

Title: BICYCLISTS' BRAKING PROFILE ON SEVERAL TYPES OF URBAN PAVEMENTS

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Abstract:

Bicycling is considered to be one of the sustainable transport modes and its use is going to rise in the future, in order to promote the sustainable mobility in the urban road environment. Many cities are not ready to deal with the rising necessity of a safe and functional bicycle road network, which is critical for the bicyclists' safety. Bicyclists except for bikeways can ride their bikes on pedestrian areas, sidewalks or on road segments sharing the road with other vehicles. The purpose of this study is to investigate the necessary brake length and time until the bicycle is stopped, considering factors like the type of the road pavement and the speed of the bicycle.

The study will take place in the city of Volos, which is a typical medium sized Greek city. In order to conduct the study, specific GPS based equipment (Video VBOX, Racelogic, UK) will be used. This equipment collects data like speed, length and deceleration, providing simultaneously real time video data. Furthermore, specific equipment that counts the friction of the pavement shall be used. A city model bike will be used, which is representative to the type of bicycles that are being used in the urban environment. Except of the equipment, a volunteer bicyclist that would be healthy and experienced was necessary to participate. The inclusion criteria for the participants should be: age 20-30 years old; healthy without serious cardiovascular or musculoskeletal disease; and commuting with bike more than three times a week for the past two years. The maximum bicycle speed at the braking time is chosen to be 15 km/hr (low), 20 km/hr (medium) and 25 km/hr (high).

It is necessary that the study area should be clear of trees or high buildings that hamper the GPS signal from the satellites. Due to that fact, the field test shall be conducted in the University of Thessaly campus and the pedestrian area at the port of the city. Furthermore, the field test should be conducted under good weather condition, without winding or raining. In the selected areas, the bicyclist should ride the bike in specific designed routes on three different types of pavement: asphalt, cement bricks and cement plates. Before the beginning of each test, the participant should ride the bike for several hundred meters in order to get used to it. Starting the field test, the bicyclist accelerates to the chosen speed and after keeping it for several seconds moving in a direct line, he reaches the braking point. As soon as he reaches that point, he will suddenly apply the brakes with maximum force until the bike will completely stop. After each testing route and the data collection, the data will be exported to a laptop with the use of a compatible card-reader for further analysis.

During the data analysis process, the data will be analyzed using specific software. The results of our study will be the finding and evaluation of speed-length and speed-time diagrams for each type of pavement. After that, we will be able to precisely count the braking length and deceleration for each pavement type and compare them according to the three tested speed levels.

In summary, in the present research, the main target is to find out the braking profile of typical city bicycles in representative pavements of urban road infrastructure, where a bicyclist could normally move and evaluate them for the bicyclists' road safety improvement.