Feature Article

Calculation and Sharing of Route Travel Time Using ETC2.0 Probe Information in the Area Affected by the 2024 Noto Peninsula Earthquake

Road Traffic Department

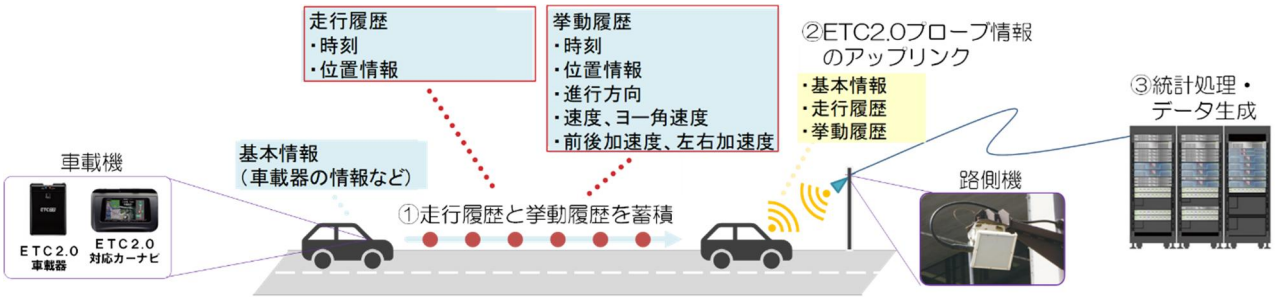
Presentation of our research

The Road Traffic Department conducts research and development of systems for grasping the road traffic status from ETC2.0 probe information (see below). After the occurrence of the 2024 Noto Peninsula Earthquake, we have made efforts to calculation and share the route travel time between major bases by using the above systems, with a view to having such time utilized as a rule of thumb for the travel time in the affected area, and others.

At ordinary times, the Regional Development Bureaus also carry out analysis of the road traffic status, using the "Final Processed Data (data available for use 30 days later)" of ETC2.0 probe information. Since the Earthquake was especially a large-scale disaster, the NILIM set up a system for performing operations from obtaining data to the calculation of the route travel time in the shortest possible time, thereby enabling travel time information to be provided in a more timely manner as a quick report. In addition, the system has also features such that the "Data Obtained by Stream Processing (available for use 1 - 3 hours later)" has been used for the calculation of the route travel time for the first time in this study, which was used for the grasping of "with or without a traffic record" until the present.

What is ETC2.0 probe information

The development of ITS (Intelligent Transport Systems: advanced road transport systems) is promoted proactively, which build integrated systems of humans, roads, and cars using the cutting edge information communications technologies, toward the mitigation of traffic congestion and the reduction of traffic accidents. The NILIM examined the "mechanisms for collecting vehicle location information (roadside units, onboard units, and the functions of communication between vehicles and roads, etc.," with a view to grasping the problems on road traffic and utilizing the mechanisms for the examination, evaluation, etc. of the measures, in the joint research with 27 entities such as onboard unit manufacturers, and prepared drafts of standards and specifications that should be prescribed in common (March 2006). As a result of this, the sale of onboard units started in 2009, and the installation of roadside units started in 2011, and the collection of the "location information of vehicles equipped with ETC2.0 onboard units (ETC2.0 probe information, see Fig.-1)" started in the same year, 2011. The rate of propagation of ETC2.0 onboard units at present is about 14% (cumulative number of cases of new setup as of March 2024: 11 million/number of vehicles equipped with the unit: 83 million).



① ETC2.0 onboard units accumulate the "travel histories, behavior histories, etc. (ETC2.0 probe information) of vehicles".

② "Roadside units for collecting information from ETC2.0 onboard units" are installed on the roads, and when a vehicle equipped with an ETC2.0 onboard unit passes through a roadside unit, ETC2.0 probe information is uplinked.

③ By performing statistical processing of the ETC2.0 probe information on multiple vehicles, data showing the average travel time in each time zone and in each section is generated. The route travel time is calculated by totaling this data, while considering the differences in travel time zones.

Fig.-1 Illustration of ETC2.0 probe information

Calculation and sharing of route travel time information

Following the route shown in Fig.-2, the calculation of the route travel time was made every day, in a cycle where a data file up to the noon was obtained at 12:30 and calculation was completed at around 13:30. The calculation results were posted on the website of the Ministry of Land, Infrastructure, Transport and Tourism: "2024 Noto Peninsula Earthquake Road Recovery Visualization Map" and on the NILIM Intranet as well for use by disaster responders within the Ministry. An example of the route travel time between Nanao City and Anamizu Town is shown below (Fig.-3, Fig.-4). By means of this, it has been made possible to provide the latest information around 15:00, that serves as a rule of thumb for the travel time on the "return route in the evening on the day (southbound)" and on the "outward route in the morning on the day (northbound)."

Fig.-2 Example of a route subject to the calculation of route travel time

北行き※（穴水町方面）	9時台	13時台	17時台
1月18日（木）	約2時間	約1時間10分	約1時間
1月19日（金）	約2時間10分	約1時間20分	約1時間10分
1月20日（土）	約1時間30分	約1時間	約1時間
1月21日（日）	約1時間	—	—
南行き（七尾市方面）	**9時台**	**13時台**	**17時台**
1月18日（木）	約40分	約40分	約1時間20分
1月19日（金）	約40分	約1時間	約1時間40分
1月20日（土）	約1時間	約50分	約1時間20分
1月21日（日）	約40分	—	—

Fig.-3 Illustration of a posting on the MLIT website

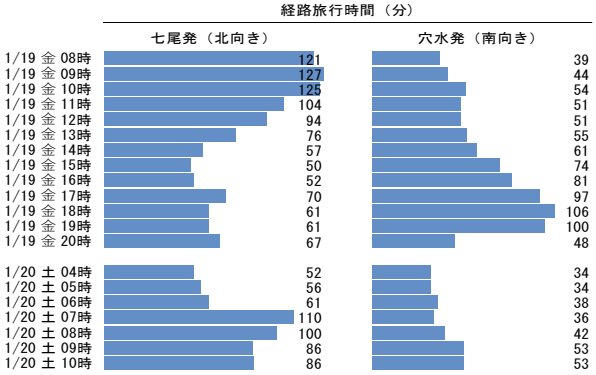


Fig.-4 Illustration of a posting on the NILIM Intranet

Fig.-5 Illustration of a posting of the route subject to the calculation of route travel time

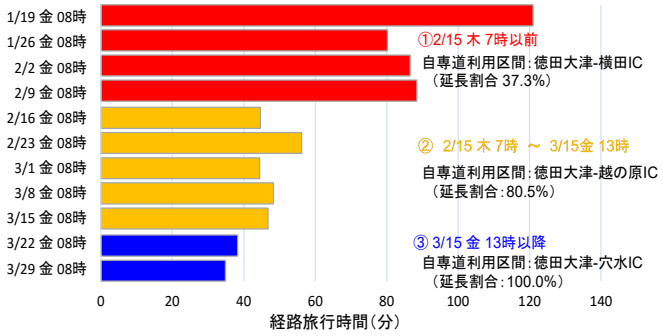


Fig.-6 Transition of the route travel time (between 8:00 and 9:00, Nanao → Anamizu)

Fig.-7 Example of data transmitted by NILIM on X (formerly Twitter)

On the Intranet, the location map of the route subject to calculation was posted in a form that enables the change history to be checked according to the traffic control. An example of the "Nanao → Anamizu" route is shown above (Fig.-5). In view of the travel time of the above route (between 8:00 and 9:00 on Friday), the situation can be seen in which the travel time decreased with the progress of road recovery (Fig.-6).

In addition to the above, updated information about the route travel time on the above website was transmitted by NILIM on X (formerly Twitter) (79 cases from January 23 to March 13; Fig.-7). The number of views was 772.5/case (maximum 3,225/case) on average, "Good" was posted 7.1/case (maximum 30/case) on average, and there were reposts (retweets) of 3.3/case (maximum 18/case) on average.