

# Verification of the superiority of motorcycles as a road traffic mode kind to the global environment

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## 1. Introduction

The carbon dioxide emissions by the transportation section account for a constant share internationally, and it is necessary to continue to restrict them. On the other hand, it is predicted that in the countries of Asia, continued economic growth will be accompanied by a switch to 4-wheel vehicles from motorcycles, which now have an overwhelming share. This survey will serve as a reminder of the fact that the motorcycle is a road transport mode superior in its ability to lower global environmental loads and result in proposals for international policies. This survey is now in progress as bilateral joint research with the RDCRB, Indonesia.

## 2. Comparative survey of carbon dioxide emissions from 4-wheel vehicles, motorcycles and electric scooters

In order to confirm that motorcycles and electric scooters are road transport modes kinder to the global environment than 4-wheel vehicles, a comparative survey of carbon dioxide emitted by these vehicles during actual driving was performed. The survey was carried out in Tokyo in the daytime for a total of 12 hours—3 hours per day on three weekdays from September 27 to 29, 2011—on an ordinary road which is always congested (9.2km from Yoyogi Park to Hibiya Park). The vehicles used for the survey were a 4-wheel vehicle, motorcycles (250cc, 125cc, 50cc) and an electric scooter (equivalent to 50cc). The vehicles selected had average vehicle specifications for vehicles in each class. The carbon dioxide emissions were converted from the quantities of fuel consumed and electric power consumed. The quantity of fuel consumed was obtained by measuring the actual quantity of oil supplied while the quantity of electric power was determined by measuring the quantity charged after driving.



Photo 1 View of the Performance of the Survey

## 3. Outline of the survey results

Figure 1 shows the relationship between traveling speed and carbon dioxide emissions based on the result, while Table 1 shows the average traveling speed and carbon dioxide emissions by vehicle type. The survey revealed the following trends.

1. Carbon dioxide emissions decline in the order: 4-wheel vehicle (air-conditioning on), 4-wheel vehicle (air-conditioning off), motorcycles, and electric scooters.
2. Average traveling speed in the congested section was higher for the motorcycles (250cc, and 125cc) than the 4-wheel vehicles.
3. The carbon dioxide emitted by all vehicles decreased as the average traveling speed increased.

In the future, the synergistic effects of the two superior aspects of motorcycles (lower carbon dioxide emissions, greater traveling speed during congestion) will be analyzed.

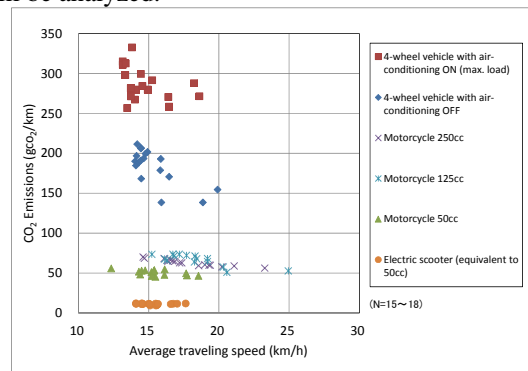


Figure 1. Relationship of Traveling Speed to Carbon Dioxide Emissions

Table 1. Average Traveling Speed and Carbon Dioxide Emissions by Vehicle Type

Items surveyed		Average traveling speed (km/h)	Average CO <sub>2</sub> Emissions (gCO <sub>2</sub> /km)
4-wheel vehicle	air-conditioning ON (max. load)	14.7	287.2
4-wheel vehicle	air-conditioning OFF	15.3	184.0
Motorcycle	250cc	17.9	62.7
Motorcycle	125cc	18.4	66.3
Motorcycle	50cc	15.5	50.4
Electric scooter	equivalent to 50cc	15.5	11.0

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