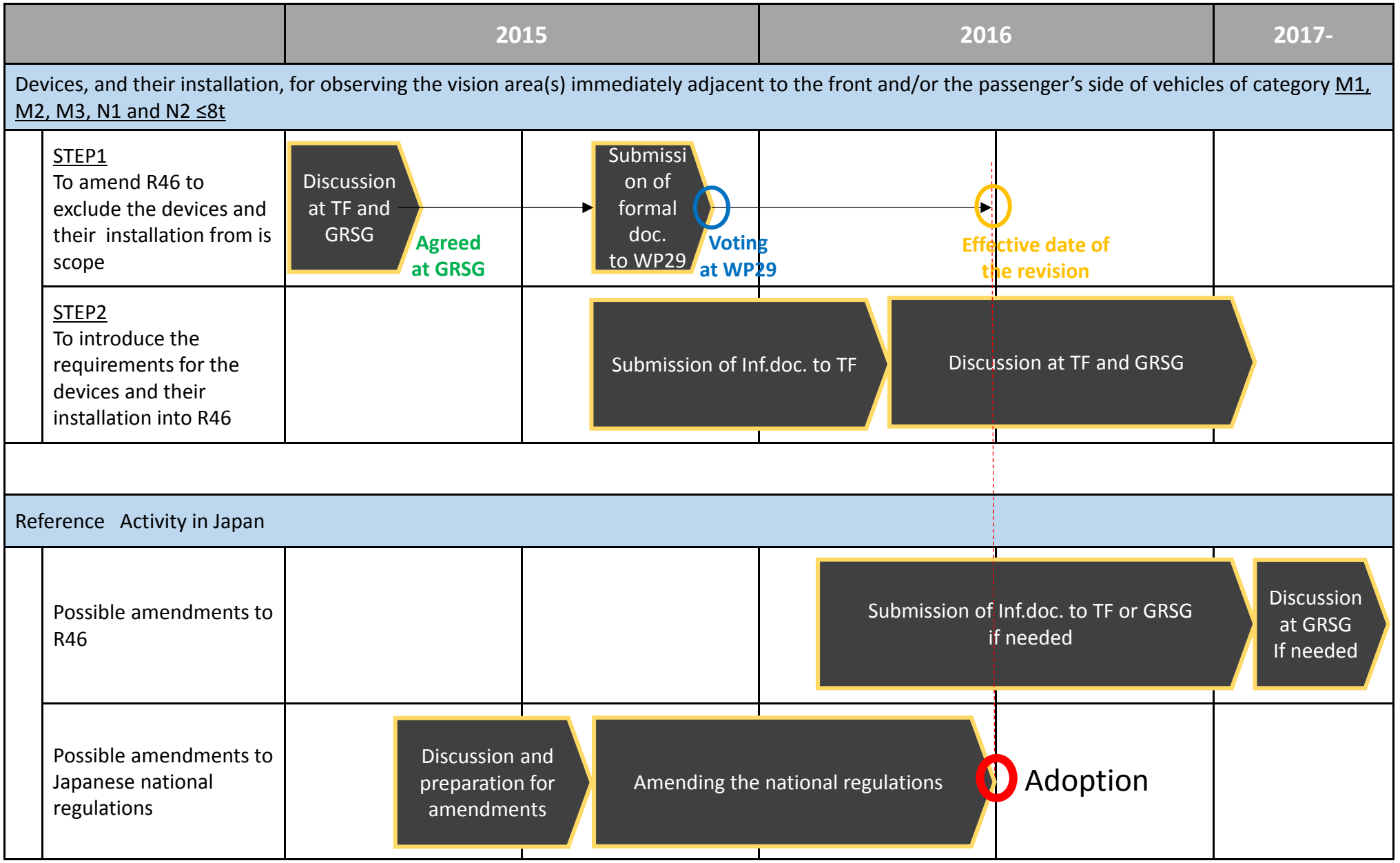
Informal document **GRSG-109-20**
(109th GRSG, 29 Sept.-2 October 2015,
agenda item 6)

Study of Pedestrian's fatal accidents (vs. motor vehicles at low speed) in Japan

109th GRSG

MLIT, Japan

Roadmap toward adoption of R46



Pedestrian's fatal accidents (vs. motor vehicles at low speed)

Data (provided by Institute for Traffic Accident Research and Data Analysis)

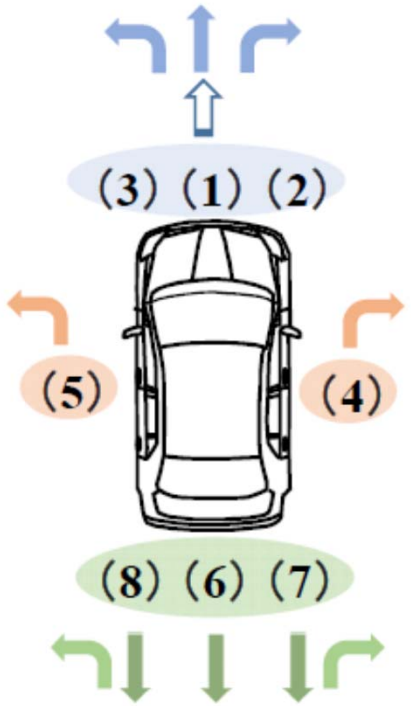
- Country: Japan
- Type of accident: Pedestrian's fatal accidents (vs. motor vehicles)
- Period: 2010 – 2014 (5 years)
- Time: Daytime
- Vehicle type:
  1) Large vehicles designed for carriage of goods ≒ N3 and N2 (GVW>7.5)
  2) Small vehicles designed for carriage of goods ≒ N2 (GVW≤7.5) and N1
  3) Sedan (passenger vehicles of which capacity is 4-5 people other than SUVs and mini-vans.)
- Vehicle speed: less than or equal to 10 km/h

Institute for Traffic Accident Research and Data Analysis
http://www.itarda.or.jp/english/

Points of analysis

1) Direction/Surface of collision
2) Behavior of the vehicle

	Surface of collision	Behavior of the vehicle
Front of the vehicle	1）front	1) Start 2) forward 3) turn right 4)turn left
	2）right-front (driver's side)	1) Start 2) forward 3) turn right 4)turn left
	3）left-front (the other side of the driver)	1) Start 2) forward 3) turn right 4)turn left
Side of the vehicle	4）right-side (driver's side)	turn right
	5）left-side (the other side of the driver)	turn left
Rear of the vehicle	6）rear	Back
	7）rear-right (driver's side)	1) turn right 2) back
	8）rear-left (the other side of the driver)	1) turn left 2) back



Pedestrians killed by the vehicles at low speed

Collision between pedestrians and vehicles at low speed

Could the driver be aware of the pedestrian?

One of the promising measures is improving the driver's view

The number and rates of Pedestrian's accidents killed by vehicles at low speed

Type of vehicles	The number of pedestrians killed by the vehicles (≤ 10km/h) (A) / Total number of pedestrians killed by the vehicles (B)	Rates (A/B)
1) Large vehicles designed for carriage of goods (≒N3 and N2 (GVW>7.5))	**78** / 243	**32.1%**
2) Small vehicles designed for carriage of goods (≒N2 (GVW≤7.5) and N1)	**92** / 640	**14.4%**
3) Sedan (passenger vehicles of which capacity is 4-5 people)	**64** / 485	**13.2%**

Number and rates of pedestrians killed by vehicles

Vehicle type:

1) Large vehicles designed for carriage of goods ≒ N3 and N2 (GVW>7.5)

2) Small vehicles designed for carriage of goods ≒ N2 (GVW≤7.5) and N1

3) Sedan (passenger vehicles of which capacity is 4-5 people other than SUVs and mini-vans.)

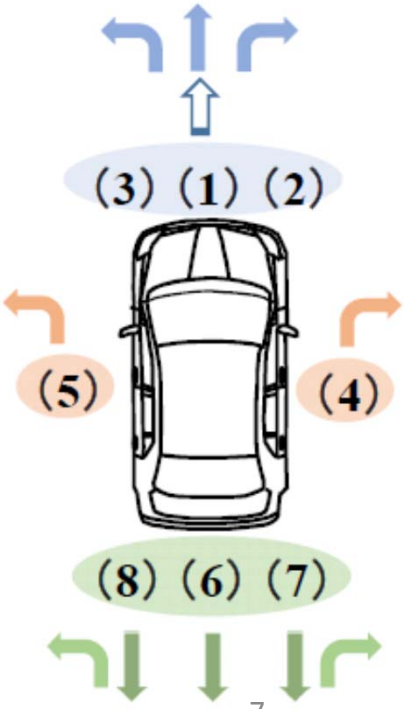
Speed of the vehicles: <u>All</u>

Number (1)-(8) : surface of collision

Surface of collision	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
N (>7.5)	105	54	60	7	7	2	5	3
N (≤7.5)	351	116	134	4	2	24	5	4
Sedan	274	82	101	3	2	15	2	6

Rates (%) (1)-(8) : surface of collision

Surface of collision	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
N (>7.5)	43	22	25	3	3	1	2	1
N (≤7.5)	55	18	21	1	0	4	1	1
Sedan	56	17	21	1	0	3	0	1



Number and rates of pedestrians killed by vehicles

Vehicle type:

1) Large vehicles designed for carriage of goods ≒ N3 and N2 (GVW>7.5)

2) Small vehicles designed for carriage of goods ≒ N2 (GVW≤7.5) and N1

3) Sedan (passenger vehicles of which capacity is 4-5 people other than SUVs and mini-vans.)

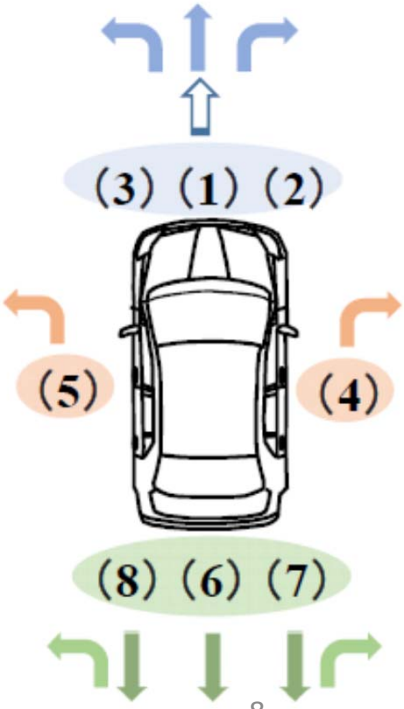
Speed of the vehicles: less than or equal to 10km/h

Number (1)-(8) : surface of collision

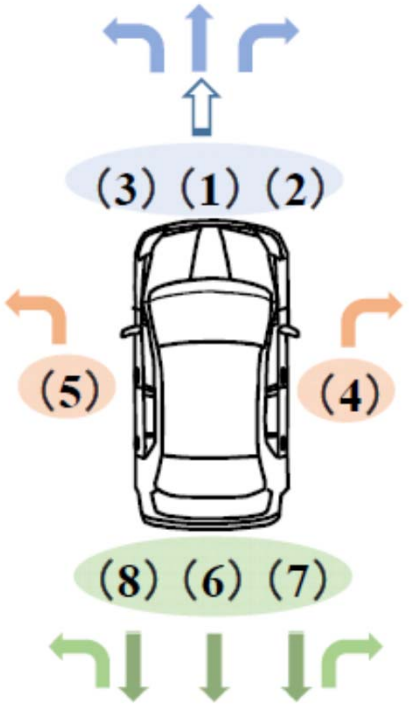
Surface of collision	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
N (>7.5)	26	14	22	3	6	2	4	1
N (≤7.5)	27	17	15	3	1	21	4	4
Sedan	17	15	8	2	0	14	2	6

Rates (%) (1)-(8) : surface of collision

Surface of collision	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
N (>7.5)	33	18	28	4	8	3	5	1
N (≤7.5)	29	18	16	3	1	23	4	4
Sedan	27	23	13	3	0	22	3	9



Data of collision of surface

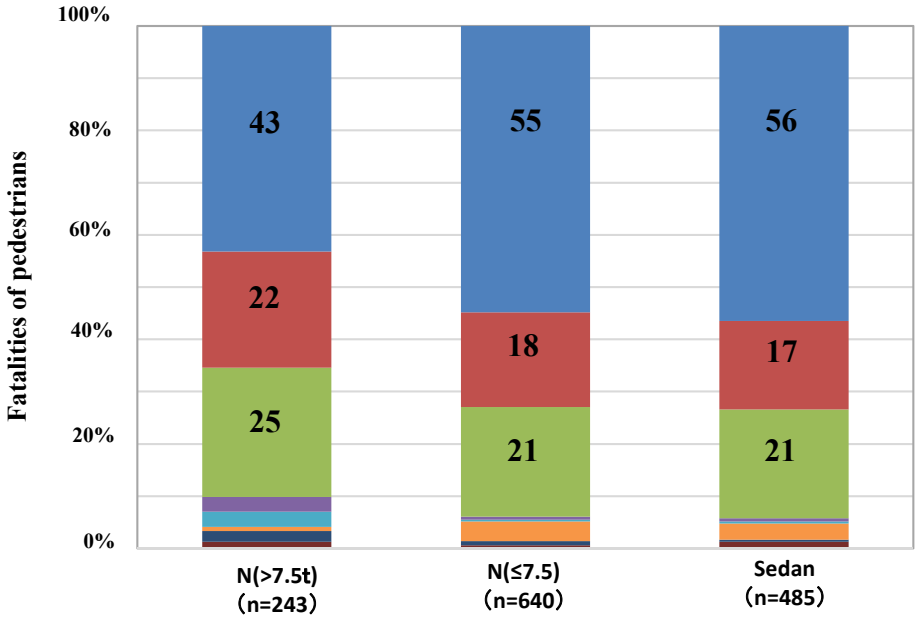


N (≤7.5) and Sedan:

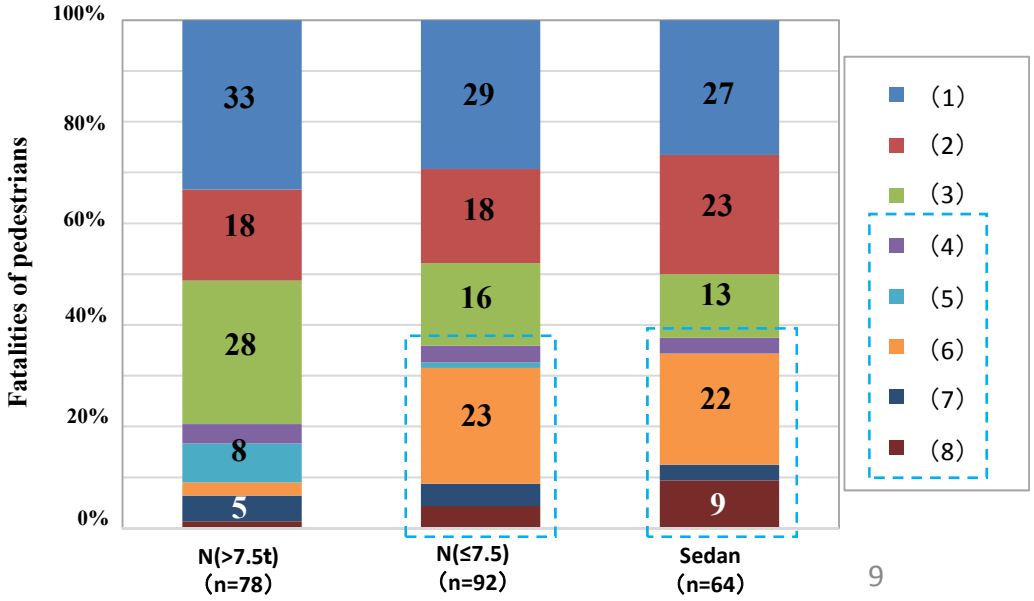
Collision rate at side and rear is high

(Comparison with total data)

Total



10km/h≤



Behavior of the vehicle killed pedestrians at low speed

Speed of the vehicles: less than or equal to 10km/h

Number

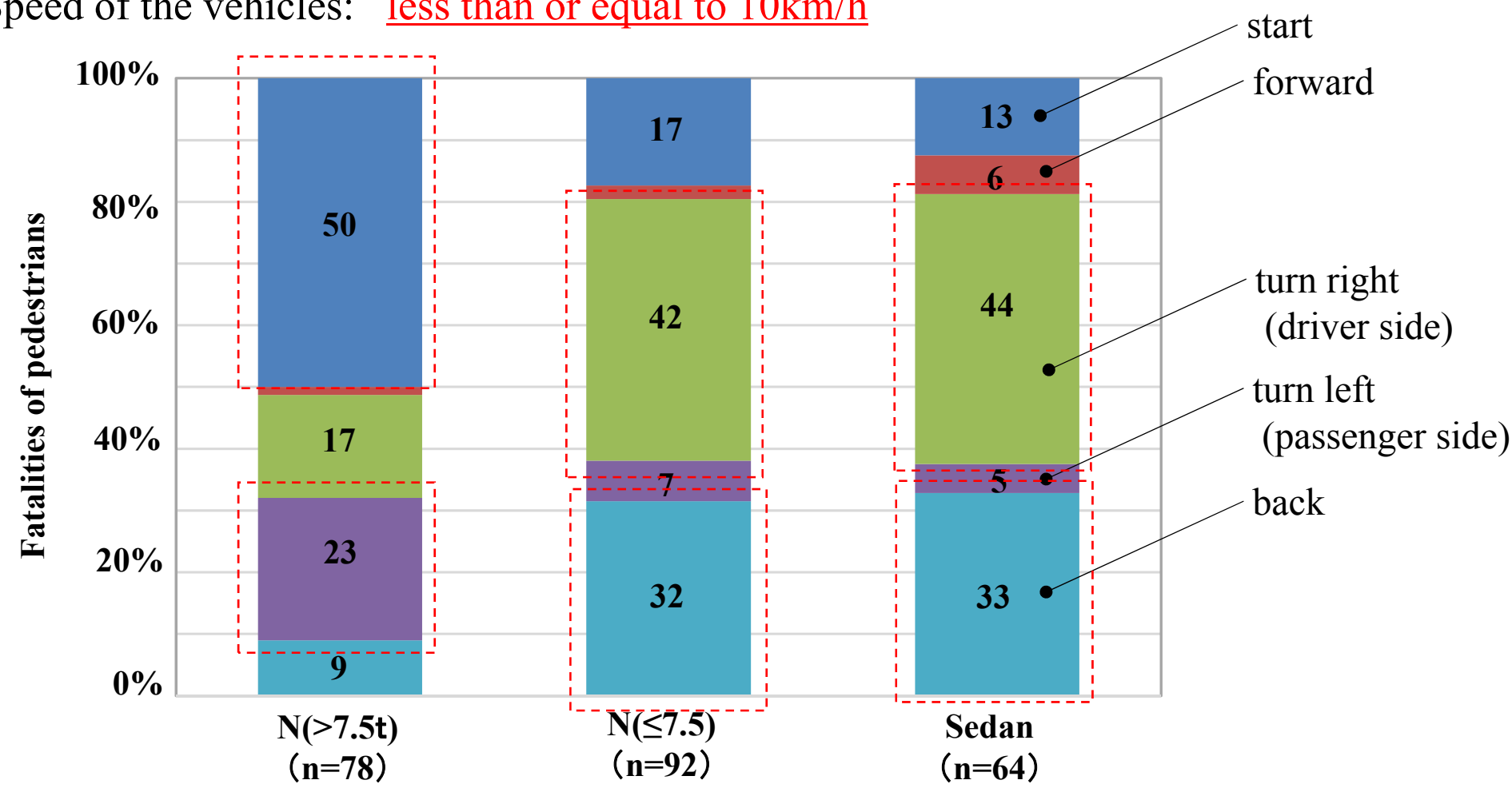
Behavior	Start	forward	turn right	turn left	Back
N (>7.5)	39	1	13	18	7
N (≤7.5)	16	2	39	6	29
Sedan	8	4	28	3	21

Rates (%)

Behavior	Start	forward	turn right	turn left	Back
N (>7.5)	50	1	17	23	9
N (≤7.5)	17	2	42	7	32
Sedan	13	6	44	5	33

Behavior of the vehicle killed pedestrians at low speed

Speed of the vehicles: less than or equal to 10km/h



N (>7.5) : Collision rate during start and turning left is high

N (≤7.5) and Sedan: Collision rate during turning right and back is high

Summary

●Fatal accidents of pedestrians killed by the vehicles at low speed

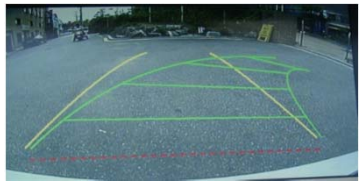
•The rate of fatal accidents of pedestrians killed by the vehicles at low speed is NOT low.

•One of the promising measures is improving the driver's view

●Surface of collision (pedestrian vs. vehicles at low speed)

•Rate of side and rear collision is high (especially small N and Sedan)

* The possible reason why the number/rate of rear collisions of large N is not high in Japan is that voluntary fitting of camera monitoring systems (rear view monitor) are popular for these vehicles.

In Japan, about 70% of large N is fitted rear view   monitoring systems

●Behaviors of vehicles killed pedestrians at low speed

・large N: Rate of "Start" and "Turning left" (the other side of the driver) is high

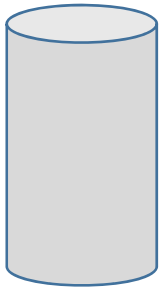
⇒ Front and side vision (Class 5 and 6) is important

・Small N and Sedan: Rate of "Turning right" and "Back" is high

⇒ Turning right: Matter of direct vision (e.g. A pillar)

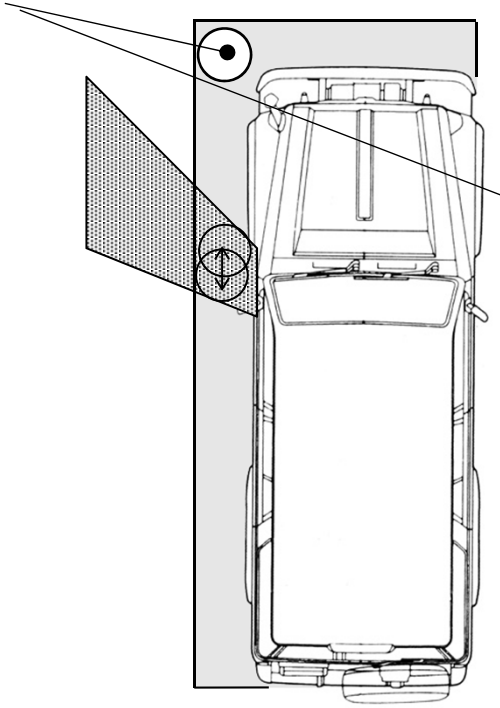
Back: Rear vision is also important.

Requirement for proximity vision area



Object
1m (ϕ0.3m)

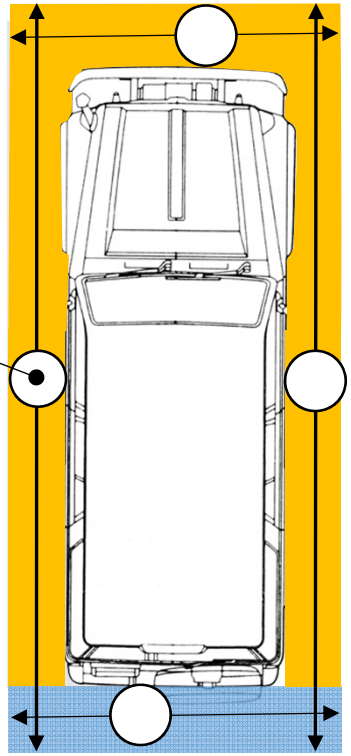
Japanese
Existing requirement



Scope: M and N (<8t)

The test object shall be seen directly or indirectly (mirrors or CMS) from the driver's seat

<u>Example of a possible solution</u>



Scope: [M and N (≤7.5t)]

The test object shall be seen directly or indirectly from the driver's seat.
<u>As alternative the object may be detected by devices such as sonar.</u>