-4											21-4		
	3	right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7							!												
	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? Failure to confirm safety	→ {	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5															19-5				
n collision	2	Did the intersection collision occur because a driver attempted to confirm safety, but entered the intersection without being able to do so?	→	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1			
Intersection	_	Cannot see the vehicle Cannot see the vehicle	→ :	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? Cannot stop	 → .	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→																							
a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? Dangerous crossing Dangerous crossing	→ 1	Are there elements that encourage pedestrians to cross roads dangerously.	→											11-13												
ing in		Did the vehicle hit the pedestrian because the driver tried to confirm safety, but proceeded without being able to see the pedestrian?	→	Are there elements that block the view of drivers?	→			3-1													16-1	17-1	18-1		20-1		<u> </u>	\perp
e cross	2	★ >****	→ →	Are there elements that obscure the	→ →					5-2			8-2	9-2	10-2				+				 	19-2	-		+	-
Whi		Pedestrian not visible	→	intersection? Are there elements that encourage drivers	→				-		-				-		-		-				-	_		+	+	-

^{*} 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.

		(4) Intersection – signaled – 4 roads – multi-lane road x 2			<u> </u>								Ro	ad enviro		that cau		ents						<u> </u>	(2/2)
		Accident process			1	Accessorie	s/structure		Roads	ide envi	ronment		Road	surface litions	CITATIO		Signals			Congestion/ stopping			Others		
					\top	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	С	heck points of the road environment that causes accidents		Obstructions to vision on the road sides (buildings, walls, etc.)	Jows of bright structures lining the cadway	-acilities that distract drivers	Heavily used roadside facility driveway axit/entrance or narrow street	Unclear roadside facility driveway sxifentrance or narrow street	Driveways of facilities along the oadside entering the intersection	/isibility reduced by sunlight in the norning 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	Songested 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
	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	ш. ц.		<u> </u>							5, 5	<u> </u>	<i>,</i>					2. (0		
	2	Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→							30-2			33-2						40-2	41-2			
ear-end collision	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
R	5	Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger? Dangerous vehicle Pedestrian etc. Avoiding 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
	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					
right turn		Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→			26-2															42-2	43-2	j
During righ		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	→ 4	Are there elements that encourage dangerous right turns?	→									:		34-4									
Ĭ	3	Dangerous right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→													36-7							
	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? Failure to confirm safety	→ 5	i	→		•				29-5	30-5			33-5						40-5	41-5			
collision		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	→ 1	Are there elements that block the view of drivers?	→	24-1					ļ !		,							38-1					44-1
Intersection	2	Cannot see	→ 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? Cannot stop	→ 4	Are there elements that encourage drivers to move forward, start to move, or to cut in dangerously?	→		<u> </u>									34-4	35-4								
a crosswalk	1	Was the pedestrian hit by the vehicle when crossing the road while ignoring the signal? Dangerous crossing Dangerous crossing	→ 13		→											34-13				38-13					
sing in		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					ļ
cros	2	A	→ 2	Are there elements that distract a driver so he is not attentive? Are there elements that obscure the	→			26-2		-			1	 	33-2	-	ļ					41-2			
While	-	Pedestrian not visible	→ 5	intersection? Are there elements that encourage drivers	→					+-	-		-	 				-			40-5				
			→ 4		→] .			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.

		A			丁		-								ad enviro	nments	that cau	se acci	dents								(1/2)
		Accident process			-		Road al	ianment	<u> </u>	Τ			factors				L	anes/wi	dth	+			ic enviro cessorie			-	
						1	2	3		5	6	7	_	9	10	11		13		15	16			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	ong steep downhill gradient	Srest	ong straight section before an	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 ntersection	ong crossing distance for pedestrians and bicycles	wo or more right/left turn lanes	Varrow major road	Changing lane operation (through lane changes to a left or right turn lane)	A bicycle crossing zone at a location vith a pedestrian crosswalk	Park intersection where pedestrians and parked vehicles are difficult to see	oorly located and maintained trees itc. on the center median	oorly located and maintained egetation, signboards, etc. on the idewalks	appropriately located traffic signs and oad surface indicators with unsuitable ontents (unclear and complex)	ridge piers and other structures	Same lanes used for right and left turn rehicles and for through vehicles	Vehicles turning right or left leave the ight and left turning lanes
	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			Ĭ											17-1	18-1	= = 0	ш	0) >	_2.E
			→ 2		→															15-2		!		19-2			
ar-end collision	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?	→						6-14	7-14		9-14					14-14					19-14		21-14	22-14
. Be	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	→ 15	Check for elements that cause accidents by drivers avoiding other danger.	→ 1	I-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
	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	1-1		3-1									12-1					17-1			20-1		
ng right turn		Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→ .									9-2										19-2			
D Curi	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	→ 4	Are there elements that encourage dangerous right turns?	→										10-4											21-4	
		right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→		2-7		4-7																		
	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? Failure 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			
on collision	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	→ 1	Are there elements that block the view of drivers?	→	1-1		3-1				7-1										17-1	18-1		20-1		
Intersection		Cannot see the vehicle	→ 2		→																			19-2			
	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?	→																						
a left turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? Abruptly turning left	→ 6	Are there elements that encourage abrupt left turning?	→								8-6											19-6			
During a	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? Cannot see the vehicle	→ 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 O-15), refer to other types of

^{*} 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

		(5) Intersection – signaled – 4 roads – multi-lane road x n													vironme											-/2)
		Accident process			-	Accessories			Roadsid	de envir	ronment			Road :	raffic env surface	ironmer		Signats			Congestion/			Others		-
	 T					/structure 23	24		26				30	cond 31	tions 32	33	34	35	36	37	stopping 38	40		42	43	44
Type of accident	Accident process pattern No.	State of occurrence of accidents	Cr	neck 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	location they	Motorcycles and cyclists weaving through traffic	On-street parking and stopped busses obstructing traffic movement
	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																			
		Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive? Are there elements that encourage drivers	-								30-2			33-2						40-2	41-2		····	
ar-end collision	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
Rear	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	→ 15	Check for elements that cause accidents by drivers avoiding other danger.	→	23-15	24-15		26-15		1.0	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
		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					
right turn	2	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→				26-2															42-2	43-2	
During riç		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	→ 4	Are there elements that encourage dangerous right turns?	→												34-4									
	3	Dangerous right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→														36-7							
	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? Failure 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			
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 elements that block the view of drivers?	→		24-1														38-1					44-1
ersection		Cannot see the vehicle	→ 2	Are there elements that distract drivers so they are not attentive?	→				26-2				30-2			33-2						40-2	41-2		43-2	
Inte	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?	→												34-4	35-4								
eft turn	1	Did this collision occur because the driver turned left without predicting a vehicle ahead? Abruptly turning left	→ 6	Are there elements that encourage abrupt left turning?	->							29-6														
During a left turn	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? Cannot see the vehicle	→ 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 O-15), refer to other types of accidents.

Γ		A - 1d - A										Dani	foot	Roa	ad enviro	nments	that cause	accide	ents			Toole					
		Accident process			\vdash		Road al	gnment					factors section s	shape			Lane	es/width	h					nment fa			\longrightarrow
	T					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					21	22
1 '	lype of accident	State of occurrence of accidents	CI	neck 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		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	maintair redian	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
	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				
		Noticed too late	→ 2	Are there elements that distract a driver so he is not attentive?	→									9-2						15-2				19-2	 		
	noisiloo pua-ri	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?	→						6-14	7-14		9-14				1	14-14					19-14		21-14	22-14
	Hear	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	→ 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				1	14-15	15-15		17-15	18-15	19-15	20-15	21-15	22-15
		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		ı												17-1			20-1		
1	t tru	Cannot see the vehicle	→ 2	Are there elements that distract drivers turning right so they are not attentive?	→									9-2										19-2			
	During right	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	→ 4	Are there elements that encourage dangerous right turns?	→									100					į							21-4	
	3	Dangerous right turn	→ 7	Are there elements that cause drivers turning right to misunderstand the behavior of oncoming traffic?	→	-	2-7		4-7																		
	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? Failure to confirm safety	→ 5	Are there elements that prevent awareness of the need to try to confirm safety, stop, then advance slowly?	→				4-5					1										19-5		j	
	n collision	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		
	Intersection	Cannot see the vehicle Cannot see the vehicle the vehicle	→ 2	Are there elements that distract drivers so they are not attentive?	→									9-2										19-2			
	- -	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?	→																						

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															Road er		nts that o			3							
		Accident process				-	Accessories/			Roads	ide envi	ronment			Road	surface	VIIOIIIIEI	III IACIOI	Signals			Congestion/			Others		
-	1		1				structure 23	24	25			28	29	30	31	itions 32	33	34		36	37	stopping 38	40	41	42		44
Type of accident	Ιğ	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	clists weaving through	On-street parking and stopped busses obstructing traffic movement
	2	Did the rear-end collision occur because a driver did not check the car ahead on time?	→	1 vi	re there elements that obscure a driver's iew of vehicles ahead?	→		24-1																			
		Noticed too late	→	2 h	e is not attentive?	→								30-2			33-2						40-2	41-2			
noisilloo buo re		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	→ 1	14 ro	re there elements that encourage drivers on make frequent emergency stops, to ecclerate, or to change lanes on the main pad?	→				26-14			29-14		31-14	32-14							40-14	41-14			44-14
۵		Did the rear-end collision occur because a driver abruptly stopped or changed lanes in order to avoid danger?			theck for elements that cause accidents y drivers avoiding other danger.																						
	5	Dangerous vehicle Avoiding danger Avoiding danger Avoiding danger	→ 1	15	i	→	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
		Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety?	→		are there elements that obscure the view f the road ahead of drivers turning right?	→	23-1										33-1					38-1					
	2	Cannot see the vehicle	→		re there elements that distract drivers urning right so they are not attentive?	→				26-2															42-2	43-2	
400	,	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	→		are there elements that encourage angerous right turns?	→												34-4									
	3	Dangerous right turn	→	l tı	are there elements that cause drivers urning right to misunderstand the behavior of oncoming traffic?	1														36-7							
	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? Failure to confirm safety	→	10	are there elements that prevent awareness of the need to try to confirm safety, stop, hen 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? Cannot see the vehicle	→	1 d	Are there elements that block the view of lrivers?	→		24-1				-			}							38-1					44-1
	2	Cannot see the vehicle	→	2 ti	Are there elements that distract drivers so hey 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? Cannot stop	→	te	Are there elements that encourage drivers on move forward, start to move, or to cut in langerously?	→												34-4	35-4								

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		Accident process			F						Boad	factors	oad envi	onment	ts that ca	ause ac	cidents			raffic on	vironmo	nt factors		
		Accident process						d alignn				ion shape			anes/wid					Access	ories/str		<u></u>	
	No.					1	2	3	4	5	6	7	8	9	10 aud	th lane (e)	12 Logis	ians, ent are	lo pell	15 səə.	16 S S	17	18 with	19
Type of accident	Accident process pattern	State of occurrence of accidents	Ch	eck 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 a width of lanes	Complex change of the number width of lanes	Changing lane operation (through I changes to a left or right turn lane)	Slow vehicles traveling in a sect without a passing zone (lane)	Dark intersection where pedestriparked vehicles, and the alignm difficult to see	Optical guidance either not insta inadequate (nighttime)	Poorly located and maintained treetc. on the center median	Poorly located and maintained tre signboards, etc. on the sidewalks		Inappropriately located traffic sigunsuitable contents (unclear and complex)	Bridge piers and other structures
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating	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	
collision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Noticed too late	1	Are there any elements that block visibility?	→	1-1																		
Rear-end	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? Avoiding 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
	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.	→																			
ier crossing	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 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? Cannot stop	8	Are there any elements that contribute to driver inability to control a vehicle?	→																			
	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	
departure	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														
Lane	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	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
		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? Entering the curve at high speed without confirming its alignment	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																
no collision		Passing without confirming safety	11	Are there any elements that encourage frequent passing in the oncoming lane?	→									,			12-11							
Head-c	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	17	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? Cannot stop	8	Are there any elements that contribute to driver inability to control a vehicle?	→	7				5-8														ļ
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? Dangerous vehicle Avoiding danger Avoiding 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	19-1
t tum	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 any elements that block visibility?	>	1-1		3-1																19-1
During right	3	ngnt?	+ 4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in. Are there elements that encourage misunderstanding of the	→														-					ļ
L°		Judging it is safe to turn right	, 7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→		2-7		4-7										<u></u>			لــــا	<u> </u>	

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		Accident process								·				F			ents tha		accidents ors						
	т		1			-	20	21	Roads 22	side en 23			5	27	Roa 28	d surfac	ce cond	litions 31	Congestio 34	on/stopping 35	37	40	Others 41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check po	oints 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	streets warrow streets	roadside facility driveway		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 troad	Congested main road	Heavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	tion they	ng through vehicle	On-street parking and stopped busses bostructing traffic movement
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating and deceleration an	→ 1	Are t emer main	there elements that encourage drivers to make frequent ergency stops, to decelerate, or to change lanes on the n road?	→			22-14	23-1	4 24-	14 25	15						34-14	35-14					43-14
ollision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Noticed too late	→ 1	Are t	there any elements that block visibility?	→	20-1							27-1											
Rear-end o	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle?	→ {		there any elements that contribute to driver inability to trol 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? Dangerous vehicle Avoiding danger	→ 1		eck for elements that cause accidents by drivers avoiding or danger.	→	20-15	21-15	22-15	23-1	5 24-	15 25	-15 2	?7-15	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15	4	43-15
	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	→ 1		there elements that encourage pedestrians to cross ds dangerously.	→										-				35-13			41-13	,	43-13
r crossing	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	→	Are 1	there any elements that block visibility?	→	20-1	21-1			i			27-1						35-1					43-1
Ö	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?	→		there any elements that contribute to driver inability to trol a vehicle?	→									28-8	29-8	30-8	31-8							
	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? Delayed awareness of the alignment	→ 1		there any elements that make it difficult to understand the nment?	→																			
e departur	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 cont	there any elements that contribute to a driver's inability to trol a vehicle?	→									28-8	29-8	30-8	31-8							
Lan	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	→ 1	15 acci	there any elements that cause danger avoidance type idents?	→	20-15	21-15	22-15	23-1	5 24	-15 25	-15	27-15	28-15	29-15	30-15	31-1	34-15	35-15	37-15		41-15		43-15
		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? Entering the curve at high speed without confirming its alignment	→ 1		there any elements that make it difficult to understand the inment?	→			-				į												
	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?	→		e there elements that make it difficult to confirm safety fore moving into the oncoming lane to pass a vehicle?	→	20-10																		
n collision		Passing without confirming safety	→	11 the	e there any elements that encourage frequent passing in oncoming lane?	→								<u>.</u>											43-11
Head-c	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→	17 dan onc	e there any elements that encourage drivers to pass ngerously when it is easy to misunderstand the behavior of coming vehicles?	→																		-	
	4	Cannot stop	→	8 con	e there any elements that contribute to driver inability to ntrol a vehicle?	→									28-8	29-8	30-8	31-1	3					-	
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? Avoiding danger Avoiding danger Avoiding danger	→	15 othe	eck for elements that cause accidents by drivers avoiding er danger.	→	20-15	21-1	5 22-1	5 23-	15 24	-15 2	5-15	27-15	28-15	29-15	30-1	5 31-1	5 34-15	35-15	37-15		41-15		43-15
ttum	2	Cannot see the vehicle	→	1	e there any elements that block visibility?	→								27-1						35-1					<u> </u>
Juring right	3	ngin:	→	4 dar	e there elements that encourage drivers to drive ingerously or start up, and aggressively cut in. e there elements that encourage misunderstanding of the				-		.						-	-	34-4		37-4	-			
		Judging it is safe to turn right	→	7 bet	havior of oncoming vehicles.	→									<u> </u>	<u> </u>				_					'

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		Accident process								-	Road	factors	oad envi	ronmen	ts that c	ause ac	cidents			raffic en	vironme	nt factor		1/2)
		Acqueit process						d alignn	nent			tion shape		 	anes/wi					Access	ories/str	uctures	<u> </u>	
						1	2	3	4	5	6	7	8	9	10		12	13	14	15	16	17	18 =	19
Type of accident	Accident process pattern No.	State of occurrence of accidents	CH	eck points of the road environment that causes accidents	3	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	<u>a</u> a	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 unsultable contents (unclear and complex)	Bridge piers and other structures
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	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	
collision	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			
ar-end o	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?	→																			
, B	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Avoiding 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
	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.	→			,									·							
ner crossing	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 any elements that block visibility?	→	1-1		3-1	,									13-1						19-1
ð	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?	→												1							
E	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
ring right	3	and tried to turn right?	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in. Are there elements that encourage	→																			
3		Judging it is safe to turn right	→ 7	misunderstanding of the behavior of oncoming vehicles.	→		2-7		4-7															
	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? Delayed awareness of the alignment	→ 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	
ne departure	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													-	l
P	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle	→ 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	5	13-15	14-15		16-15		18-15	19-
a left turn	1	Sudden left turn	→ 18		→																		18-18	
During a	2	Did the collision occur while the driver turned left after checking for safety but without confirming safety? Cannot see the vehicle	→ 2	Are there elements that district drivers, making then inattentive?	→																			

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		Accident process							<u> </u>		duar			1	raffic er	vironme	ent factor		n/otone:==	1		Others		
 -			Т-			-	20	21	Roads 22	ide env	ironmen 24	t 25	27	28	ad surfa	ce condi		Congestic 34	n/stopping 35	37	40	Others 41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents		Chec	ck 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
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→	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
collision	2	Did the collision occur because of delayed awareness	→	1	Are there any elements that block visibility?	→	20-1				ļ <u>-</u>		27-1											_
ar-end	4	Cannot stop	→		Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							
ă	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Dangerous vehicle	→	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
	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
er crossing	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 any elements that block visibility?	→	20-1	21-1					27-1						35-1					43-1
độ (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							
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					
g right		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				
During	3	Judging it is safe to turn right	→	7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→																		
	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?	-																		
departure	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							
Laned		Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger?			Are there any elements that cause danger avoidance type accidents?	ļ															-			
	5	Dangerous vehicle Pedestrian etc.	→	15		→	20-15	21-1	5 22-1	5 23-1	5 24-1	5 25-1	5 27-1	28-15	29-15	30-15	31-15	34-15	35-15	37-15		41-15	42-15	43-
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?	-						25-1	3											
During a le	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 O-15), refer to other types of accidents.

	-											R	oad env	ironmen	ts that c	ause ac	cidents						(1,-/
		Accident process			\vdash						Road								7			nt factors	
	<u> </u>		_		-			d alignn		-	Intersecti				anes/wi		1				sories/str		
Type of accident	Accident process pattern No.	State of occurrence of accidents	CI	neck points of the road environment that causes accidents		Sharp curve	Long steep downhill gradient	ο Crest	Long straight section	Reverse cant	Corner cut-off with large radius on	Obtuse angle intersection 4	Varrow lanes 88	Sudden decline of the number and ω	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 nadequate (nighttime)	Poorly located and maintained trees	Poorly located and maintained trees, aignboards, etc. on the sidewalks	Vegligently cut center median appropriately located traffic signs with musuitable contents (unclear and	
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 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						18-1	4
d collision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Noticed too late	→ 1	Are there any elements that block visibility? →	1	1-1																	
Rear-end	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? Dangerous vehicle Avoiding 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	18-1	5 19-15
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	1-1		3-1															19-1
During right	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? Judging it is safe	→ 4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in. →	•																		
۵		to turn right	→ 7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.			2-7		4-7			1											
lision	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 any elements that block visibility? →	, 1	1-1		3-1				-									16-1		19-1
ersection collisi	3	Cannot stop	→ 4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	•																		
Inter	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	→ 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 (9) Uninterrupted flow section – city – multiple lanes – no center median

		Accident process		,										···		cause a	accidents					
		, 100 Marin process			ļ			Roadsi	de envi	ronmen				d surfac			Congestio	n/etopping			Others	
	T		1			20	21		23			27	28		30		34	35	37	40		42 43
Type of accident	Accident process pattern No.	State of occurrence of accidents	C	neck 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 froad	Congested main road	Heavy traffic on the main road	rians or cyclists on and dewalks and shoulders	facilities at a location they	stopped busses
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 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
d collision	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										
Rear-end	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? Avoiding 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
turn	2	without succeeding in confirming safety? Cannot see the vehicle	→ 1	Are there any elements that block visibility?	→							27-1						35-1				
During right turn	3	o 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			
۵			7	Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	→																	
collision	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 any elements that block visibility?	→	20-1						27-1										43-1
Intersection coll	3 .	Did the intersection collision occur because a driver ried to confirm safety and decided it was safe to proceed? Cannot stop	→ 4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→														37-4			
<u>**</u>	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	→ 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.

		Accident process			-						Dood		ad envi	ronment	s that c	ause acc	cidents	r		#				
		Accident process			-		Roa	d alignm	nent		Road	on shape		نا	anes/wid	dth	 -	 			/ironmer			
					+	1		3		5	6	7	8	9	10	11	12	13		15	16	17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents	Che	eck points of the road environment that causes accidents .		Sharp curve	ong steep downhill gradient	Crest	ong straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Varrow 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)		Optical guidance either not installed or nadequate (nighttime)	Poorly located and maintained trees	only located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	Sridge piers and other structures
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	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		
collision	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			
Rear-end c	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?	•																			
ш.	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Dangerous vehicle	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			1	15-15	16-15	17-15	18-15	19-1
nt 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
During righ	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? Judging it is safe to turn right	4	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in. Are there elements that encourage	•																		-	
		Did the collision occur because a driver changed lanes without time to confirm safety?	7	misunderstanding of the behavior of oncoming vehicles. Are there elements that encourage drivers to make	<u> </u>	\perp	2-7		4-7															
ging course	5	Passing without confirming safety	14	frequent emergency stops, to decelerate, or to change lanes on the main road?	,	. 5	ļ																18-14	
When changir	J	Did the vehicle hit the pedestrian, because it left its lane to avoid danger? Dangerous vehicle Avoiding danger Avoiding 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	19-1
ion	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 any elements that block visibility?	•	1-1		3-1												15-1	16-1			19-
Intersection collis	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 drive dangerously or start up, and aggressively cut in.	→																			
Inte	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 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.

		Accident process				-	<u> </u>									at cause nent fact	accidents					
		· · · · · · · · · · · · · · · · · · ·						Roads	ide envi	ronmen	t				ace cond			on/stopping	Ι"		Others	
			$\neg \vdash$,		20	21	22	23	24	25	27	28	29	30	31	34	35	37	40		42
Type of accident	Accident process pattern No.	State of occurrence of accidents		Check points of the road environment that causes accident	s	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the oadway	acilities that distract drivers	Heavily used roadside facility driveway exit/entrance	leavily used narrow streets	Inclear roadside facility driveway exityentrance or narrow street	fisibility reduced by sunlight in the norning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	toad surface icing	Phicles preparing to turn right or left topping or decelerating on the main oad	ongested main road	leavy traffic on the main road	Many pedestrians or cyclists on and around the sidewalks and shoulders	facilities at a loca	Motorcycles weaving through vehicle traffic
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→			22-14		24-14	25-14						34-14	35-14		~ 0	2.6	43
collision	2	Did the collision occur because of delayed awareness of the vehicle ahead?	→	Are there any elements that block visibility?	→	20-1						27-1						·				
Rear-end o	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? Cannot stop	→	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? Dangerous vehicle Avoiding danger	→	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
t turn	2	Did the right turn collision occur because a driver attempted to confirm safety, but turned right without succeeding in confirming safety?	→	Are there any elements that block visibility?	->							27-1						35-1				
ıring right		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?	→	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	-												34-4		37-4			
۵	3	Judging it is safe to turn right	→	7 Are there elements that encourage misunderstanding of the behavior of oncoming vehicles.	-																	
ging course	5	Did the collision occur because a driver changed lanes without time to confirm safety? Passing without confirming safety	→	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→						25-14											
When chan	3	Did the vehicle hit the pedestrian, because it left its lane to avoid danger? Dangerous vehicle Avoiding danger Avoiding danger	→	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	5 30-15	31-15	34-15	35-15	37-15			43
Ilision	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	→	Are there any elements that block visibility?	→	20-1						27-1										4
ersection co	3	Did the intersection collision occur because a driver tried to confirm safety and decided it was safe to proceed? Cannot stop	->	Are there elements that encourage drivers to drive dangerously or start up, and aggressively cut in.	→														37-4			
Ħ	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?	→	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.

		Accident process			F						Road	Re factors	oad envi	ronmen	ts that c	ause ac	cidents		7	raffic er	vironmer	t factore		(1/2)
								d alignn		1	Intersec	tion shape			anes/wi		~			Access	ories/stru	ctures		
					F	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	C	neck points of the road environment that causes accidents		Sharp curve	ong steep downhill gradient	Crest	ong straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Varrow 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 ifficult to see	Optical guidance either not installed or nadequate (nighttime)	Poorly located and maintained trees	Poorly located and maintained trees, signboards, etc. on the sidewalks	Vegligently cut center median	nappropriately located tramc signs with insuitable contents (unclear and complex)	3ridge piers and other structures
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 14	Are there elements that encourage drivers to make frequent emergency stops, to decelerate, or to change lanes on the main road?	→								8-14		10-14	11-14	5, 2				- W	1	18-14	
collision	2	Did the collision occur because of delayed awareness of the vehicle ahead?	→ 1	Are there any elements that block visibility?	>	1-1																		
ar-end	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?	→																			
P.	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Dangerous vehicle	→ 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			1	18-15	19-15
0	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			1	18-12	
e departur	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														
Lane	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	→ 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			1	18-15	19-1
		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? Entering the curve at high speed without confirming its alignment	→ 12	Are there any elements that make it difficult to understand the alignment?	→	1-12		3-12										13-12	14-12			1	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																
on collision		Passing without confirming safety	→ 11	Are there any elements that encourage frequent passing in the oncoming lane?	→												12-11							
Head-c	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→ 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	Cannol stop	→ 8		→					5-8														
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? Avoiding danger Avoiding danger Avoiding 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			1	18-15	19-
	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.	→																			
her crossing	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 any elements that block visibility?	→	1-1		3-1										13-1						19
Other	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?	→																			

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

		Accident process													ents that		accidents						(2)
<u> </u>			1	·		30	21		ide env 23	ironmen 24	t 25	27	Ros 28	ad surfa 29	ce condi	tions 31	Congestio	n/stopping	37		Others	42	42
Type of accident	Accident process pattern No.	State of occurrence of accidents	CI	eck points of the road environment that causes accident	s	Obstructions to vision on the road sides by buildings, walls, etc.)	Rows of bright structures lining the roadway	acilities that distract drivers	Heavily used roadside facility driveway Neway	Heavily used narrow streets	Unclear roadside facility driveway SxiVentrance 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 so	Congested main road \$	Heavy traffic on the main road	clists on and nd shoulders	facilities	ycles weaving through vehicle	On-street parking and stopped busses bostructing traffic movement
	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
collision	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											
ar-end	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							
æ	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding 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
0	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?	→																		
e departur	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					-		
Lan	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	→ 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
		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? Entering the curve at high speed without confirming its alignment	→ 12	Are there any elements that make it difficult to understand the alignment?	→																		
	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?	→	20-10																	
n collision		Passing without confirming safety	→ 11	Are there any elements that encourage frequent passing in the oncoming lane?	· →																		43-11
Head-on coll	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→ 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? Cannot stop	→ 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? Avoiding danger Avoiding danger	→ 15		->	20-15	21-15	22-15	23-15	5 24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
	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		-													35-13			41-13		43-13
Other crossing	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 any elements that block visibility?	-	20-1	21-1					27-1						35-1					43-1
δ	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? Cannot stop	→ 8	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							1

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		(12) Uninterrupted flow section – flat land – 2-lanes or less – side			Т							R	oad envi	ronmen	ts that c	ause ac	cidents							1/2)
		Accident process										factors							Ţ			nt factor		
				· · · · · · · · · · · · · · · · · · ·	+	1		d alignn 3		5	Intersecti 6	on shape	8	 	anes/wi		12	13	14	Access 15	ories/str 16	uctures 17	18	19
Type of accident	Accident process pattern No.	State of occurrence of accidents	Ch	eck points of the road environment that causes accidents		Sharp curve	ong steep downhill gradient	orest c	ong straight section	Neverse cant	corner cut-off with large radius	Obtuse angle intersection	larrow lanes	sudden decline of the number and width of lanes	complex change of the number and didth of lanes	Changing lane operation (through lane changes to a left or right turn lane)	slow vehicles traveling in a section in a section in its passing zone (lane)	ark intersection where pedestrians, arked vehicles, and the alignment are ifficult to see	idance either not installed or e (nighttime)	Poorly located and maintained trees	Poorly located and maintained trees, signboards, etc. on the sidewalks	edian	nappropriately located traffic signs with insuitable contents (unclear and complex)	গাdge piers and other structures
	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?	•	0,							8-14	9-14	10-14	-	0,3			<u></u> w	u. ø		18-14	
collision	2	Did the collision occur because of delayed awareness of the vehicle ahead?	1	Are there any elements that block visibility?	→	1-1																		
ar-end	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?	→																			
Re	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding 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
		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? — Entering the curve at high speed without confirming its alignment	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	d venide:	→	1-10		3-10																
on collisio		Passing without confirming safety →	11	Are there any elements that encourage frequent passing in the oncoming lane? Are there any elements that encourage drivers to	→												12-11							
Неаф	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	17	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? Cannot stop	8		→					5-8														
	5	Did the head-on collision occur because a driver shifted into the oncoming lane to avoid danger? Avoiding danger Avoiding danger Avoiding danger	15		→	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	19-1
e	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		→	1-12	-	3-12						9-12	10-12			13-12	14-12				18-12	
e departur	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														
Lan	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	15		→	1-15	2-15	3-15		5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15				18-15	19-1
	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.	→																			
Other crossing	2	Can rettner see nor be seen	1		→	1-1 -		3-1										13-1						19-
δ	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.

		Accident process	,				-	Roads	ide em	rironmen	·		ר	raffic er		ent facto	-	n/stopping		·	Others		
			T			20	21	22	23			27	28		30	31	34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents	C	heck 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	c 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 raffic	On-street parking and stopped busses obstructing traffic movement
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 1 ₄	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
ollision	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											•
ar-end c	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							
Re	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Dangerous vehicle	→ 1	Check for elements that cause accidents by drivers avoiding other danger.	→	20-15	21-15	22-15	23-1	5 24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15	į		41-15		43-15
		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? Entering the curve at high speed without confirming its alignment	-→ 1:	Are there any elements that make it difficult to understand the alignment?	→				:														
·	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?	→ 1	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	20-10			:														
on collision		Passing without confirming safety	→ 1	Are there any elements that encourage frequent passing in the oncoming lane?	→																		43-11
Head-on	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→ 1	the behavior of oncoming venicles?	→																		
	4	Did the head-on collision occur because a driver lost control of the vehicle, straying into the oncoming lane? Cannot stop	→ {	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? Avoiding danger Avoiding danger Avoiding danger	→ 1		→	20-15	21-15	22-15	23-1	5 24-15	25-15	27-15	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-15
	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? Delayed awareness of the alignment	→ 1		→																		
departure	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?	→	Are there any elements that contribute to driver inability to control a vehicle?	→	_							28-8	29-8	30-8	31-8							
Lane	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerou vehicle Pedestrian etc.	→ 1		→	20-15	21-1	5 22-1	23-1	5 24-1	5 25-15	5 27-1	28-15	29-15	30-15	31-15	34-15	35-15			41-15		43-1
_	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	→ 1		→													35-13		_	41-13		43-13
her crossing	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	→	Are there any elements that block visibility?	-	20-1	21-1					27-1						35-1					43-1
ð	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?	→	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							

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		Accident process			-						Road f		ad envi	ronment	s that ca	ause acc	cidents	T		raffic en	vironmen	t factors		
							Road a				Intersection				nes/wid		- 40	10			ories/stru		40	
Type of accident	Accident process pattern No.	State of occurrence of accidents	Che	ck points of the road environment that causes accidents	Sharp curve	# T T T T T T T T T T	cong steep downnill gradient	3 Crest	ong 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)	Poorty located and maintained trees etc. on the center median	Poorly located and maintained trees, signboards, etc. on the sidewalks	Negligently cut center median 21		Bridge piers and other structures
		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? Entering the curve at high speed without confirming its alignment		Are there any elements that make it difficult to understand the alignment? →	1-1	2	3	-12										13-12	14-12			1	8-12	
:	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?		Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	1-1	0	3	-10																
n collision		Passing without confirming safety Did the head-on collision occur a driver shifted to the oncoming	11	Are there any elements that encourage frequent passing in the oncoming lane? Are there any elements that encourage drivers to		_											12-11							
Head-c	3	lane after judging that it is possible to pass safely? Judging that it is possible to pass Did the head-on collision occur because a driver lost control	17	pass dangerously when it is easy to misunderstand the behavior of oncoming vehicles?		2-	17		4-17															
	4	of the vehicle, straying into the oncoming lane? Cannot stop Did the head-on collision occur because a driver	8	inability to control a vehicle? Check for elements that cause accidents by drivers						5-8														
	5	shifted into the oncoming lane to avoid danger? Avoiding danger Avoiding danger Avoiding danger	15	avoiding other danger. →	1-1	15 2-	-15 3	-15	4-15	5-15			8-15	9-15	10-15	11-15	12-15	13-15	14-15			1	18-15	
	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? Delayed awareness of the alignment	12		1-1	12	3	1-12	:					9-12	10-12			13-12	14-12			1	18-12	
Lane departure	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? Check for elements that cause accidents by drivers			:			5-8														
֟ ֓֞֟֝֟	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle	15	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	
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 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	
end collision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle?		Are there any elements that contribute to driver	→ 1	-1																		
Rear	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger?	-	Check for elements that cause accidents by drivers avoiding other danger.	+	-15 2	2-15	3-15	4-15	5-15			8-15	9-15	10-15	5 11-15	5 12-1	5 13-1	5 14-15	5			18-15	

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		Accident process							Roade	de envi	nnmen	•		1	raffic er		nt factor	ccidents rs Congestio	n/stopping			Others		
			Т			\dashv	20	21	22	23	24		27	28		30		34	35	37	40	41	42	43
Type of accident	Accident process pattern No.	State of occurrence of accidents		Che	eck 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	-acilities that distract drivers	Heavily used roadside facility driveway	Heavily used narrow streets	Unclear roadside facility driveway sxiVentrance 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 oad	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	ehicle	On-street parking and stopped busses obstructing traffic movement
		Did the head-on collision occur because a driver entered the curve at excessive speed without being able to			Are there any elements that make it difficult to understand the alignment?		-				T -		-	1 10		- -								-
		check the alignment of the road ahead, straying into the oncoming lane without being able to confirm safety? Entering the curve at high speed without confirming its alignment	→	12	understand the anglinnent?	→					•													
	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?	->	20-10																	
collision		Passing without confirming safety	→	11	Are there any elements that encourage frequent passing in the oncoming lane?	→																		43-11
Head-on	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→	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? Cannot stop	→	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? Avoiding danger Avoiding danger Avoiding 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
	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?	→																		
e departure	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	į						
Lane	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	→	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
,	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→	14	3	→			22-14	23-14	24-14	25-14						34-14	35-14					43-14
d collision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Noticed too late	→	1	Are there any elements that block visibility?	→	20-1						27-1											
Rear-end	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? Cannot stop	→	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? Avoiding danger Avoiding 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

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		Accident process					-			Boo	Ro d factors	ad envi	ronment	s that c	ause ac	cidents			roffic '				1/2)
	1	· · · · · · · · · · · · · · · · · · ·				Ro	oad align	ment			tion shape	-	Li	anes/wi	dth				raffic envi			<u> </u>	
					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	CI	neck points of the road environment that causes accidents	Sharp curve	ong steep downhill gradient	Orest	ong straight section	Reverse cant	Corner cut-off with large radius	Obtuse angle intersection	Varrow 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 vithout a passing zone (lane)	Dark intersection where pedestrians, parked vehicles, and the alignment are lifficult to see	Optical guidance either not installed or inadequate (nighttime)	ocated and maintaine the center median	oorly located and maintained trees, ignboards, etc. on the sidewalks	edian	Inappropriately located traffic signs with unsuitable contents (unclear and complex)	sridge piers and other structures
		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?		Are there any elements that make it difficult to understand the alignment?	 		1	-	<u> </u>				0/5	0 3	0.8	0,5	<u> </u>	<u> </u>	ш в	T &		= 3 0	
		Entering the curve at high speed without confirming its alignment	12	l -	1-1	2	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?	1-1	0	3-10																
collision		Passing without confirming safety —	11	Are there any elements that encourage frequent passing in the oncoming lane?												12-11							
Head-or	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	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? Cannot stop	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? Avoiding danger Avoiding danger Avoiding danger	15	Check for elements that cause accidents by drivers avoiding other danger. →	1-1	5 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	
	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? Delayed awareness on the alignment	12	Are there any elements that make it difficult to understand the alignment?	1-1	2	3-12						9-12	10-12			13-12	14-12				18-12	
Lane departure	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									,					
, La	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	15	Check for elements that cause accidents by drivers avoiding other danger.	1-1	5 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	
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	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	
d collision	2	Did the collision occur because of delayed awareness of the vehicle ahead? Noticed too late	1	Are there any elements that block visibility? →	1-	ı														16-1			
Rear-end	4	Did the collision occur the driver tried to confirm safety, made a judgment, and took action, but could not control the vehicle? Cannot stop	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? Avoiding danger Dangerous vehicle	15	Check for elements that cause accidents by drivers avoiding other danger. →	1-1	5 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 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 (14) Uninterrupted flow section – mountainous land – 2-lanes or less – sidewalks

		Accident process											, 1	raffic er	nvironm	ent facto							
	Г Т		ı			20	21		ide envi	ronmen 24		27	Roa 28	d surfa	ce cond	itions 31	Congestio 34	n/stopping 35	37	40	Others	42	
Type of accident	Accident process pattern No.	State of occurrence of accidents	1	heck points of the road environment that causes acciden	ts	Obstructions to vision on the road sides (buildings, walls, etc.)	Rows of bright structures lining the roadway	acilities that distract drivers	Heavily used roadside facility driveway sxityentrance	Heavily used narrow streets	Unclear roadside facility driveway sxit/entrance or narrow street	Asibility reduced by sunlight in the norning and in the west	Deteriorated road surface paving (ruts and cracks)	Poor drainage	Deposited mud or sand	Road surface icing	/ehicles preparing to turn right or left topping or decelerating on the main oad	Congested main road	deavy traffic on the main road	Many pedestrians or cyclists on and argument the sidewalks and shoulders	No crossing facilities at a location they are needed	ehicle	On-street parking and stopped busses & Obstructing traffic movement
		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?		Are there any elements that make it difficult to understand the alignment?					1 4		1				 " -	<u> </u>	76=			< 0	28	25	<u> </u>
			→ 1		→																		
	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?	→ 1	Are there elements that make it difficult to confirm safety before moving into the oncoming lane to pass a vehicle?	→	20-10														,			
Head-on collision		Passing without confirming safety -	→ 1	Are there any elements that encourage frequent passing in the oncoming lane?	→																	,	43-11
Head-on	3	Did the head-on collision occur a driver shifted to the oncoming lane after judging that it is possible to pass safely? Judging that it is possible to pass	→ 1	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? Cannot stop	→ {	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? Avoiding danger Avoiding danger Avoiding danger	→ 1	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				4	43-15
	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? Delayed awareness of the alignment	→ 1	Are there any elements that make it difficult to understand the alignment?	→														·				
ne departure	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?	→ {	Are there any elements that contribute to driver inability to control a vehicle?	→								28-8	29-8	30-8	31-8							
Lane	5	Did the collision occur because the vehicle shifted into the oncoming lane to avoid danger? Dangerous vehicle Pedestrian etc.	→ 1	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
	1	Did the collision occur because the vehicle ahead unexpectedly stopped, decelerated, or changed lanes? Dangerous stopping and decelerating Lane change	→ 1	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
d collision	2	Noticed too late	→	Are there any elements that block visibility?	→	20-1						27-1											
Rear-end co	4	Cannot stop	→ 1		-								28-8	29-8	30-8	31-8							
	5	Did the collision occur because a driver abruptly stopped or changed lanes to avoid danger? Avoiding danger Avoiding danger	→ 1	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 O-15), refer to other types of accidents.

Document 2

Table of Countermeasures

Table A	Intersection – Non-signaled	Document 2-1
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Table C	Uninterrupted flow – 2-lane road or less	Document 2-16
Table D	Uninterrupted flow – Multi-lane road	Document 2-22

Table A

Intersection – Non-signaled

Table A Intersection - Non-signaled

	Accident occurr	ence process and causes	Ty	pe of	accide erned					Planning the accident cou	untermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Right turn	Left tum	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 5117	Installing signals (normal signals) Controlling vehicle responsiveness and dilemma responsiveness	Its introduction is studied only when the intersection is still hard to see after the above countermeasures are taken.	-	
		<through vehicle=""> Notices the oncoming right-turn vehicle too late.</through>		•			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		
		<right-turn vehicle=""> Notices the oncoming through vehicle too late.</right-turn>							5102	Installing signals (arrow signals)	intersections of multiple lane roads.		
2-7	Long steep downhill gradient	<right turn="" vehicle=""> Misunderstands the behavior of the through vehicle.</right>		•			1	Control the speed of through vehicles.	1601 5221	Road surface indicators (road surface deceleration indicators)	This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
									5304 2102	Speed warning display boards Warning sign (201:Intersection ahead)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)		
							2	Control the movement of right-turn vehicles	1404 5101	Improving pavement (level difference pavement) Installing signals (normal signals)	The two countermeasures should be implemented together.	(9)	Document 3-9
								and through vehicles to keep them apart.	5102	Installing signals (arrow signals)	 This countermeasure should be aggressively implemented at intersections of multiple lane roads. 		
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.</through>		•			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		
		<right-turn vehicle=""> Notices the oncoming through vehicle too late.</right-turn>					2	Control right turns by vehicles.	5102 5003	Installing signals (arrow signals) Prohibiting travel outside a designated direction	intersections of multiple lane roads. This is studied when countermeasure 1 cannot be taken. (countermeasure code 5003 is prohibition of right turns)		
									5009	Prohibiting U-turns	(countermeasure code 3003 is promibition of right turns)		
4-5	Long straight section before an intersection	Notices intersection too late.		!			1	Alert drivers to the intersection	5016 5212 5222	Stopping before entering intersection Internally illuminated traffic signs Large signs and high-brightness signs	Case where a stop before crossing sign is already installed		
									5224 5103	Cantilever and gate type signs Installing signals (1 light flashing)	For small intersections		
									1610	Intersection center indicator (intersection rivets) Intersection center indicator (self			
									2501 1404	light-emitting intersection rivets) Roadside mirrors Improving pavement (level difference		(9)	Document 3-9
									2102	pavement) Warning sign (201:Intersection ahead)		(3)	Document 3-3
									1609	Intersection center indicator (cross, T-mark)			
									1603 5217	Channelizing strip	At a convergence (Countermeasure code 1603 is a road administrator's countermeasure, and 5217 is a Public safety commission's countermeasure.)		
4-7	Long straight section before an intersection	<right turn="" vehicle=""> Misunderstands the behavior of the oncoming through vehicle.</right>		•			1	Control the speed of through vehicles	1601 5221	Road surface indicators (road surface deceleration indicators)	This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
									5304	Speed warning display boards Improving pavement (level difference pavement)	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's countermeasure.)	(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 5102	Installing signals (normal signals) Installing signals (arrow signals)	The two countermeasures should be implemented together. This countermeasure should be aggressively implemented at intersections of multiple lane roads.		

	Accident occurr	ence process and causes	T	ype of	accio						Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Right turn	Left turn	Other crossing	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				•	•	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
		easily overlooked.								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.</right>	l l'					1	Alert 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.)		
								- 1:	Encourage vehicles performing emergency stops or emergency deceleration to stop or decelerate outside the driving lanes	1109	Left turn lane (new)			
									Remove elements that cause emergency stops and deceleration and lane changes on	1103	Alignment improvement (increasing cut-off corner diameter)			
									the main road.	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</left>	•			•			Restore the normal shape of the intersection (acute angle intersection)	1105	Alignment improvement (improving intersection angle)			
		around the left comer is poor						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.)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
								3	Control the traffic to keep two vehicles or a	5101	Installing signals (normal signals)			
									vehicle and a pedestrian apart	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		
										1404	Improving pavement (level difference pavement)	pedestrians entering traffic lanes.		
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.</right>		•				1	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes on the road	1105	Alignment improvement (improving intersection angle)			
									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.)		
								- 1	Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)		-	
									Cause vehicles abruptly stopping or decelerating to stop or decelerate outside	1109	Left turn lane (new)	This is studied in cases where left turn traffic is heavy.		
									the traffic lanes on the main road	1107	Right turn lane (new)	 This is studied aggressively in cases where right turn traffic is heavy. 	(0)	Document 3-2
8-2	Obtuse angle intersection	<left turn="" vehicle=""> Attention is inadequate because drivers turn left at high speed without</left>				•	•		Restore the normal shape of the intersection (acute angle intersection)	1105	Right turn lane (lengthening, widening) Alignment improvement (improving intersection angle)		(2)	Document 3-2
		slowing down.							Control the speed of moving vehicles	1401	Coloring the inside of the intersection	This countermeasure is implemented where drivers can stop		
										1402 1404	Improving pavement (coloring the lanes) Improving pavement (level difference pavement)	safely after it alerts them to the intersection.	(9)	Document 3-9
							-	3	Control the traffic to keep vehicles and	5101	Installing signals (normal signals)	This should be studied at locations with high pedestrian demand	 	
									pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)	and locations with many people handicapped in traffic (children, elderly etc.).		
9-2	Complexly shaped intersection	Drivers are distracted or inattentive.	•	• •	-	•	•		Stabilize unstable driving courses inside the intersection	1604	рецеѕитап рлаѕе)	This is studied in cases where the line of motion of the main traffic flow bends		
	I ROISECHOIT									5220	Guide line	(Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's countermeasure.)		
										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		
									Provide information about the shape of the intersection	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			1
								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 occurr	ence process and causes	ī		f accid					Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	turn	Other crossing Crossing at		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	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 5220	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.)		
									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	1109	Left turn lane (new)	 This is studied only in cases where there is heavy left turn traffic. 		
			.					decelerating to stop or decelerate outside the traffic lanes on the main road	1107	Right turn lane (new)	This is aggressively studied in cases where there is heavy right		
1									1108	Right turn lane (lengthening, widening)	turn traffic.	(2)	Document 3-2
							4	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes	1105	Alignment improvement (improving intersection angle)			
			1		$\downarrow \downarrow \downarrow$			on the road	1106	Alignment improvement (others)			
10-4		Drivers turn right by slipping through a gap with the oncoming lane among the multiple		•			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 		
		lanes.		_	-				5102	Installing signals (arrow signals)	intersections of multiple lane roads.		
11-13	Long crossing distance for	There are factors that encourage pedestrians			1	•	1 -	Clearly indicate where people cross the road	5036	Crosswalk (new)			
	pedestrians and bicycles	to cross when it is dangerous.			1 1				5101	Installing signals (normal signals)	Implemented where there is heavy traffic.		
			1		1		ļ		5120	Pedestrian use lights			
13-5		At locations where drivers must confirm safety	•				1	Inform drivers of the intersection and that the	5016	Stopping before entering intersection			
		and stop or decelerate, drivers cannot sense these needs.						road ahead is a major road	5212	Internally illuminated traffic signs	Case where "Stop before entering" signs are already installed		
ŀ									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)			
						1			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		Case of a convergence		
									5217	Channelizing strip	(Countermeasure code 1603 is a road administrator's countermeasure, and 5217 is a Public safety commission's countermeasure.)		
14-14	(through lane changes to a	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 location with a pedestrian	The pedestrian bridge causes drivers to mistakenly believe that cyclists do not cross		•			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.)			
	crosswalk.	the road here, so they are not attentive to cyclists in the bicycle crossing zone.							2304	Pedestrian – cyclist use fence (to prevent crossing)			
1							2	Arouse drivers' attention	2116		"Watch out for bicycles crossing"		
									5216	Signs and indicators not legally required (letters, symbols, arrows)	(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	5101	Installing signals (normal signals)	Intersection with both grade-separated crossing facility and road level crossing facility (crosswalk).		
									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.). 		

	Accident occurr	ence process and causes	T	Type of	accio					Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	pue un	E	<u></u>	crosswalk	Countermeasure goal	Counter- measures code table number		Precautions when selecting and implementing countermeasures	Case No.	Case page
16-1	Dark intersection where pedestrians and parked	It is difficult to see pedestrians and parked cars.				•	1	Improve drivers' ability to see the intersection	· · · · · · · · · · · · · · · · · · ·	3 3 7	This is studied in the case of high nighttime accident rate.		
	vehicles are difficult to see						2	Control traffic to keep vehicles and	2002 5101	Road lighting (enlargement, moving) Installing signals (normal signals)	This should be studied at locations with high pedestrian demand		
								pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)	and ocations with many people handicapped in traffic (children, elderly etc.)		
							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.</right>					1	Remove elements that reduce drivers' ability to see the intersection	1	Rearranging vegetation	 This is related to rear-end collisions on curves. This is checked first at locations with a center median and vegetation. 		
		<through vehicles=""> It is difficult for drivers to see vehicles on the curve.</through>					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	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		<left turn="" vehicles=""> It is difficult for drivers turning left to see pedestrians entering the</left>		•		•		Remove elements that reduce drivers' ability to see the intersection	1305	Rearranging vegetation	This is related to rear-end collisions on curves.		
	signboards, etc. on the sidewalks	crosswalk. <through vehicles=""> It is difficult for drivers to see vehicles on the curve.</through>					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	5101	Installing signals (normal signals)	This is related to rear-end collisions on curves.		
										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	traffic signs and road	Drivers become confused about the direction, becoming distracted and inattentive, resulting	•	• •		•	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.		
	surface indicators with unsuitable contents (unclear and complex)	in them overlooking oncoming vehicles or pedestrians.				į	2	Revise unclear indicator content		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 		
									1	Road indicators (high brightness)	commission's countermeasures.)		
									1605 5225	Road surface indicators (enlarging, increasing brightness)			
							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	contents of signs and road	Encourages emergency stopping, deceleration, and lane changing on the main		•			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. 		
	surface indicators (unclear, complex)	road by drivers who are confused about their course					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. 		
		·							5213 1605 5225	Road indicators (high brightness) Road surface indicators (enlarging, increasing brightness)	(Countermeasure codes 1605 and 1606 are road administrator's countermeasures, and 5213 and 5225 are Public safety commission's countermeasures.)		
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	5215 5216	Warning of lane use control Signs and indicators not legally required (letters, symbols, arrows, etc.)			
							2	Control the movement of vehicles to keep	5101	Installing signals (normal signals)	This should be studied along with the above countermeasures at		
								them apart	5110	Improvement of the signal phase (adding a pedestrian phase)	locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		<u> </u>
L						L L.				a pedestrian priase)			

	Accident occurr	ence process and causes	7		of acc		t				Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Rear end	Left turn	Other crossing	Crossing at		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	Vehicles waiting to turn left or right turn when	\Box	•	•	T		1	Separate right-turn and left-turn vehicles	1109	Left turn lane (new)	This is studied only when there is heavy left turn traffic.		
		it is dangerous to do so, because they are blocking the progress of through vehicles that							from following through vehicles to prevent dangerous right and left turns			 One vehicle stopping space is placed before the crosswalk around the left corner. 		
		are following them.								5038	Crosswalk (set back)	 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. 		
1									·	1107	Right turn lane (new)	This is studied aggressively in a case where there is right turn		
1							1	L.		1108	Right turn lane (lengthening, widening)	traffic.	(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.		
			Ιİ						and through vehicles to keep them apart	5102	Installing signals (arrow signals)	 This countermeasure should be aggressively implemented at intersections of multiple lane roads. 		
								3	Control traffic to keep vehicles and	5101	Installing signals (normal signals)	This should be studied along with the above countermeasures at		
	·								pedestrians apart	5110	Improvement of the signal phase (adding pedestrian phase)	locations with high pedestrian demand and locations with many people handicapped in traffic (children, elderly etc.)		
21-14	Same lanes used for right	Vehicles waiting to turn left or right block the		•				1	Separate right and left turn vehicles from	1107	Right turn lane (new)	This is studied aggressively in a case where there is right turn traffic.		
	and left turn vehicles and for through vehicles	progress of through traffic that is following them, causing drivers to abruptly stop,							through vehicles	1109	Left turn lane (new)	This is studied only in a case where left turn traffic is heavy.		
		decelerate, or change lanes.								5101	Installing signals (normal signals)	This is studied in a case where there are left and right turn lanes,		
	•	·								5102	Installing signals (arrow signals)	but vehicles stray out of these lanes into the main road		
											Right turn lane (lengthening, widening)	obstructing through vehicles.This is studied in a case where there are left and right turn lanes,	(2)	Document 3-2
										1108	<u> </u>	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	Vehicles waiting to turn left or right block the		•				1	Guarantee that right and left turn lanes are	1110	Left turn lane (lengthening, widening)	This is studied only in a case where left turn traffic is heavy.		
	leave the right and left turning lanes	progress of following through traffic, causing drivers to abruptly stop, decelerate, or change lanes.		İ					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
23-1	Oncoming right turn	<right turn="" vehicle=""> Driver does not notice</right>		1	•		T	1	Control the movement of right-turn vehicles	5101	Installing signals (normal signals)	This countermeasure should be aggressively implemented at		
	vehicles stopping at inappropriate locations	oncoming vehicles on time.							and through vehicles to keep them apart	5102	Installing signals (arrow signals)	intersections of multi-lane roads.		
	mappiophate totalions							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.)	(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,	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. 		
	walls, etc.)									1304	Removal of obstructions (facilities, signboards)			
								2	Alert drivers to, and provide information about, conditions that will make a location a	2116	Signs and indicators not legally required	Case where rear-end collisions occur where there is a curve before an intersection.		
									dead angle for drivers	5216	(letters, symbols, arrows, etc.)	(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	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	Obstructs drivers' view.		_		•	•	1	Control traffic to keep vehicles and	5101	Installing signals (normal signals)	The two countermeasures should be implemented together.		
	lining the roadway								pedestrians apart	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 5216	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.)		
26-14	Facilities that distract	Drivers abruptly stop or decelerate on the	+-	•	-	+	+	1	Arouse attentiveness	2116		"Be careful to look to the side"		
	drivers.	main road when they are distracted by the facilities.								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.)		

	Accident occurr	ence process and causes		Type	of ac		t				Planning the accident cou	untermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment		Rear end	Hight 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	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</through>	1 1	•	•			1	Move roadside facility driveways	3101	Concentrating facility entrances by moving them outside the main road			
		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.						2	Arouse attentiveness	2116 5216	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.)		
		<motorcycle a="" after="" following="" 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.</motorcycle>						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	Drivers are inattentive, because they cannot confirm the intersection (or confirm it on time)	•	•				1	Arouse attentiveness	2116	Signs and indicators not legally required	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's		
30-5	Visibility reduced by	because of the sunlight. Drivers are unaware of or cannot check the intersection because of the sunlight.	•					1	Alert drivers to the intersection	5216 1404	(letters, symbols, arrows, etc.) Improving pavement (level difference pavement)	countermeasure.) This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.	(9)	Document 3-9
	in the west	miersection because of the sumight.								1401	Coloring the inside of the intersection	Salely area it along them to the mersection.		
			\perp	_		4	_			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	!!	•				1	Remove elements that prevent control of vehicles	1405	Improving paving (drainage pavement) Road surface maintenance	Drainage systems must be modified as necessary.	(8)	Document 3-8
		decelerates on the main road.						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	•	•	•	1	Prevent weaving traffic	1501	Narrowing the shoulder			
38-13	Congested main road	Because pedestrians can easily cross congested lanes where vehicles are stopped,				•	•	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		
		pedestrians are encouraged to cross the road.								2304	Pedestrian – cyclist use fence (to prevent crossing)	and locations with many people handicapped in traffic (children, elderly etc.)		
40-2	Adjoining intersections	A driver sees the signal on the adjoining intersection, failing to notice the first	•	•				1	Prevent drivers from noticing adjacent signaled intersections	5123	Signal lights indicating restriction on distance			
		intersection.						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	•	\top	\top		•	1	Prevent drivers from noticing adjacent signaled intersections	5123	Signal lights indicating restriction on distance			
		the driver should notice.						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.		
40-14	Adjoining intersections	Confused by the signal on the adjoining		•	-	+		1	Prevent drivers from noticing adjacent	2102 5123	Warning signs (201:Intersection ahead) Signal lights indicating restriction on			
		intersection, a driver stops at an intersection where it is not necessary to stop.						2	signaled intersections Alert drivers to the intersection	1404	distance Improving pavement (level difference pavement)	This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection.		
41-2		Distracted by the adjacent railway crossing, a		•			•	1	Provide advance information about the	2102	Warning signs (201:Intersection ahead)			
	the intersection	driver fails to notice the intersection the driver should notice.							locational relationship of the railway crossing and intersection	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	•					1	Provide advance information about the locational relationship of the railway crossing and intersection	2102 2109	Warning signs (201:Intersection ahead) Guide traffic signs (108, 108-2: road			
		decelerate.						2	Control traffic by signals	5101	lahead, direction, advance warnings) Installing signals (normal signals) Improving signal phase (operates linked	The two countermeasures should be implemented together.		
									·	5115	to railway crossing)		<u> </u>	

	Accident occurr	ence process and causes	Т	ype of conc	accid erned					Planning the accident cou	untermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	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		Distracted by the adjacent railway crossing, a	1	•			1	Provide advance information about the	2102	Warning signs (201:Intersection ahead)			
	the intersection	driver stops at an intersection where it is not necessary to stop.		-				locational relationship of the railway crossing and intersection	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	Because pedestrians cross at locations where		•			1	Clearly indicate that there are pedestrians	5036	Crosswalk (new)			
	not satisfy crossing demand	drivers are unaware of the crossing, they are not careful about pedestrians.						crossing	2116	Signs and indicators not legally required	(Countermeasure code 2116 is a road administrator's		
	demand	not careful about pedesilians.						!	5216	(letters, symbols, arrows, etc.)	countermeasure, and 5216 is a Public safety commission's countermeasure.)		
							2	Make it easier for drivers to see pedestrians	2001	Road lighting (new)			
							ļ		2002	Road lighting (enlargement, moving)			
42-13	Crossing facilities that do	At a location where there is no crossing,				•	1	Prevent pedestrians from crossing	5101	Installing signals (normal signals)	The two countermeasures should be implemented together.		
	not satisfy crossing	pedestrians cross through gaps between vehicles.						dangerously	5120	Installing pedestrian use lights			
	demand	vericles.					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 vehicles easily enter a driver's dead	•	•	•		1	Prohibit weaving traffic	1501	Narrowing the shoulder			
	weaving through traffic	angle so he is not attentive to them.					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. 		
	On-street parking and stopped busses obstructing	<vehicles driving="" main="" on="" road="" the=""> It expands drivers' dead angle delaying their</vehicles>	•			•	1	Make parked cars park off the main road	2704	Bus bay			
	traffic movement	awareness of vehicles and pedestrians that that suddenly appear on the road.				-			2703	Parking zone			
		<vehicle and<br="" entering="" main="" road="" the="">pedestrians crossing it> Drivers enter the main road while still unable to confirm vehicles on the main road.</vehicle>					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	Cars parked or stopped busses that drivers on		•	1		1	Make parked cars park off the main road	2704	Bus bay			
	stopped busses obstructing traffic movement	the main road are not very aware of cause vehicles on the main road to abruptly stop,				·			2703	Parking zone			
	uanic movement	decelerate, or change lanes.					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 occur	rence process and causes		•	of ac	ccider ned	nt				Planning the accident cou	ntermeasures		
ause	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right 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	Delayed awareness of the intersection	•	•	•	•	•	1	Alert drivers to the intersection and provide	2102	Warning sign (201:Intersection ahead)			
	intersection								information in advance	5108	Advance warning light			
					ļ			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.</through>			•			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.		
		<right turn="" vehicle=""> Driver's awareness of an oncoming through vehicle is delayed.</right>								5102	Installing signals (arrow signals)			
2-7	Long steep downhill gradient	<right turn="" vehicle=""> Driver misunderstands the behavior of the oncoming through</right>			•		-	1	Control the speed of through vehicles	1601	Road surface indicators (road surface	(Countermeasure code 1601 is a road administrator's countermeasure, and 5221 is a Public safety commission's		
	gradient	vehicles.								5221	deceleration indicators)	countermeasure.)		
										5304	Speed warning display boards			
										2105	Warning sign (208-2:Traffic signal ahead) Improving pavement (level difference		(0)	Decument 2.0
,										1404	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)	ign.	 	
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.</through>			•			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. 		
		<right turn="" vehicle=""> Driver's awareness of an oncoming through vehicle is delayed</right>			İ			ļ		5102	Installing signals (arrow signals)		ļ <u>-</u> -	
		Oncoming unough vehicle is delayed		,				2	Control right turns by vehicles	5003 5009	Prohibiting travel outside a designated direction Prohibiting U-turns	 This is studied when countermeasure 1 cannot be taken. (Countermeasure code 5003 is prohibiting right turns.) 		
4.5	Lang straight agotion	Deleved swarpness of the interception	•			+	+	1	Alert drivers to the intersection	2105	Warning sign (208-2:Traffic signal ahead)			
4-5	Long straight section before an intersection	Delayed awareness of the intersection						'	Alest differs to the intersection	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
			ļ					į	·	1401	Coloring the inside of the intersection	Only the area inside the intersection is colored.		
								l		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.</right>			•			1	Control the speed of through vehicles	1601 5221	Road surface indicators (road surface deceleration indicators)	 This countermeasure is implemented where drivers can stop safely after it alerts them to the intersection. 		
										5304	Speed warning display boards	(Countermeasure code 1601 is a road administrator's		
					i					1404	Improving pavement (level difference pavement)	countermeasure, and 5221 is a Public safety commission's countermeasure.)	(9)	Document 3-9
										2105	Warning sign (208-2:Traffic signal ahead)			
							ļ	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.		
							1			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	1			1	•	• 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
		pedestrians.								5017	Stopping lane (moving it forward)		(19)	Document 3-12
								<u> </u>	Drovide and according of the Para of	5037	Crosswalk (moving it forward)	a Introduction of this massure should be studied only when the	(12)	Document 3-12
			1					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 occur	ence process and causes	T .	•	of ac		nt				Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Other crossing	Crossing at		Countermeasure goal	Counter- measures code table number	· · · · · · · · · · · · · · · · · · ·	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.</left>		•				1	Alert drivers	2116 5216	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.) 		
								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	———	Alignment improvement (increasing cut-off corner diameter)			
7-1	Acute angle intersection	<left turn="" vehicle=""> Visibility of the road on the left is reduced.</left>	•		\perp	-	•	1	Change the shape of the intersection to a normal shape (right-angled intersection)	1111	Installing left turn channelizing strip Alignment improvement (improving intersection angle)			
		ien is reduced.	-					2	Alert drivers to, and provide information about, conditions that will make a location a	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		
								3	dead angle for drivers 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		
										1404	Improving pavement (level difference pavement)	pedestrians being entangled in vehicle traffic.		
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.</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 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.)		
								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	1109	Left turn lane (new)	This is studied only in cases where left turn traffic is heavy.		
				Ì					the traffic lanes on the main road	1107	Right turn lane (new)	 This is studied aggressively in cases where there is right turn traffic. 	(0)	D
8-2	Obtuse angle intersection	<left turn="" vehicles=""> They are inattentive,</left>	+	-+	+	٠,		1	Restore the normal shape of the intersection		Right turn lane (lengthening, widening) Alignment improvement (improving		(2)	Document 3-2
0-2	Obtuse angle intersection	because they turn left at high speed without decelerating.							(right-angle intersection) Control the speed of moving vehicles	1105	intersection angle) Improving pavement (level difference	This countermeasure is implemented where drivers can stop	(0)	B
								-		1404	pavement)	safely after it alerts them to the intersection	(9)	Document 3-9
										1401	Coloring the inside of the intersection		(7)	Document 3-7
								3	Control the traffic to keep vehicles and pedestrians apart	5110	Improving pavement (coloring the lanes) 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.).	(/)	Document 3-7
8-6	Obtuse angle intersection	<left turn="" vehicles=""> They are inattentive, because they turn left at high speed without</left>			1	•		1	Restore the normal shape of the intersection (right-angle intersection)	1105	Alignment improvement (improving intersection angle)			
		decelerating						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		<u> </u>	
9-2	Complexly shaped	Drivers are distracted and inattentive.	-	•	•	+	•	1	Stabilize unstable driving courses inside the	1402 1604	Improving pavement (coloring the lanes)	This is studied in cases where the line of motion of the main	(7)	Document 3-7
	intersection								intersection	5220	Guide line	traffic flow bends. (Countermeasure code 1604 is a road administrator's countermeasure, and 5220 is a Public safety commission's		
					-					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)			
			\perp					4	Simplify the flow of the traffic	5002	One way traffic	This is applied in the direction of relatively light traffic.		

	Accident occurr	ence process and causes			of ac	cident ned	İ				Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right 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	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 5220	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.)		
										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	1109	Left turn lane (new) Right turn lane (new)	 This is studied only in cases where there is heavy left turn traffic. This is studied aggressively in cases where there is right turn 		
									the traffic lanes on the main road	ູ 1107 1108	Right turn lane (riew) Right turn lane (lengthening, widening)	traffic.	(2)	Document 3-2
								4	Remove elements that encourage vehicles to abruptly stop, decelerate, or change lanes	1105	Alignment improvement (improving intersection angle)		(2)	Document 3-2
									on the road	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					•	1	Reduce the size of the intersection to control the speed of moving vehicles	5037 5017	Crosswalk (moving it forward) Stopping lane (moving it forward)	The two countermeasures should be implemented together.	(12)	Document 3-12
		pedestrians.						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. 		
				-		+	•	1	Padura the grassing distance	5102	Installing signals (arrow signals) Crosswalk (making it right-angles to	This is studied at intersection where roads intersect diagonally.		
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.	/					'	Reduce the crossing distance	5039 1113	sidewalk) Installing a traffic island	• This is studied at intersection where roads intersect diagonally.	(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.</right>			•			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. 		
			4-4	_	\perp	_	\perp			5102	Installing signals (arrow signals)		<u> </u>	
14-14		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	The pedestrian bridge causes drivers to mistakenly believe that cyclists do not cross		•				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. 		
	crosswalk.	the road here, so they are not attentive to cyclists in the bicycle crossing zone.								2304	Pedestrian – cyclist use fence (to prevent crossing)	The two countermeasures should be implemented together.		
								2	Arouse drivers' attention	2116 5216	Signs and indicators not legally required (letters, symbols, arrows)	Signs such as, "Beware of crossing bicycles" are studied. (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	It is difficult to see pedestrians and parked				•	•	1	Improve drivers' view of the intersection	2001	Road lighting (new)	This is studied in the case of high nighttime accident rate.		
i	pedestrians and parked vehicles are difficult to see	cars.						2	Control traffic to keep vehicles and	2002	Road lighting (enlargement, moving) Improvement of the signal phase (adding			
								ļ	pedestrians apart Separate lines of motion of vehicles and	5110	pedestrian phase) Constructing grade-separated crossing	Introduction of this measure should be studied only when the		
								3	pedestrians on different levels	1801	(pedestrian bridge, pedestrian tunnel)	crossing pedestrian traffic is high.	<u> </u>	

	Accident occur	rence process and causes		.,	of acc	ident ed					Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	. Impact on the road environment		Rear end	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</right>	•	•	•	•	•	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. 		
		road. <through vehicles=""> It is difficult for drivers to see vehicles ahead on the curve.</through>						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.</left>	•	•			•	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. 		
	Sidewaiks	<through vehicles=""> It is difficult for drivers to see vehicles ahead on the curve.</through>						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	Drivers become confused about their course, becoming distracted and inattentive, resulting	•	•	•	•	•	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. 		
	surface indicators with unsuitable contents (unclear and complex)	in them overlooking oncoming vehicles, pedestrians, or signals.						2	Revise unclear indicator content	1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)	 This is installed before intersections so that drivers can change course safely after this countermeasures has let them confirm their course direction. 		
										5213 1605 5225	Road indicators (high brightness) Road surface indicators (enlarging, increasing brightness)	(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. 		٠
19-14	Inappropriately located traffic signs and road	Drivers become confused about their course, abruptly slowing down or stopping, or		•				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. 		
	surface indicators with unsuitable contents (unclear and complex)	changing lanes on the main road.						2	Revise unclear indicator content	1606	Lines showing the sides, centers, and boundaries of traffic lanes (high brightness)	 This is installed before the intersection so that drivers can change course safely after confirming their course thanks to this countermeasure. 		
										5213 1605 5225	Road indicators (high brightness) Road surface indicators (enlarging, increasing brightness)	(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 occurre	ence process and causes	Т		of acc	cident ed					Planning the accident cou	ntermeasures		-
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	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	Vehicles waiting to turn left or right tend to			•				Separate left and right turn vehicles from	1109	Left turn lane (new)	This shall be studied only when there is heavy left turn traffic.		
		make dangerous left or right turns, because they obstruct the movement of following cars.							through vehicles that are following them to prevent dangerous left and right turns	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.	(0)	B
									Control the movement of right-turn vehicles	1108 5114	Right turn lane (lengthening, widening) Improving the signal phases (separating	This countermeasure should be aggressively implemented at	(2)	Document 3-2
									and through vehicles to keep them apart.	5102	left or right turn from through traffic) Installing signals (arrow signals)	intersections of multiple lane roads.		·
								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	Vehicles waiting to turn left or right block the progress of following through traffic, causing		•				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. 		
	for through vehicles	drivers to abruptly stop, decelerate, or change								1109	Left turn lane (new)	This is studied only in a case where left turn traffic is heavy.		
	,	lanes on the main road.								5102	Installing signals (arrow signals)	• This is studied in a case where there are left and right turn lanes,		
				Ī						5112	Improving the signal phase (adjusting green time)	but vehicles stray out of these lanes into the main road, obstructing through vehicles.	į	
:										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, 	(2)	Document 3-2
										1110	Left turn lane (lengthening, widening)	obstructing through vehicles 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	Vehicles waiting to turn left or right block the progress of following through traffic, causing		•				1	Guarantee that right and left turn lanes are long enough to hold left and right turn	1108	Right turn lane (lengthening, widening)	 This is studied aggressively in a case where there is right turn traffic. 	(2)	Document 3-2
	turning lanes	drivers to abruptly stop, decelerate, or change lanes on the main road.							vehicle demand	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	<right turn="" vehicle=""> Driver does not notice oncoming vehicles on time.</right>		1	•			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.		
	inappropriate locations									5102	Installing signals (arrow signals)	Oir and "Downson of this lock waise sight" and "Downson of	-	
		·						2	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)	 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,	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.		
	walls, etc.)									1304	Removal of obstructions (facilities, signboards)			
		·						2	Alert drivers to, and provide information	2116	<u> </u>	This is studied in cases of rear-end collisions on curves before interpretions.		
:					ŀ				about, conditions that will make a location a dead angle for drivers	5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	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 occurr	ence process and causes	•	Type o	of accid					Planning the accident cou	untermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Left turn	Other crossing	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		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		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		A driver traveling in the main road who intends to stop at the stop line of the intersection	1 1	•	•		1	Move the roadside facility driveway	3101	Concentrating facility entrances by moving them outside the main road			
		doesn't notice a vehicle emerging from a driveway before the stop line on time, and is			1		2	Arouse attentiveness	2116		Signs such as "Beware of emerging vehicles" are installed		
		forced to make an emergency stop, deceleration, or lane change. <motorcycle a="" after="" following="" left="" turn=""></motorcycle>							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.)		
		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.					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		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		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
	in the west								1401	Coloring the inside of the intersection	Roadside conditions are considered because level difference pavement is noisy.		
			1 1	- 1	1		\perp		1402	Improving pavement (coloring the lanes)	<u> </u>	(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	r	•			1	Remove elements that prevent control of vehicles	1405 1408	Improving paving (drainage pavement) Road surface maintenance	Drainage systems must be modified as necessary.	(8)	Document 3-8
		decelerates on the main road.					2	Give advance warning that it is easy to lose control	2106	Warning signs (209: Slippery)			
33-1	Poorly located signals that	Drivers cannot confirm a signal (on time),		•	•		1	Move or expand signals to improve their	5107	Improve the location of signals			
	are difficult to see	failing to drive in conformity with the signal (the driver may ignore the signal).						visibility	5106	Increase the number of signals	When moving existing signals does not resolve the problem,		
		(the driver may ignore the signal).				1 1			5108	Advance warning light	increasing their number and installing warning signals are studied.		
							_		2105	Warning sign (208-2:Traffic signal ahead)		ļ	
. <u> </u>			1-1			1	- 2	, , , , , , , , , , , , , , , , , , , ,	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.	•					Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance	This is studied when there are continuous intersections. This is studied in a case where are distanced and the first are all intersects and the first are all intersects and the first are all intersects.	-	
				-	_			Manage and simple to improve their	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.	<u> </u>	
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	•					Move or expand signals to improve their visibility	5107 5106	Improve the location of signals Increase the number of signals	When moving existing signals does not resolve the problem,	1	
		unaware of these needs.							5108	Advance warning light	increasing their number and installing warning signals are		
									2105	Warning sign (208-2:Traffic signal ahead)	studied.		
							-	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.	s •	1	•		•		5112	Improving the signal phase (adjusting green time)		1	
		, and a service of our moungorously.							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	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 aid.		
									1505	Increasing the number of lanes (exclusive small-sized vehicle road)	the incoming side.		
									1703	Expanding sidewalk waiting spaces	This countermeasure is studied in a case where pedestrians waiting for a signal fill the sidewalk.		

	Accident occur	ence process and causes			of ac	ccider ned	nt				Planning the accident cou	untermeasures		·· ···
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	Rear end	Right turn	Company Consists Control Contr	Crossing at	43	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	Grade separate the lines of motion of vehicles	1101	Grade separated intersection (normal road) Grade separated intersection (exclusive			
34-13	Short time available for	Because the pedestrian green time is short,	\forall	\dashv	+		•	1	Lengthen the time vehicles can move	5112	small-sized vehicle road) Improving the signal phase (adjusting		-	
	forward movement	pedestrians cross dangerously.						2		5121	green time) Waiting time indicator and voice function			
-								3		1801	equipped push button Constructing grade-separated crossing	Introduction of this measure should be studied only when the		
35-4	Short clearance time	Many vehicles try to pass through the	•	\dashv	+		+	1	Allow leeway when signals change	5113	(pedestrian bridge, pedestrian tunnel) Improving the signal phase (lengthening	crossing pedestrian traffic is high.		
		intersection as the signals change, resulting in them driving through dangerously.						2	Reduce the size of the intersection	5037	clearance time) Crosswalk (moving it forward)	These two countermeasures should be implemented together.	(12)	Document 3-12
								-	Troduce the size of the intersection	5017	Stopping lane (moving it forward)	In a case where left turn traffic is heavy, it is not a good	(12)	Document 3-12
36-7	Signal phase operation is difficult to understand	Driver misunderstands the behavior of an	$\dagger \dagger$	\dashv	•	+	-	1	Control the movement of right-turn vehicles	5114	Improving the signal phases (separating	countermeasure (because it encourages the situation in 21-14). This countermeasure should be aggressively implemented at	ļ	
	(complex, time differences)	oncoming through vehicle.							and through vehicles to keep them apart	5102	left or right turn from through traffic) Installing signals (arrow signals)	intersections of multiple lane roads.		
								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.		
				\perp	\perp	\perp	\perp			5104	Installing signals (responsive type)			
37-4	Deceleration and stopping of right and left turn	Vehicles waiting to turn left or right turn when it is dangerous to do so, because they are					•	1	Separate left and right turn vehicles from through vehicles following them to prevent	1109	Left turn lane (new)	This is studied only in case where there is heavy left turn traffic. One vehicle stopping space is placed before the crosswalk		
	vehicles on main road	blocking the progress of through vehicles following them.							dangerous left and right turns	5038	Crosswalk (set back)	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.		
									ļ.	1107	Right turn lane (new)	This is studied aggressively in a case where there is right turn		
								-		1108	Right turn lane (lengthening, widening)	traffic.	(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.		
38-1	Congested main road	Drivers' view of motorcycles weaving through	•		•	١.		1	Prevent weaving traffic	5102	Installing signals (arrow signals)	,	+	
		traffic is obstructed.					•		Keep vehicles and pedestrians apart	1501	Narrowing the shoulder			
30-13	Congested main road	Because pedestrians can easily cross congested lanes with stopped cars, the						'	Reep venicies and pedestrians apart	2304	Pedestrian – cyclist use fence (to prevent crossing)			
		pedestrians try to cross.								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	•	•				1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
		the driver should observe						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
	<u> </u>							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	•				•	1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
		the drivers should notice.						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)	4 '		
								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		•				1	Prevent drivers from mistaking signals	5123	Signal lights indicating restriction on distance			
		where it is not necessary to stop.						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 occurr	ence process and causes	T		f accid					Planning the accident cou	untermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Right furn	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		Distracted by the adjacent railway crossing, a driver fails to notice the intersection the driver	• (•		•	1	Provide advance information about the relationship of the locations of the railway	2105	Warning sign (208-2:Traffic signal ahead)			
	the intersection	should notice.						crossing and the signals	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	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.		
								trains with railway crossings and plane intersections.	1102	Grade separated intersection (exclusive small-sized vehicle road)			
41-5		Distracted by the adjacent railway crossing, a	•		1		1	Provide advance information about the	2105	Warning sign (208-2:Traffic signal ahead)			
	the intersection	driver notices the intersection where he must stop too late, forcing him to abruptly stop or						relationship of the locations of the railway crossing and the signals	2109	Guide traffic signs (108, 108-2: road ahead, direction, advance warnings)			
		decelerate.					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	the lines of motions of vehicles and railway	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. 		
								trains with railway crossings and plane intersections.	1102	Grade separated intersection (exclusive small-sized vehicle road)			
41-14		Distracted by the adjacent railway crossing, a	1	•			1	Provide advance information about the	2105	Warning sign (208-2:Traffic signal ahead)			•
	the intersection	driver stops at an intersection where it is not necessary to stop.						relationship of the locations of the railway crossing and the signals	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	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. 		
								trains with railway crossings and plane intersections	1102	Grade separated intersection (exclusive small-sized vehicle road)			
42-2	No crossing facilities at a	Because pedestrians cross at locations where		•	,		1	Clarify that pedestrians are crossing the	5036	Crosswalk (new)			
	location they are needed	drivers are unaware of the crossing, they are not careful about pedestrians.						road	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	Take measures so drivers see pedestrians	2001	Road lighting (new)			
					\perp			more easily	2002	Road lighting (enlargement, moving)			
43-2	Motorcycles and cyclists	Weaving traffic tends to be in a driver's dead	•		•		1	Prevent weaving traffic	1501	Narrowing the shoulder			
	weaving through traffic	angle so the driver does not notice it.					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="" main="" on="" road="" the=""> The driver's dead angle widens delaying the driver's awareness of pedestrians and</vehicle>	•			•	1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
	a same movement	vehicles that appear unexpectedly. <vehicle entering="" main="" pedestrian<="" road,="" td="" the=""><td></td><td></td><td></td><td></td><td></td><td></td><td>2703</td><td>Parking zone</td><td></td><td></td><td></td></vehicle>							2703	Parking zone			
		crossing the road> The pedestrian enters (or crosses) the main road without being able to confirm if there are vehicles on the main road.		į			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	Cars parked or stopped busses that drivers on		•			1	Cause stopped vehicles to stop outside the	2704	Bus bay			
		the main road are not very aware of cause vehicles on the main road to abruptly stop,						main road	2703	Parking zone			
	Tallo movement	decelerate, or change lanes.					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 occur	rence process and causes			e of a	accide erned	nt		-		Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision	pi pi		ft turn crossing	When changing course	Larie 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 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	This is studied in a case where there are obstructions inside a curve.		
								2	Construct roads that do not reduce a driver's ability to see the road ahead	1301	Alignment improvement	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
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)			
		,						2	Add passing lanes	1201 1506	Center median (separation) Climbing lane, yield lane	Its installation is studied for locations such as long rising slopes		
			\sqcup		1					1507	Passing lane	where there tends to be slow moving vehicles.		
1-12	Sharp curve	Drivers enter a curve at high speed without confirming the alignment ahead on time.		•				P 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	2103	Warning signs (202 – 206: bends, curves, winding road)	This is studied in a case where there are obstructions inside a curve.		
									dead angle for drivers and encourage deceleration	2202	Approaching oncoming vehicle indicator	(Countermeasure code 2202 is a road administrator's countermeasure, and 5303 is a Public safety commission's countermeasure.)		
										5303	device	 Introduction of this measure should not be studied only when the oncoming traffic is high. 		
									:	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 3-1
2-7	Long steep downhill gradient	<right turn="" vehicle=""> Drivers misunderstand the behavior of</right>			•			1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
	3	oncoming through vehicles.								1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
										1601 5221	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.)		
								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		
										5007	Prohibiting vehicle crossing Center median (post cones)	on center medians. (Countermeasure code 5003 is prohibition of right turns)		
2-17	Long steep downhill	<passing vehicles=""></passing>	++	•	+			1	Prohibit passing in the oncoming lane	1202 5005	Prohibiting driving on the right side in	,		
		Drivers misunderstand the behavior of oncoming through vehicles.								5218	order to pass a vehicle Road indicators (road rivets, and			
											vibration devices)			
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	1202 2116	Center median (post cones) Signs and indicators not legally required	(Countermeasure code 2116 is a road administrator's countermeasure, and 52161 is a Public safety commission's		
		10 poor.							dead angle for drivers	5216	(letters, symbols, arrows, etc.)	countermeasure.)		
								2	Prohibit right turns and right turn crossing	2101	Warning signs (general) Prohibiting travel outside a designated	Its implementation should be studied along with the prohibition of		
								-	and the state of t	5003	direction	right turns and vehicle crossing and the installation of post cones on center medians.		
										5007	Prohibiting vehicle crossing	(Countermeasure code 5003 is prohibition of right turns)	<u> </u>	
3-10	Crest	It is difficult to confirm safety when passing in	+	•			$\dagger \dagger$	1	Prohibit passing in the oncoming lane	1202 5005	Center median (post cones) Prohibiting driving on the right side in	ţi.,		
		the oncoming lane.								5218	order to pass a vehicle Road indicators (road rivets, and			
										1202	vibration devices) 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		Warning signs (202 – 206: bends, curves, winding road)			

	Accident occurr	ence process and causes			of a	ccident				·· • •	Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Rear end	Right turn	Other crossing	course	מונים מפלים ומים	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</right>			•			1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
		oncoming through vehicles.								1402	Improving pavement (coloring lanes)		(7)	Document 3-7
										1601 5221	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.)		
								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 		
										5007	Prohibiting vehicle crossing	on center medians.		
										1202	Center median (post cones)	(Countermeasure code 5003 is prohibition of right turns)		
4-17		Drivers pass dangerously in conditions where it is easy to misunderstand the behavior of		•				1	Take physical measures to prevent passing	1201	Center median (separation)			
		oncoming vehicles.							in the oncoming lane	1202	Center median (post cones)			1
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		Slow to notice the decline of number of lanes						1	Indicate a reduction of the number of lanes	2108	Warning sign (212: narrowing road)	Several are installed far enough in advance to allow drivers to		
	number and width of lanes	or narrowing on the road ahead, drivers do not decelerate in time and stray from their lane.							or road width in advance	2107	Warning sign (211: reduction of lanes)	safely decelerate and change lanes.		
9-14		Drivers abruptly stop, decelerate, or change		•				1	Provide advance information about the	2108	Warning sign (212: narrowing road)	Several are installed far enough in advance to allow drivers to		
	number and width of lanes	lanes on the main road.							reduction of number of lanes and road width	2107	Warning sign (211: reduction of lanes)	safely decelerate and change lanes.		
10-12	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	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		•				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.		
		the main road.	i					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		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		Drivers pass in the oncoming lane.	1 7	•				1	Provide physical measures to prevent	1202	Center median (post cones)			
	section without a passing zone (lane)								passing in the oncoming lane	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		
										1507	Passing lane	where there tends to be slow moving vehicles.		
13-1	Dark intersection where pedestrians, parked	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, 		
	vehicles, and the alignment are difficult to see									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 occurr	ence process and causes	1		pe of a		ent				Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	c 7	Right turn	ff turn 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	It is difficult to understand the alignment.		•			1	• 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. 		
	vehicles, and the alignment								Improve visionity	2002	Road lighting (enlargement, moving)	(Countermeasure codes 1606 and 1607 are road administrator's		
	are difficult to see							2	Install safety equipment so that it is easy to understand the alignment	1203	Center median (road rivets, chatter bars)	countermeasures, and 5213 and 5218 are Public safety commission's countermeasures.)		
									understand the angliment	2401	Visual guidance indicators (new)	osimilosion o obundimozodros.,		
										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
ļ								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	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. 		
	(nighttime)									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.)		
								1		5213	Road indicators (high brightness)			
16-1	Poorly located and maintained trees,	<vehicles and="" entering="" from="" main="" narrow="" road="" roads="" side="" the=""></vehicles>	•	•	•			1	Remove elements that obstruct visibility	1305	Rearranging vegetation	This is related to rear-end collisions on curves.		·
	signboards, etc. on the sidewalks	It is difficult for their drivers to check for vehicles on the main road.						2	Alert drivers to, and provide information about, conditions that will make a location a	2116		This is related to rear-end collisions on curves. (Countermeasure code 2116 is a road administrator's)		
		<through main="" on="" road="" the="" traveling="" vehicles=""> It is difficult for drivers to check vehicles ahead on curves.</through>							dead angle for drivers	5216	Signs and indicators not legally required (letters, symbols, arrows)	countermeasure, and 5216 is a Public safety commission's countermeasure.)		
18-12		Drivers cannot correctly understand the alignment ahead because the locations and		•				• 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).		
	contents (unclear and complex)	contents of traffic signs are inappropriate.						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	Drivers become confused about what action to take, abruptly stopping, decelerating, and		1	•		•	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).		
	contents (unclear and complex)	changing lanes on the main road.						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 occurre	ence process and causes	T	• •	e of a	cciden	nt	T			Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Rear end	Right turn	Other crossing	When changing course Lane departure		Countermeasure goal	Counter- measures code table number		Precautions when selecting and implementing countermeasures	Case No.	Case page
18-18	traffic signs with unsuitable	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.		
	complex)	onal pitamito ano tota								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, 		
										1202	Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed.		
										5003	Prohibiting travel outside a designated direction	This countermeasure should be applied to close meaningless openings in center medians.		
										5009	Prohibiting U-turns	(Countermeasure code 5003 is a prohibition on right turns.)		
		It obstructs drivers' view				•		2	Alert drivers to, and provide information about, conditions that will make a location a	2116	Signs and indicators not legally required	This is related to rear-end collisions on curves (Countermeasure code 2116 is a road administrator's)		
									dead angle for drivers	5216	(letters, symbols, arrows, etc.)	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)	 It is studied for rear-end collisions and other crossing accidents in cases where there is a curve. 		
	Walls, Etc.)							2	Alert drivers to, and provide information	0440		 It is taken as a priority countermeasure whenever possible. It is studied for rear-end collisions and other crossing accidents 		
									about, conditions that will make a location a dead angle for drivers	2116 5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	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.)		
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		Drivers abruptly stop, decelerate, or change lanes on the main road.		•				1	Arouse drivers' attention	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		Drivers abruptly stop, decelerate, or change lanes on the main road.		•		ı		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. 		
	exit/entrance							2	Separate vehicles entering or exiting roadside facilities from vehicles on the main	1508	Additional lanes for roadside facility use	The construction of additional lanes is studied where there is a large scale roadside facility.		
									road	1509	Frontage road	A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
24-14		Drivers abruptly stop, decelerate, or change lanes on the main road.		•	$\dagger \dagger$			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	3		
25-14		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		
	narrow roads									2102	Warning sign (201:Intersection ahead)			
								2	Separate vehicles entering or leaving roadside facilities and narrow roads from	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a		
									vehicles on the main road	1509	Frontage road	large scale roadside facility. • A frontage road should be constructed in a case where there is a row of medium and small scale facilities.		
25-18		A driver does not notice a narrow side street he plans to turn left into on time, and makes a				•		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		
		sharp turn to the left.								2102	Warning sign (201:Intersection ahead)			
								2	Separate vehicles entering or exiting roadside facilities from vehicles on the main	1508	Additional lanes for roadside facility use			
									road road road road	1509	Frontage road			

	Accident occur	rence process and causes			e of a	cciden	it				Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Rear end	Right turn	Left turn Other crossing	when changing course Lane departure		Countermeasure goal	Counter- measures code table number		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 5216	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.)		
								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			
30-8	Deposited mud or sand	Drivers cannot control their vehicles.			\coprod			2	Provide advance warning of a section where vehicle control is difficult	2106	Warning signs (209: Slippery)			
	Road surface icing	Vehicles are uncontrollable					-	<u> </u>	Provide advance warning of a section where vehicle control is difficult	2106	Warning signs (209: Slippery)			
31-0	rioad surface icing	verticles are uncontrollable						'	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	Vehicles turning right into a roadside facility or	.				1	1	Prohibit right turns	1202	Center median (post cones)			
	right or left stopping or decelerating on the main road	narrow side road advance dangerously.								5003	Prohibiting travel outside a designated direction	Right turns are prohibited.		
					1 1					5007	Prohibiting vehicle crossing			
								2	Separate vehicles entering/exiting roadside facilities and narrow roads from vehicles on	1508 1509	Additional lanes for roadside facility use Frontage road	 The addition of lanes is studied where there is a large roadside facility. 		
									the main road	1204	Center median (new center zebra)	 A frontage road should be constructed in a case where there is a row of medium and small scale facilities. 	(4)	Document 3-4
34-14	Vehicles preparing to turn	Vehicles turning right or left into a roadside		•	П			1	Prohibit right turns	1202	Center median (post cones)			
	right or left stopping or decelerating on the main road	facility or narrow side road abruptly stop, decelerate, or change lanes on the main road								5003	Prohibiting travel outside a designated direction	Right turns are prohibited.		
	1000									5007	Prohibiting vehicle crossing			
								2	Separate vehicles entering/exiting roadside	1508	Additional lanes for roadside facility use	The addition of lanes is studied where there is a large roadside		
									facilities and narrow roads from vehicles on the main road	1509	Frontage road	facility.		
									4	1204	Center median (new center zebra)	 A frontage road should be constructed in a case where there is a row of medium and small scale facilities. 	(4)	Document 3-4
35-1	Congested main road	Congestion causes pedestrians to jaywalk			•	•		1	Prohibit right turns	1202	Center median (post cones)			
		and blocks visibility between drivers of vehicles turning right from facilities and narrow roads and drivers of vehicles on the							;	5003	Prohibiting travel outside a designated direction	Right turns are prohibited.		
		main road.								5007	Prohibiting vehicle crossing			
		The ability of drivers of vehicles turning right							Prevent weaving	1501	Narrowing the shoulder			
		from the main road to see oncoming weaving motorcycles is reduced.						3	Prevent jaywalking	2304	crossing)	The two countermeasures should be implemented together.		
					$\sqcup \bot$		\perp	1_		5035	Prohibition on pedestrian crossing		<u></u>	
35-13	Congested main road	Congestion shortens the actual crossing distance, encouraging pedestrians to jaywalk				•		1	Prevent jaywalking	2304	Pedestrian cyclist use fence (to prevent crossing)	The two countermeasures should be implemented together.		
		and obscuring the vision of drivers of vehicles on the main road.								5035	Prohibition on pedestrian crossing			
								2	Prevent weaving	1501	Narrowing the shoulder		<u></u>	

	Accident occurre	ence process and causes			of a	ccident	t			 	Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision			Other crossing	course Lane departure		Countermeasure goal	Counter- measures code table number		Precautions when selecting and implementing countermeasures	Case No.	Case page
35-14	Congested main road	Congestion occurs, causing drivers on the	\top	•		11		1	Alert drivers to, and provide information	2299	Other road information provision systems	A signboard warning of the end of congestion is installed.		
		main road at the rear end of the congestion to abruptly stop, decelerate, or change lanes.	'						about, conditions that will make a location a dead angle for drivers.			 It should be studied in particular in cases where congestion occurs around a curve or in a tunnel. 		
										5399	Others	(Countermeasure code 2299 is a road administrator's countermeasure, and 5399 is a Public safety commission's countermeasure.)		
										2116		Signs such as "Warning! Congestion Ahead" are displayed.		
									, , , , , , , , , , , , , , , , , , , ,	5216	Signs and indicators not legally required (letters, symbols, arrows)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
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	1508	Additional lanes for roadside facility use			
	ioau	nom roauside facilities and harrow roaus.							vehicles on the main road	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. 		
	,								la constant	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	Driver's vision is obstructed.	•			•		1	Cause stopping vehicles to stop outside the	2704	Bus bay			
	stopped busses obstructing traffic movement								main road lanes	2703	Parking zone			
								2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-11	On-street parking and	Drivers pass in the oncoming lane.	11	•		\sqcap		1	Cause stopping vehicles to stop outside the	2704	Bus bay			
	stopped busses obstructing traffic movement								main road lanes	2703	Parking zone			
								2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-13	On-street parking and	Pedestrians are encouraged to jaywalk				•		1	Cause stopping vehicles to stop outside the main road lanes	2704	Bus bay			
	stopped busses obstructing traffic movement								man road lanes	2703	Parking zone			
								2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
								3	Prohibit jaywalking	2304	crossing)	The two countermeasures should be studied together.		
			\perp	\perp		$\perp \perp$		ļ	1	5035	Prohibition on pedestrian crossing		_	
43-14	On-street parking and stopped busses obstructing	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			
	traffic movement	Tables of the financial								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 occurre	ence process and causes			of accid					Planning the accident cou	ntermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection collision Head-on	Rear end	Hight turn Left turn	Other crossing When changing course	Lane departure	Countermeasure goal	Counter- measures code table number	1	Precautions when selecting and implementing countermeasures	Case No.	Case page
1-1		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 5216	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		
							2	Construct roads that do not reduce a driver's view ahead	1301	Alignment improvement	countermeasure, and 5216 is a Public safety commission's countermeasure.)		-
2-7	Long steep downhill gradient	<right turn="" vehicle=""> Drivers misunderstand the behavior of</right>		l l	•		1	Control the speed of through vehicles	1404	Improving pavement (level difference pavement)		(9)	Document 3-9
		oncoming through vehicles.							1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
									1601 5221	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.)		
							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		
							ļ		5007	Prohibiting vehicle crossing	should be studied together. (Countermeasure code 5003 is prohibiting right turns)		
			1_	4-1			4.		1202	Center median (post cones)			
3-1		Drivers have difficult seeing vehicles ahead and pedestrians crossing the road.			•		י	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.)		
									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. 		
									5007	Prohibiting vehicle crossing	(Countermeasure code 5003 is prohibiting right turns)		
4-7	Long straight section	<right turn="" vehicle=""> Drivers misunderstand the behavior of</right>		++,	•	+	1	Control the speed of through vehicles	1202	Center median (post cones) Improving pavement (level difference pavement)	(countries and course of promise may make the many	(9)	Document 3-9
		oncoming through vehicles.			11				1402	Improving pavement (coloring the lanes)		(7)	Document 3-7
									1601		(Countermeasure code 1601 is a road administrator's	- (, ,	
									5221	Road surface indicators (road surface deceleration indicators)	countermeasure, and 5221 is a Public safety commission's countermeasure.)		
		,					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. 		
		`							5007	Prohibiting vehicle crossing	(Countermeasure code 5003 is prohibiting right turns)		
8-14	Narrow lanes	Drivers abruptly stop or decelerate on the main road.		•		+++	1	Eliminate narrowing of the road	1202	Center median (post cones) Widening lanes	It is aggressively implemented if it is possible to guarantee land and budget.		
9-14		Drivers abruptly stop, decelerate, or change	11	•		\dashv	1	Provide advance indication of a reduction of	2108	Warning sign (212: narrowing road)	Several are installed far enough in advance to allow drivers to		
	number and width of lanes	lanes on the main road.						the number of lanes or road width	2107	Warning sign (211: reduction of lanes)	safely decelerate and change lanes.		
10-14	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		•			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		
		the main road.					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 from="" or<br="" right="" roadsides="" turning="">narrow roads into the main road> The ability to see the main road is obscured.</vehicles>	•	•	•		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		
	,	<vehicles from="" main="" right="" road="" the="" turning=""></vehicles>								<u> </u>	visibility.	1	
		The drivers' ability to see oncoming through vehicles is reduced. <through main="" on="" road="" the="" vehicles=""></through>					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		
		It s difficult to check the stopping or deceleration behavior of vehicles ahead on							1202	Center median (post cones)	possible should be closed. It is studied in cases where there is an intermittent center median		
		curves							5003	Prohibiting travel outside a designated direction	on a multi-lane road. • This countermeasure should be applied to close meaningless openings in center medians.		
									5009	Prohibiting U-turns	(Countermeasure code 5003 is a prohibition on right turns.)		

	Accident occurre	ence process and causes			of acc					Planning the accident cour	ntermeasures		
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		Precautions when selecting and implementing countermeasures	Case No.	Case page
16-1	Poorly located and	<vehicles entering="" from="" main="" road="" td="" the="" the<=""><td>•</td><td></td><td></td><td></td><td>1</td><td>Remove elements that obstruct visibility</td><td>1305</td><td>Rearranging vegetation</td><td>This is related to rear-end collisions on curves</td><td></td><td></td></vehicles>	•				1	Remove elements that obstruct visibility	1305	Rearranging vegetation	This is related to rear-end collisions on curves		
	signboards, etc. on the sidewalks	roadside or from narrow roads> It is difficult for them to check for vehicles on the main road. <through main="" on="" road="" the="" vehicles=""> It is difficult to check vehicles ahead on curves.</through>					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		Drivers on the main road abruptly stop, decelerate, or change lanes, because		•			1	Close openings so that the number of things drivers on the main road must pay attention	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, 		
		vehicles cut in from openings in the center						to is low	1202	Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed.		
		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							5003	Prohibiting travel outside a designated direction	 It is studied in cases where there is an intermittent center median on a multi-lane road. 		
		many things at the same time.)							5007	Prohibiting vehicle crossing	 This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.) 		
18-14	Lucia propriorio de la constante de la constan	Confused about what action to take, drivers abruptly stop, decelerate, or change lanes on		•		•	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.		
		the main road.			İ		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,		
									1202	Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed.		
									5003	Prohibiting travel outside a designated direction	This is studied in cases where there is an intermittent center median on a multi-lane road.		
		<u>.</u>		-					5009	Prohibiting U-turns	This countermeasure should be applied to close meaningless openings in center medians.		
		Machania and Addison design	-	++	-		-	Alort drivers to and arouids information	2116		(Countermeasure code 5003 is a prohibition on right turns.) This is related to rear-end collisions on curves		
		It obstructs drivers view.					2	Alert drivers to, and provide information about, conditions that will make a location a dead angle for drivers		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.)		
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	2116		This is studied in a case where rear-end collisions and other		
								about, conditions that will make a location a dead angle for drivers	5216	Signs and indicators not legally required (letters, symbols, arrows, etc.)	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	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. 		_
	exit/entrance						2		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	 	
		·						facilities from roads on the main road	1509	Frontage road	constructed in a case where there is a row of medium and small scale facilities.		
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		1	
25-14	Unclear roadside facility driveway exit/entrance or	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.		
	narrow road	included in the main road						,	2102	Warning sign (201:Intersection ahead)			
							2	1	1508	Additional lanes for roadside facility use	• The construction of additional lanes is studied where there is a		
								facilities from roads on the main road	1509	Frontage road	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.		

Road environment factors on the road where the countermeasures are taken Impact on the road environment Road environment	e table Precautions when selecting and implementing countermeasures No. Case page
27-1 Visibility reduced by sunlight in the morning and in the west Visibility reduced by sunlightion to the morning and in the west Visibility reduced by sunlightion to the morning and in the west Visibility reduced by sunlight in the morning and in the west Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced by sunlightion to the morning legated Visibility reduced	alt chould be possible to change large from large from the
sunlight in the morning and in the west 28-8 Deteriorated road surface paving (ruts and cracks) 29-8 Poor drainage Vehicles become uncontrollable 29-8 Poor drainage Vehicles become uncontrollable 29-8 Poor drainage Vehicles become uncontrollable 29-8 Poor drainage Vehicles become uncontrollable 29-8 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 29-9 Poor drainage Vehicles become uncontrollable 20-9 Provide advance warning that it is easy to lose control 1408 Road surface maintenance 1409 Improving pavement (grooving pavement) 1408 Road surface maintenance 1409 Improving paving (drainage puncontrollable) 1409 Im	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).
28-8 Deteriorated road surface paving (ruts and cracks) Vehicles become uncontrollable Vehi	
paving (ruts and cracks) Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Povide advance warning that it is easy to lose control Provide advance warning that it	This is installed in a case where head lamps of oncoming vehicles reduce visibility.
2 Provide advance warning that it is easy to lose control 3 Stabilize the control of vehicles 1403 Improving pavement (slip-prot pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 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 • • • • • • • • • • • • • • • • • •	
3 Stabilize the control of vehicles 1403 Improving pavement (slip-prodice pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1407 Improving pavement (grooving pavement) 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface maintenance 1408 Road surface	y)
29-8 Poor drainage Vehicles become uncontrollable 1406 Improving pavement (grooving pavement) 1406 Improving pavement (grooving pavement) 1408 Improving pavement (grooving pavement) 1408 Road surface maintenance 2 Provide advance warning that it is easy to lose control 30-8 Deposited mud or sand Vehicles become uncontrollable. 31-8 Road surface icing Vehicles become uncontrollable 4 0 0 1 Provide advance warning that it is easy to lose control 4 1 Remove elements that make vehicles warning that it is easy to lose control 4 1 Remove elements that it is easy to lose control 5 2 Provide advance warning that it is easy to lose control 6 1 Remove elements that make vehicles warning that it is easy to lose control 7 2 Provide advance warning that it is easy to lose control 8 31-8 Road surface icing Vehicles become uncontrollable 9 1 Remove elements that make vehicles uncontrollable 9 2 Provide information about the road surface in advance in a	oof
Poor drainage Vehicles become uncontrollable Vehicles become	ng
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 countermeasu heating) Snow and cold countermeasu (spreading anti-icing agent) 2 Provide information about the road surface in advance 2 Provide information about the road surface in advance 2 Provide information about the road surface 2 Provi	pavement) (8) Document 3-8
30-8 Deposited mud or sand Vehicles become uncontrollable. 9	
31-8 Road surface icing Vehicles become uncontrollable Marning signs (209: Slippery)	y)
31-8 Road surface icing Vehicles become uncontrollable • • • • • • • • • • • • • • • • • •	y)
2801 Snow and cold countermeasu (spreading anti-icing agent) 2 Provide information about the road surface in advance	sures (road
2 Provide information about the road surface	sures
	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 narrow streets, travel dangerously. Openings in the center media them etc.)	ian (closing Because in sections where there are many openings in a center median, the traffic flow is disrupted by vehicles turning right,
decelerating on the main road 1202 Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed
5003 Prohibiting travel outside a de direction	•
5007 Prohibiting vehicle crossing	This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)
2 Separate vehicles entering/exiting roadside 1508 Additional lanes for roadside	e facility use • The construction of additional lanes is studied where there is a
facilities from roads on the main road 1509 Frontage road	large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small
1204 Center median (new center zo	apple facilities
34-14 Vehicles preparing to turn right or left stopping or narrow street abruptly stop, decelerate, or	median, the traffic flow is disrupted by vehicles turning right,
decelerating on the main change lanes on the main road. 1202 Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed.
5003 Prohibiting travel outside a de direction	This is studied in cases where there is an intermittent center median on a multi-lane road.
5007 Prohibiting vehicle crossing	This countermeasure should be applied to close meaningless
2 Separate vehicles entering/exiting roadside 1508 Additional lanes for roadside	The construction of additional lanes is studied where there is a
facilities and narrow streets from vehicles on the main road 1509 Frontage road	large scale roadside facility and a frontage road should be constructed in a case where there is a row of medium and small
1204 Center median (new center z	The state of the

	Accident occurr	rence process and causes		,,,	e of a	ccide	nt				Planning the accident cou	intermeasures		
Cause code	Road environment factors on the road where the countermeasures are taken	Impact on the road environment	Intersection	Rear end	Right turn	Left turn Other crossing	When changing course Lane departure		Countermeasure goal	Counter- measures code table number		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			•	•		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,		
		vehicles turning right from facilities and narrow roads and drivers of vehicles on the								1202	Center median (post cones)	reducing safety, as many openings in the center median as possible should be closed.		
		main road. The ability of drivers of vehicles turning right								5003	Prohibiting travel outside a designated direction	This is studied in cases where there is an intermittent center median on a multi-lane road.		
		from the main road to see oncoming weaving motorcycles is reduced.								5007	Prohibiting vehicle crossing	This countermeasure should be applied to close meaningless openings in center medians. (Countermeasure code 5003 is a prohibition on right turns.)		
								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		•				1	Alert drivers to, and provide information about, conditions that will make a location a	2299	Other road information provision systems	A signboard warning of the end of congestion is installed.		
		abruptly stop, decelerate, or change lanes.							dead angle for drivers	5399	Others	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.)		
										2116		Signs such as "Warning! Congestion Ahead" are displayed.		
										5216	Signs and indicators not legally required (letters, symbols, arrows)	(Countermeasure code 2116 is a road administrator's countermeasure, and 5216 is a Public safety commission's countermeasure.)		
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	1508	Additional lanes for roadside facility use			
,	load	Trom roadside facilities and flarrow roads.						1	road	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	Drivers' view of the road ahead is obstructed.				•		1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
	traffic movement								Train roug	2703	Parking zone			
		,						2	Remove vehicles stopped on the main road	5022	Prohibiting parking			
43-14	On-street parking and stopped busses obstructing	Drivers abruptly stop, decelerate, and change		•				1	Cause stopped vehicles to stop outside the main road	2704	Bus bay			
	traffic movement	Talloo on the main road.								2703	Parking zone			
	ŧ							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	
(1)	Reducing the radius of corner cut-offs	Document 3-1
(2)	Increasing right-turn traffic lanes (to 2 lanes)	Document 3-2
(3)	Installing traffic islands	Document 3-3
Cente	r median	
(4)	Installing a central zebra zone	Document 3-4
Road	surface indicators and lane markings	
(5)	Installing guide lines (right turn and through traffic guide lines)	Document 3-5
(6)	Increasing the brightness of lane markings (producing vibration)	Document 3-6
Paven	nent	
(7)	Coloring road surface pavement	Document 3-7
(8)	Introducing drainage pavement ·····	Document 3-8
(9)	Introducing level difference pavement	Document 3-9
Other	s	
(10)	Installing self-illuminated line of sight guidance beacons	Document 3-10
[Publi	c Safety Commission's Countermeasures]	
Signa		
(11)	Enlarging signal lights ·····	Document 3-11
Road	surface indicators	
(12)	Moving a crosswalk forward·····	Document 3-12

(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.

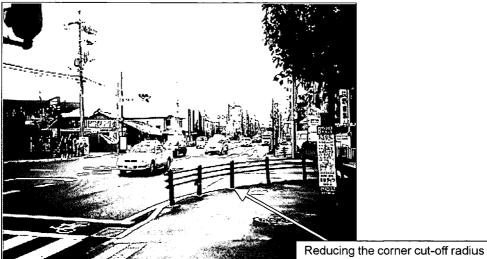
<Pre><Pre>cautions>

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

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.

<Pre><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.

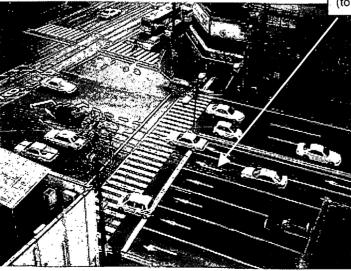
<Major types of accidents targeted>

Pedestrian crossing a crosswalk when a vehicle is turning right

<Countermeasure photographs>



Increasing right-turn traffic lanes (to 2 lanes)



* 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
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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.

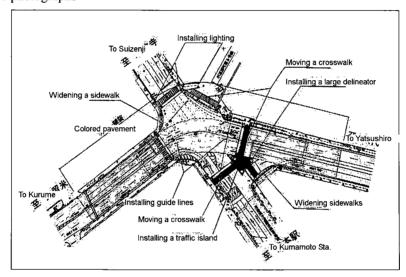
<Pre><Pre>cautions>

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)

(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.

<Pre><Precautions>

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

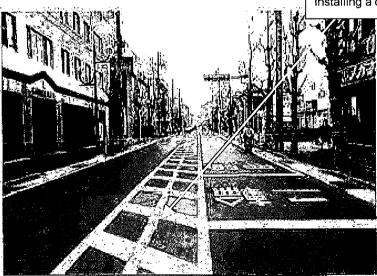
<Major types of accidents targeted>

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
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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.

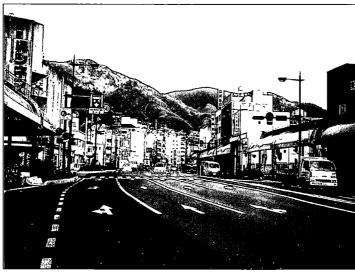
<Pre><Pre>cautions>

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	Purpose	Preventing lane departures and guiding drivers' line of vision
	markings (producing vibration)	•	guiding drivers line of vision

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

<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).

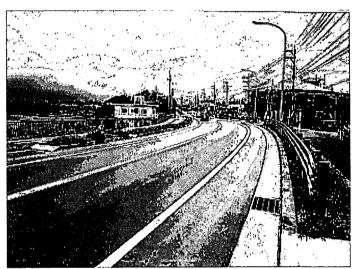
<Pre><Pre>cautions>

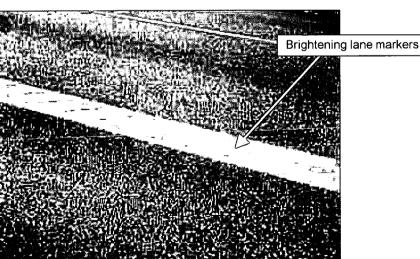
Because this measure causes noise along with vibration, it is necessary to make a complete study when implementing it in a residential district.

<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)

(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.

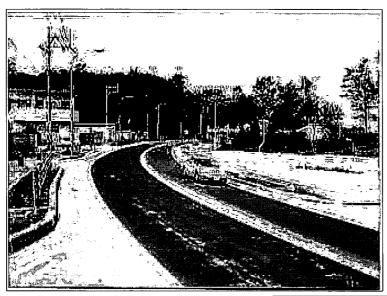
<Precautions>

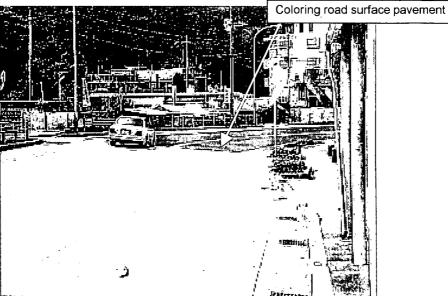
At locations where traffic is heavy and locations where the view of the road ahead is obscured, even if the road surface pavement at a hazardous spot is colored, drivers do not notice this countermeasure on time. In this case, it should be taken in advance of the hazardous spot.

<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)

(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.

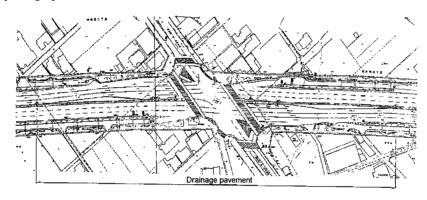
<Pre><Pre>cautions>

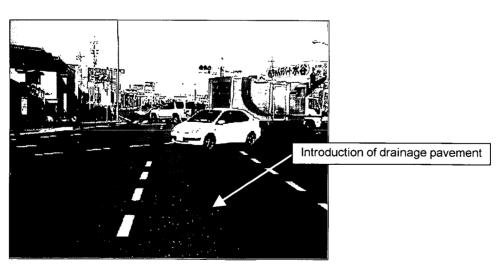
There is a danger that plugging (by waste material etc.) of voids in drainage pavement may lower its performance so the road surface must be thoroughly maintained (cleaned etc.).

<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
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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.

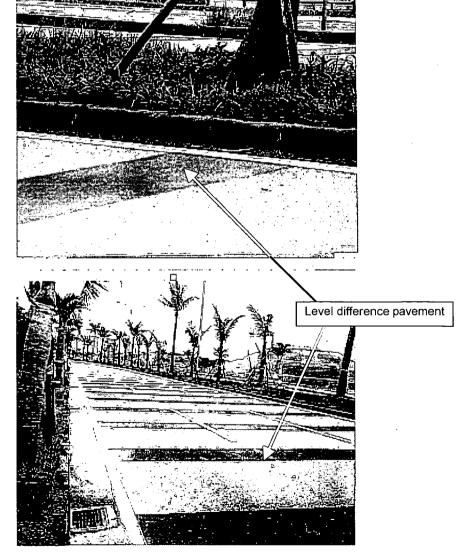
<Precautions>

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)

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>

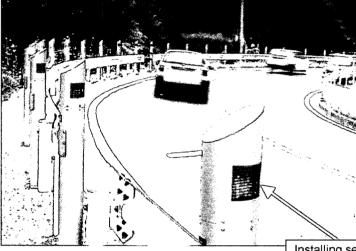
Flashing line of sight guidance beacons (self-illuminated) along the flow of vehicles to show drivers the alignment on curves. Setting the speed of the flow of flashing lights at an appropriate speed also controls vehicle speed.

<Pre><Pre>cautions>

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>



Installing self-illuminated line of sight guidance beacons



* 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
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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.

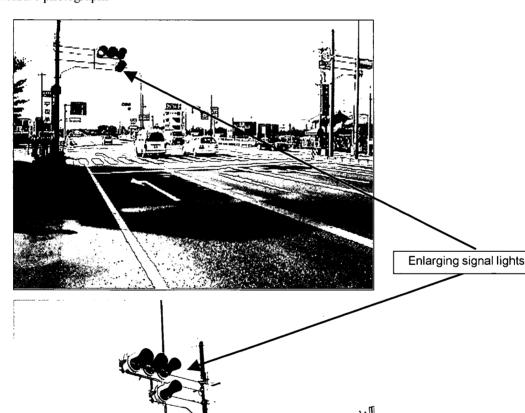
<Pre><Pre>cautions>

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)

(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.

<Pre><Pre>cautions>

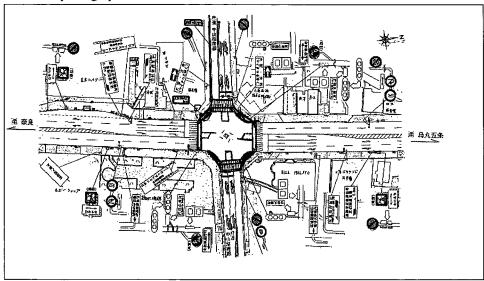
There is concern that if the crosswalk is moved forward to far, when a left turn vehicle is waiting for pedestrians to cross before turning left, it will hold up vehicles following it.

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>





Moving a crosswalk forward

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

TECHNICAL NOTE of NILIM

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