

## Speed differences of conventional and pedal assisted bicycles in Austria

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**Keywords:** speed pedelec, pedelec, speed difference, cycling infrastructure

The increasing number of pedal assisted bicycles, commonly subsumed under the term “e-bikes”, on roads and cycling facilities lead to new safety challenges. One main concern is the difference between the actual driving speeds of bicycles with and without electric support. A substantial speed difference between different road users in a mixed traffic environment can lead to an increased number of conflicts, near accidents and actual accidents and can also reduce their subjective level of safety.

The aim of this study funded by the Austrian Road Safety Board (KFV) therefore is to investigate the speed differences between conventional bicycles and bicycles with electric support using different statistical methods as well as to survey the users on their perception of safety conditions in real traffic.

Two main research questions shall be answered:

1. Does a person choose a different speed level on different bikes or do people stay in their personal comfortable speed zone no matter which bike they are riding?
2. Does the mean speed of speed pedelecs and conventional bikes differ significantly when riding in different styles on the same infrastructure?

A sample of 100 people from different age groups are riding each of three bicycles on the same circular course with varying topography in a real traffic environment. Relevant indicators like mean and maximum velocity or acceleration are measured using a GPS sports tracker. The tested bikes are

- a conventional bicycle without any kind of electric pedalling assistance
- a pedelec (a pedal electric cycle, assisted pedalling up to 25kph, max. rated power 250W) and
- a speed pedelec (assisted pedalling up to 45kph, max. rated power 600W, needs type approval and registration in Austria).

The collected data is then analysed using descriptive as well as advanced statistical methods to verify the research question.

In addition to the quantitative indicators, the participant will be asked through a standardised questionnaire about their experiences with the bicycles and their subjective level of safety during the test.

The analysed data showed [1] that a person does not have a personal comfortable speed zone but the riding speed depends on the bike someone is riding and [2] that the mean riding speed of conventional bikes and speed pedelecs in opposing riding styles differ.

Finally, recommendations for legislation to traffic authorities on what types of vehicle should be allowed on what types of facilities can be derived from the results of this study. All these findings will be discussed in the full paper.