

Accidents involving pedelecs and conventional bicycles in Germany

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Pedelecs represent a new form of mobility and are currently enjoying great popularity. With the growing number of pedelecs (bicycles with support of an electric motor up to a speed of 25 kmph), however, the potential for conflict also increases. This short technical paper is a brief description of an extensive project that analysed accidents involving pedelecs and compared it with accidents involving conventional bicycles by using accident statistics (2014-2017).

Prior to the project, scientific analyses of pedelecs focused on their rapidly increasing number, the physical effort required to ride a pedelec and the health effects for the users. Safety research has mainly been concerned with the (deviant) driving behaviour and injury patterns of the users. Comparisons of the accidents involving pedelecs and those involving conventional bicycles, which examine whether there are different requirements for road safety, are rare. The few existing studies are based on case studies, mostly with a small number of cases. These studies analyse individual, presumed typical and frequent constellations of accident events. A comprehensive analysis of all accidents in Germany involving pedelecs and conventional bicycles did not exist.

Therefore, my study was intended to answer the questions of whether the spread of pedelecs has a significant impact on bicycle accidents (pedelecs and conventional bicycles as a whole), whether pedelec accidents differ from accidents involving conventional bicycles (e.g. are more serious) and whether this results in new requirements for road safety work.

To answer these questions, data from the accident database of the Federal Highway Research Institute (BASt) were analysed. These contain the police data of all road accidents in Germany, including information on the accident causes, the vehicle type of the involved road users and the injured persons. In addition, the database contains information from the Federal Motor Transport Authority (KBA) on the motor vehicles involved. The data can be analysed according to various (combined) criteria. However, the database does not contain any links to exposures such as stock, mileage or number of trips covered by individual vehicle types. The analysis was split into three parts. In the first part, accidents and road users involved were examined with structural analysis. In the second part, demographic analysis was used to describe the injured users in more detail. The third part was a detailed analysis based on the key results of parts one and two.

Results showed that pedelec accidents are more severe than accidents involving conventional bicycles. With a relatively constant total number of bicycle accidents (sum of both vehicles), increasing pedelec participation leads to a smaller decrease in severe accidents. Pedelec users are more likely to have single accidents and more likely to have accidents in rural areas (where they are even more likely to be fatal). In addition, the mean age of injured and in particular of killed pedelec users is higher than that of injured or killed users of conventional bicycles. The analyses thus prove that there are new challenges for road safety work for which these data could serve as a basis.