Analysis of the Effects of the Measures for Technical Note of Traffic Safety Measures and Planning

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1. Introduction

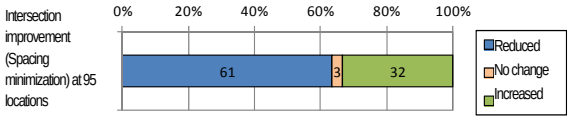
Ministry of Land, Infrastructure, Transport and Tourism, joined with National Police Agency, designated as "accident black spots" of those intersections and basic road sections which has the high rate and/or are of frequent occurrence of fatal and injury accident, and Prefectural Public Safety Commission and the responsible road administration offices implement cooperated measures. This project lowers fatal and injury accidents overall at the locations which were completed the measures, however, investigated by each location, it found points to be improved that the measure effects vary and there increased other types of accidents which were not targeted to reduce by the implementation of the measures, etc. Therefore, the researchers analyzed the effects of traffic safety measures that were implemented up to the present and they clarified consideration points such as the effects of each construction measure type and its factors that cause a dispersion, and effects on traffic behaviors, in order to write technical notes that will contribute planning and implementation of the more effective safety measures.

2. Analysis of the effects of traffic safety measures

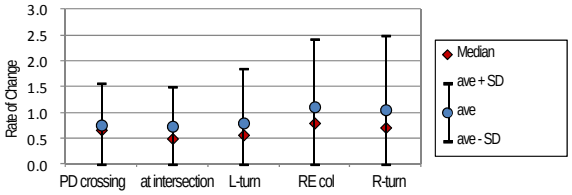
An analysis was conducted of the effects by construction measure type on 106 construction measure types that were implemented at 10 locations for the implemented traffic safety measures on accident black spots. The rate of change in the number of fatal and injury accidents before and after measure implementation (= the average number of the accidents after measure implementation / (divided by) the average number of the accidents before measure implementation) showed the result that there were 89 construction measure types with the rate of change as 1.0 or lower and the number of accidents were reduced by the implementation of the measures in general.

Then, the authors focused on the dispersion of the effects by each construction measure type. The following indicates a couple of examples of the analysis results of the spacing minimization measures of intersection improvements. The purposes of spacing minimization are: (1) the speed control of left-turn vehicles by "smaller minimum corner radius" (2) an improvement of visibility for pedestrians through turning traffics by "reallocation of a pedestrian crossing closer to the intersection", (3) the reduction of dilemma zone followed by shorter stop line distance by "forwarding the stop line marking".

Among 96 locations where implemented spacing minimization, the rate of change of the number of total fatal and injury accidents before and after measure implementation resulted that the number of accidents was reduced at 61 locations (64%) and was increased at 32 locations (33%)(Graph 1). Next, it was focused on the rate of change of the number of fatal and injury accidents by accident type, among the accidents at pedestrian crossing, at an intersection corner, and on right-turn traffic which was targeted to reduce by spacing minimization, both the median and the average of the rate of change



Graph 1 The change of the number of total fatal and injury accidents after measure implementation (spacing minimization)



* The rate of change = the average number of the accidents after measure implementation / the average number of the accidents before measure implementation

Graph 2 The rate of change of fatal and injury accidents by accident type (spacing minimization)

were less than 1.0 and that there were many locations that were reduced the number of accidents (Graph 2). On the other hand, the median of the rate of change was less than 1.0 on rear-end collisions and at right turn and the number of accidents were reduced at half or more locations, however, the average was larger than 1.0 and there were locations that increased the number of accidents.

To recognize the factors of increased accidents, the researchers investigated the effects on traffic behaviors by implementation of the measures. It was found that there was following vehicle's sudden breaking after rapid deceleration of the left-turn vehicle at locations that implemented "smaller minimum corner radius". It may be considered effective to implement a speed control measure for left-turn vehicles before the intersection and/or other measures as multiple measures for the applicable locations.

3. Summary and the points to improve

From the above results, it was confirmed that it was shown effective for the accident types that were targeted to reduce by the implementations of the measures while it is possible to increase the number of accidents among other accident types depending on the location. In order to implement traffic safety measure more effectively, it is important to select the construction measure type with thorough estimation of traffic condition changes after measure, and it is necessary to make investigations suitable for the site location such as implementing multiple measures based on the necessity.

In the future, it will be further summarized the results of the analysis of the effects on traffic safety measures, consideration points at measure implementation, etc. by accident type and by construction measure type, and is planned to write technical notes which will support planning and implementation of the more effective traffic safety measures.