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Investigation of μ–S Characteristics Using an Indoor Flat Road Tire Measurement System

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There is a growing demand for a testing method that enables highly reproducible and stable indoor measurement of tire μ–S characteristics under dry and wet conditions, and research in this area is ongoing. The objective of this study is to accurately measure the μ–S characteristics of individual tires in an indoor environment and to investigate the effects of positions on measurement road surfaces, dry/wet conditions, load, and inflation pressure on these characteristics.

To this end, we conducted individual tire measurements using an indoor flat road surface tire force and moment (F&M) testing machine, which allows μ–S characteristic tests to be performed under relatively stable conditions. The experimental apparatus is shown in Fig. 1. The main feature of this testing machine is its ability to control the vertical load Fz and tire rotational speed ω with relatively high accuracy during low-speed μ–S measurements, and to stably set wet conditions, which is a significant advantage of this testing machine. In addition, by controlling the water flow rate, a stable water film can be formed, making it possible to conduct both dry and wet tests on the same road surface.

Figure 2 shows the results of μ–S characteristics obtained from repeated tests at different positions on the test surface under identical surface conditions. It can be seen that highly reproducible data were obtained. The experimental results in detail are presented in the paper.

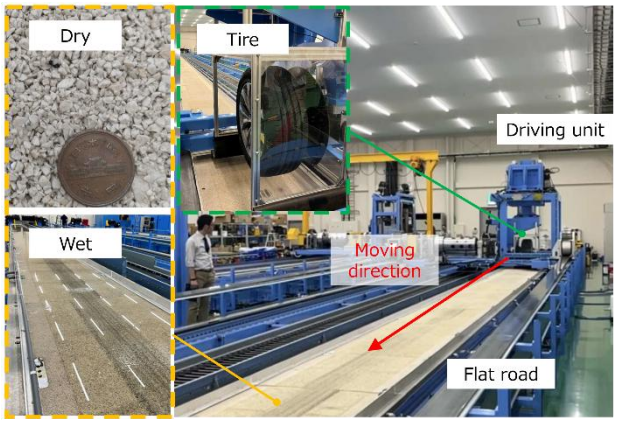

Fig.1 The indoor flat road tire measurement system

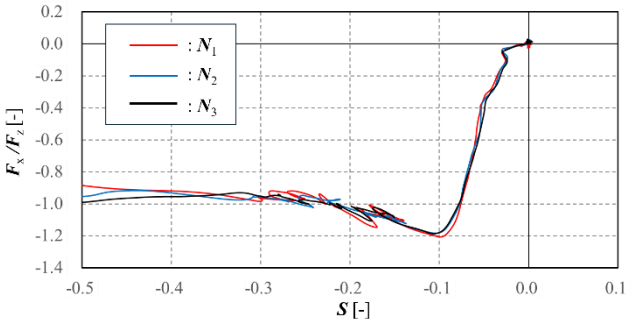

Fig.2 μ–S curve under the dry and breaking conditions at a tire pressure of 240 kPa and a vertical force of 5000 N