

Evaluation of subjective safety when riding a pedelec at low speeds

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To keep a bicycle stable at low speeds, the cyclist needs to stabilize the bicycle with steering movements and/or by weight shift using the upper body. Thus, the cyclist must work actively and constantly to stabilize the bicycle. Depending on the individual riding skills, riding behavior and safety feeling, both the quantity and characteristics of control interventions vary. Consequently, the workload associated with controlling the stability of the bicycle at low speeds may result in the rider feeling uncomfortable or even unsafe.

As part of a study taking place at Pforzheim University, the relations between riding safety and actual measurements of bicycle stability are explored. The study will take place at the beginning of April 2020. One objective is to determine how the cyclist experiences the stability of a pedelec at different low speed maneuvers and which factors affect the cyclist's subjective feeling of safety. Since it is more difficult to stabilize the bicycle at low speeds, this must also influence the cyclist's subjective feeling of riding safety. If the cyclist has to cope with a situation in which he has to ride slowly, his subjective feeling of riding safety should be correlated with his individual safety motives and riding skill. Considering the motor support provided by the pedelec, the cyclist's subjective safety feeling should also be affected by the motor assistance while pedaling, especially during low speed maneuvers. Both, the subjectively experienced riding safety of the cyclist and his individual safety motives will be surveyed during the study.

In total, 60 men and women at the age of 60 years and over are participating in the study. All participants own a pedelec. The study is carried out on a tartan sports field, separated from public and open traffic. The riding tasks are typical for the conditions encountered on cycle paths or in public traffic situations. Each riding task is conducted with different motor support settings and/or different gears. The pedelec is equipped with measuring devices to record several quantities that provide information on the motion of the pedelec, e.g. steering angle, roll angle and trajectory. At the beginning, each participant is asked to give a self-assessment regarding riding safety and riding performance. A modified version of the »Cycling Skill Inventory« questionnaire is used for this purpose. While conducting the riding tasks, each rider is observed by experts to determine the intersubjective riding safety. Additionally, video recordings are created for subsequent evaluation. After each riding task, the participants are questioned about their subjective impressions regarding riding safety and riding performance using a standardized questionnaire.