

ITARDA INFORMATION

交通事故分析レポート

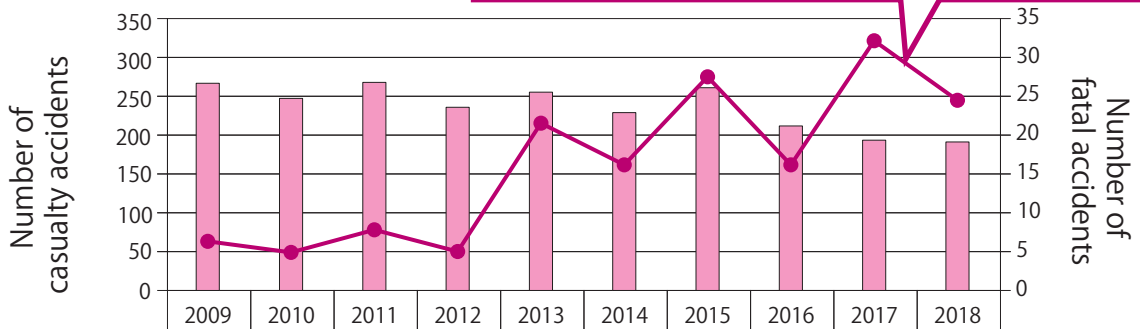
No.134

Special feature

Accidents caused by spontaneous starts

~ Using combination of "park" mode and parking brake when getting out of vehicle! ~

Decreasing trend for casualty accidents, but increasing trend for fatal accidents!

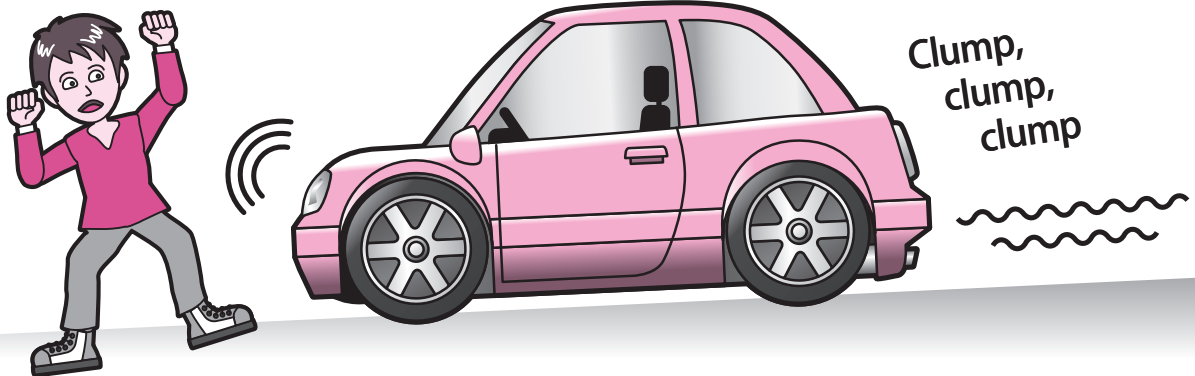


■ Casualty accidents	265	246	267	235	254	229	259	212	194	191
● Fatal accidents	7	5	8	5	22	16	27	16	32	24

Trend in number of casualty accidents caused by spontaneous starts

* Spontaneous-start accidents: traffic accidents that occur as the result of a vehicle, etc. starting to move due to a cause other than the driving operations of the driver, etc.

* Casualty accidents: accident in which a person was killed or injured



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1 Introduction

Have you ever heard the term “spontaneous start”?

This is a term defined in the “Report Coding Manual for Traffic Accident Statistics,” which is a document that the police prepares after having dealt with casualty accidents, so most people are probably not familiar with this term unless they have used the “Report Coding Manual for Traffic Accident Statistics.” “Spontaneous-start accidents” are defined as “traffic accidents that occur as the result of a vehicle, etc. starting to move due to a cause other than the driving operations of the driver, etc.”

First of all, we will take a look at the trend in the occurrence of casualty accidents caused by spontaneous starts. During the 10-year period of 2009 to 2018, there were 2,352 casualty accidents caused by spontaneous starts among all vehicles, and these consisted of 162 fatal accidents, 387 serious injury accidents, and 1,803 slight injury accidents. While there were a total of 47 fatal accidents during the five-year period of 2009 to 2013, such accidents increased by approximately 2.5-fold to a total of 115 during the most recent five-year period of 2014 to 2018. Although “casualty accident caused by spontaneous start” is by no means a common type of accident, the fatal-accident ratio of spontaneous starts (number of fatal accidents / number of casualty accidents) in the past five years was approximately 11%, which is remarkably higher than the 0.8% fatal-accident ratio of traffic accidents in the past five years overall.

Thus, on this occasion, we will focus on spontaneous-start accidents, which have an increasing trend regarding fatal accidents, even as fatal accidents are on the decline overall. We will shed light on the characteristics, etc. of spontaneous-start accidents, and consider what to focus on in order to prevent casualty accidents caused by spontaneous starts.

2 Accident characteristics

Targets of fatal and serious injury accidents

Figure 1 shows the number of fatal and serious injury accidents caused by spontaneous starts, divided by the type of secondary party (accident party not at fault, or the second most at fault).

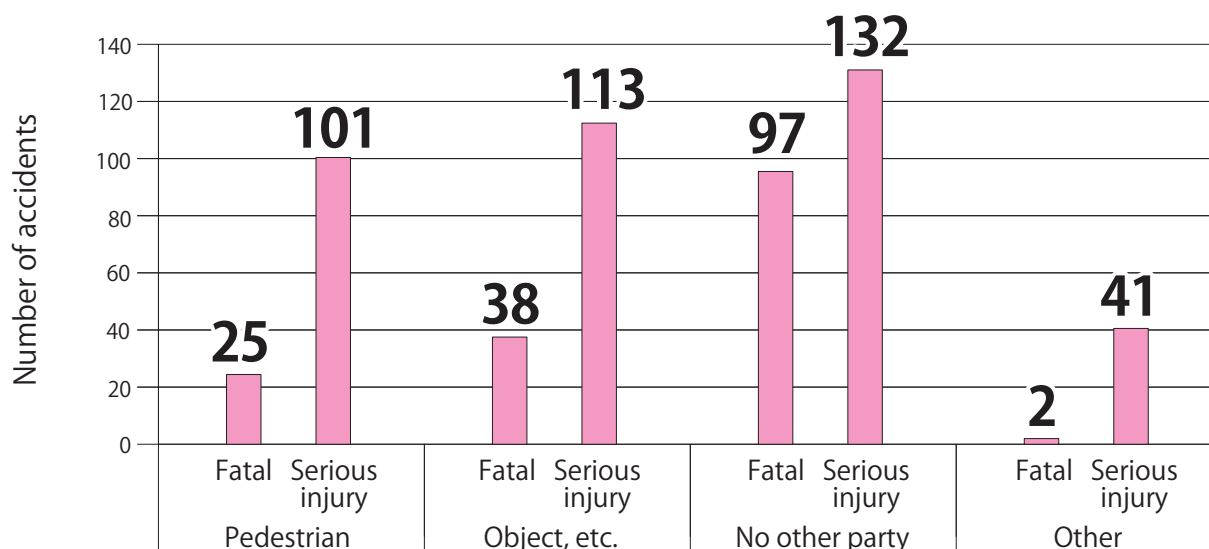


Fig. 1. Fatal and serious injury accidents by type of secondary party

In the case that the secondary party was a “pedestrian,” a third party other than the driver ended up becoming involved in the accident. Meanwhile, in the case of “object, etc.” and “no other party,” while it may seem strange that there are casualties in such accidents, the figure shows that in most cases, the driver is the party that is killed or injured.

As such, a major characteristic of fatal accidents caused by spontaneous starts is the fact that when there is a fatality, the fatality is the “primary-party (accident party the most at fault) driver” approximately 82% of the time. Also, in approximately 64% of serious injury accidents, the primary-party driver is injured.

Since the drivers are being injured, the following type of situation regarding these accidents can be envisioned. It seems that during many of the accidents, the driver gets out of the vehicle, and then the vehicle begins to move for some reason. Then, the driver is hit by the vehicle, or the driver notices that the vehicle has started to move and tries to stop the vehicle but fails to do so and is hit by the vehicle, or is sandwiched between the vehicle and an object such as a telephone pole or wall.

■ Situation of accident occurrence separated by vehicle type

Figure 2 shows the number of casualty accidents caused by spontaneous starts divided by the type of vehicle of the primary party.

The numbers of casualty accidents for passenger cars and goods vehicles are about the same, and there does not appear to be a significant difference between them.

Nevertheless, the number of fatal accidents is approximately 1.5 times higher for goods vehicles than it is for passenger cars.

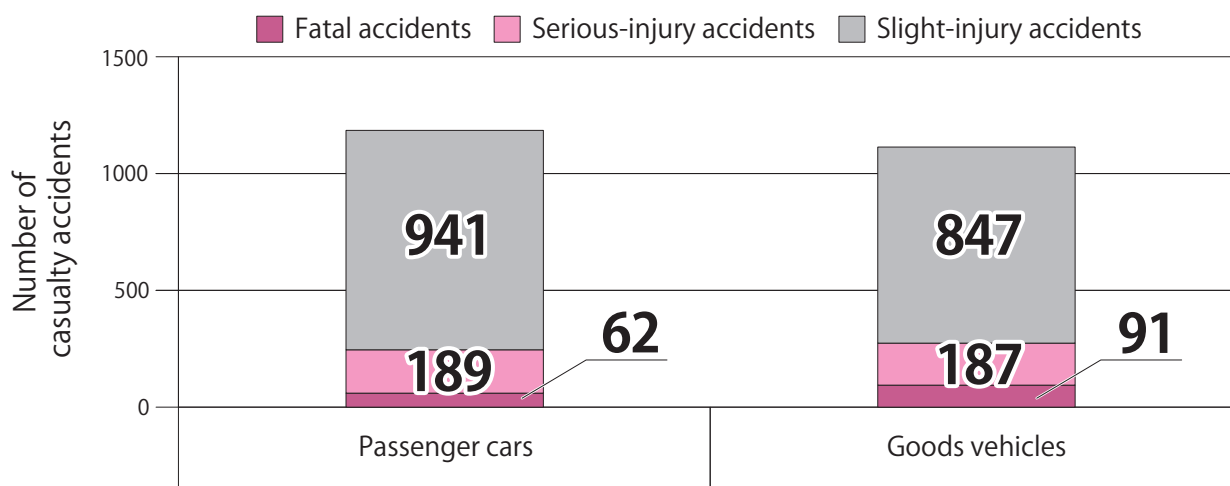


Fig. 2. Number of casualty accidents caused by spontaneous starts divided by passenger cars and goods vehicles (2009 to 2018)

Figure 3 shows the numbers of fatal accidents broken down by type of passenger car and type of goods vehicle. In the case of passenger cars, medium sized vehicles and kei sized vehicles account for approximately 89% of the accidents, and in the case of goods vehicles, although large sized vehicles account for most of the accidents, it appears that medium sized vehicles and kei sized vehicles also account for many of the accidents. Based on these results, it is clear that there is a tendency even for kei sized vehicles and medium sized vehicles, which have relatively low vehicle weights, to become involved in these accidents.

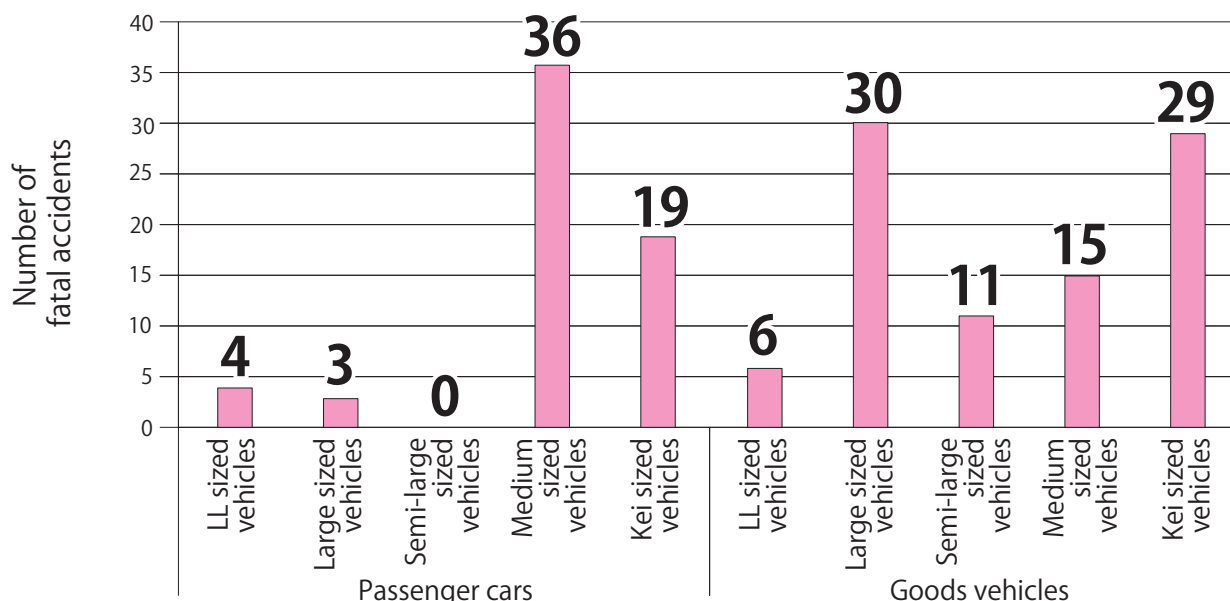


Fig. 3. Number of fatal accidents caused by spontaneous starts divided by type of vehicle of the primary party (2009 to 2018)

■ Accident causes

Figure 4 shows the human causes of spontaneous start accidents.

Looking at the breakdown of human causes, “operational error,” which includes “inappropriate braking operation” and so on, accounted for approximately 92% of the accidents, and thus it appears that the accidents are being caused by failures to appropriately operate brakes and so on. In the accidents, since vehicles thought to be properly parked suddenly start to move, it may seem that the causes are related to poor vehicle maintenance and so on. Nevertheless, vehicle-related causes, such as poor maintenance, accounted for approximately 1% of the accidents, while environmental causes accounted for approximately 4%.

The above shows that most of the causes of spontaneous starts are not related to the vehicles or road environments, but rather, problems with the driver’s method of parking.

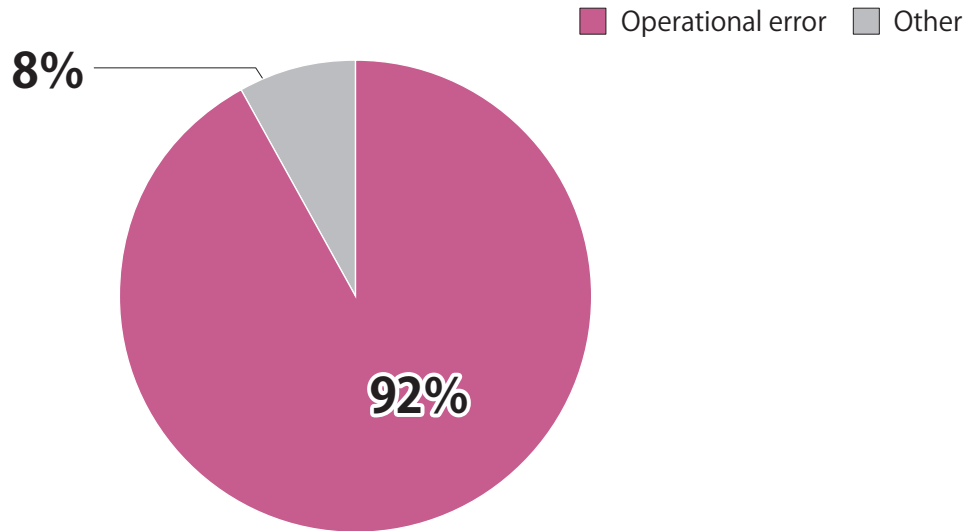


Fig. 4. Human causes of accidents

■ Age of primary party, and number of years passed since license acquisition

Figure 5 shows the age composition ratios of the primary parties in four-wheel-vehicle accidents (all accidents in which the primary party is a four-wheel vehicle) and spontaneous-start accidents in 2009 to 2018.

In the case of “accidents in which the primary party is a four-wheel vehicle,” the composition ratio of the primary party peaks at “20s” and then decreases as the age increases. Meanwhile, “casualty accidents caused by spontaneous starts” differed from “accidents in which the primary party is a four-wheel vehicle,” in that the composition ratio was high for “50s” through “70s,” with “60s” having the highest ratio.

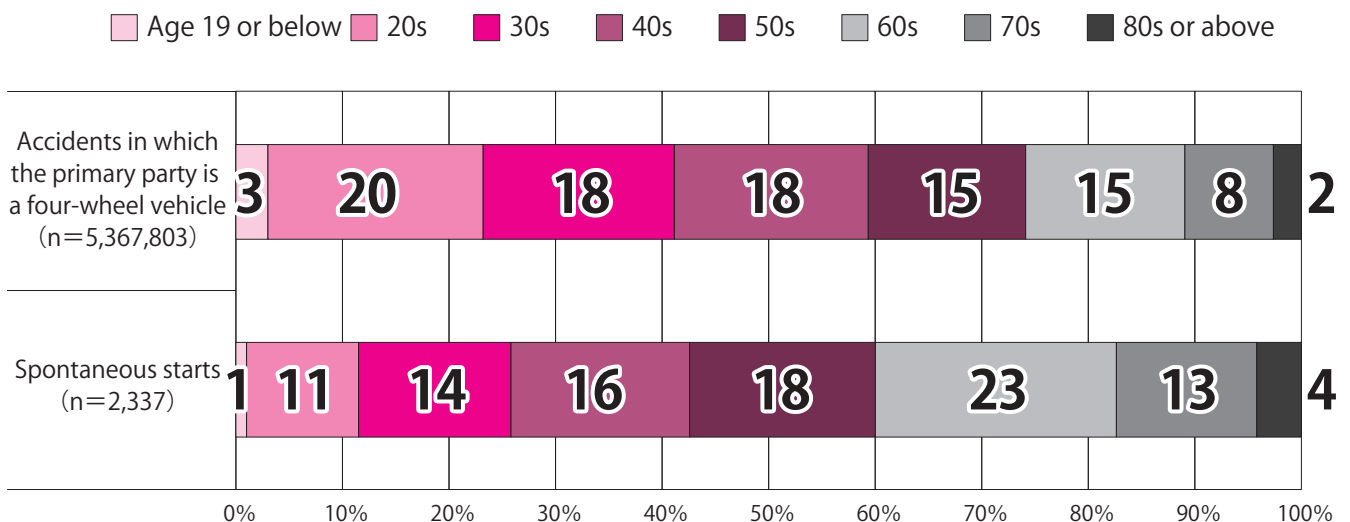


Fig. 5. Age composition ratios regarding “accidents in which the primary party is a four-wheel vehicle” and “spontaneous-start accidents” (2009 to 2018)

Figure 6 shows the numbers of years passed since license acquisition by the primary parties of spontaneous-start accidents. Approximately 83% of all spontaneous starts are being caused by “drivers who acquired their license 10 or more years earlier.” It appears that in the case of fatal accidents, “drivers who acquired their license 10 or more years earlier” are the primary party approximately 90% of the time, and this figure is approximately 89% for serious injury accidents, and approximately 81% for slight injury accidents.

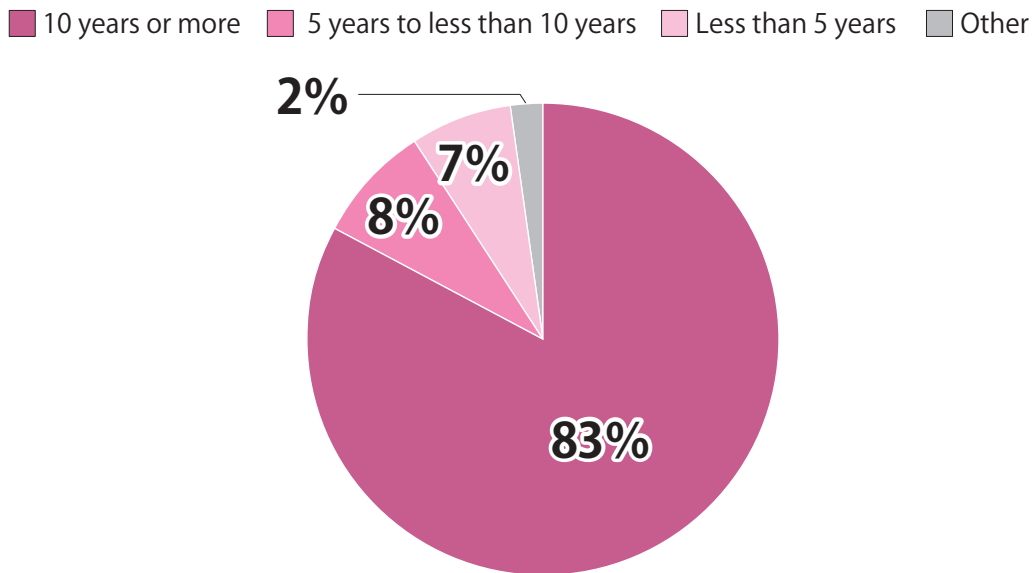


Fig. 6. Composition ratios of numbers of years passed since license acquisition by primary parties

Accident occurrence locations

Figure 7 shows the composition ratios of accident occurrence locations, which are differentiated based on road alignment, divided by accident content.

Approximately 60% of spontaneous-start fatal accidents are occurring on sloping roads with a gradient of 3% or above. It appears that approximately half of serious injury accidents are occurring on sloping roads with a gradient of 3% or above. It thus appears that when “casualty accidents caused by spontaneous starts” occur on sloping roads with a gradient of 3% or above, they are more likely to be serious accidents with fatal and serious injuries, than when they occur on roads with a low gradient of less than 3%.

Nevertheless, since serious accidents are occurring even on roads with a low gradient of less than 3%, it seems that drivers need to take into consideration the fact that roads may have some gradient even though they may appear to be flat. Many “casualty accidents caused by spontaneous starts” are occurring at general-traffic locations, which include parking areas. Although the gradients of general-traffic locations are not indicated in the accident data, it seems that part of the reason that many accidents are occurring at these locations is the fact that these are locations where parking and then getting out of vehicles frequently takes place.

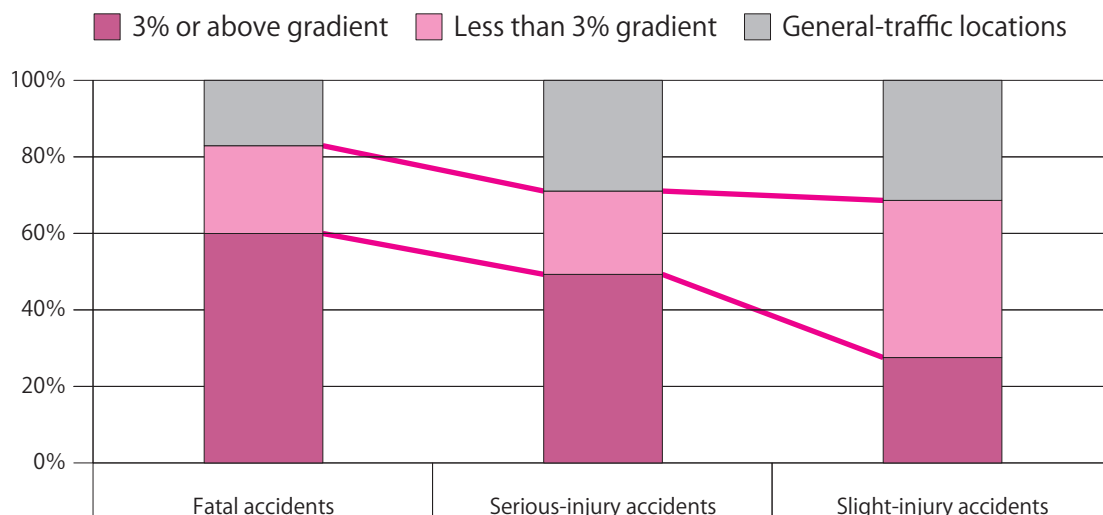


Fig. 7. Composition ratios of accident occurrence locations divided by accident content (2009 to 2018)

3 Introduction of accident example

■ Example of accident caused by spontaneous start (Figure 8)

This accident example is based on information from surveys on individual traffic accidents (micro data) carried out by ITARDA. The following is an overview of the accident.

The driver, a woman in her 60s, parked her vehicle, a manual-transmission kei sized goods vehicle, at a parking area adjoined to a store in order to make a delivery. When getting out of the vehicle while holding a package in her right hand, she became unsteady and leaned against the driver's-side door, and then fell onto the parking area.

When the driver parked, she forgot to engage the parking brake, and left the vehicle in neutral when she got out. As a result, the vehicle that she had been driving started moving backward, and struck her side and back after she had fallen.

Subsequently the vehicle continued to move without stopping, so the driver jumped into the driver's seat of the vehicle, and managed to stop the vehicle just before it went out onto a road.

The woman was a “veteran driver” who had driven nearly every day since she acquired her license more than 30 years earlier. The parking area where the accident occurred was a place that she visited nearly every day in order to make deliveries. Before the accident occurred, the driver was under the impression that the parking area in question was a flat parking area. Nevertheless, a careful check revealed that the parking area was gently sloping upward (in the direction that the vehicle had advanced). An investigator from ITARDA measured the parking area and found that it had an upward gradient of 0.9%.

The driver explained that she felt rushed because she was behind schedule regarding her deliveries and was trying to get back on schedule.

It thus seems that she should have engaged in the parking brake in accordance with basic rules, which are based on the idea that even if an area appears to be flat, it should be assumed to have some gradient.

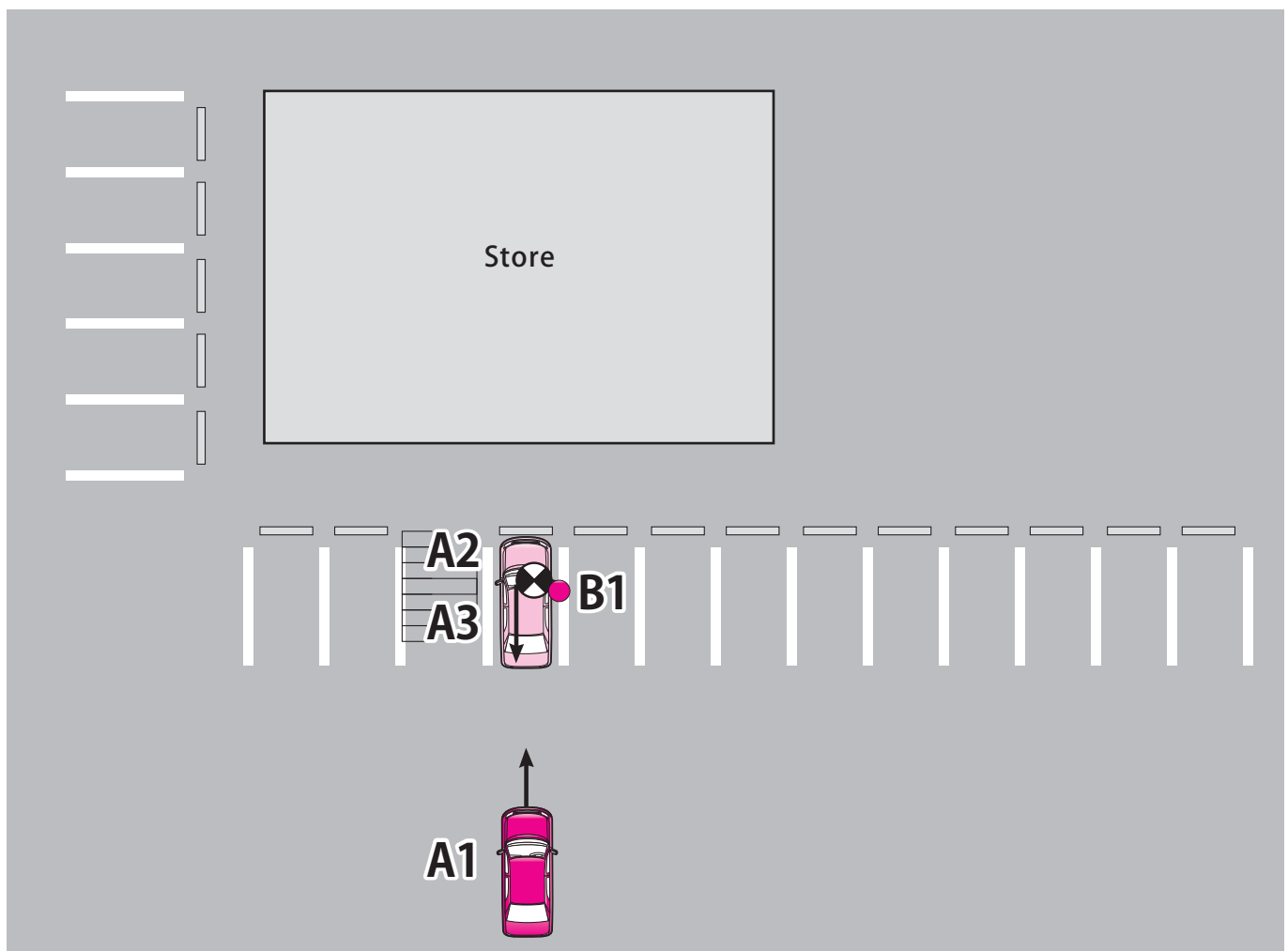


Fig. 8. Diagram showing occurrence of casualty accident caused by spontaneous start

4 Conclusion

■ Characteristics of accident

The results of an analysis of casualty accidents caused by spontaneous starts revealed the following points.

○ Ratio of fatal accidents

Even though the number of casualty accidents caused by spontaneous starts is low, at around 200 per year, these include more than 20 fatal accidents per year, and in recent years, the number of such fatal accidents has been in an increasing trend. In the past five years, the ratio of fatal accidents was approximately 11%, and this is high relative to the 0.8% ratio of fatal accidents for all traffic accidents in the past five years.

○ Characteristics of primary parties

Looking at the primary parties by age, they are most commonly in their 60s, and in many of the accidents that occur, 10 years or more have passed since they acquired their license.

○ Accident occurrence locations

There is a tendency for the accidents to be serious accidents with fatal and serious injuries when they occur on sloping roads with a gradient of 3% or above.

These are accidents that can occur anywhere, and they often occur at locations and parking areas, etc. that have a low gradient but appear to be flat.

○ Causes

Operational error, which includes inappropriate braking operation, accounts for approximately 92% of human causes.

The accidents are almost never caused by vehicle-related factors or road environment-related factors, and the main causes of the accidents are failures to carry out appropriate parking measures when parking.

■ Parking measures

Article 71 Item 5 of the Road Traffic Act stipulates that drivers of vehicles, etc. are required “to take the necessary measures to keep the vehicle or streetcar stopped when leaving the vicinity of a vehicle or streetcar, such as turning off the motor or engine and fully engaging the brakes.”

<Parking method>

The results of an analysis on the human causes indicate that it is important for parking methods to be in accordance with basic rules.

In order to keep vehicles stationary, the following measures <(1) and (2)> should be carried out in combination.

(1) In order to lock the drive shaft, which transfers power to the tires:

- On automatic-transmission vehicles, the shifter should be moved to “park” mode.
- On manual-transmission vehicles, in the case of flat surfaces and downward gradients, the shifter should be moved to “reverse.” In the case of upward gradients, the shifter should be moved to “first gear” so that the vehicle does not move uncontrollably in the event that the engine ends up being started as-is. (For details, please read the vehicle’s user manual.)

(2) The parking brake should be used so that the wheels of the vehicle do not rotate. There are manual type and electric type parking brakes. The manual type is operated through pulling using one’s own strength (or pressing with one’s foot), so it is necessary to pull the lever thoroughly (or thoroughly step on the parking-brake pedal in the case of parking brake that is pressed with one’s foot). In the case of electric type parking brakes, the vehicle decides the appropriate amount of strength for the user. Parking brakes have a weaker application force than foot brakes, so it needs to be noted that there are cases in which vehicles cannot be kept stationary on sloping roads and so on.

Furthermore, in cold regions, there is a risk of brake parts freezing, so in some cases, the parking brake should not be used. In such situations, the flattest available location should be chosen, and in some cases, wheel stoppers should be used to help keep the vehicle in place.

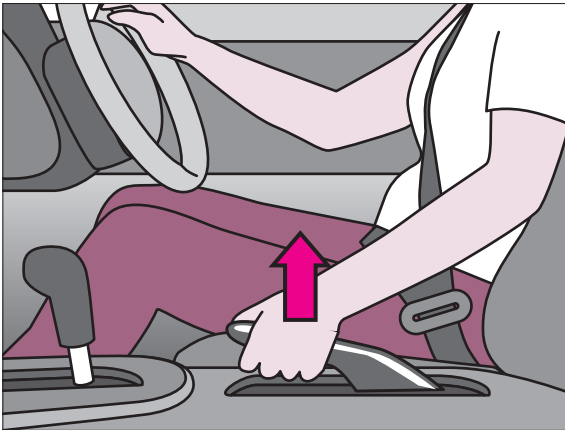
■ Conclusion

Perhaps you think that in the event that a vehicle thought to be parked begins to move, you will be able to stop it with your own hands because the movement is slow at the beginning. The vehicle weight of kei sized vehicles is generally about 600 to 1,000 kg, and about 700 to 2,000 kg for medium sized vehicles, so once a vehicle with such a weight begins to move, it would be very difficult for a person to stop it with his/her own strength. As such, moving into the path of such a vehicle is extremely dangerous. Even though in the accident example above the driver fortunately managed to jump into the vehicle and stop it, there are cases in which it is not possible to jump into the vehicle and a serious accident ends up occurring. Therefore, it is important to not make an unreasonable effort to stop the vehicle, and to instead prevent secondary accidents by letting others around you know that the vehicle has started to move.

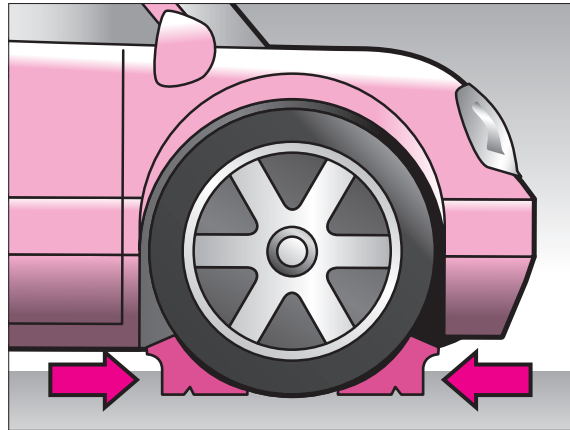
Even if a location appears to be flat, it should be assumed that it is a location with some gradient. Parking at locations with a high gradient, etc. should be avoided as much as possible, and if it is necessary to park in such a location, it is perhaps best to use wheel stoppers, which are frequently used when parking vehicles for transport, etc. Whether one is leaving one's vehicle for a short period of time or for a long period of time, the abovementioned appropriate parking measures should be carried out in order to prevent the vehicle from starting to move.

(Tatsuya Saito)

1) State in which parking brake has been thoroughly pulled



2) Wheel stoppers being used



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