

Special feature

Right-turn accidents at signalized intersections

~ Drivers must look out for bicycles
and pedestrians to their right ~

Making right turns is a weak point for many drivers. Drivers making right turns are confronted not only by oncoming cars but by many other road users that they must look out for such as bicycles and pedestrians passing to the driver's right, and failure to confirm safety due to slight inattention or complacency can lead to serious accidents.

In 2011, the number of accidents which occurred when the primary party was a four-wheeled vehicle making a right turn (right-turn accidents) stood at 88,445, and the most common place for such accidents to occur was signalized intersections where approximately 44% of right-turn accidents took place, followed by unsignalized intersections at approximately 37% (Fig. 1).

In this issue of ITARDA Information, we look at the issue of right-turn accidents at signalized intersections, focusing on accidents involving bicycles which are particularly common among such accidents, and on accidents involving pedestrians which are particularly likely to be serious in nature, and will consider the causes behind such accidents and some driving techniques that will prevent them from occurring.

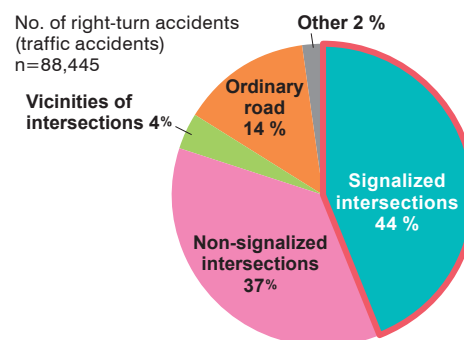


Fig. 1: Breakdown of right-turn accidents by road configuration (2011)

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SECTION
1

Situations where accidents at signalized intersections occur

First, let us look at the situations where accidents at signalized intersections occur.

(1) Road users involved in accidents at signalized intersections

Fig. 2 shows the breakdown of all traffic accidents by road configuration in 2011. More than half of traffic accidents occurred at intersections and their vicinities, with approximately 16% (109,599) accidents occurring at signalized intersections.

Fig. 3 shows the road user combinations involved in accidents at signalized intersections. The majority of accidents occur from combinations of “four-wheeled vehicle with four-wheeled vehicle,” “four-wheeled vehicle with two-wheeled vehicle (including mopeds),” “four-wheeled vehicle with bicycle”

and “four-wheeled vehicle with pedestrian”; more than 90% of such accidents involve four-wheeled vehicles. Furthermore, in approximately 95% of accidents that involve four-wheeled vehicles the four-wheeled vehicle driver is the primary party*. It is evident therefore that the majority of accidents at signalized intersections occur primarily because of the negligence of four-wheeled vehicle drivers, with four-wheeled vehicle drivers thus constituting the perpetrators.

*1. “Primary party” refers either to the party whose negligence was greatest out of the parties directly involved in a traffic accident, or (where both parties’ negligence was the same) to the party whose injury was the lightest in degree. The other party in the accident with the primary party is referred to as the secondary party.

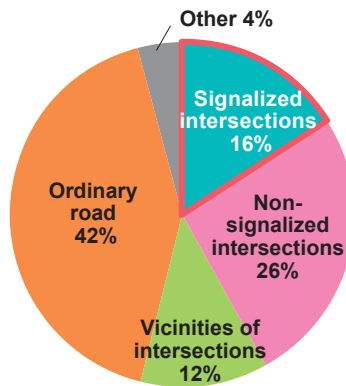


Fig. 2: Breakdown of traffic accidents by road configuration [2011]

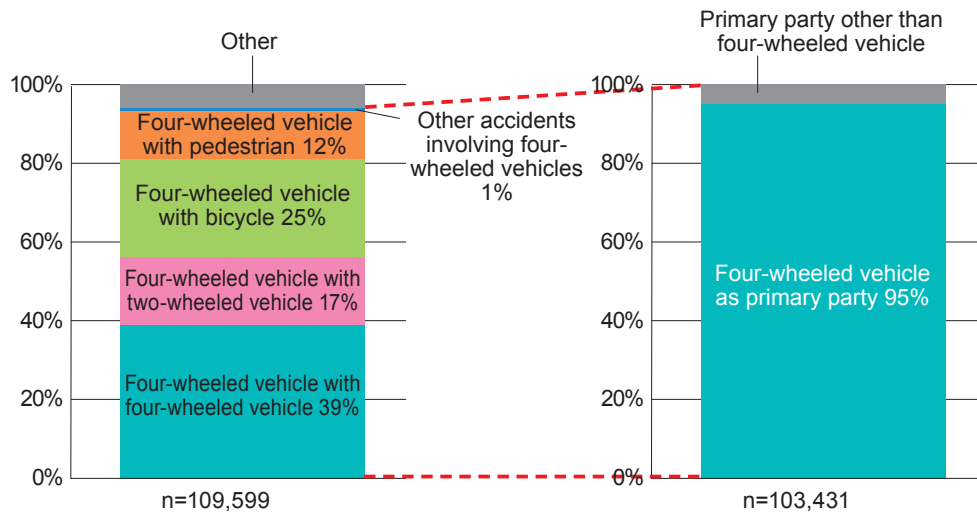


Fig. 3: Breakdown of signalized intersection accidents by road user combination, and percentage of primary parties that are four-wheeled vehicles [2011]

(2) Accidents occur most commonly when the primary-party four-wheeled vehicle is making a “right turn”

Let us investigate the movements of primary-party four-wheeled vehicles when accidents occur at signalized intersections. Fig. 4 shows the numbers of accidents and the percentage of the accidents caused by the primary or secondary party being guilty of “ignoring signals,” broken down by the type of movement of the primary-party four-wheeled vehicles. The most common type of vehicle movement by primary-party four-wheeled vehicles was making a “right turn” (hereinafter referred to as “right-

turn accidents”) which comprised 39% (38,294) of the total, followed by accidents that occurred when the vehicle was traveling “straight ahead.” While more than half of the “straight ahead” accidents were caused by “ignoring signals,” in contrast only approximately 3% of the right-turn accidents were caused by “ignoring signals,” indicating that in most right-turn accidents both road users are advancing into the intersection when the signal is green.

Chart 1: No. of accidents and no. of “ignoring signals” accidents, by primary-party four-wheeled vehicle movement type [2011]

	Starting up	Straight ahead	Left turn	Right turn	Other	Total
No. of traffic accidents at signalized intersections (primary-party four-wheeled vehicles)	7,779	32,256	16,393	38,294	2,858	97,580
No. of “ignoring signals” accidents	1,134	16,515	240	1,032	75	18,996

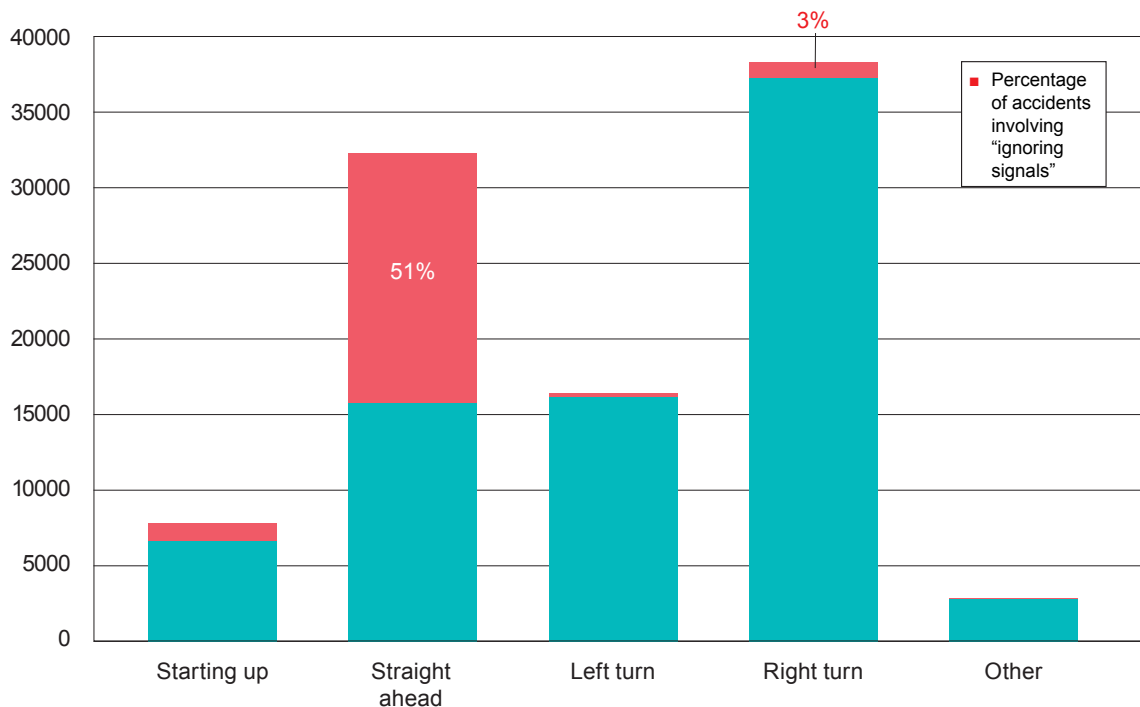


Fig. 4: No. of accidents and percentage of “ignoring signals”^{*2} accidents, by primary-party four-wheeled vehicle movement type [2011]

^{*2} Accidents in which this violation was committed by the primary or secondary party

Distinguishing features and causes of right-turn accidents

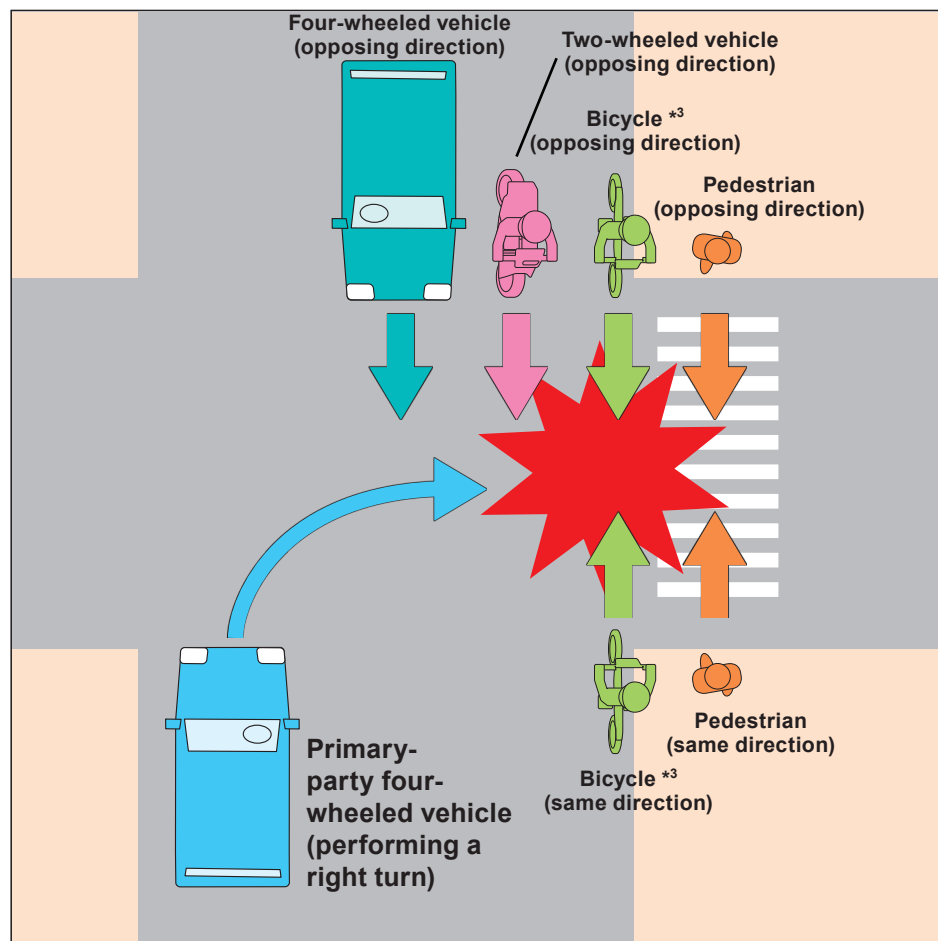
In what kind of situations do right-turn accidents occur? Here, we will examine the distinguishing features and causes of right-turn accidents.

Fig. 5 shows the targets that we will analyze. Accidents to be analyzed are those between primary-party four-wheeled vehicles and secondary-party four-wheeled vehicles (advancing in an opposing direction), two-wheeled vehicles (advancing in an opposing direction), bicycles (advancing in an opposing direction/advancing in the same direction) and

pedestrians (advancing in an opposing direction/advancing in the same direction).

When aggregated, the accidents from all four of these road user combinations together comprise approximately 70% (26,782 accidents) of all right-turn accidents at signalized intersections that occurred in 2011.

The following analysis uses the aggregated values taken from the Traffic Accident Database over the five-year period from 2007 to 2011.



*3 The locations of bicycles included roads, pedestrian crossings and their vicinities.

Fig. 5: Targets for analysis of “right-turn accidents” with primary-party four-wheeled vehicles

(1) Among traffic accidents causing fatalities and injuries, accidents with bicycles are common; among fatal accidents, accidents with pedestrians are common

Fig. 6 shows the component rates of the numbers of accidents from various road user combinations. Among traffic accidents, accidents with bicycles are the most common, followed by accidents with other four-wheeled vehicles. Among fatal accidents, accidents with pedestrians are the

most common, followed by accidents with two-wheeled vehicles. It is evident that among right-turn accidents, accidents with bicycles occur the most frequently, and that accidents involving pedestrians and two-wheeled vehicles are the most likely to turn into serious accidents.

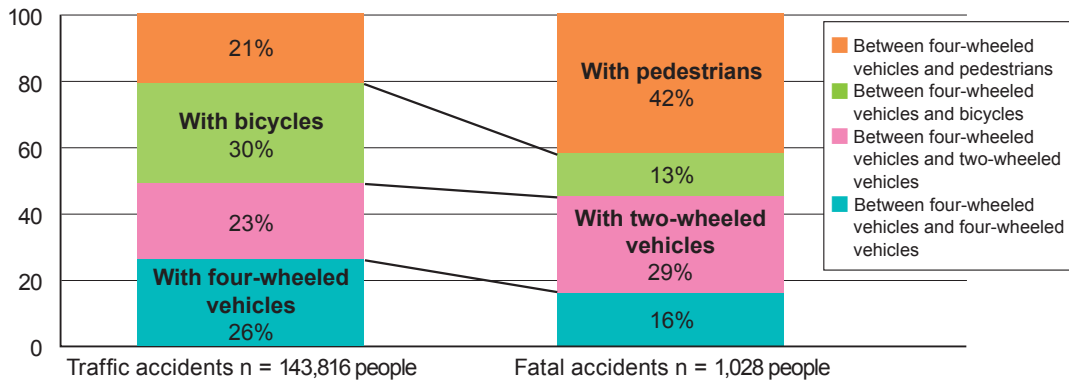


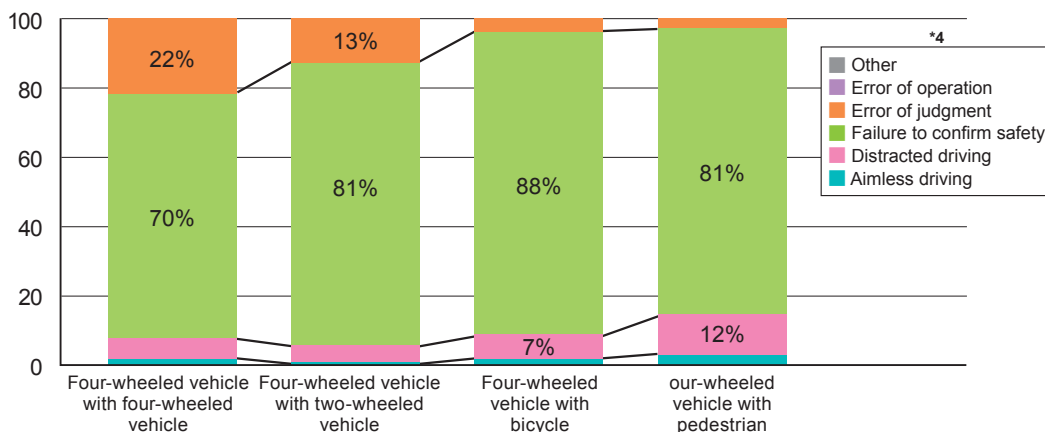
Fig. 6: Component rates of secondary parties involved in “right-turn accidents” with a primary-party four-wheeled vehicle [2007~2011]

(2) The main factor behind accidents is four-wheeled vehicle drivers “failing to confirm safety” when making right turns

What kinds of factors cause right-turn accidents? Fig. 7 shows the component rates of human causes attributable to primary-party four-wheeled vehicle drivers, broken down by road user combination. It is evident that for each road user combination, the majority of accidents were caused by “failure to confirm safety.” Among accidents with bicycles and pedestrians, the percentage caused by “distraction” was quite high, indicating that drivers’ attention was turned towards something else at the time the accident occurred. Among accidents with other four-wheeled vehicles and with two-wheeled vehicles, the percentage of accidents caused by “error of judgment” was high, meaning that a driver perceived

the presence of the other road user (the four-wheeled vehicle or two-wheeled vehicle) but made an error of judgment—“I think I’m the one who’s to move first,”—leading to an accident.

What kind of situations lead drivers to “fail to confirm safety,” the factor which caused the majority of accidents? From the next section onwards, we will focus on bicycle and pedestrian accidents which occur in particularly large numbers, and will look at what kind of situations give rise to accidents caused by “failure to confirm safety,” based on an analysis which breaks accidents down by road width and by daytime/nighttime.



*4 “Failure to confirm safety” refers to both “Driver did not confirm safety” and “Driver did not confirm safety sufficiently”; “Distracted driving” refers to items such as “Driver was looking at other vehicle or pedestrian,” “Driver was operating a navigation device” etc.; “Error of judgment” refers to human causes such as “Driver made error of judgment regarding the distance or speed between own vehicle and other road user,” “Driver failed to keep an eye on other road user due to the belief that other road user would give way” etc.

Fig. 7: Component rates of human causes attributable to primary-party four-wheeled vehicle drivers [2007~2011]

Distinguishing features and causes of right-turn accidents involving bicycles and pedestrians to the driver's right

(1) Distinguishing features of right-turn accidents broken down by road width

Let us analyze the situations which give rise to accidents according to the width of the road from which the primary-party four-wheeled vehicle emerged, breaking down the accidents according to whether the road was “narrow,” “medium” or “wide.” Roads from which the

primary-party four-wheeled vehicles emerged (roads) are categorized as “narrow” if they were under 5.5m in width, “medium” if they were 5.5m or over and under 13m, and “wide” if they were 13m or over (Fig. 8).

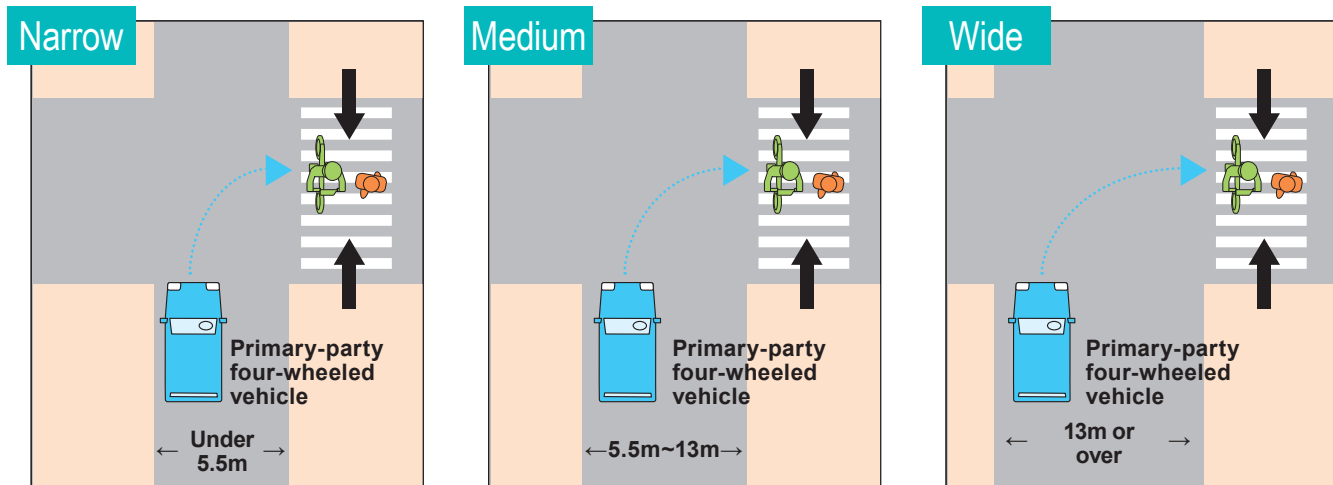


Fig. 8: Width of roads from which primary-party four-wheeled vehicles emerged

Fig. 9 shows the component rates of the numbers of the various road user combinations involved in accidents, broken down by road width. When drivers enter an intersection from a narrow road, the percentage of accidents with bicycles and pedestrians is high. In intersections with a narrow width, the traffic volume of four-wheeled vehicles and two-wheeled vehicles coming in an opposing direction is smaller, meaning that in relative terms accidents with bicycles and pedestrians

to the driver's right become more likely to happen. When drivers enter an intersection from a wide road, the percentage of accidents with four-wheeled vehicles is higher. It is believed that these accidents increase because the wider the road, the higher the traffic volume in the opposing lane and the higher the average driving speed, making it harder to spot oncoming vehicles and to judge whether it is possible to turn right or not.

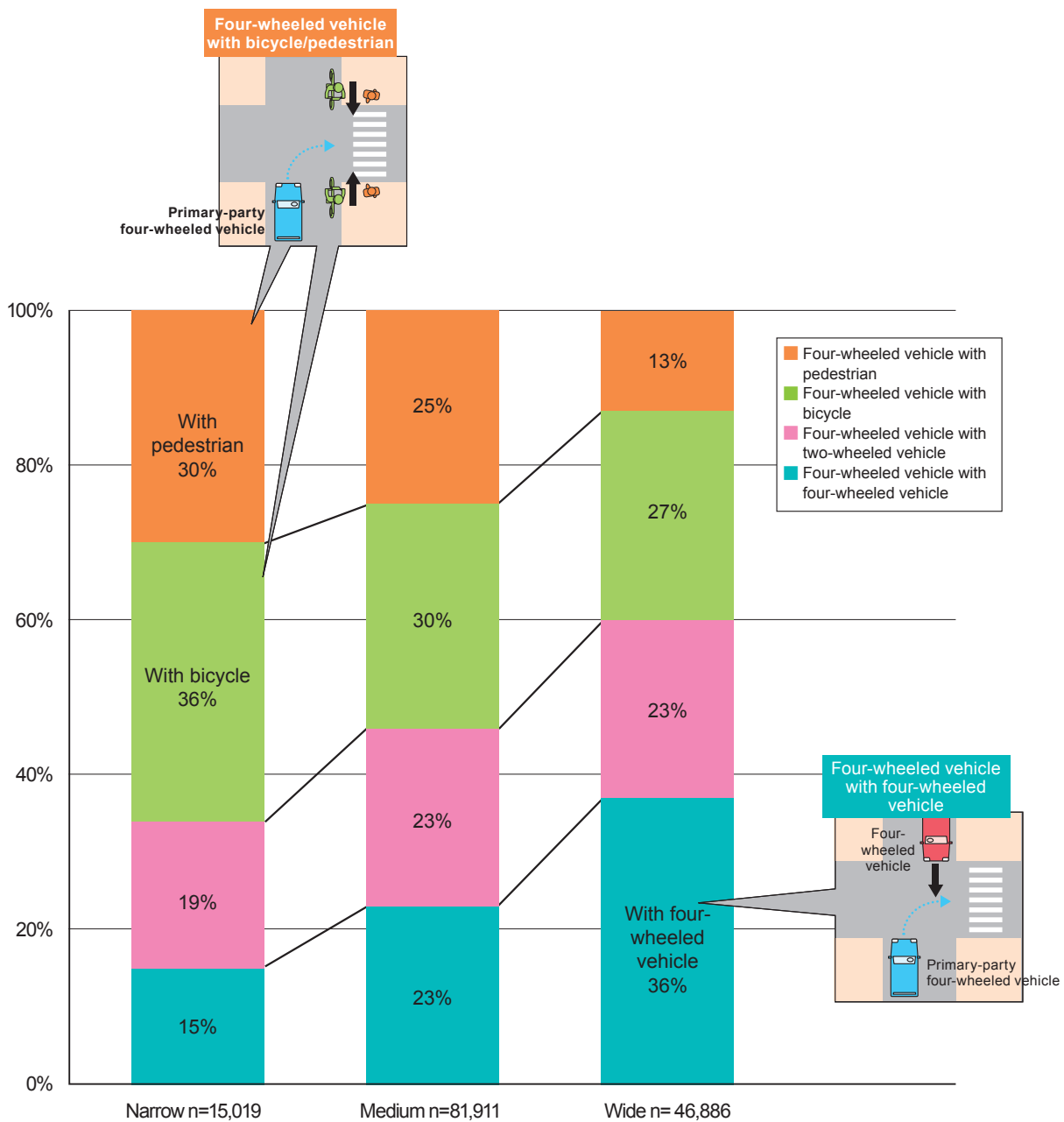


Fig. 9: Breakdown of secondary parties by width of road from which the primary-party four-wheeled vehicle emerged [2007~2011].

(2) When drivers enter an intersection from a “wide” road, they are apt to overlook bicycles and pedestrians traveling in the same direction

Fig. 10 shows the directions in which bicycles and pedestrians are traveling at the time accidents occur, broken down by road width. The wider the road, the higher the percentage of accidents in which the vehicle and pedestrian/cyclist were traveling in the “same direction.” As we saw in the previous section, the wider the

road the harder it is for the driver to gauge the situation in the opposing lane; it is believed that because drivers’ attention is thus diverted in a frontward direction towards the opposing lane, they neglect to pay attention to bicycles and pedestrians to their right who are traveling from the same direction as their own vehicles.

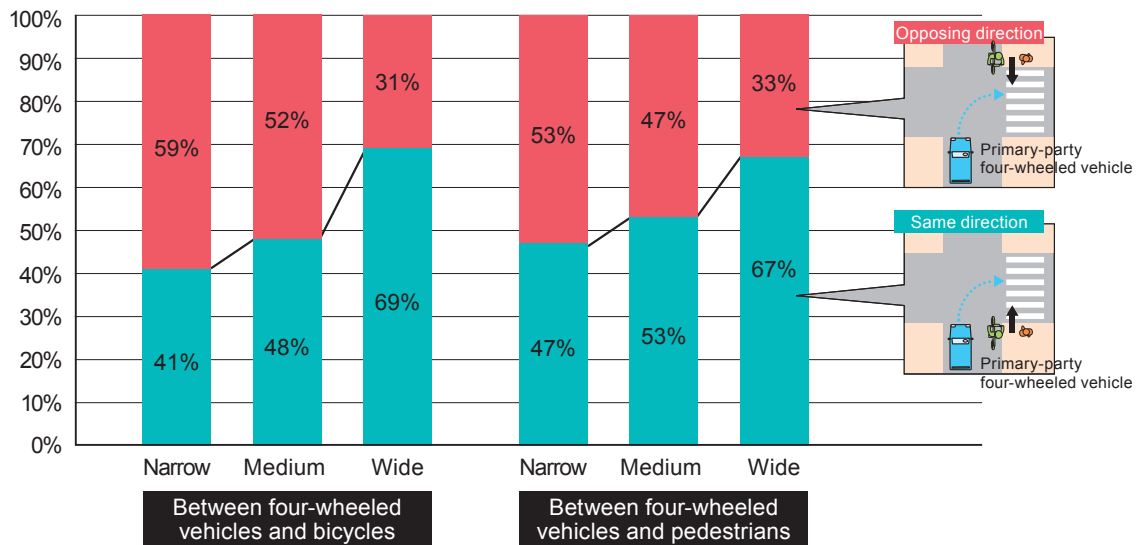


Fig. 10: Percentages of bicycle/pedestrian movement types, by primary-party four-wheeled vehicle road width [2007~2011]

(3) At nighttime, drivers are apt to overlook pedestrians and bicycles traveling from the same direction

Let us look at the directions in which bicycles and pedestrians were traveling at the times of accidents, breaking these down by daytime/nighttime. Accidents which occurred in the daytime were split approximately 50:50 between those in which bicycles and pedestrians were traveling in an “opposing” direction to the four-wheeled vehicle and those in which they were traveling in the “same direction.” By contrast, among nighttime accidents

there was a rise in the percentage of accidents in which the pedestrian or bicycle was traveling in the “same direction” as the driver (Fig. 11). This is believed to be because as the driver’s surroundings grow dark at night, it is harder for the driver to perceive bicycles and pedestrians traveling in the “same direction” as the driver, partly because the light from the front headlights of four-wheeled vehicles does not easily reach them.

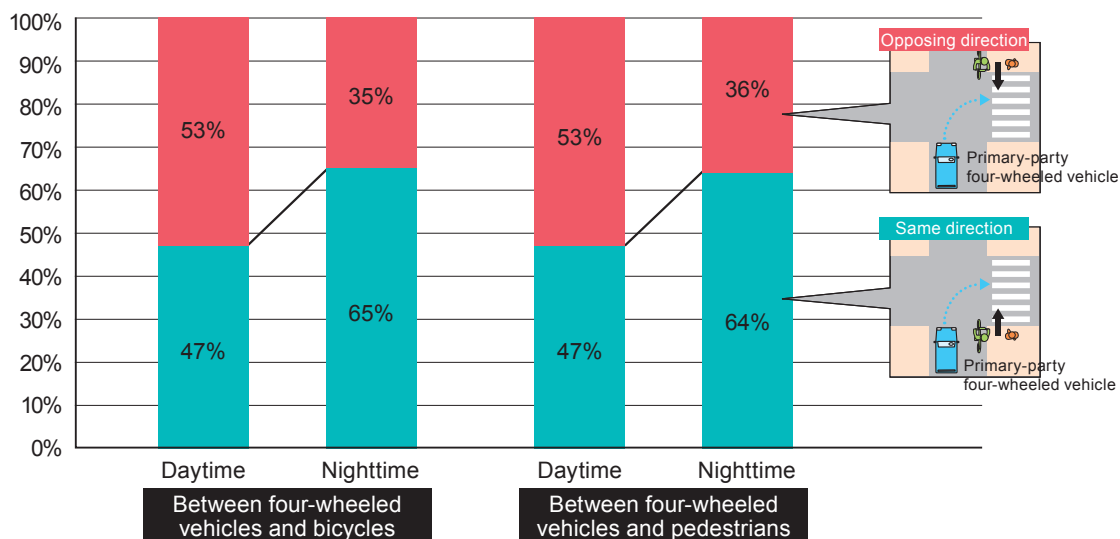


Fig. 11: Percentages of bicycle/pedestrian directions, by daytime/nighttime [2007~2011]

(4) “Lack of focused attention” and “complacency/failure to confirm safety” cause drivers to overlook bicycles and pedestrians

It is evident from the results of the above analysis that drivers’ overlooking bicycles and pedestrians is affected by the situation in the opposing lane and by their surrounding environment. In order to understand in more detail the actual situation surrounding such overlooking of bicycles and pedestrians, accident causes were classified in greater detail based on interview surveys of four-wheeled vehicle drivers who had caused right-turn accidents, cyclists and pedestrians. Data used in the analysis was extracted from recent examples of accidents taken from our in-depth study database gathered at the Institute.

Fig. 12 shows the causes (attributable to either party) of accidents between four-wheeled vehicles and bicycles. Data from a total of 28 accidents was analyzed.

In terms of causes attributable to four-wheeled vehicle drivers, a large number of accidents were observed to be as a result of “lack of focused attention” by drivers, such as “Driver’s attention was turned towards the oncoming four-wheeled vehicles” and “Driver was worried about something to his/her right.” It is believed that such accidents might have been avoided had the driver in each case confirmed the safety of his/her surroundings carefully before starting to make a right turn, and decelerated adequately and confirmed the road to his/her left and right after moving to the right.

The other cause of accidents was omissions in confirming safety, such as “Driver started turning right without thinking” and “Driver turned right by following the preceding vehicle.” It is believed that inattention or complacency—“I don’t think there are any cars there”

—is an underlying cause of drivers’ neglecting to confirm safety.

Meanwhile, a feeling among cyclists of being a privileged road user—“That car is sure to stop”—is also a major cause of accidents. Cyclists perceived the four-wheeled vehicles, so had the cyclists continued to keep an eye on the vehicles’ movements right to the end, the accidents might have been prevented. Many cases were also seen in which cyclists neglected to confirm the safety of their surroundings due to complacency—“I don’t think any cars will come out”—and thus failed to notice vehicles coming towards them until immediately before the collision. There were also plenty of examples of negligence by cyclists in accidents at nighttime and on rainy days, including cyclists cycling without lights or while holding umbrellas. It is important that cyclists ensure that they cycle with lights on and at a slower speed when travelling at night.

Looking at causes attributable to four-wheeled vehicle drivers among accidents between four-wheeled vehicles and pedestrians, as with accidents with bicycles “lack of focused attention” by drivers such as “Driver’s attention was turned towards the oncoming four-wheeled vehicles” was seen in a large number of cases. Meanwhile, among the pedestrians, a large number of accidents were seen in which pedestrians started to cross roads without thinking and did not notice vehicles coming towards them until immediately before the collision; it is believed that inattentiveness and complacency—“The light’s green, so it’s okay to cross”—led to these accidents.

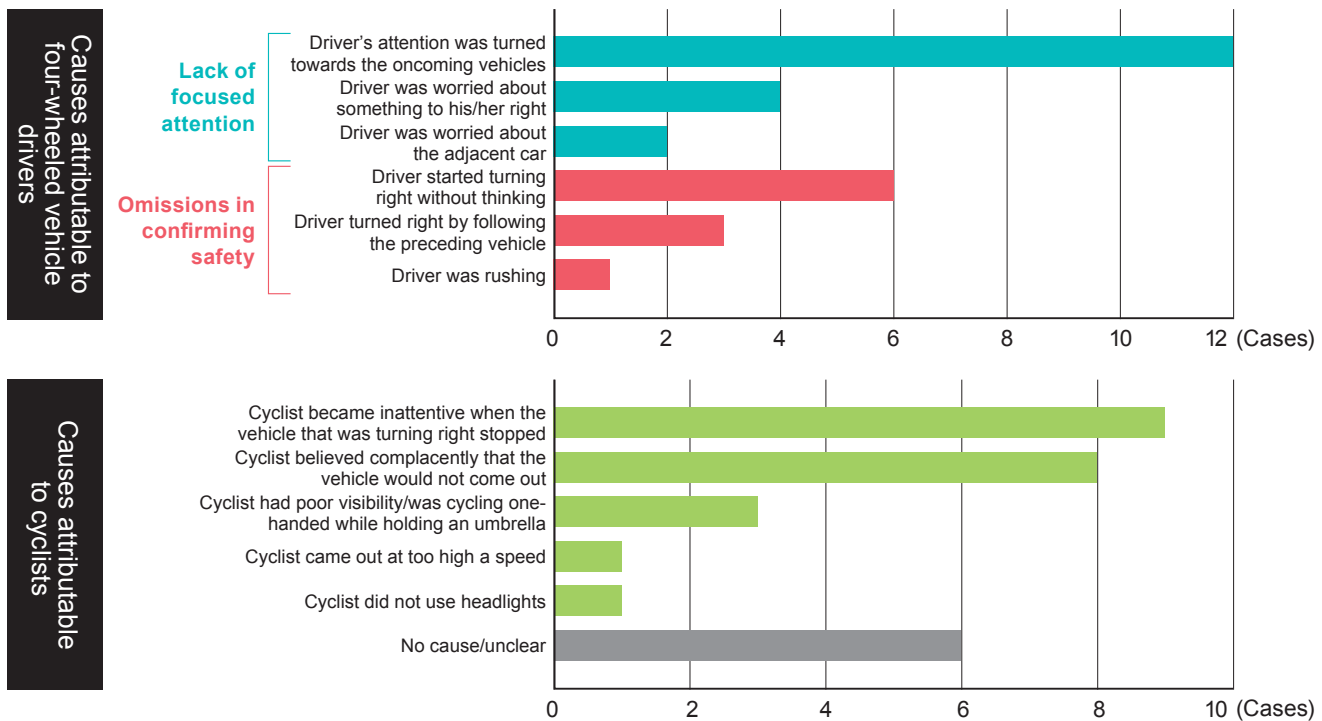


Fig. 12: Human causes of “right-turn accidents” between four-wheeled vehicles and bicycles

Example of an accident

Here we will present an example of an accident between a four-wheeled vehicle and a bicycle, taken from the Traffic Accident Database.

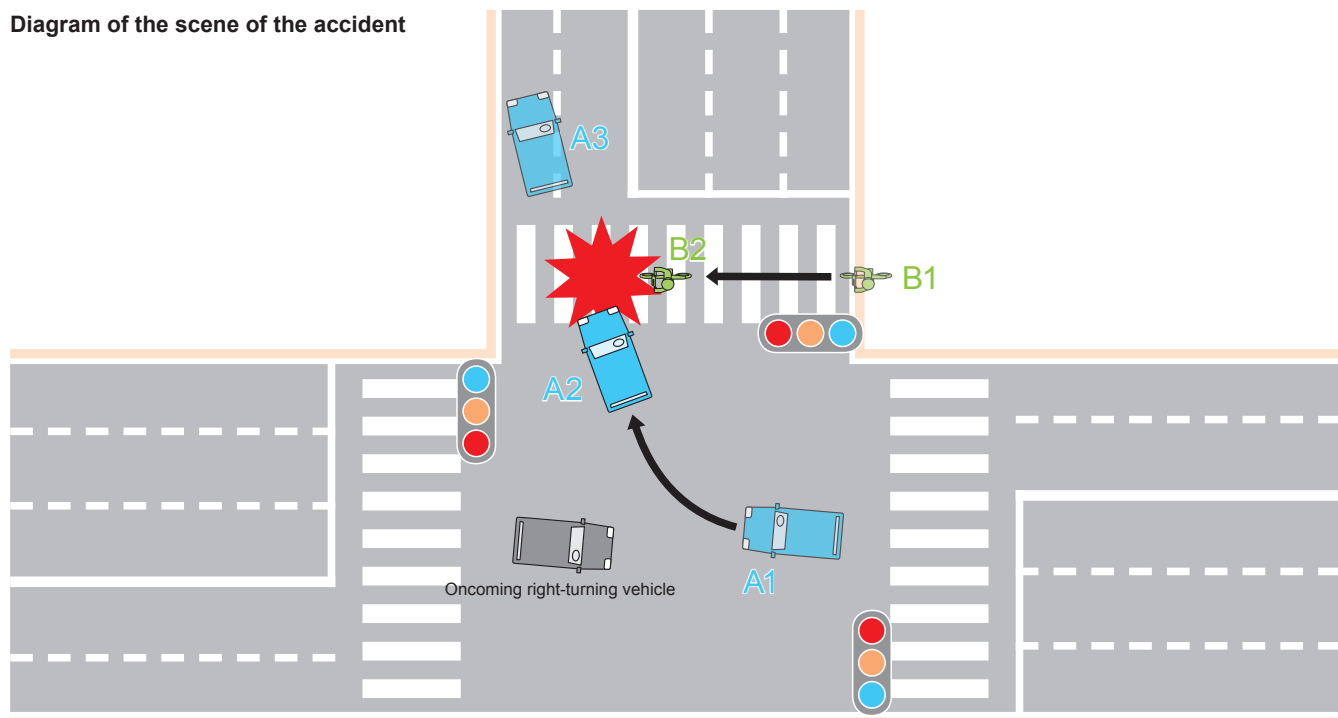
[Accident situation]

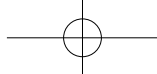
On a rainy night, a 66-year-old woman was driving a standard-sized passenger car (Car A); as she made a right turn at a crossroad intersection equipped with traffic signals, she stopped her vehicle for a moment near the center of the intersection because the oncoming vehicle that was waiting to turn right was thrown into shadow and visibility in the oncoming lane was poor. After letting several oncoming vehicles pass, the driver then drove to the right, paying attention to the situation in the oncoming lane; at this moment the vehicle collided with Bicycle B which was coming over the pedestrian crossing from the driver's right-hand side.

[Causes]

The cause of the accident was that Driver A's attention was drawn by the oncoming lane, causing her to overlook the bicycle. Had she paid attention to the area surrounding the pedestrian crossing as well before starting to make a right turn, it is possible that she might have spotted the bicycle earlier. Meanwhile, Cyclist B was using an umbrella and cycling one-handed—violations of cycling rules—and this was one factor that delayed the cyclist's noticing the vehicle. It goes without saying that road users need to obey traffic rules; it is also important that cyclists put effort into defensive cycling, such as paying closer attention to their surroundings and attaching reflective materials to their bicycles to make themselves more conspicuous.

Diagram of the scene of the accident





特集

信号交差点における右折事故
～右折先の自転車、歩行者に注意～

SECTION

5

Summary

◆ Distinguishing features of right-turn accidents at signalized intersections

- Accidents at intersections occur most frequently when primary-party four-wheeled vehicles are making a right turn.
- Both primary and secondary parties' vehicles are causing accidents when they enter intersections when the lights are green.
- The main cause of accidents is "failure to confirm safety" by the driver of the primary-party four-wheeled vehicle making a right turn.
- As drivers' attention tends to be drawn to oncoming vehicles, they are apt to overlook bicycles and pedestrians to their right.
- At nighttime, drivers are apt to overlook bicycles and pedestrians who are traveling in the same direction as the driver's vehicle.

Here, we will summarize some cautionary points for avoiding accidents

◆ For drivers of four-wheeled vehicles when making right turns:

- In conditions that make it difficult to see the oncoming lane, drivers should make sure that they stop for a moment and confirm safety carefully. To avoid a situation where drivers are "looking but not really seeing," it is important that drivers adopt the mindset of "unseen dangers may be lurking," and act to confirm danger (or safety).
- When they spot oncoming vehicles, drivers should wait for them to pass rather than try to rush across.
- Drivers should confirm the safety of the road to their right before starting to make a right turn. It is essential that drivers decelerate sufficiently when approaching pedestrian crossings to ensure that they can stop if something unexpected happens.

◆ For cyclists' and pedestrian's self-protection

- Cyclists and pedestrians should continue to keep an eye on the movements of vehicles right to the end, and not become inattentive due to feelings that they are privileged road users.
- It is crucial that cyclists ensure other road users notice them at nighttime by switching their lights on and other measures.
- Cyclists should cycle on the left-hand side of the road. Even where there is a sidewalk where cycling is permissible, cyclists should take care that they cycle on the left-hand sidewalk and avoid cycling on the right-hand sidewalk.

(Kenji Fujita)



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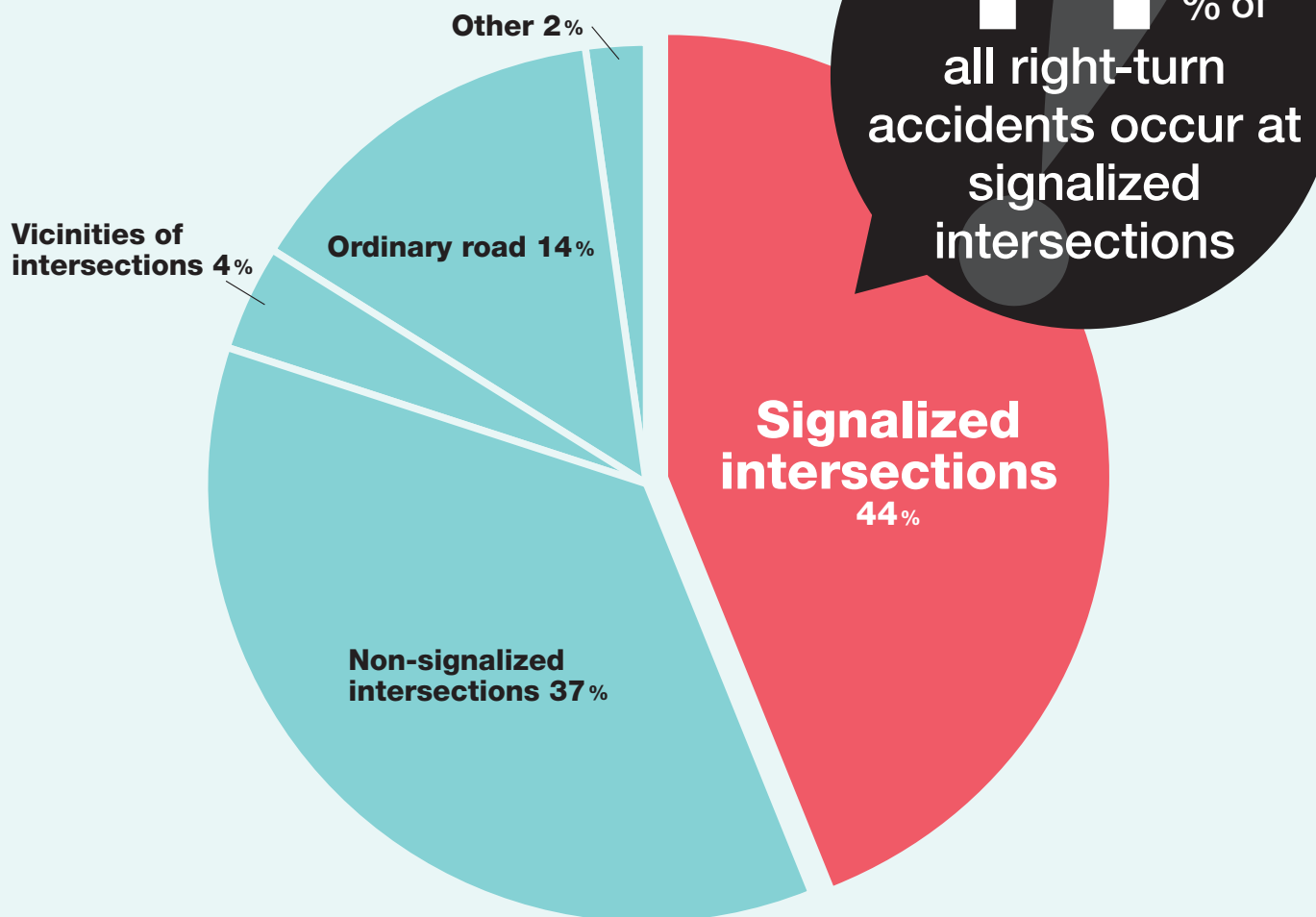
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Breakdown of right-turn accidents by road configuration



Special feature

Right-turn accidents at signalized intersections

~Drivers must look out for bicycles and pedestrians to their right~