

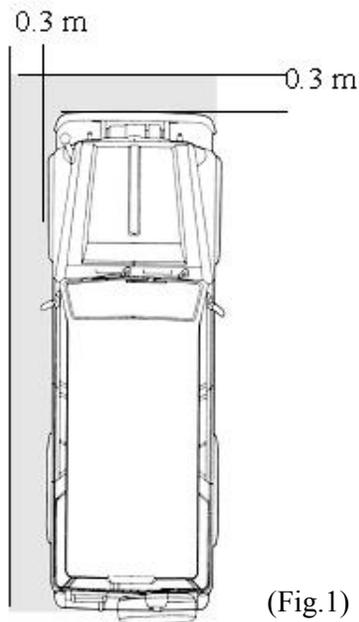
**Proposal for Step-2 revision of Regulation No. 46**  
(Rear view mirrors)

For many years, Japan has consistently conducted researches and studies on the driver's visibility for the purpose of ensuring road traffic safety, and has developed regulations based on the results of accident analyses as explained in InfGRSG-84-15. With many narrow streets and intersections, the road traffic in Japan is unique in that separation between pedestrians/cyclists and vehicles is not sufficient. For this reason, it is an important task to ensure visibility in the proximity of the vehicle and for turning at narrow intersections.

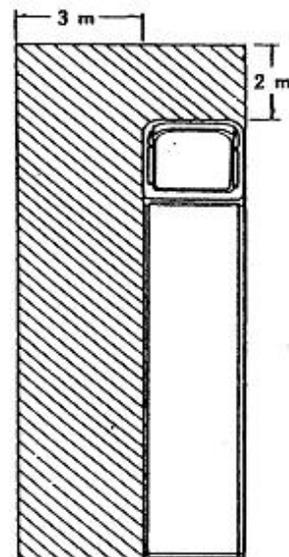
With regard to visibility in the proximity of the vehicle, we set forth necessary requirements, as described in InfGRSG-83-15, so that the visibility can be ensured by using an auxiliary mirror or camera. As for ensuring visibility for turning at intersections, since it is particularly important for large vehicles, we specified the range of side visibility for large vehicles by considering balance between direct and indirect visibility. (Our concerns for applying GRSG/2002/10 to the Japanese regulation are as described in InfGRSG-83-18.)

Accordingly, the following changes need to be made in order for Japan to adopt R46:

- (1) Visibility in the proximity of the vehicle (See Fig.1)
  - For vehicles of Category N2 not exceeding 7.5 tonnes and of Categories M1, M2, and N1, a pole, 30 cm in diameter and 1 m in height, which is placed in front of the vehicle or in the close proximity of the side of the front passenger's seat shall be partially visible through a mirror (including the surveillance mirror) or directly or by camera.
  - However, blind spots caused by A-pillars and other vehicle structures shall be excluded. (See InfGRSG-83-15.)
  - The surveillance mirror may be installed at a height of 2 m or less above the ground only if the impact test requirements are met.
  - In addition to the dynamic impact test required in the current regulation, the static impact test will be newly added, and one of the two tests may be chosen to satisfy its requirements.



(Fig.1)



(Fig.2)

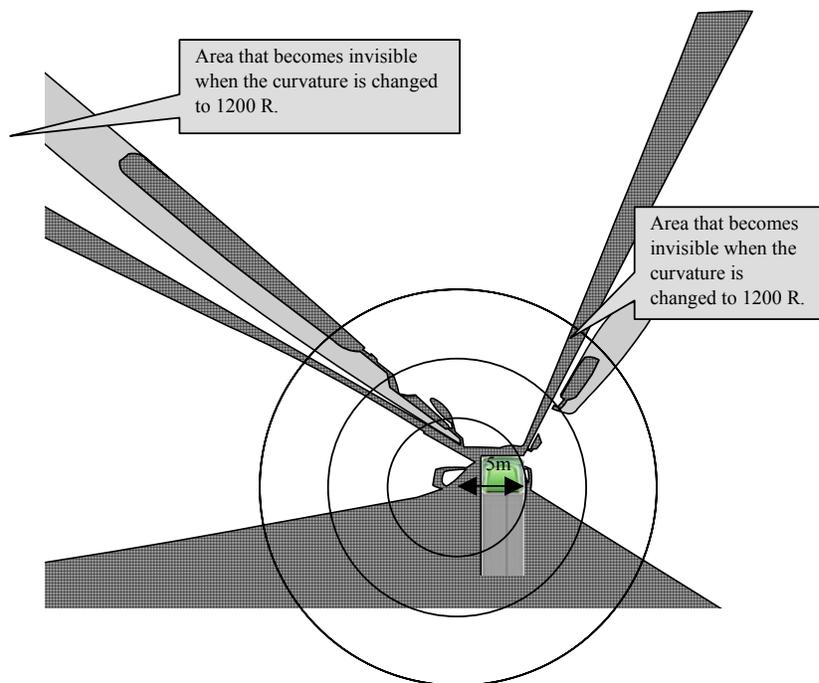
- (2) Visibility for turning vehicles (adequate balance between direct and indirect visibility)  
(See Fig.2)
- The curvature of Class II and III mirrors shall be 600 R or more.
  - Class IV mirror shall be optional for N2 vehicles.
  - For N2 vehicles exceeding 7.5 tonnes and N3 vehicles, the 1m-pole placed in an area with a range covering 2 m from the front of the vehicle and 3 m from the side of the front passenger's seat shall be visible through a mirror (including the surveillance mirror) or directly or by camera.
  - If the above requirement is met, Class V and IV mirrors shall be optional.

Reference Material 1

**Study on Obstruction of Direct Visibility Using Different Curvatures for Class II and III Mirrors**

The degree of obstruction of direct visibility was compared between two mirrors, one with a curvature of 1,200 R and the other with 600 R, both having the same field of view.

Under this study of direct visibility, the invisible area was defined as a place where the blind spot on the ground and that on a horizontal plane at 1 m above the ground overlap. The figure below shows the blind spots getting wider when the mirror with 600 R is replaced with the one with 1,200 R. These areas play an important role when the vehicle turns on a narrow street, which means that an increase in the mirror curvature is associated with lowering of direct visibility.



Comparison of Blind Spots between Mirrors with 1,200 R and 600 R

## Measure Against Left-Turn Accidents of Large Vehicles and Its Effects

### 1. Measure Against Left-Turn Accidents of Large Vehicles

In March 1979, the then Ministry of Transport revised the Safety Regulations to address an issue of preventing left-turn accidents which occurred frequently. For large vehicles, the amended regulation required a 1m-pole placed in an area with a range covering 2 m from the front of the vehicle and 3 m from the side of the front passenger's seat to be visible through a mirror (including the surveillance mirror) or directly.

This requirement was made mandatory for both new and in-use vehicles by 31 October 1980. Accordingly, large vehicles manufactured in 1981 and thereafter all have the structure that conforms to the revised regulation described above.

### 2. Number of Fatal Left-Turn Accidents of Large Vehicles

The number of fatal left-turn accidents of large vehicles in 1978 was 208 (of which 198 accidents were caused by large trucks).

The percentage of the other party being killed was broken down to (1) 65% cyclists, (2) 20% moped riders (3) 10% pedestrians, (4) 3% motorcycle riders, and (5) 1% four-wheel vehicle drivers.

### 3. Changes in the Number of Fatal Accidents by Accident Type

#### (1) Changes in the number of fatal left-turn accidents

The number of fatal accidents that occur while the vehicle is turning left (Note: the number includes vehicles other than large vehicles and excludes accidents in which the other party is a pedestrian) is shown below (Figure 1).

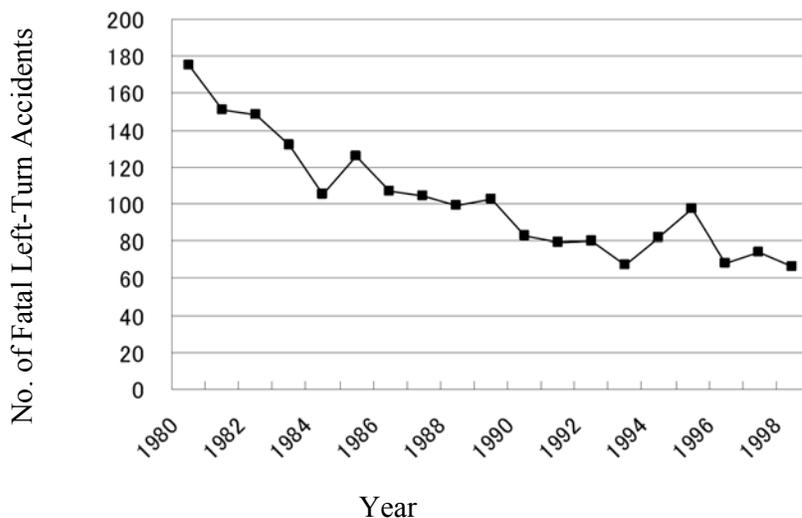


Figure 1 Changes in the Number of Fatal Left-Turn Accidents

Whereas the number of fatal left-turn accidents was 175 in 1980, it declined in 1981 and kept decreasing thereafter. The number was recorded at 66 accidents 18 years later (1998).

(2) Changes in the number of fatal accidents by accident type (1980 as base year)

Changes in the number of fatal accidents where two vehicles crash into each other are shown by accident type below (Figure 2). Here, the changes are demonstrated by using the number of fatal accidents by accident type in 1980 as the base.

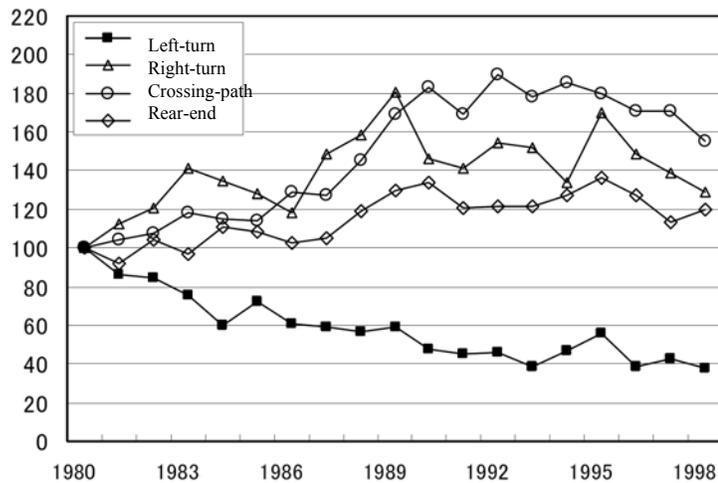


Figure 2 Changes in the Number of Fatal Accidents by Accident Type (1980 as Base Year)

For fatal accidents other than left-turn (right-turn, crossing-path, rear-end), the percentage increased at 120-160% in 1998 compared to the base year 1980 (100%). In contrast, the percentage of the fatal left-turn accident declined each year to 38% in 1998. The number of fatal left-turn accidents is decreasing while that of the other types of accidents keeps growing, and there are a number of factors for this, such as, new or added vehicle devices (addition of auxiliary direction indicator lamps, improvement of side guards, etc.), safety education to drivers and other road users, and better intersections. Still, the largest factor is the above-described measure for ensuring visibility, and it is thus essential to maintain the level of visibility in the proximity of the vehicle as high as required under the current regulation.

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