

# ITARDA INFORMATION

## 交通事故分析レポート

No.119

Special  
feature

### Preventing angle collision accidents involving elderly drivers

~ Particular caution is needed at non-signalized intersections ~

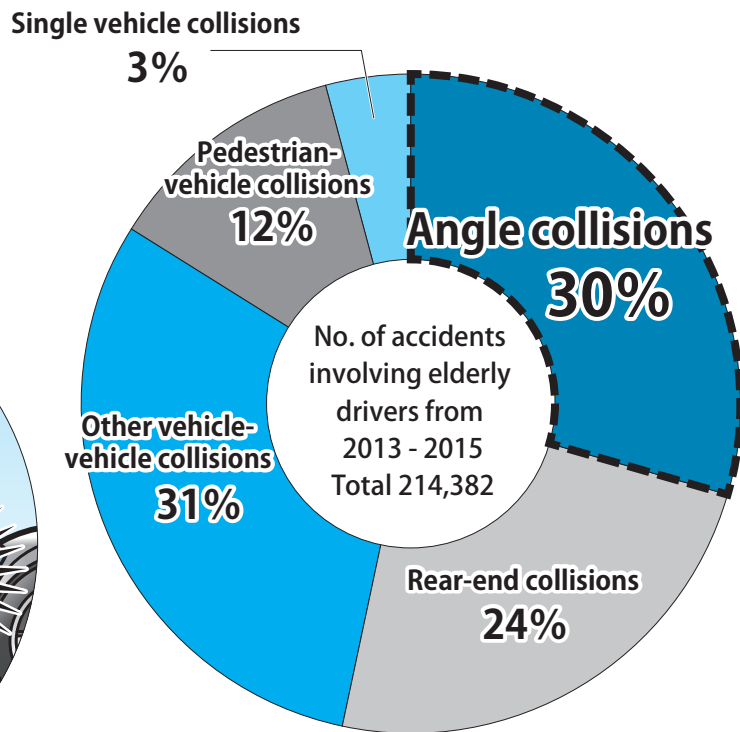


Fig. 1. Percentage of accidents by type of accident  
(Accidents where the primary party aged 65 or over is the driver of a private passenger vehicle; 2013 - 2015)

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# 1 Introduction

In 2014, the people referred to as “baby boomers” turned 65 years or older. In 2016, the population of elderly people in Japan reached approximately 34 million, with their share of the total population marking a record high of 27.3%. There has been a steady rise in the number of elderly people with driver’s licenses that has followed the increase in the elderly population, and it is becoming increasingly commonplace to see elderly people driving vehicles in their day-to-day lives.

Yet at the same time, traffic accidents involving elderly drivers have come to pose a major social problem in recent years. Automobiles are now a means of daily transport that elderly people could not do without. But conversely, it is said that the decline of physical function as people age could potentially exert a grave influence on their driving ability, and there is likely no shortage of elderly people and members of their families who feel anxious over having elderly people driving on a daily basis.

Therefore, in this issue of ITARDA Information we will deal with traffic accidents involving elderly drivers. We will discuss the extent to which angle collision accidents occur and introduce characteristics of them, as these are accidents that are particularly common among elderly people. In addition, we will also consider points that merit attention for the sake of preventing such accidents.

This report will primarily focus on automobile accidents that occur in everyday life, and so it will investigate and analyze accidents where the primary party was the driver of a private passenger vehicle (accidents where the primary party was operating a commercial passenger vehicle, truck, motorcycle / bicycle, and so on were excluded; cases where the private passenger vehicle was a rental car or school bus or the like were also not included).

# 2 Extent to which accidents involving elderly drivers occur

Fig. 2 shows trends in the number of traffic accidents that have occurred in the 20-year span from 1996 to 2015, and indicates the percentage of accidents caused by elderly drivers aged 65 or over. The number of accidents peaked in 2014, and has been falling year by year since then, with a major causal factor behind this being the fact that accidents by drivers aged 64 and under have been falling. The number of accidents caused by elderly drivers has remained largely unchanged. For this reason, the percentage of accidents involving elderly drivers out of all accidents has continued climbing, and accounted for nearly 20% of the total in 2015. The percentage of accidents caused by drivers between the ages of 65 - 74 in particular saw an especially substantial increase starting from around 2012 due to the increase in the elderly population from the people referred to as “baby boomers” reaching the age of 65, as mentioned at the beginning.

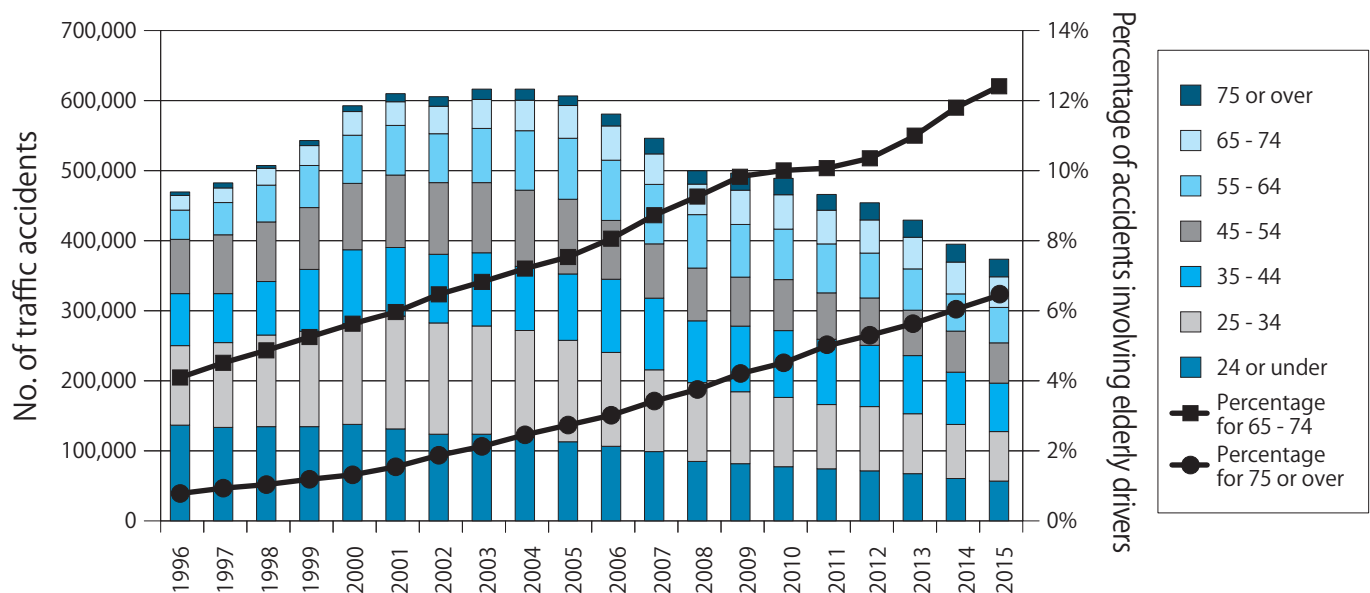


Fig. 2. Trends in the number of traffic accidents and the percentage of accidents involving elderly drivers (1996-2015)

### 3 Characteristics of angle collision accidents involving elderly drivers

Fig. 3 shows a comparison of the percentage of accidents by type of accident and by age bracket over a three-year period from 2013 - 2015. Rear-end collision accidents are most prevalent among drivers 64 and under at 42% of the total, with angle collision accidents accounting for 23%. On the other hand, rear-end collision accidents among elderly drivers are low at 24%, with angle collision accidents relatively high at 30%. Apparently, compared with non-elderly drivers, elderly drivers tend to be more likely to cause angle collision accidents.

Now then, in what sorts of locations do these angle collision accidents occur?

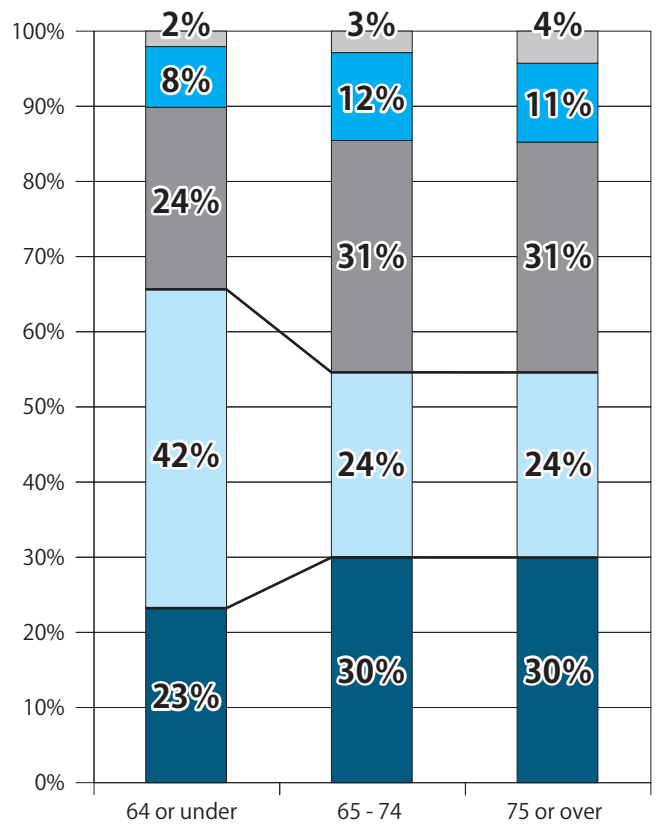
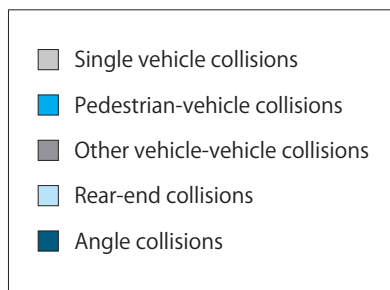


Fig. 3. Percentage of accidents by type of accident (2013 - 2015)

Fig. 4 shows percentages for the types of location where angle collisions involving elderly drivers occur. An overwhelming majority occur at non-signalized intersections accounting for approximately 65% of the total accidents. Since non-signalized intersections lack traffic regulations via a traffic signal, the driver must make the decision to proceed into the intersection or to come to a stop on their own. As such, compared with signalized intersections they contain numerous subjects for which safety must be confirmed. Moreover, in many cases there are impairments to the driver's vision such as roadside structures, walls, and trees and shrubs, requiring them to more carefully check to confirm that it is safe. For these reasons, non-signalized intersections constitute an environment in which it is extremely likely that angle collision accidents will occur.

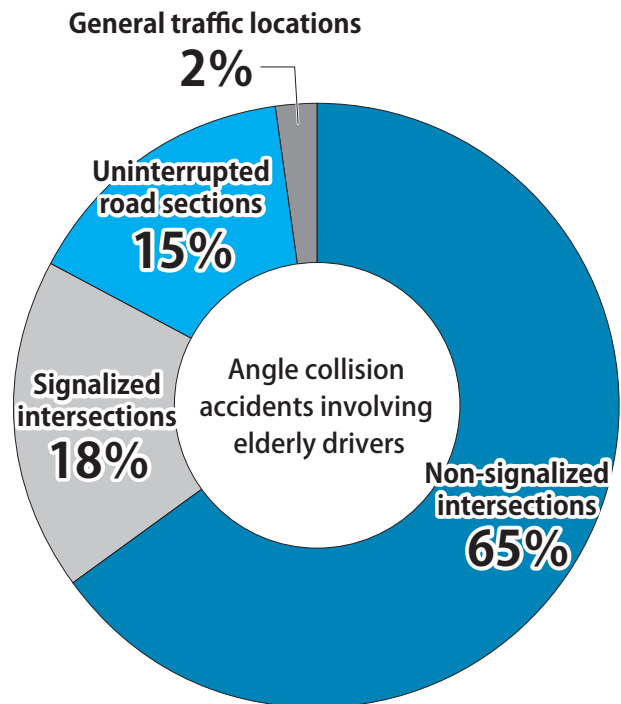


Fig. 4. Percentage of angle collision accidents by type of location (where the primary party is 65 years or over; 2013 - 2015)

## 4 Characteristics of angle collision accidents involving elderly drivers in non-signalized intersections

Here, we will take a look at the characteristics of non-signalized intersections, where angle collision accidents involving elderly drivers are particularly likely to occur.

Fig. 5 shows a comparison of the percentage of accidents by type of legal violation for angle collision accidents at non-signalized intersections and by age bracket. The most common type for each age bracket is violation of mandatory safe driving, though the percentage for this type decreases as one's age increases. On the other hand, the percentage of accidents from failing to temporarily stop increases as one ages, and it is one of the factors that increases the likelihood of elderly drivers getting into angle collision accidents at non-signalized intersections. It is believed that this increase in elderly drivers failing to temporarily stop is backed by an increase in elderly drivers overlooking road signposts and road markings, as well as the rise in cases in which they fail to come to a complete stop before accelerating once more.

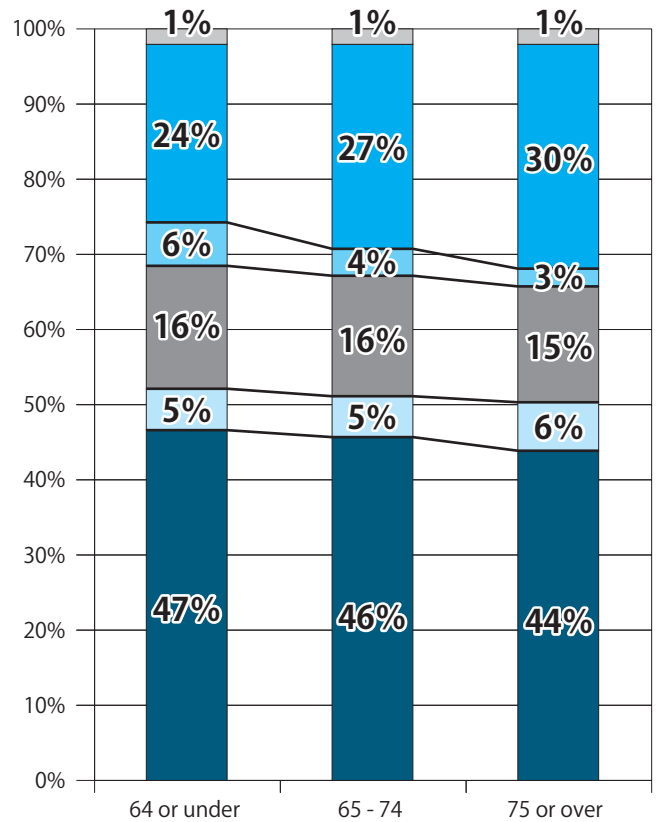
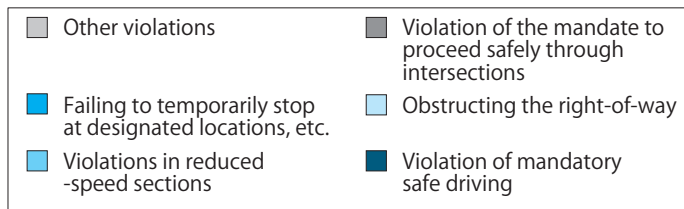


Fig. 5. Percentage of angle collision accidents by type of legal violation (non-signalized intersections; 2013 - 2015)

Next, Fig. 6 shows a comparison of the percentage of accidents by type of movement for angle collision accidents at non-signalized intersections and by age bracket. This reveals that the older the driver the higher the percentage for accidents that occur when starting up. Conceivably, angle collision accidents when starting up include instances where a driver temporarily stops before advancing into the intersection, yet despite this when they then start up they collide with another vehicle that is coming in from a cross street. One factor behind the increase in such accidents is believed to be the effects from the decline in cognitive function and judgment function due to aging. This in turn renders elderly drivers unable to recognize other vehicles even if they check to confirm safety, or to predict their movement even if they do recognize them.

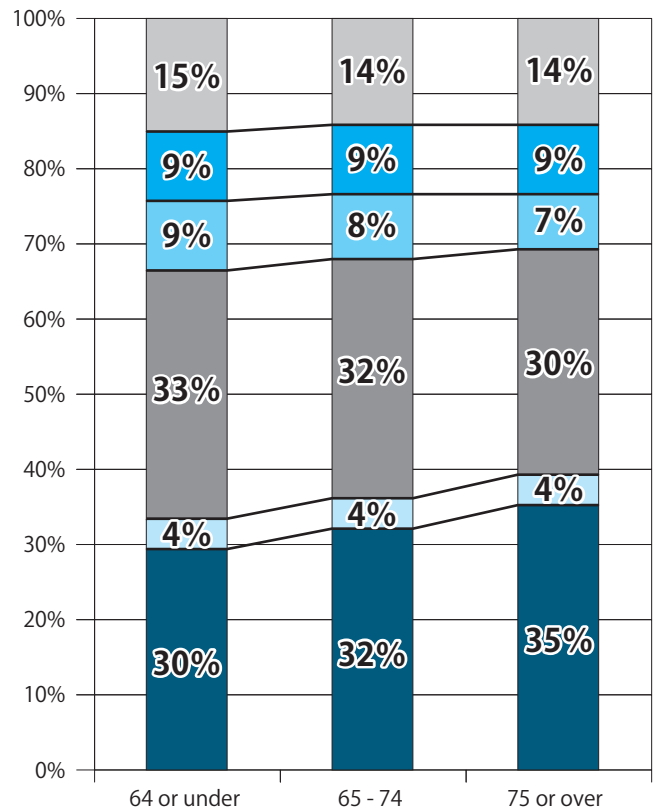
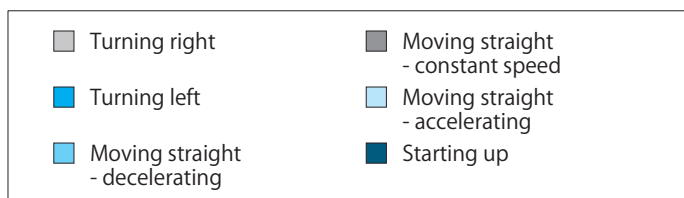
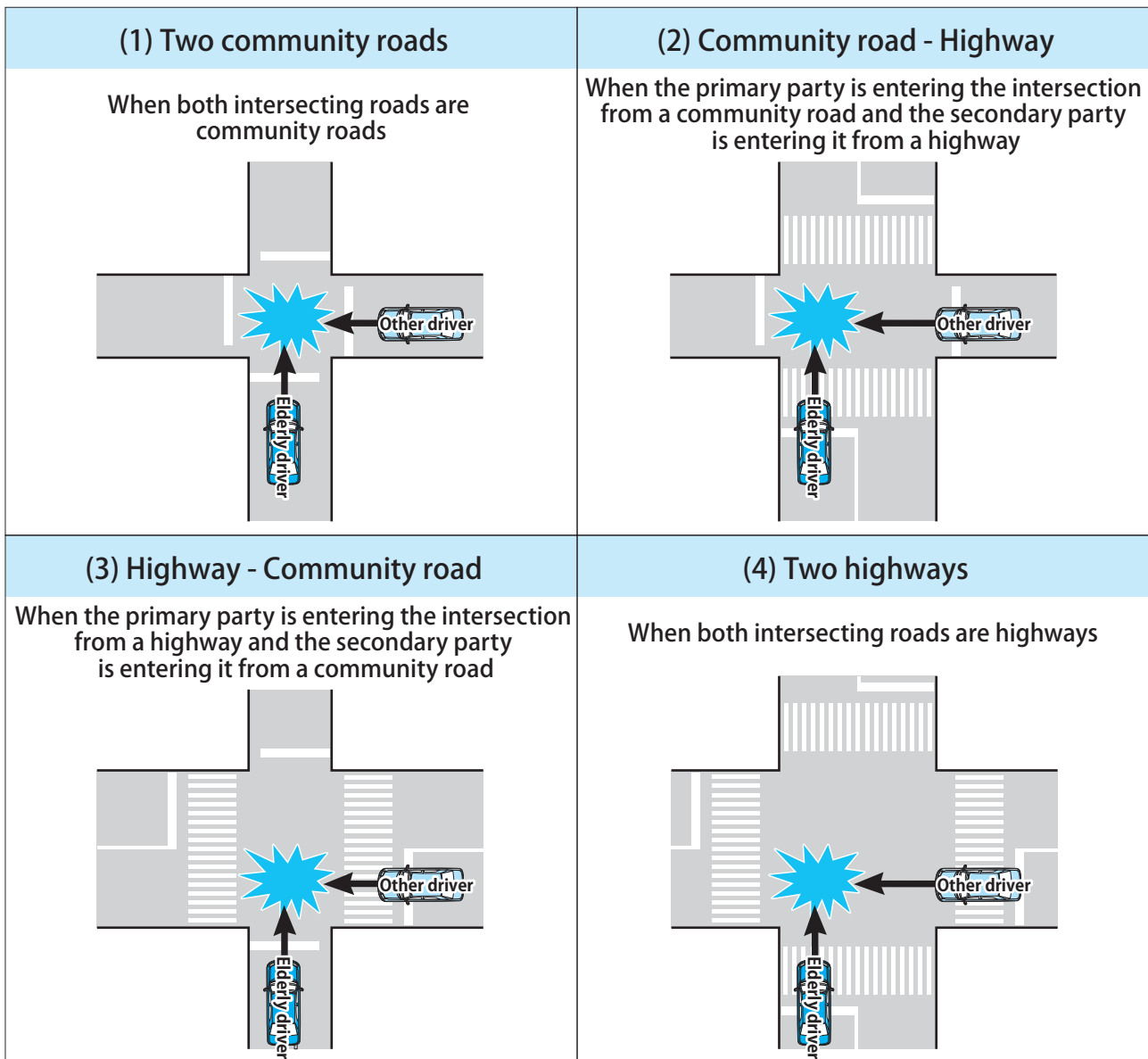


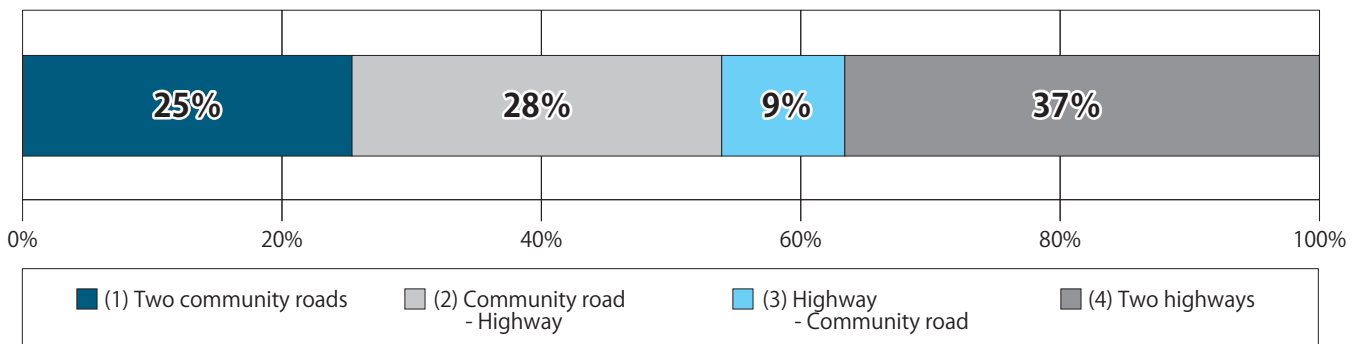
Fig. 6. Percentage of angle collision accidents by type of movement (at non-signalized intersections; 2013 - 2015)

Next, we would like to subdivide intersection size into the following four categories based on road width, and take a look at characteristics for each of them in order to clarify the causal factors for angle collision accidents at non-signalized intersections in greater detail (Fig. 7). The percentage of angle collision accidents that occur in each intersection size classification is shown in Fig. 8.



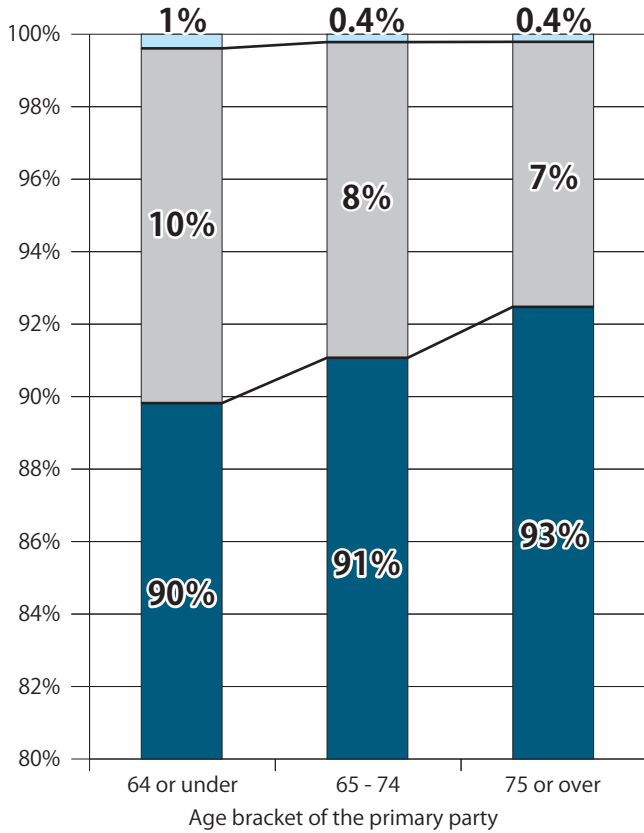
**Fig. 7. Intersection size classifications**

\* For this report, the decision was made to perform the analysis by first defining roads with a road width of no more than 5.5m as "community roads" and those of 5.5m or greater as "highways" based on the categories for Road Traffic Accident Statistics.



**Fig. 8. Percentage of angle collision accidents by intersection size classification (at non-signalized intersections with a primary party of 65 years or over; 2013 - 2015)**

■ Angle collision accidents in non-signalized intersections at (1) Two community roads



Non-signalized intersections at (1) Two community roads are distributed in large numbers along the complicated network of roads and back alleys in residential areas. Therefore, consideration has been given to the possibility that poor visibility from road-side structures, walls, and trees and shrubs could serve as a causal factor behind angle collision accidents. Therefore, Fig. 9 shows a comparison of the percentage of accidents by type of road environmental factors and by age bracket. As people get older, the percentage of accidents for which it was determined that they had a visual impairment tends to decline, and make up no more than 10% of the total. In other words, the fact that elderly drivers end up causing angle collision accidents in non-signalized intersections at (1) Two community roads is not necessarily influenced by visual impairments. Rather, it is thought to show the rise in cases in which they cause accidents even in intersections with good visibility as a result of the declining cognitive function resulting from aging.

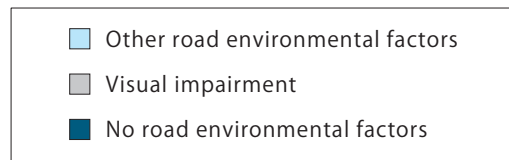
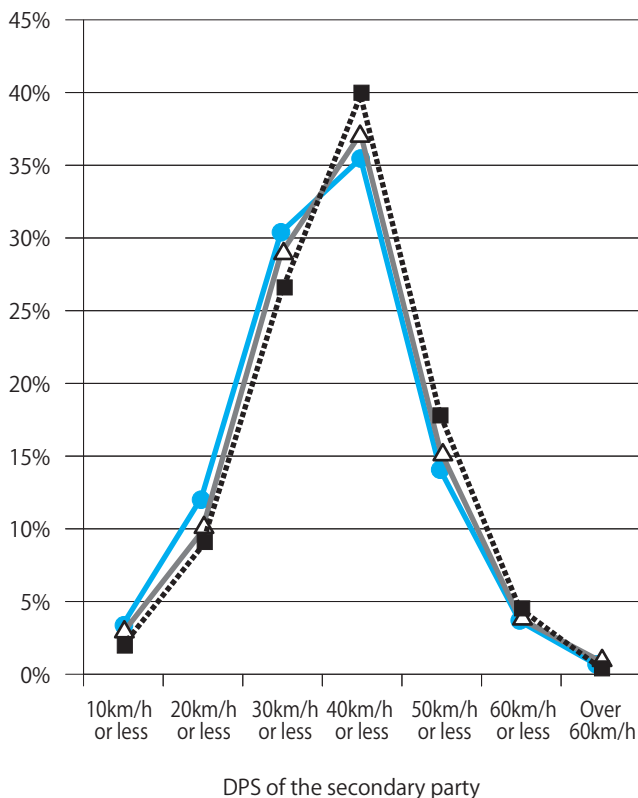


Fig. 9. Percentage of angle collision accidents by type of road environmental factor (2013 - 2015)

■ Angle collision accidents in non-signalized intersections at (2) Community road - Highway



Non-signalized intersections at (2) Community road - Highway consist of a configuration whereby primary parties advance from narrow community roads onto broad highways. Presumably, cases in which drivers neglect to check to confirm safety, such as by temporarily stopping or decelerating decrease. Conversely, as the road the driver is entering is broad, they must simultaneously check for vehicles traveling from both left and right sides. Fig. 10 shows a comparison of the percentage of accidents by the danger perception speed (DPS) of the secondary party, the party that the elderly driver must check on, and by age bracket. This shows that as one ages the graph moves further to the right and the percentage of accidents where there is a rapid DPS of the secondary party increases. This indicates an increase in cases where elderly drivers are no longer able to accurately recognize the speed at which other vehicles are traveling as a result of declining cognitive function due to aging, or cases where drivers are no longer able to properly determine whether they should start up or wait for other vehicles to pass by according to the speed at which other vehicles are traveling and their distance.

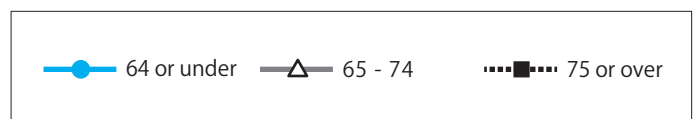
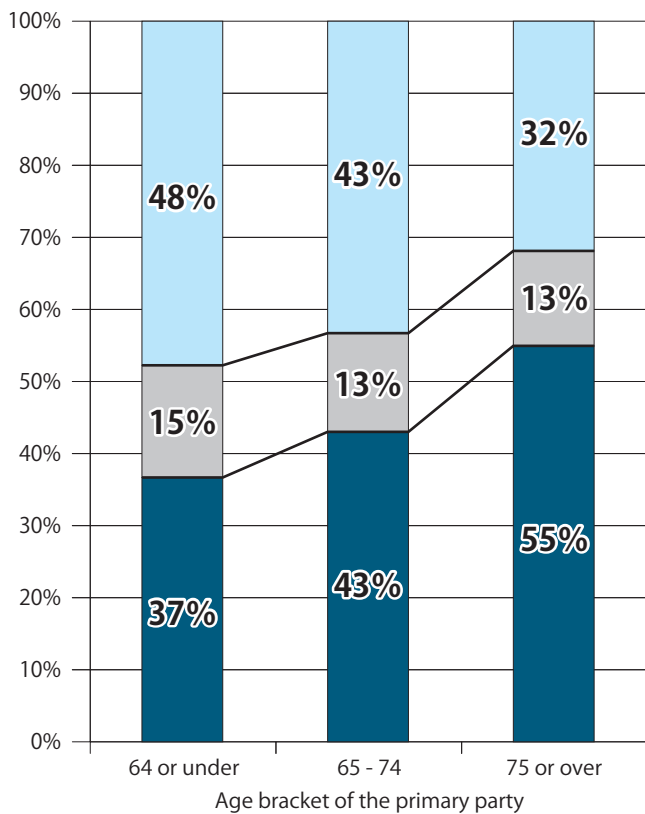


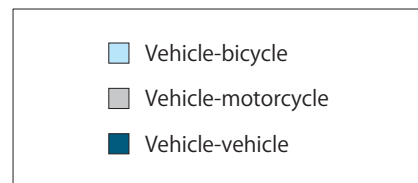
Fig. 10. Percentage of angle collision accidents by DPS of the secondary party (when the secondary party is driving a moped or larger vehicle; 2013 - 2015)



**Angle collision accidents in non-signalized intersections at (3) Highway - Community road**

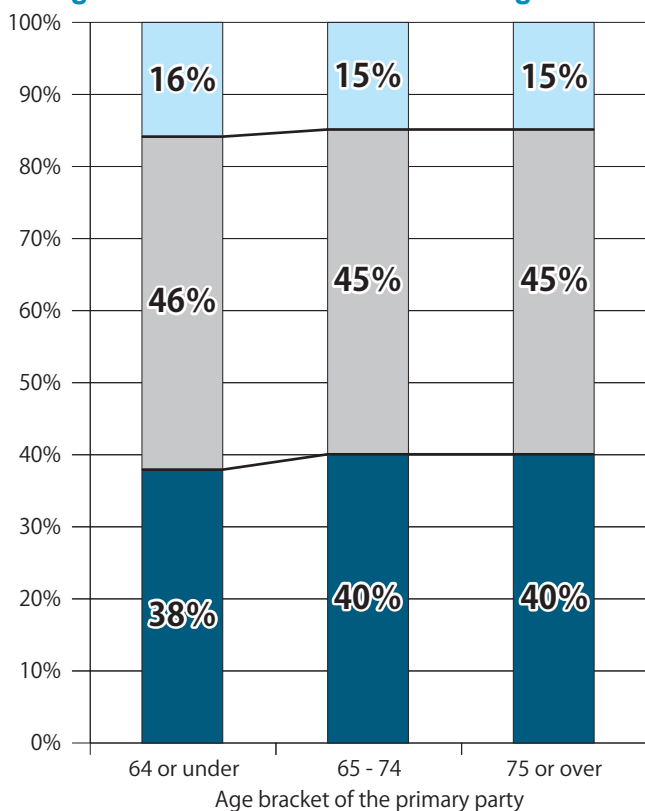


Non-signalized intersections at (3) Highway - Community road represent a configuration whereby the primary party is on a broad highway, that receives inflows of traffic from narrow community roads. This configuration is characterized by the fact that the side the primary party is entering from is oftentimes the road with right-of-way. As such, cases where they become the primary party (defined as the party that bears the heavier responsibility when there is a difference in the level of errors between parties) when an accident occurs, are rare. Fig. 11 shows a comparison of the percentage of accidents by type of secondary party and by age bracket, which reveals a tendency for there to be a larger percentage of vehicle-vehicle accidents the older one gets. This is believed to indicate an increase in cases whereby elderly drivers cause an accident because they were unable to recognize even vehicles with large bodies as a result of declining cognitive function resulting from aging.

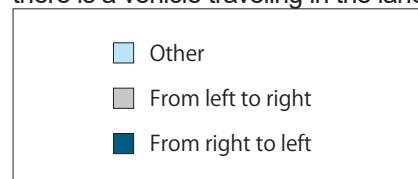


**Fig. 11. Percentage of angle collision accidents by type of secondary party (2013 - 2015)**

**Angle collision accidents in non-signalized intersections at (4) Two highways**



The non-signalized intersections at (4) Two highways feature numerous opportunities for complexly intertwined roadways in the anticipation that they will have a certain volume of traffic, making these accident-prone environments. This is indicated by the fact that this configuration has the highest percentage of angle collision accidents by size classification for non-signalized intersections seen in Fig. 8 above. Fig. 12 shows a comparison of the percentages of accidents by direction of motion of the secondary party and by age bracket. As people grow older, the percentage of accidents in which the secondary party is passing through from the right-hand side tends to increase. In other words, there is an increase in cases in which accidents are caused from the near lane of the intersection. In general, people tend to overlook checking to confirm safety when it comes to vehicles traveling in the far lane when they pull out into intersections. But this is thought to indicate that the decline in cognitive functions resulting from aging increases cases in which they cause accidents without even recognizing that there is a vehicle traveling in the lane close to them.



**Fig. 12. Percentage of angle collision accidents by direction of motion of the secondary party (when the primary party is moving straight ahead; 2013 - 2015)**

## 5 Conclusion

As we have seen thus far, accidents involving elderly drivers have the following characteristics.

- As people grow older, they become increasingly likely to cause an angle collision accident.
- Angle collision accidents mainly occur at intersections, with approximately 65% of them concentrated at non-signalized intersections.

Moreover, angle collision accidents at non-signalized intersections involving elderly drivers have the following characteristics.

- As people grow older, the percentage of accidents caused by a “failure to temporarily stop” increases.
- As people grow older, the percentage of accidents “when starting up” increases.
- The following characteristics depend on the size of the intersection.
  - (1) At non-signalized intersections with two community roads, the percentage of accidents caused by impaired visibility decreases.
  - (2) At non-signalized intersections with community road - highway, the percentage of accidents with vehicles traveling rapidly increases.
  - (3) At non-signalized intersections with highway - community road, the percentage of vehicle-vehicle accidents increases.
  - (4) At non-signalized intersections with two highways, the percentage of accidents with vehicles traveling from the right-hand side increases.

In addition, it is believed that driving while taking heed of the following points is an effective way of preventing angle collision accidents at non-signalized intersections.

### ■ When passing through intersections:

- Drivers must always strictly comply with temporary stops. Since there is the possibility that drivers may carelessly overlook road signposts and road markings, they must always pay particular attention when passing through intersections.
- Even if a driver temporarily stops or decelerates, there is still the possibility that they have failed to properly check for other vehicles. Drivers must not be content to just temporarily stop at the stop line. They must endeavor to come to a stop once again at a point where they can see into the intersection and check to confirm that it is safe, and also pass through at a speed that is sufficiently safe.

### ■ Especially for intersections with two narrow roads:

- Even if an intersection has good visibility and an open field of view, drivers must not forget to check to confirm that it is safe when passing through. They must pass through intersections with poor visibility due to road-side structures, trees and shrubs, and other such obstacles by using curved traffic mirrors etc., and be extra careful.

### ■ Especially for intersections where drivers merge from a narrow road onto a broad road:

- Even when it appears that other vehicles are far away, they could potentially be traveling at a higher speed than the driver imagines. When there is another vehicle present, drivers must wait for them to go by before passing through the intersection.

### ■ Especially for intersections with narrow roads when drivers are traveling on a broad road:

- Just because an intersection intersects with a narrow road, does not necessarily mean that drivers do not have to take notice of other vehicles. Drivers must not only observe automobiles, but also motorcycles and bicycles, and must not forget to check to confirm that it is safe before passing through them.

### ■ Especially for intersections with two broad roads:

- Numerous vehicles pass through broad intersections which increases the risk of accidents. Drivers must not forget to check to confirm that it is safe with regard to other vehicles traveling from both left and right sides before passing through intersections.

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