

Research Trends and Results

Examination of running quality of vehicles due to differences in apron structure of roundabout

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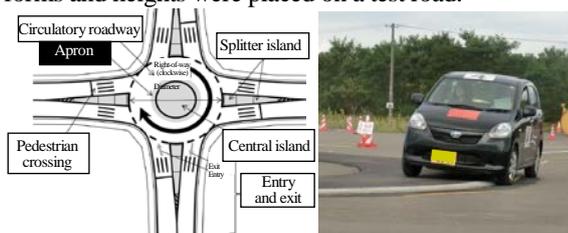
(Key words) roundabout, apron, driving experiment, passenger vehicle, large vehicle

1. Introduction

In August 2014, the document “Desirable roundabout structures”¹⁾ was issued by the Road Bureau, Ministry of Land, Infrastructure, Transport and Tourism, and the basic concept for the installation of a roundabout, which is a type of circular road crossing, was shown.

The apron (see figure), which is placed between the circulatory roadway and the central island, is a structure peculiar to a roundabout. A large vehicle is allowed to drive over this apron because it is difficult to drive only on the circulatory roadway, but it is not desirable for a passenger vehicle to drive over it because it may cause high vehicle’s speed. Thus, it is desirable to find an appropriate structure for an apron that fulfills this function.

At the NILIM, we examine and study roundabouts, and in this article, we provide an overview of a driving experiment (photo) where aprons with various structural forms and heights were placed on a test road.



(Left) Figure Standard drawing of roundabout

(Right) Photo Snapshot of driving experiment

2. Overview of driving experiment

The participants drove passenger vehicles and large vehicles on an apron placed on a test road, and we obtained data about vehicle behavior (velocity, shock, etc.). We also conducted a questionnaire survey that asked the participants about the drivability, safety, and so on. We studied six cases of aprons, as listed in the table.

3. Results of experiment

An evaluation of the tolerance (whether or not a participant wanted to drive on the apron), as reported in the questionnaire, showed that the tolerance was particularly bad when the height of an apron was 5 cm or

6 cm, and the tolerance difference between the heights of 4 cm and 5 cm was larger than the other differences. In addition, the shock became larger when the apron became higher, for both passenger vehicles and large vehicles. Therefore, we can say that making the height of an apron 5 cm or higher was effective at discouraging passenger vehicles from driving over an apron. On the other hand, considering the drivability of large vehicles, an apron with a taper ranging from 2–5 cm could be used.

 【Height 2 cm】	 【Height 4 cm】	 【Rubber Height 4 cm】
 【Height 5 cm】	 【Height 6 cm】	 【With a taper of 2 to 5 cm】

* The values in the plots in the table are shown in millimeter units.

Table Cases of aprons

4. Summary

We expect that the knowledge obtained in this study will be used by road administrators who are considering the installation of an apron with a step structure. In the future, we would like to examine an appropriate structure for an apron, considering the results of investigations about vehicle behavior before and after the installation of an apron with a step structure on actual roads.

☞ Detailed information:

1) Website of Ministry of Land, Infrastructure, Transport and Tourism:

<http://www.mlit.go.jp/road/sign/kijyun/pdf/20140901tuuti.pdf> (in Japanese)