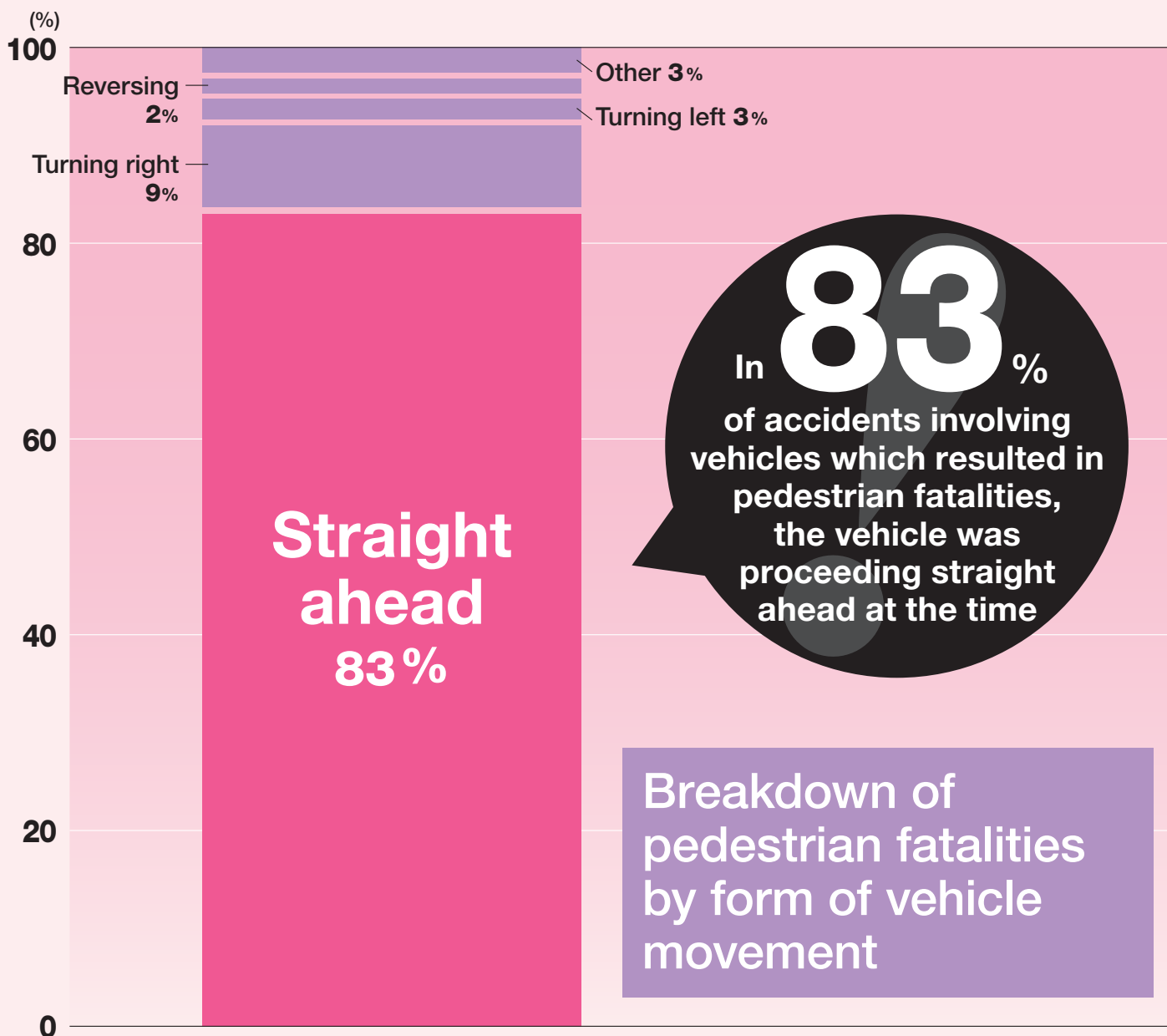


## ITARDA INFORMATION

No. **94** 2012  
APRIL



Special feature

**Accidents resulting in pedestrian fatalities occur most frequently with vehicles proceeding straight ahead**

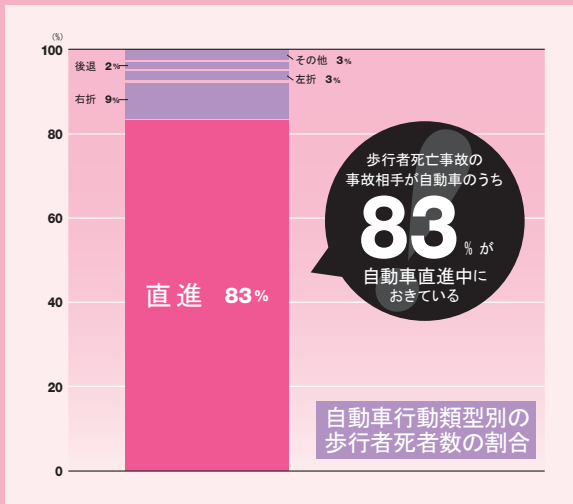
~ Earlier danger perception by drivers can prevent fatal accidents ~

# ITARDA INFORMATION

公益財団法人 交通事故総合分析センター  
イタルダ・インフォメーション

2012 APRIL

No. **94**



## Special feature

### Accidents resulting in pedestrian fatalities occur most frequently with vehicles proceeding straight ahead

~ Earlier danger perception by drivers can prevent fatal accidents ~

The number of traffic accident fatalities in Japan (the number of fatalities occurring within 24 hours of an accident) has been decreasing year on year; nevertheless, at 4,863 fatalities as of 2010, the level of harm suffered remains considerable. Among these, fatalities among people killed while walking the streets at 1,714 represent the highest number of fatalities among the various means of transport, comprising 35% of total fatalities. Going forward, further countermeasures against pedestrian fatalities are necessary if we are to reduce the harm caused by traffic accidents.

In this issue of ITARDA Information, we will look at “accidents with vehicles proceeding straight ahead,” as the form of accident causing the greatest number of fatalities among traffic accidents involving pedestrians; we will analyze the characteristics of accidents based on traffic accident data from 2010, and consider measures for preventing pedestrian fatalities.

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- 1 Accidents resulting in pedestrian fatalities occur most frequently with vehicles proceeding straight ahead
- 2 Characteristics of accidents resulting in pedestrian fatalities with vehicles proceeding straight ahead
- 3 Earlier danger perception by drivers can prevent fatal accidents
- 4 Breakdown of pedestrian age composition by law violation status
- 5 Summary

SECTION  
1

# Accidents resulting in pedestrian fatalities occur most frequently with vehicles proceeding straight ahead

Fig. 1 shows the trends in the number of fatalities by means of transport over the past 10 years. It is evident that while the number of vehicle occupant fatalities has fallen markedly over the past 10 years, the decrease in the number of pedestrian fatalities has been only a gradual one. In 2008, pedestrians for the first time stood suffered higher numbers of fatalities than any other means of transport, and almost no decrease has been seen since this point.

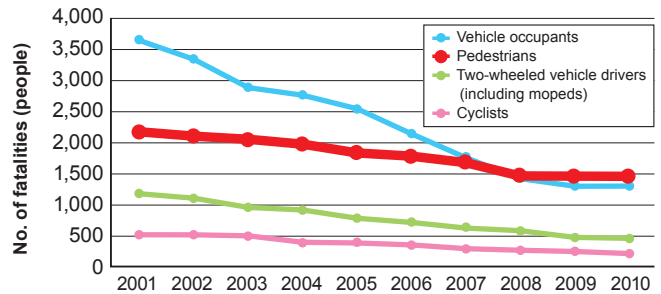


Fig. 1: Trends in numbers of fatalities by means of transport

When we turn to the parties other than pedestrians involved in accidents resulting in pedestrian fatalities (confined to accidents in which pedestrians were the primary or secondary parties) in 2010, 94% of these were four-wheeled vehicles, comprising standard-sized passenger cars, mini-sized passenger cars, standard-sized trucks and light trucks in that order (Table 1, Fig. 2). Furthermore, looking at the forms of vehicle movement at the time of accidents, the majority (83%) of pedestrian fatalities occurred with vehicles proceeding “straight ahead,” followed by “turning right,” “turning left” and “reversing” (Table 2, Fig. 3).

movement, a higher fatality rate is found for “straight ahead” than for other forms of movement (Table 2, Fig. 4).

$$\text{Fatality rate (\%)} = \frac{\text{No. of fatalities}}{\text{(No. of casualties)}} \times 100$$

From the above, it is evident that pedestrian accidents involving vehicles proceeding straight ahead produce many fatalities, and that this form of vehicle movement produces a high fatality rate. Let us now analyze the characteristics of accidents resulting in pedestrian fatalities involving vehicles proceeding straight ahead. This analysis looks at accidents in which pedestrians were the primary or secondary parties among traffic accidents in 2010.

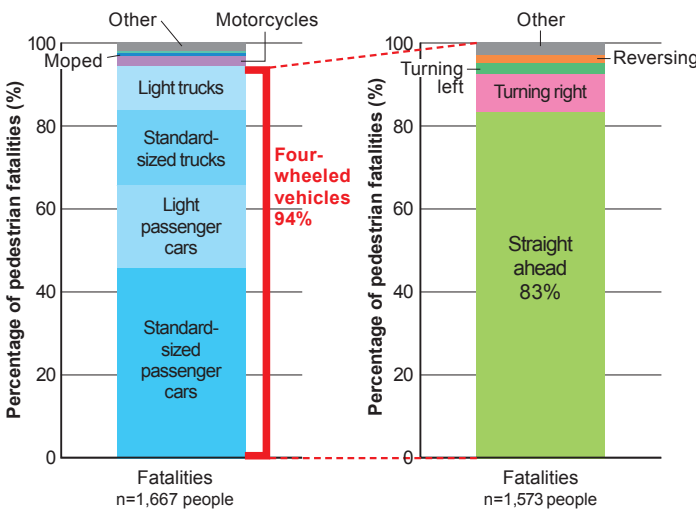


Fig. 2: Breakdown of pedestrian fatalities by other party in collision (2010)

(Accidents in which pedestrians were the primary or secondary parties)

Fig. 3: Breakdown of pedestrian fatalities by form of vehicle movement (2010)

(Accidents in which pedestrians were the primary or secondary parties)

Table 1: Breakdown of pedestrian fatalities/casualties by other party in collision (2010)

(Accidents in which pedestrians were the primary or secondary parties)

Other party in collision		Fatalities (people)	Casualties (people)
Four-wheeled vehicles	Standard-sized passenger cars	762	35,166
	Mini-sized passenger cars	332	12,683
	Standard-sized trucks	300	5,346
	Light trucks	179	5,159
	Other	0	9
	<b>Subtotal</b>	<b>1,573</b>	<b>58,363</b>
Motorcycles		37	1,706
Mopeds		15	2,903
Light vehicles		5	2,669
Other		37	2,850
<b>Total</b>		<b>1,667</b>	<b>68,491</b>

Table 2: Numbers of pedestrian fatalities/casualties and fatality rates by form of vehicle movement (2010)

(Accidents in which pedestrians were the primary or secondary parties)

Other party in collision	Fatalities (people)	Casualties (people)	Fatality rate (%)
Straight ahead	1,310	26,386	5.0
Turning right	142	16,302	0.9
Turning left	43	3,621	1.2
Reversing	33	6,590	0.5
Other	45	5,464	0.8
<b>Total</b>	<b>1,573</b>	<b>58,363</b>	<b>2.7</b>

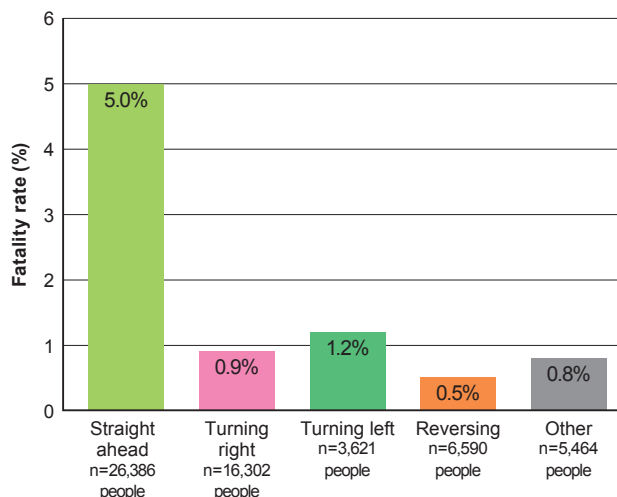


Fig. 4: Pedestrian fatality rates by form of vehicle movement (2010)

(Accidents in which pedestrians were the primary or secondary parties)

SECTION

2

## Characteristics of accidents resulting in pedestrian fatalities with vehicles proceeding straight ahead

Let us analyze the characteristics of accidents resulting in pedestrian fatalities with vehicles proceeding straight ahead.

(1) 70% of accidents caused by human causes attributable to drivers are caused by delays in noticing pedestrians due to aimless driving or distracted driving

Analysis of the causes of accidents reveals certain characteristics in the human causes attributable to drivers. Fig. 5 compares the percentages of accidents caused by human causes attributable to drivers, broken down by form of vehicle movement. “Aimless driving,” such as when drivers are thinking of other things or daydreaming, comprised 35% of accidents in the “straight ahead” category, while “distracted driving” such as operating audio systems or watching traffic signals in the distance comprised 35%, together comprising 70% of the total. By contrast, the majority of accidents in the “turning

right,” “turning left” and “reversing” categories were caused by “failure to confirm safety”—the mistaken belief that no pedestrian was present or failure to confirm this properly. Unlike other forms of vehicle movement, the major cause behind accidents involving vehicles proceeding “straight ahead” was when drivers’ noticing of pedestrians was delayed due to drivers’ momentary carelessness or lack of caution, such as when drivers did not concentrate on their driving or when their attention was diverted to other things around them.

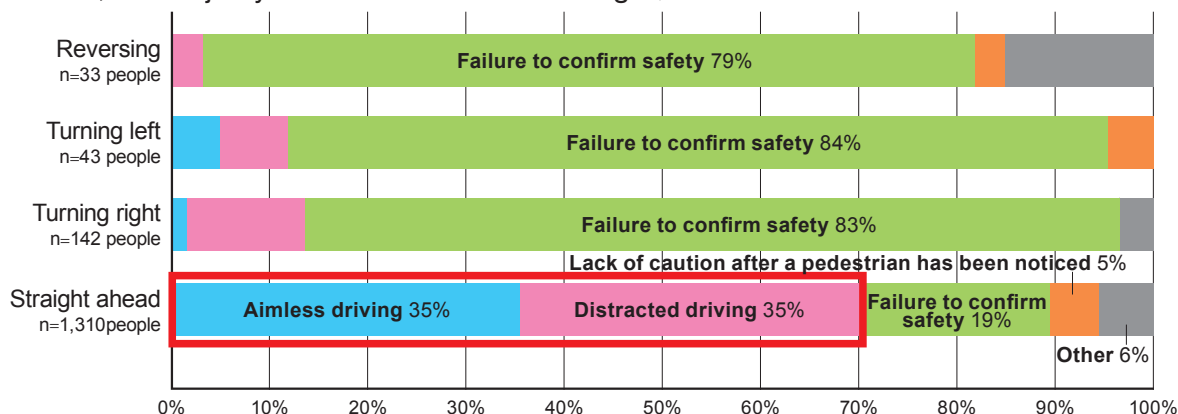


Fig. 5: Breakdown of pedestrian fatalities by form of vehicle movement/human causes attributable to drivers

(2) 70% of pedestrians “commit violations of the law”

In terms of causes of accidents attributable to pedestrians, distinctive characteristics were seen in pedestrians’ law violation status. Fig. 6 compares the percentages of pedestrians who “committed violations” or “did not commit violations” of the law, for various forms of vehicle movement. It is evident that pedestrians “committed violations of the law” in 70% of all accidents with vehicles proceeding “straight ahead,” a strikingly high proportion compared to other forms of vehicle movement. Furthermore, if we break down pedestrians’ violations of the law in the cases of accidents with vehicles proceeding “straight ahead,” 73% were violations related to crossing the road such as “crossing immediately before/after a vehicle,” “crossing other than at a

pedestrian crossing” and “disregarding traffic signals.” These were followed by “drunkenness, wandering aimlessly, lying on the road etc.” at 13% and “traffic demarcation-related violations” such as walking on the left side of the road or mingling with traffic at 7% (Fig. 7).

From the above characteristics, it may be said that in order to prevent accidents resulting in pedestrian fatalities it is essential to reduce violations of the law by pedestrians at the same time as ensuring that drivers notice pedestrians at an earlier stage. Moreover, among violations of the law by pedestrians there is a particular need to reduce violations of the law involving crossing the road.

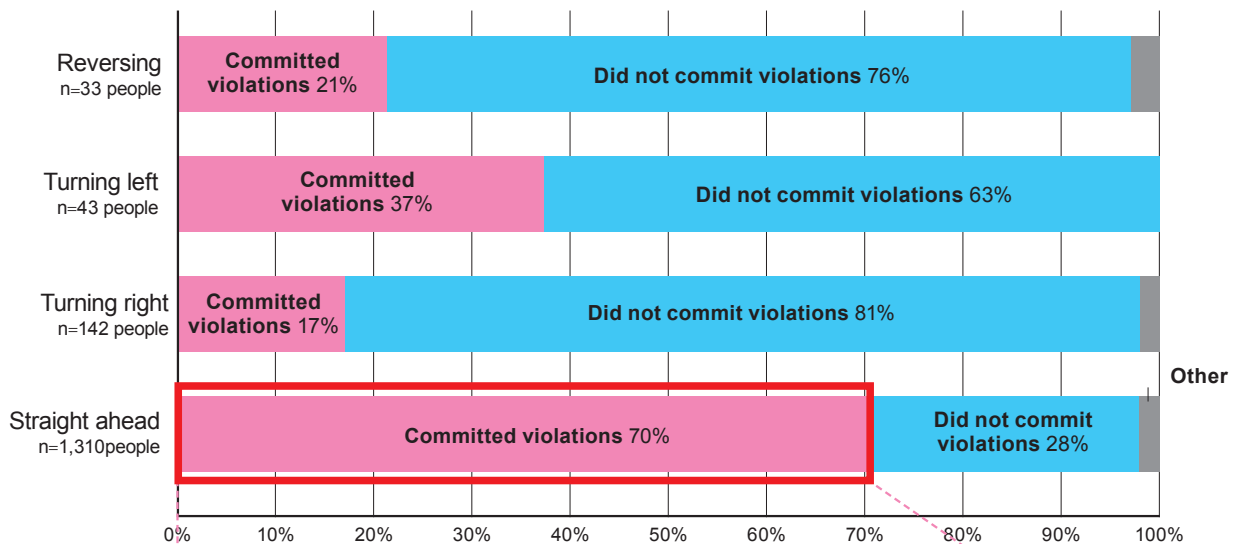


Fig. 6: Percentages of pedestrians by form of vehicle movement and by law violation status

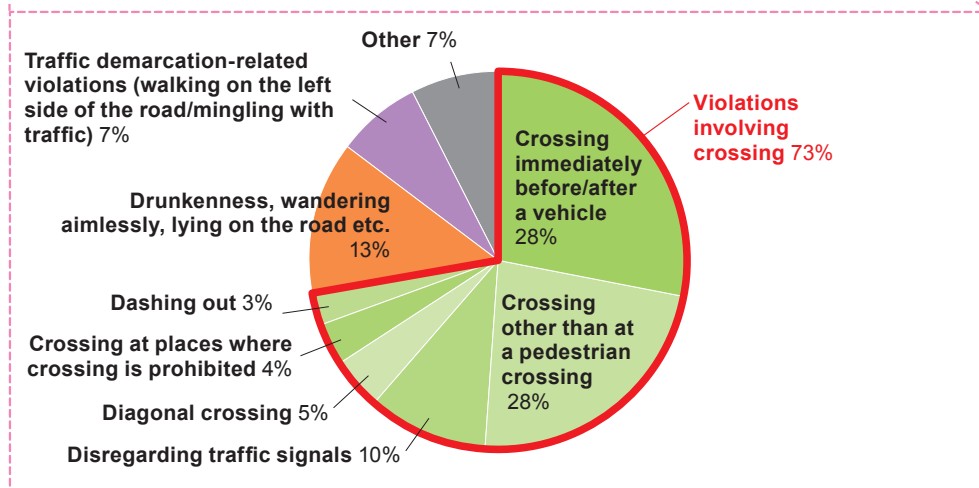


Fig. 7: Breakdown of fatalities by type of violation committed by pedestrians who “committed violations of the law” with vehicles proceeding straight ahead

SECTION

3

# Earlier danger perception by drivers can prevent fatal accidents

It is evident that delays in noticing pedestrians can lead to accidents resulting in pedestrian fatalities. At approximately what point did these drivers notice pedestrians prior to collision?

We investigated the points at which drivers noticed pedestrians—that is to say, how many meters in front of the point of collision the drivers perceived danger—in accidents between pedestrians and vehicles proceeding straight ahead, and broke these down according to the degree of harm caused.

From our in-depth study database gathered at the Institute (microdata), we extracted accidents which occurred between pedestrians crossing other than at a pedestrian crossing and vehicles proceeding straight ahead, including both cases of fatal accidents and cases where harm was limited to slight injuries, and presented the driving speed of each vehicle at the point where the driver perceived danger, and the distance between that point and the pedestrian, broken down by the degree of harm caused to each pedestrian (Fig. 8). The estimated free running distance (the distance the vehicle travels between the point where the brake is applied once the driver perceives danger and the point where the vehicle starts to decelerate) and stopping distance (the distance the vehicle travels between the point where the driver perceives danger and the point where the

vehicle stops) are displayed on the same graph. When calculating the free running distance and stopping distance, the reaction time (the time between the moment the brake is applied once the driver perceives danger and the moment the vehicle starts to decelerate), generally considered to be 0.5~1.0 seconds, was set at 0.7 seconds, while the deceleration upon braking was set at 0.6G as being a reasonable speed for sudden braking. For example, if driving speed is 40km/h, the free running distance will be approximately 8m and the stopping distance approximately 18m.

From Fig. 8, it is evident that with most fatal accidents the vehicle often collides with the pedestrian before it can start to decelerate, since these accidents most often occur within the free running area. In addition, where the driving speed was high as seen in cases of driving speed of 60km/h or 80km/h, fatal accidents occurred even when the driver perceived danger from a point further removed than the free running distance. By contrast, the distribution of the accidents causing slight injuries indicates that the driving speed tends to be lower and that the distance from the driver to the pedestrian is greater than with fatal accidents. Based on this, we believe that the curbing of vehicle driving speed and earlier danger perception by drivers will reduce harm to pedestrians.

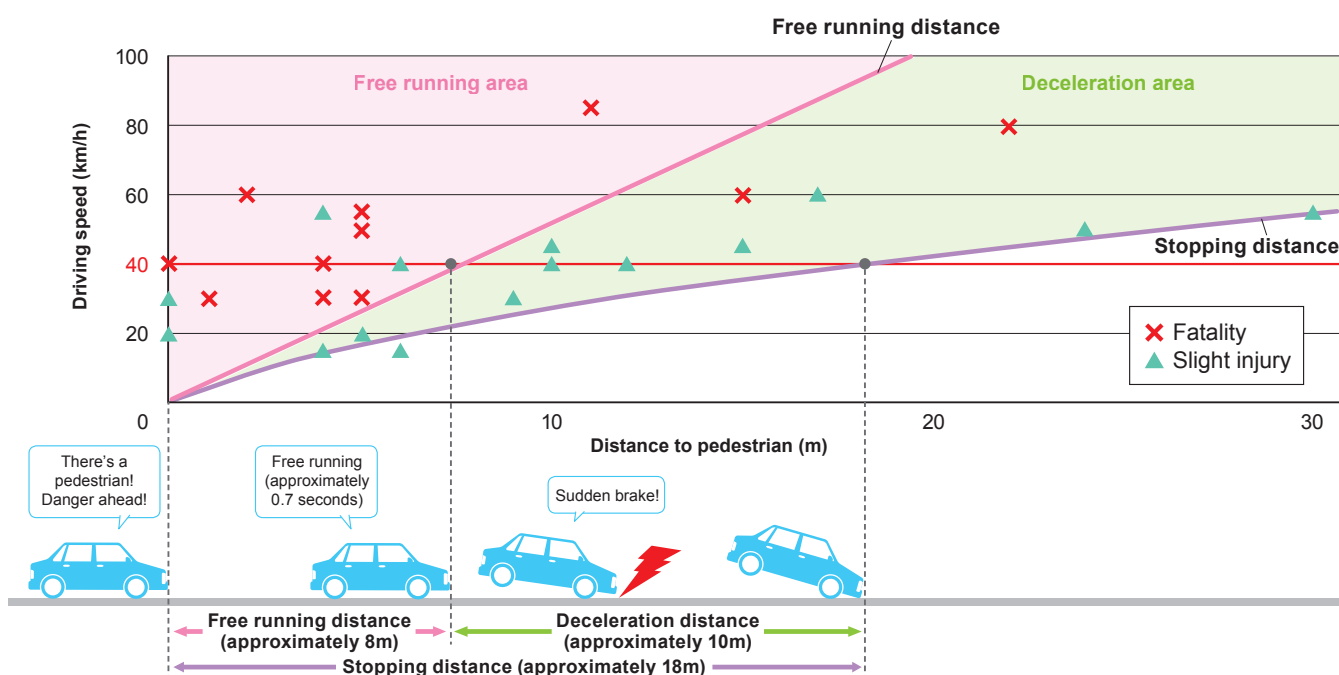


Fig. 8: Distance and speed at danger perception point by degree of harm

SECTION

4

# Breakdown of pedestrian age composition by law violation status

It is evident that violations of the law by pedestrians can lead to fatal accidents. Let us now examine which age groups of pedestrians are involved in fatal accidents, and break these groups down by their law violation status.

We compared the age composition of the pedestrians killed in accidents with vehicles proceeding straight ahead, and broke these down by their law violation status (Fig. 9). Overall, the percentage of pedestrians aged 65 or over was high; however, for “crossing immediately before/after a vehicle,” “crossing other than at a pedestrian crossing,” and “diagonal crossing,” the percentage of pedestrians aged 65 or over was particularly high, exceeding 80%. By contrast, for “dashing out,” pedestrians aged 15 or under comprised the largest group, while for “drunkenness, wandering aimlessly, lying on the road etc.,” the largest group was pedestrians aged 16~64; it is thus evident that the age composition of pedestrians varies according to the nature of the violation of the law.

Fewer violations of the law by pedestrians—that is, pedestrians’ obeying of traffic rules—will lead to fewer accidents that result in pedestrian fatalities. In particular, it is crucial that elderly pedestrians aged

65 or over are thoroughly educated about traffic rules relating to crossing, such as “crossing immediately before/after a vehicle,” “crossing other than at a pedestrian crossing,” and that violations in these areas are decreased.

The Road Traffic Law sets out the following points regarding crossing methods in addition to pedestrians’ “obligation to follow traffic signals etc.”

- Use of pedestrian crossings  
Pedestrians in the vicinity of pedestrian crossings should use the pedestrian crossing to cross.
- Prohibition of diagonal crossing  
Pedestrians should not cross diagonally.
- Prohibition of crossing immediately before/after a vehicle  
Pedestrians should not cross immediately before or immediately after a vehicle.
- Places where crossing is prohibited  
Pedestrians should not cross in parts of the road where crossing is prohibited by road signage.

Any person who crosses in defiance of the directions of police officers etc. with regard to the above shall be subject of a fine of up to 20,000 or a petty fine.

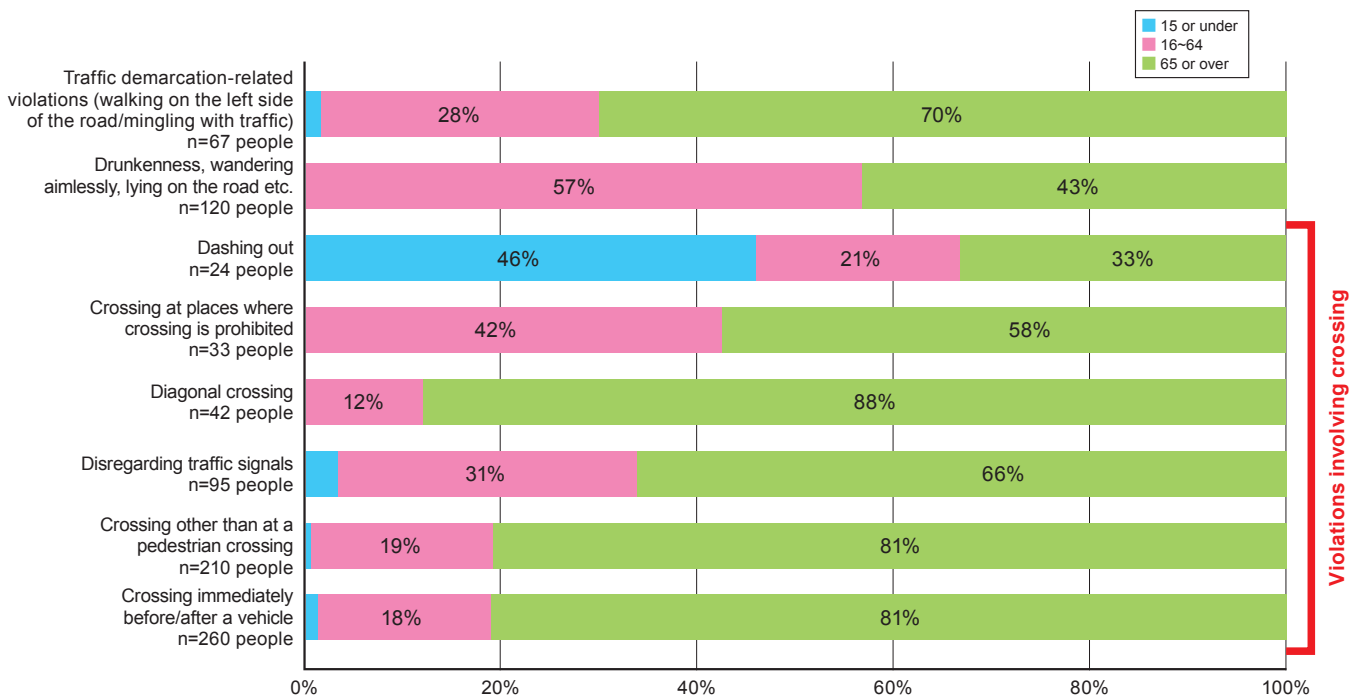


Fig. 9: Breakdown of pedestrian fatalities (with vehicles proceeding straight ahead) by age composition and by law violation type

## Summary

In this issue's discussion of "accidents with vehicles proceeding straight ahead," the commonest type of accident resulting in pedestrian fatalities, analysis has revealed the following characteristics.

### 1. Characteristics of accidents resulting in pedestrian fatalities with vehicles proceeding straight ahead

- Delays in noticing pedestrians due to aimless driving or distracted driving comprise 70% of human causes of accidents attributable to drivers. Earlier danger perception by drivers will lead to fewer accidents that result in pedestrian fatalities.
- Pedestrians "committed violations of the law" in 70% of all accidents. Pedestrians obeying the Road Traffic Law will lead to fewer accidents that result in pedestrian fatalities. In particular, it is crucial that elderly pedestrians aged 65 or over are thoroughly educated about traffic rules relating to crossing, in order to reduce fatal accidents.

### 2. To prevent accidents resulting in pedestrian fatalities

- Drivers must understand that momentary carelessness or distraction can lead to fatal accidents, and must concentrate on their driving. In particular, it is easy for drivers to let their attention slacken on roads where there is little need for driver maneuvers, such as straight, single-lane roads. Drivers who feel their ability to concentrate on their driving beginning to ebb should refresh themselves by stopping the car for a moment to move about physically or have a coffee break.
- Pedestrians must understand that violations of the law can lead to fatal accidents, and must obey traffic rules to protect themselves. There are traffic rules which pedestrians as road users are also required to obey. Pedestrians must avoid over-relying on the assumption that other road users have the responsibility of protecting them as pedestrians, and must obey the rules and behave with courtesy when walking the streets.