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Abstract
In the traffic accident related with motorcycles, the scrape mark on the ground generated by the sliding-on-side motorcycles plays a crucial factor in arbitration judgment. Two kinds of benches combining with a van, classified into wheel-off-ground type and wheel-on-ground type, are designed and manufactured to perform a series of tests for sliding-on-side light motorcycles. For the wheel-off-ground bench test, the wheel/tires of motorcycle are 10 cm high from the ground, and for the wheel-on-ground, the wheel/tires always contact on the ground as the bench test is conducted. Overall, the process of the test is such that the motorcycle is placed on or under the bench and moves with the same speed with the bench to simulate motorcycle driving. Until a prescribed speed, the motorcycle is slightly released off the bench, and then the scraping distance on the ground caused by the motorcycle is observed and measured. Therefore, the friction coefficient can be obtained through the scraping distance and the corresponding vehicle speed.
For the wheel-off-ground bench test, the results show that the friction coefficient is the highest at speeds of 30~50 km/h, and its value is between 0.50 and 0.60. In addition, it is observed that the friction coefficient gradually deceases as the vehicle speed is over 50 km/hr. The other test for the wheel-on-ground type concludes that the maximum value of the friction coefficient is in the range of 0.50~0.54 at speeds of 40~50 km/hr. Also, as the vehicle speed exceeds 50 km/hr, the friction coefficient in case of left-side-sliding illustrates a more stable tendency than that in case of right-side-sliding, and its value is about 0.53. Moreover, due to some differences between the parts of both sides of the motorcycle contacting on the ground, the results show that in case of the same speed condition, the friction coefficient for the left-side sliding is higher than the right-side sliding irrespective of using either bench test. In this research, a motorcycle pulling test is additionally conducted to illustrate the change of the friction coefficient with the time, and the corresponding result is used to explain and verify the phenomena resulting from the bench test.
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