| 講演番号 | 119 |
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# Effect of the See-Through A-pillar using Mirror on Pedestrian Detection Time during Right Turn at Intersection

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**KEY WORDS**: **Ergonomics, A-pillar, Turn Right Situation,**

Blind spots caused by the A-pillar are recognized as one of the contributing factors to right-turn accidents at intersections. To address this issue, several companies have developed see-through A-pillars that help visualize these blind spots. MIRISE Technologies has proposed an A-pillar transparency system using a mirror method (hereafter referred to as “Mirror Method”) (Fig. 1), which employs a stripe mirror instead of a half mirror. The stripe mirror consists of alternating transparent and reflective strips, and the brightness can be adjusted by changing the ratio of transparent to reflective areas. This design reduces brightness irregularities. Installing the Mirror Method, which combines a stripe mirror and a conventional mirror on the A-pillar, is expected to make the blind spot visible and shorten pedestrian detection time during right turns at intersections. However, whether detection time is actually reduced has not been clarified. In this study, we used a driving simulator to reproduce right-turn situations at intersections and verified whether installing the Mirror Method on the A-pillar shortens pedestrian detection time.

The experiment was conducted using an immersive driving simulator at Nagoya University. The experimental scenario involved a pedestrian hidden in the A-pillar blind spot during a right turn at an intersection. The intersection was a single-lane road on each side with a width of approximately 3.0 m, where the edge of the crosswalk becomes hidden by the A-pillar during a right turn. Reaction times were calculated for all participants under two conditions: None (without Mirror Method) and Mirror Method (with Mirror Method installed). The significance of the difference between the two conditions was tested. Participants included 15 drivers who drive at least once a week: 11 non-elderly individuals aged 10s–40s and 4 elderly individuals aged 65 or older.

The boxplot of reaction times is shown in Fig. 2. The average reaction time was 1.8 seconds under the None condition and 1.2 seconds under the Mirror Method condition. A Wilcoxon signed-rank test ($\alpha = 0.05$) was conducted with $n = 15$, resulting in $T = 5$, $Z = 3.10$, and $p = 0.002$, indicating a statistically significant difference. This shows that applying the Mirror Method shortened pedestrian detection time by an average of 0.6 seconds. Additional tests were conducted by dividing participants into non-elderly and elderly groups, but similar results were obtained. Therefore, it can be inferred that the effect of the stripe mirror on reaction time does not vary by age group. These results suggest that see-through A-pillars have the potential to reduce traffic accidents by improving driver visibility.

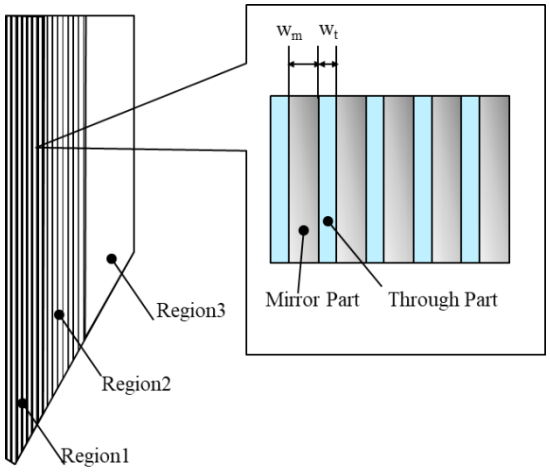


Fig.1 Stripe Mirror

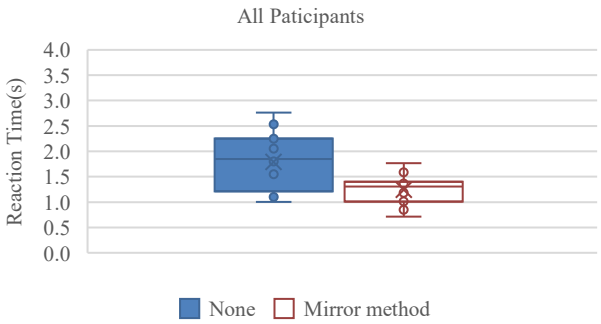


Fig.2 Reaction time of all participants