

# Research Trends and Results

## Reliability index on traveling time in road transportation

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### 1. Preface

Recently, large number of data can be available by development of information technology and understanding of travelling time for running vehicle in given zone is also becoming possible.

Road Laboratory Room is conducting concerning calculating method of travelling time reliability index by using this probe data.

### 2. What is travelling time reliability index?

Travelling time reliability is intending to indicate reliability of the travelling time of variability to the same zone. 「90% tile traveling time」 is frequently used as traveling time reliability index.

This travelling index 「90% tile traveling time」 indicates that 90% of days (9 days out of 10 days) can be traveled within 55 minutes and remaining 10% (1 day out of 10 days) is required more than 55 minutes when 90% tile traveling time is 55 minutes and reliability in the same time zone is targeted for example as shown in Figure 1..

### 3. Relation analysis between data missing state and calculation accuracy

To execute accurate analysis, correct data acquisition is required. Not always proof data can be adequately available during analysis targeted time zone. It is assumed that required accuracy for travel time reliability index could not be secured when data missing are many. So analysis is executed targeting at relation between data missing state and accuracy of traveling time reliability index. As an analysis example of targeted 30km zone that data acquisition at 7 in the morning was made for 60 days was analyzed and introduced in this report. Following are procedure of analysis.

- (1) Medium value and 90% tile value during traveling time are calculated based on acquired all the data. (These values are assumed as true values.)
- (2) For all the calculated values in procedure (1) are assumed acquired data temporary setting missing zone and acquired date.
- (3) Calculate medium value and 90% tile value using obtained data in procedure (2) and assess if the data satisfy the criteria shown in Figure2.

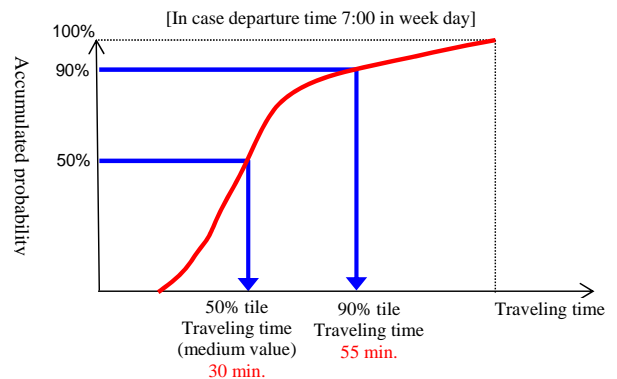


Figure 1. Distribution of traveling time and 90% tile traveling time

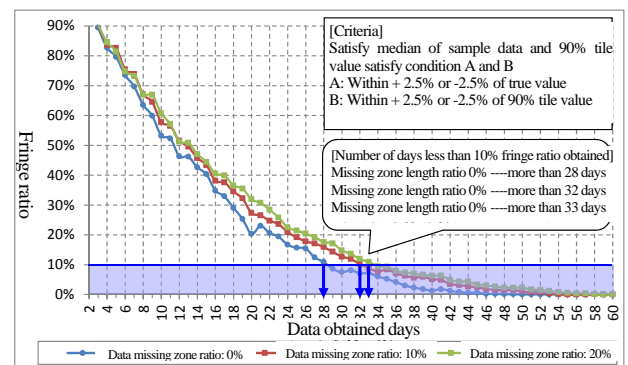


Figure 2. Relationship between the situation of missing data and calculation accuracy

- (4) Every data missing zone length ratio (0%, 10%, and 20%) and data acquired days (from 2 days to 60 days) repeat procedure (2) 1,000 times in random manner then calculate fringe ratio (ratio that the value is not satisfied the criteria in process (3)).

Analyzed result is shown in Figure 2. Naturally the more missing ratio is improved the more accuracy is improved. Figure 2 indicates that more than 33 data acquired days out of 60 days are required to obtain 10% fringe ratio when data missing zone length ratio is 20%. By using this method accuracy can be presented from index value obtained from acquired data.

In future we are going to summarize calculation method of travel time reliability index as manual including knowledge obtained from this study adding further analysis.