

A STUDY ON RIDERS' BEHAVIOR AND SAFETY PERCEPTION OF BICYCLE WITH A CHILD SEATING DEVICE

Mio Suzuki*

*Department of Civil Engineering
Tokai University
4-1-1 Kitakaname, 2591292, Hiratsuka, Japan
email: mio.suzuki@tsc.u-tokai.ac.jp

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1 BACKGROUND AND OBJECTIVES

The number of bicycles with infants is rapidly increasing due to the revision of the Road Traffic Law in 2009 and the spread of electrically power assisted bicycles in recent years. The users of electrically power assisted bicycles are mainly the elderly and the child-rearing generation, and bicycles that allow children to ride along are particularly effective tools for improving the efficiency and health of the child-rearing generation. However, the reckless riding of bicycles by parents is often overlooked because they have no other means of transportation. Therefore, we conducted a questionnaire survey of parents who transport their children to and from nursery schools by bicycle to understand the actual situation of bicycle use and the state of awareness of the rules.

2 REVIEW OF PRVIOUS STUDIES

There have been several studies on bicycles for infants and toddlers, focusing on their functions as a means of transportation, such as clarifying the acceptability of users to a new riding space and the effects on outing behavior during child rearing. The vibration characteristics of bicycles for two infants have also been studied in pursuit of structural functions.

However, there is no research that focuses on the details of falls that are considered to be a problem when using bicycles for infants, the state of awareness of the rules, and the relationship between the structure of bicycles and dangerous events, including bicycles with two infants, which were officially approved by the revision of the Road Traffic Law in 2009. In this study, we conducted a survey on the actual conditions of bicycle use and users' awareness of safety (awareness of rules and interest), focusing on the type of bicycle and seat position of bicycles for infants.

3 METHODOLOGIES

The survey was conducted in Setagaya Ward, Tokyo, which had the highest number of children on waiting lists in the 2017 survey. The reason for this is that in areas with a large number of children on waiting lists, infants are placed in day-care centers that have vacancies regardless of the area in which they live. We distributed questionnaires to parents who use bicycles among the users of day-care centers in each area (especially those that accept many infants aged 3-5). The survey period was from November to December 2018, and the number of valid responses to the questionnaire was 152.

4 RESULTS

The survey was conducted in Setagaya Ward, Tokyo, which had the highest number of children on waiting lists in the 2017 survey. The reason for this is that in areas with a large number of children on waiting lists, infants are placed in day-care centers that have vacancies regardless of the area in which they live. We distributed questionnaires to parents who use bicycles among the users of day-care centers in each area (especially those that accept many infants aged 3-5). The survey period was from November to December 2018, and the number of valid responses to the questionnaire was 152.

4.1 Types of Bicycles

The respondents were asked about their views on bicycle use, i.e., means of transportation in rainy weather and location of bicycle traffic. As for the means of transportation in rainy weather, an overwhelming number of 119 parents answered that they would use bicycles even in rainy weather. As for the position of bicyclists, the average percentage of parents who use the roadway on roads with sidewalks while carrying their children on their bicycles was about 45.1%, while the average percentage of parents who use the roadway when not carrying their children was about 53.6%.

4.2 Falling

When asked about their experiences of falling while using bicycles with infants, 90 (about 59%) of the respondents had fallen. Only 7 parents (about 5%) had experienced an accident, but 61 parents (about 40%) had experienced a near-miss, indicating that many parents had experienced dangerous events. Figure 1 shows the breakdown of the locations of the falls, and about half of them were on the road, indicating that there is a risk of serious accidents. In addition, about 40% of the parents did not respond to the questionnaire, suggesting that they have little impression of falls and do not take them seriously.

Figure-2 shows the number of fall experiences by the position of the infant seat. Bicycles with infant seats installed only in the front were excluded from the analysis because they were very few, but when comparing bicycles with infant seats installed only in the back and bicycles with infant seats installed in both the front and back, it was found that bicycles with infant seats installed in both the front and back had more fall experiences ($\chi^2=4.20$, $df=1$, $p=0.04 < 0.05$).

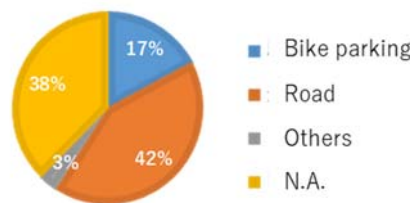


Figure 1: Places where the respondents felt on their bicycles (n=90)

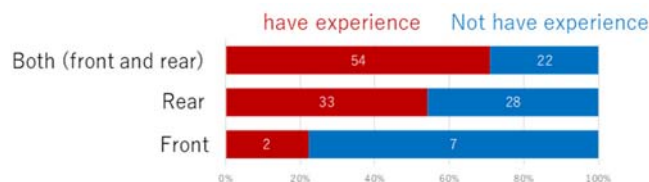


Figure 2: Relationship between experiments of falling on bicycles and positions of seats for children (n=152)

4.3 Safety Perceptions

When the respondents were asked about the rules for riding a bicycle, the percentage of correct answers was as follows.

- In principle, you should ride on the road even if you are carrying a child: 127 respondents, 69% of correct answers
- Only infants under 6 years old can ride in a car: 126 respondents, 56% of correct answers)
- Slow down on the sidewalk: 128 respondents, 91% of correct answers
- Keep to the side of the road when on the sidewalk: 124 respondents, 28% of correct answers
- Drive on the left side of the road, even in the roadside zone: 127 respondents, 90% of correct answers
- Two-step right turn: 124 respondents, 73% of correct answers
- It is not prohibited to go beyond the arrow-shaped lanes (Figure.4 (d)): 125 respondents, 17% of correct answers

- It is not prohibited to go out of the pictogram (Figure.3 (c)): 122 respondents, 56% of correct answers)

It was found that most of the respondents thought that passing on the sidewalk was acceptable when carrying a child, but the percentage of correct answers was also low for the regulations on the number of children who can ride with the driver and the position of the driver on the sidewalk. However, the percentage of correct answers was also low for the regulations on the children who can ride with the driver and the position of the driver on the sidewalk. In addition, there was a tendency to drive on the roadway so as not to go over the arrow feathers, and it was found that it may be difficult for car drivers to predict when overtaking parked cars or when the driver loses balance. These results suggest that safety education for parents is necessary.



Figure 3: Typical dedicated bicycle traffic lanes in Tokyo

5 CONCLUSIONS

This paper reports some of the results of a survey on the use of bicycles for infants and young children, which play a major role in considering the use of bicycles by a wide range of people, and on the users' awareness of safety.

The results showed that more than half of the infant bicyclists had fallen over, as has already been reported, and that many of them had fallen over on the road, which could lead to a serious accident if they made a mistake. The fact that many of the respondents did not answer the question about the location of the fall suggests that they may not remember the fall very well and may not be aware of the danger. In addition, it was found that most of the falls occurred on bicycles with both front and rear seats, which may be due to the weight and difficulty of balancing.

6 REFERENCES

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