講演番号	321

文献番号	20225321

Construction of Characteristic Measurement System for Ordinary Road Friction

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KEY WORDS: **Safety, Road Environment, Road Environment Recognition**, **Test/evaluation,**
Road Friction Coefficient, Magic formula（C1）

The safety of road traffic has depended on the driver, and the emergency avoidance behavior and braking behavior have depended on the experience value so far. In particular, the safety of road traffic on snowy roads or icy roads in winter greatly depends on the driver's experience, but for ordinary drivers, the opportunity to experience such a situation is relatively rare, and such experience value have been used. Furthermore, in order to ensure the safety of autopilot vehicles, which are expected to become widespread in the next generation, it is necessary for the controller itself to acquire road information ahead. In particular, at level 4 and above of autopilot, ensuring safety depends on the vehicle side. Currently, ABS is obligatory for vehicles in Japan, so even in an emergency braking situation such as obstacle avoidance, it is considered possible to brake using the state close to the optimum in the road surface friction. As the information for road safety, however, it is necessary to construct a forward road friction characteristic estimation system, and then, it is important to pre-construct a road friction database include snowy road and icy road. Therefore, the authors have conducted analytical method for road surface friction measurement and for estimation. The purpose of this study is to construct a road friction measurement system used for creating this database.

In order to mesure the friction characteristics on the actual road as close as possible to the actual vehicle, it is necessary to make the μ-s characteristics closer to the tire characteristics used in the actual vehicle. Therefore, in order to determine the tire for measurement, we measured the tire characteristics under various conditions and examined the design conditions. As a result, the tire size, load conditions, and internal pressure were determined, and the design conditions for the tire were determined. Based on these, the measurement system was designed. Based on these, a measurement system was designed, and the system as shown in Fig. 1 was constructed. In this system, three sets of tires with different numbers of sprocket teeth are prepared, and these are driven by trailer tires with chains. As a result, these three tires are able to achieve slip rates of 1.35%, 6.42% and 17.47%. Based on these, the results of identifying the measured road friction coefficient by MF are shown in Fig 1. Further, Fig. 3 shows a comparison between the μ-s characteristics measured by the bench test device and the MF results shown in Fig.2. Considering that the road surface of the bench test device is a Safety Walk and the coefficient of friction is relatively high, it is considered that this result is a very good characteristic measurement.

Fig.1 Constructed measurement trailer system

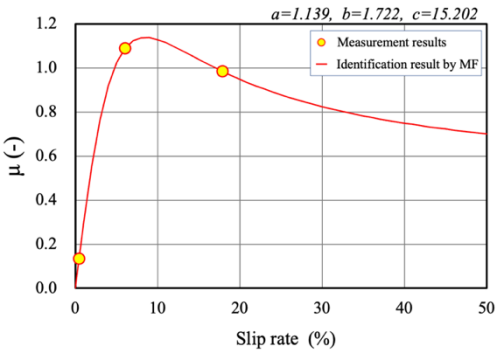

Fig.2 Experimental results and identification results by MF

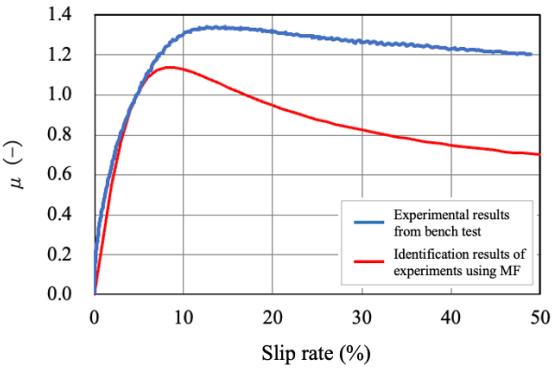

Fig.3 Comparison between bench test results and experimental results using MF