

ITARDA INFORMATION

交通事故分析レポート

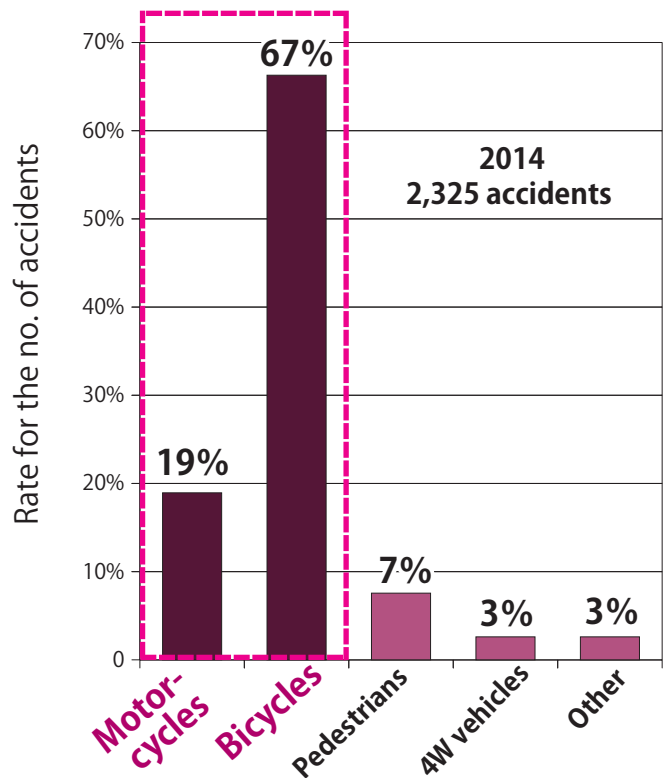
No.114

Special
feature

Dooring accidents by parked or stopped vehicles

~ Stopped vehicles can pose a danger ~

Motorcycles and bicycles
tend to overwhelmingly
be at risk of encountering
a dooring accident!



Rate for the no. of accidents from being doored
by a four-wheeled vehicle by type of party (2014)

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1 Introduction

The presumption with cars is that they are driven as vehicles for conveying people around, and as a result various different traffic accidents occur. But when the question is posed regarding whether stopped cars are safe, this cannot necessarily be said to be the case. In some cases stopped cars can also cause traffic accidents. Have you ever had the experience when you are trying to slip past beside a stopped car and a door suddenly opens and startles you, or actually hits you?

"While a car was stuck in traffic, a door suddenly opened and someone got out of the passenger seat." "I thought the taxi had stopped, but then suddenly the door flew open so that the passengers could get in."

"When I tried to go passed a car parked along a shopping street while evading it, the driver's side door suddenly flew open." These include some cases that occurred in places other than roads, such as the following: "As I was walking between cars in the parking lot of a supermarket a door suddenly flew open."

As these indicate, even when cars are not driving around they can potentially pose a danger while stopped depending on the time and circumstances, such as from doors suddenly opening. Motorcycles and bicycles, which have many opportunities to pass by on the left side of cars while they are stuck in traffic or otherwise stopped, must pay particular attention. What is more, in many cases young children and the like are unable to adequately predict this sort of danger, and so even greater caution is required for them. These same points hold true for those driving and riding in four-wheeled vehicles. Motorists and passengers must constantly be aware of the fact that carelessly opening doors can lead to accidents.

Therefore, in this issue we will clarify the actual accident conditions and causes for accidents caused by opening the doors of four-wheeled vehicles by focusing on the problem from the standpoint of both the perpetrators and the victims. In addition, we will also consider countermeasures* to prevent such accidents from occurring.

* Countermeasures generally include two aspects: hard and soft aspects, and this paper will deal with soft aspects from the standpoint of what drivers can deal with in their immediate surroundings.

2 Cases of accidents while parked or stopped

The following two cases are accidents that actually happened. This shows that dooring accidents occur not only on roadways, but also in parking lots. Fortunately, these cases did not result in the deaths of Mrs. B or Mr. D, but they were just one misstep away from danger that could have resulted in severe accidents. With the case on the left, if an oncoming car had been coming, Mrs. B may not have been so lucky. With the case on the right, if the site of the impact had been worse, it could have resulted in a serious situation.

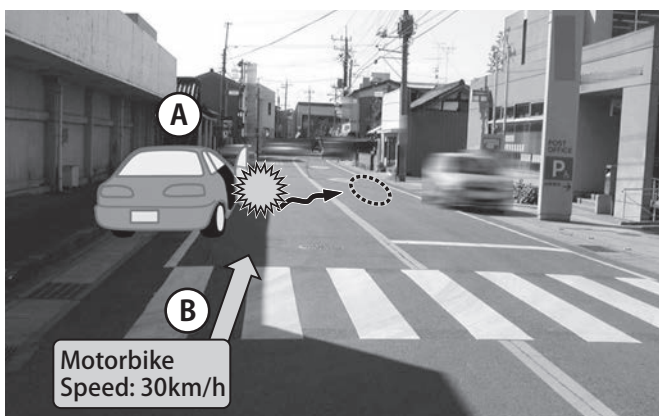


Fig. 1. Example of a dooring accident (on a roadway)

In the early afternoon of a weekday, Mrs. A (40s, female, passenger car) parked her car on the left side of the road to go to a post office on the right side. When exiting the vehicle, she was in a rush and so she failed to check her surroundings to see if it was safe before opening her door without thinking. Doing so caused a collision with Mrs. B (60s, female, motorbike) who was driving at a speed of approximately 30km/h from behind her and to the right. Mrs. B's vehicle was overturned and she was thrown into the oncoming lane (she was seriously injured, and took 50 days to make a full recovery).

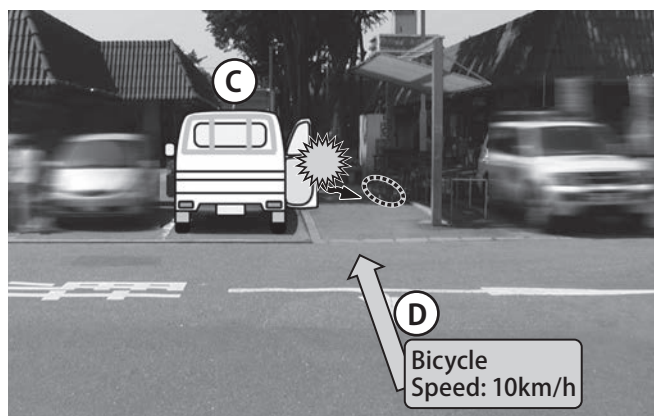


Fig. 2. Example of a dooring accident (parking lot)

On a weekday morning, Mr. C (50s, male, light cargo vehicle) went to a supermarket to go grocery shopping and parked his vehicle in the parking lot. As he was exiting the vehicle, he opened the driver's side door without checking to see if it was safe behind him and to the right. As a result, the door hit Mr. D (80s, male, bicycle), who had been traveling in a straight line from that direction at a speed of about 10km/h, on his left side, and Mr. D was knocked over to the right from the force (slight injuries from bruising to his head).

3 Analysis of the characteristics of dooring accidents

Counterparties to dooring accidents

What sorts of counterparties tend to encounter dooring accidents?

Fig. 3 shows the rate for the number of accidents by type of party from dooring accidents by four-wheeled vehicles in 2014. The total number of accidents is 2,325, of which the rate accounted for by bicycles is the highest at 67%, followed next by motorcycles at 19%, with the two of these accounting for nearly 90% in actuality.

Vehicles like bicycles and motorcycles are highly maneuverable which, when coupled with the fact that they have many opportunities to pass right beside four-wheeled vehicles that are stopped in traffic and the like, is believed to produce these results. Moreover, the fact that there are few four-wheeled vehicles is because sufficient space between parked or stopped vehicles is secured for passing through, and so these are often limited to just property damage. So conceivably these are not being counted in the number of accidents.

In light of this, for our purposes here we would like to define the counterparties to dooring accidents primarily as bicycles and motorcycles in moving forward with our analysis.

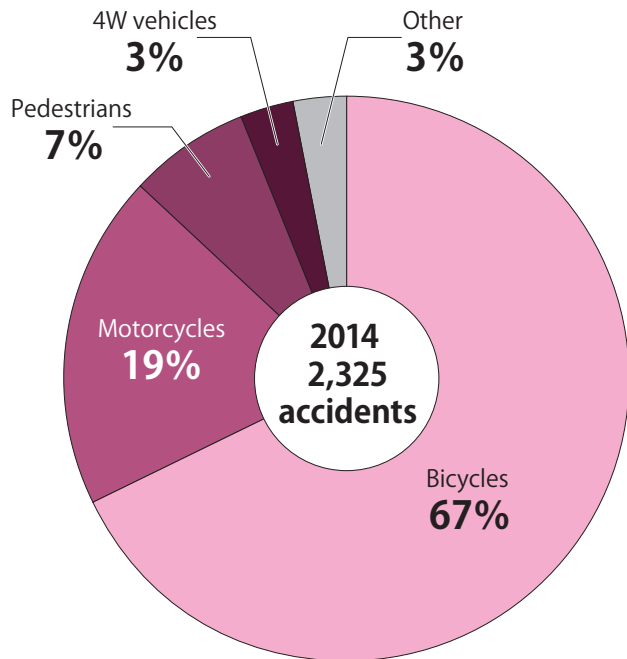
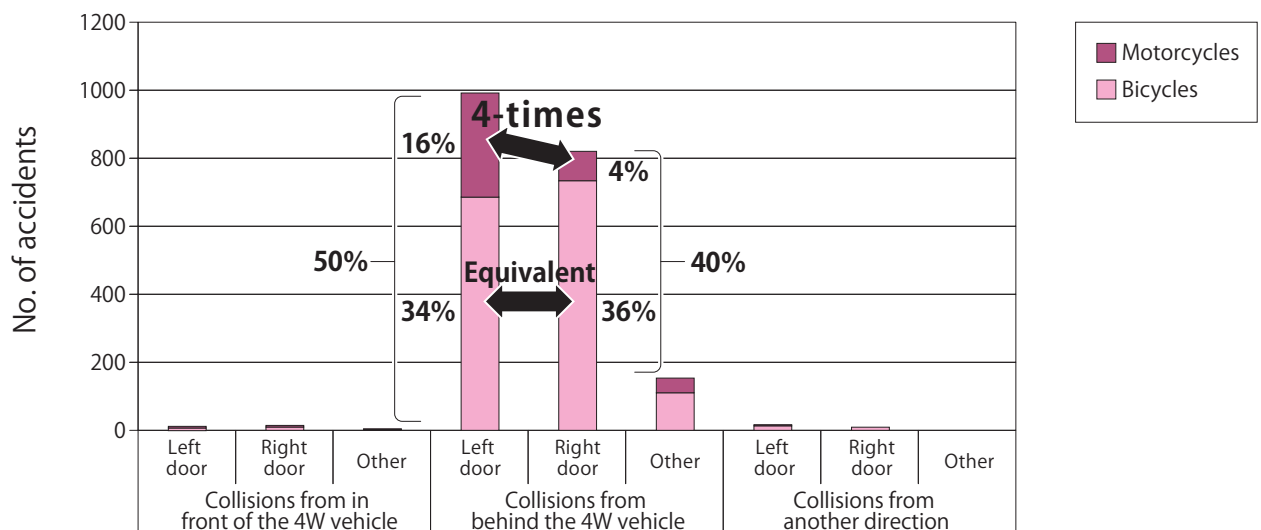


Fig. 3. Rate for the no. of accidents from being doored by a four-wheeled vehicle by type of party (2014)

Direction of movement and point of collision

When it comes to dooring accidents, which direction do bicycles and motorcycles approach four-wheeled vehicles from and with which door—right or left—do they have a higher rate of collisions?

Fig. 4 shows the number of accidents by the direction of movement of the bicycle or motorcycle and the point of collision with the four-wheeled vehicle in 2014. First off, for the direction of movement, the majority of the collisions occur from behind the four-wheeled vehicle. Next, looking at the collision rates for bicycles and motorcycles against the right / left doors reveals that bicycles have collision rates that are roughly equivalent between the right and left doors. In contrast with this, motorcycles have a collision rate with left doors that is four-times greater than that for right doors. When motorcycles pass by on the left side of four-wheeled vehicles that are waiting at traffic signals or stuck in traffic, they are forced to ride close to the left side of four-wheeled vehicles without being able to ride on the sidewalk to avoid roadways the way that bicycles can. As a result, this is believed to be why they have a higher rate of collisions with left door.



Direction of movement of bicycles and motorcycles and the point of collision with 4W vehicles

Fig. 4. No. of accidents by the direction of movement of bicycles and motorcycles and the point of collision with four-wheeled vehicles (2014)

Collision (danger perception) speed (four-wheeled vehicles and motorcycles)

For dooring accidents, at what sorts of speeds are motorcycles traveling when they collide?

Fig. 5 shows the rate for the number of accidents by danger perception speed in 2014.

(Since figures on bicycle speed cannot be obtained from the accident data, this is only listed for four-wheeled vehicles and motorcycles.)

To start with, the doors of four-wheeled vehicles are essentially only opened and closed when the vehicle is stopped. For motorcycles, the highest rate of collisions occur at 10km/h – 20km/h, which account for more than half of the total, and the majority of the collisions occur at 30km/h or slower. This is believed to be because motorcyclists ride by decreasing their speed to a certain extent in cases like when they are passing by beside stopped vehicles.

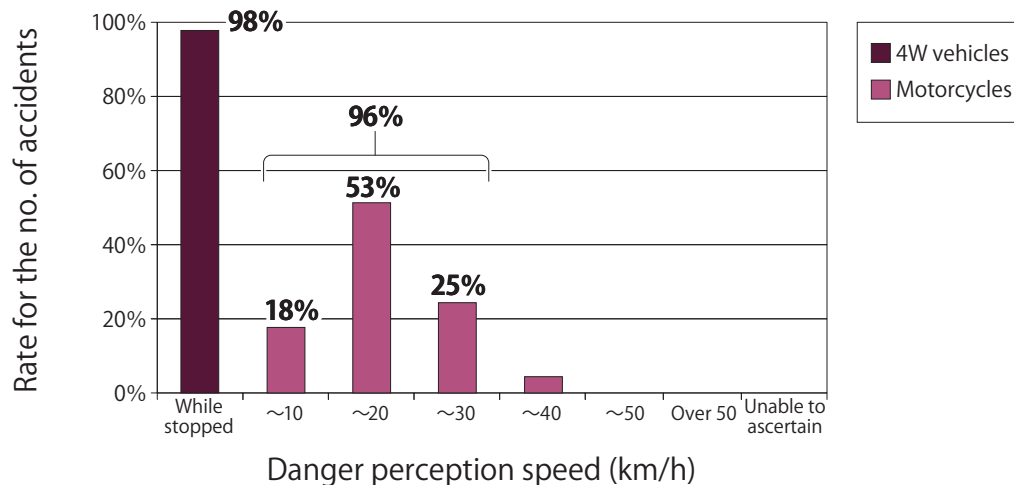


Fig. 5. Rate for the no. of accidents by danger perception speed (2014)

Degree of personal injury and major points of personal injury

To what degree are people injured by dooring accidents?

Fig. 6 shows the rate for the number of accidents by degree of personal injury in 2014. Fortunately, most dooring accidents only resulted in slight injuries, but some cases of severe injuries were also seen. There were no such accidents in 2014 that resulted in fatalities, but over the past ten years between about zero and four such accidents have occurred each year.

Fig. 7 shows the rate for the number of accidents by major points of personal injury in 2014. It reveals that most of the injuries were slight injuries in degree, and were concentrated mainly among rider's arms and legs. Furthermore, the rate of injuries to areas above the neck came to one-fourth of the total, meaning they are by no means rare. Bicyclists in particular differ from motorcyclists in that they are not obligated to wear helmets, which is believed to be why they had a higher rate of injury to the head and face compared with motorcyclists. (With dooring accidents, in general there are believed to be injuries from collisions with the door itself, as well as injuries from collisions with the road surface and other objects thereafter, but here no distinction has been made between these.)

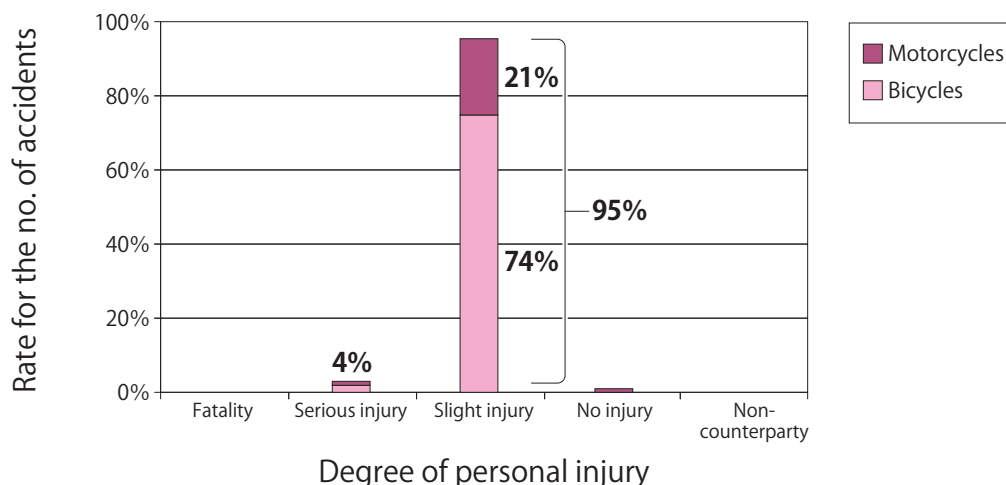


Fig. 6. Rate for the no. of accidents by degree of personal injury (2014)

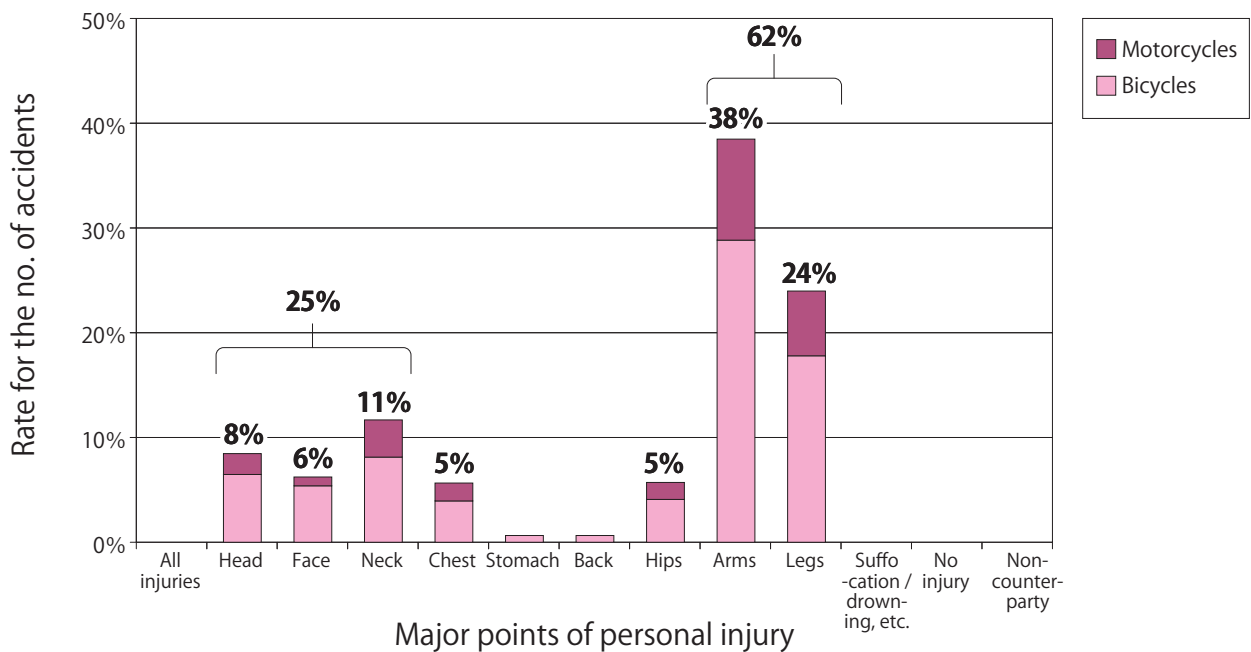


Fig. 7. Rate for the no. of accidents by major point of personal injury (2014)

■ Trip purpose

When dooring accidents occurred, for what purpose were the four-wheeled vehicle and bicycle / motorcycle driving around?

Fig. 8 shows the rate for the number of accidents by trip purpose in 2014. For four-wheeled vehicles, accidents while working accounted for more than half of the accidents, though there was by no means a shortage of accidents from visiting / picking-up and while shopping. Conversely, with bicycles / motorcycles accidents while commuting to work, shopping, and visiting / picking-up stood out. It can be surmised that the four-wheeled vehicles were busy and the bicycles / motorcycles were in a rush on their way to work, and so dooring accidents conceivably become more liable to occur when both sides are pressed for time.

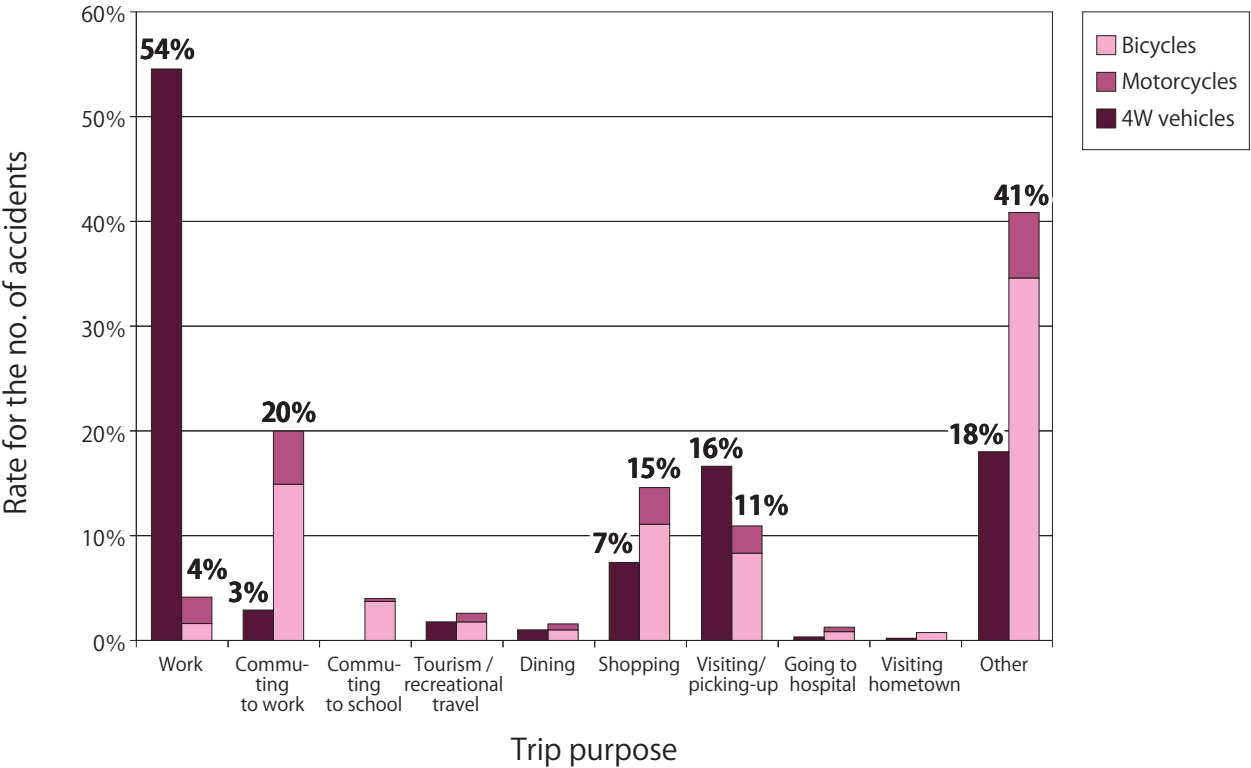


Fig. 8. Rate for the no. of accidents by trip purpose (2014)

Age group and sex

With dooring accidents, who tends to be the perpetrators and the victims in said accidents?

Figs. 9 and 10 show the rates for numbers of accidents by age group for four-wheeled vehicles and bicycles / motorcycles in 2014. For four-wheeled vehicles, the older men get, the more their accident rate increases, with men between the ages of 60 – 69 having the most accidents. With women, this peaks between the ages of 40 – 49, and tends to gradually decrease before and after this. For men, this is believed to be due to factors like the effect of aging on transportation workers, and for women it is presumably due to factors like the high frequency of vehicle use for purposes such as picking up children and shopping during their child-rearing years. The steep drop-off in the graph for men aged 70 and over is assumed to be from the retirement of transportation workers. Conversely, with bicycles / motorcycles for men the peak is between the ages of 30 – 39, then the rate of accidents decreases the older they get, which represents the opposite phenomena than that for four-wheeled vehicles. With women, there is a slight increase from their 20s through their 40s, but after that this tends to shift downward. There is a sizable gap between students and youths, with one conceivable cause for this being the different routes they take, as many of the former travel on sidewalks and many of the latter travel on roadways.

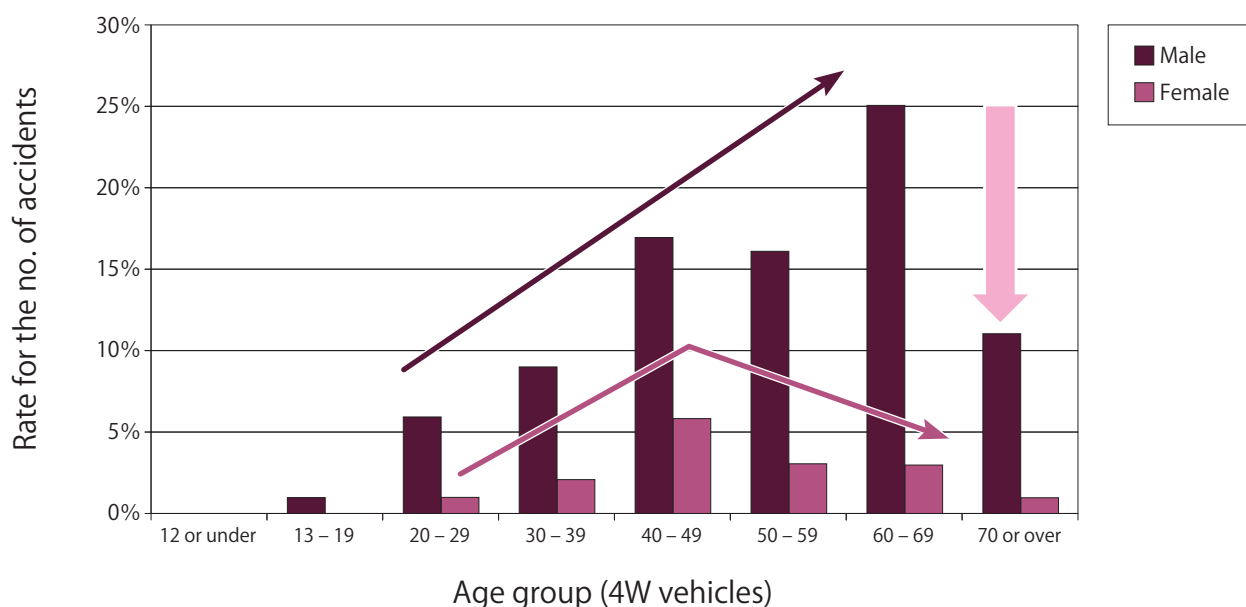


Fig. 9. Rate for the no. of accidents by age group for four-wheeled vehicles (2014)

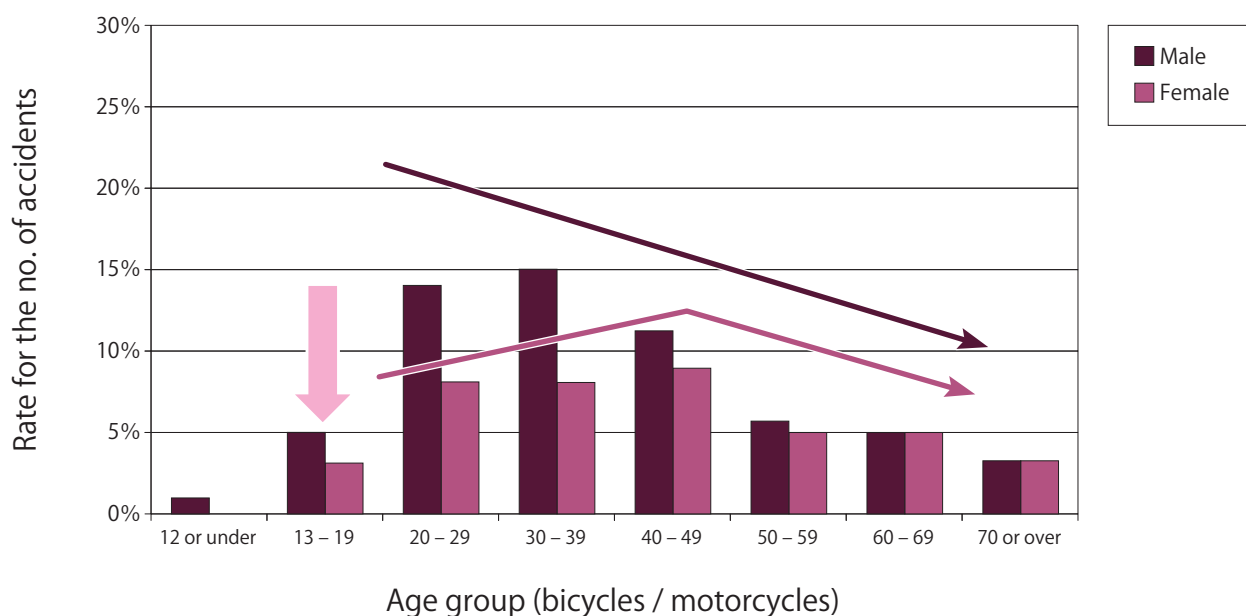


Fig. 10. Rate for the no. of accidents by age group for bicycles / motorcycles (2014)

Human factors

What sorts of human factors give rise to dooring accidents?

Figs. 11 and 12 show the rate for the number of accidents by human factors for four-wheeled vehicles and bicycles / motorcycles in 2014. As for human factors with four-wheeled vehicles, the majority of these were caused by failure to confirm safety factors in one's surroundings. In the case examples from micro-studies, there seemed to be numerous cases where people just opened their door unthinkingly without paying any particular attention when doing so. Conversely, with bicycles / motorcycles, cases where there were no human factors accounted for more than half of the total, followed by failure to observe surrounding traffic movement (neglecting to pay close attention), failure to confirm safety factors, and failure of prediction (errors in judgment). For bicycles / motorcycles, it is not easy to accurately recognize the actions of the people within a four-wheeled vehicle by looking through the window glass, so it is difficult to predict whether or not the door will open. Moreover, as far as matters that drivers of four-wheeled vehicles must observe are concerned, in the Road Traffic Act, Chapter 4. Obligations for Drivers and Users, Section 1. Obligations for Drivers (Items Drivers Must Comply With), Article 71 it states: "Drivers of vehicles must comply with the items listed below." The third of the four items listed here says: "Drivers must take the necessary steps to ensure that they do not open their door or exit the vehicle without first confirming that it is safe to do so, and to ensure that the other passengers riding in the vehicle with them do not cause traffic hazards through such conduct." Therefore, when not only the drivers of four-wheeled vehicles themselves but also their passengers go to open their doors, it is important that they soundly check to confirm whether or not any approaching vehicles (people) are in the vicinity.

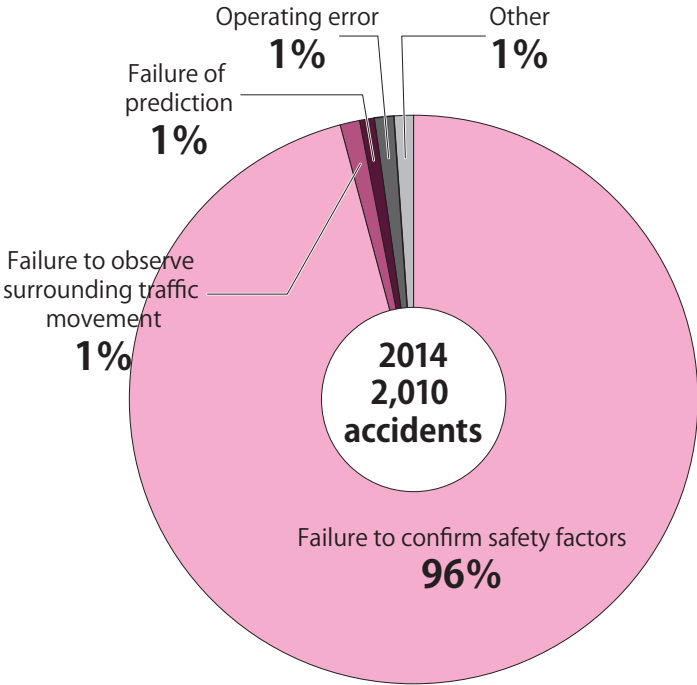


Fig. 11. Rate for the no. of accidents by human factors for the four-wheeled vehicle (2014)

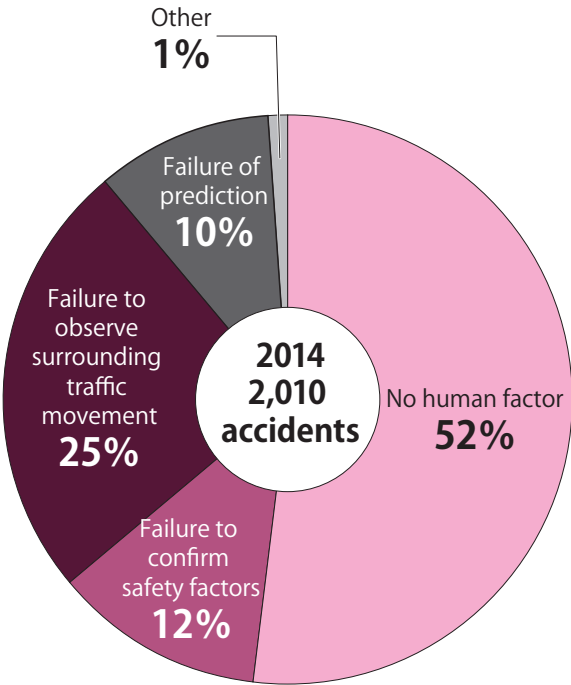


Fig. 12. Rate for the no. of accidents by human factors for bicycle / motorcycle (2014)

4 Conclusion

■ Characteristics of the analysis results

- Bicycles account for the majority of the counterparts to dooring accidents at two-thirds of the total, followed next by motorcycles at 20%.
- When it comes to collisions with four-wheeled vehicles, most of these were collisions from the rear. As for the collision rates with the left and right doors, with bicycles the rate was equivalent for both sides while for motorcycles the rate for the left door was four-times greater than that for the right door.
- The collision speed for motorcycles is 30km/h or slower in most cases, of which more than half of the cases were between 10km/h and 20km/h.
- In most cases the degree of personal injury amounted to slight injuries, with the points of injury concentrated mainly in arms and legs. However, cases where people were injured in the neck and higher accounted for one-fourth of the total.
- The trip purposes for four-wheeled vehicles mainly consisted of work in most cases, whereas for bicycles / motorcycles this often included commuting to work, shopping, and visiting / picking up.
- For men driving four-wheeled vehicles, the accident rate increases as they get older, whereas for men on bicycles / motorcycles it peaks in their 30s and then declines thereafter as they get older. For women driving four-wheeled vehicles this peaks in their 40s, then gradually decreases before and after this, while for women on bicycles / motorcycles this increases slightly from their 20s through their 40s, before starting to decline again after this.
- Human factors for four-wheeled vehicles are mostly due to failure to confirm safety factors. With bicycles / motorcycles there are no human factors in more than half of the cases, followed by failure to observe surrounding traffic movement, failure to confirm safety factors, and failure of prediction.

■ To decrease accidents

Based on the analysis results of the human factors, to start with it will be necessary to get drivers of four-wheeled vehicles to soundly check for safety.

- When opening doors, drivers should get in the habit of opening them after first checking to make sure it is safe to do so around them.
- In order to expand their range of visibility, drivers should proactively make use of their rear-view mirror and side-view mirrors.
- When opening doors, they should start by opening them a little, then opening them slowly, rather than throwing them open all at once.
- When drivers have passengers riding with them, they should encourage their passengers to pay attention by confirming their surroundings in advance, while getting on and off.
- They should be attentive to pedestrians and baby strollers and the like passing beside their vehicle, even in parking lots.

Bicyclists / motorcyclists should also make efforts to ensure that they do not end up as victims.

- They should refrain from passing between vehicles stuck in traffic to the extent possible, while also reducing their speed appropriately.
- When passing beside four-wheeled vehicles, they should leave enough space between them.
- They should pay attention to what the people inside of four-wheeled vehicles are doing while the vehicle is parked or stopped.

Postscript

The first thing I remember learning in the skills training at driving school was: "When exiting the vehicle, you must check to see whether or not there are any vehicles approaching from behind before opening your door." Now that I once again recall this matter from back when I first began learning how to drive, I would like to go back to basics and tie this in with promoting safer driving.

Incidentally, driving schools in the Netherlands teach students to open doors by twisting their body to use the hand on the opposite side of their body away from the door to open it. By instilling this habit in them, it makes it so that drivers can naturally check to see if there are any bicycles or the like behind them.

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