

## Analysis of pedelec accidents in Germany

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**Keywords:** pedelec, bicycle, accident analysis, accident risk related to distance travelled

Pedelects are becoming more and more popular in Germany. This paper assesses the road safety of pedelec riders by means of a comprehensive analysis of the pedelec accidents reported to the German police. In the first step, this paper analyses the characteristics of police-reported pedelec accidents in Germany and compares them with those of bicycle accidents. The analyses are based on accidents (collisions with other road users or single-bicycle crashes) with personal injury from the year 2019. Only accidents of pedelec riders and cyclists older than 18 years are included.

In doing so, the age distribution, gender distribution, location of accident, accident type, other party involved, cause of accident, and consequences of accident are examined. The results show, among other things, that the proportion of elderly riders is significantly higher in pedelec accidents than in bicycle accidents. If a pedelec rider is involved in an accident, he or she seems to be somewhat more often the person mainly responsible for the accident than is the case for cyclists. Of all accidents involving pedelec riders a greater share takes place out of town than is the case for accidents involving cyclists. Furthermore, the accident consequences for pedelec riders compared to cyclists are more serious. With respect to the type of accident, the share of driving accidents (meaning accidents caused by the loss of control over the bicycle without another road user being involved) in all types of accidents is higher for pedelec riders than for cyclists. With respect to the other party involved, the share of single-bicycle crashes in all accidents is higher among riders of pedelecs. Also, for pedelec riders the share of collisions with other pedelec riders in all accidents is higher than it is for cyclists. On the other hand, the share of collisions with car drivers and other cyclists is higher for riders of conventional bicycles. If a pedelec rider is at fault for an accident, an inappropriate speed is somewhat more often noted as misbehavior than is the case for cyclists. On the other hand, for cyclists a prohibited use of the road is more often noted as misbehavior.

In the second step representative travel behaviour data of pedelec riders (here kilometres driven) will be used to assess the risk of accident related to the distance travelled. First results suggest that not only elderly pedelec riders but also younger riders between 18 and 34 years have an increased mileage-related risk of being involved in an accident.

From the results of the analyses new challenges for road safety are derived. Accidents involving pedelec riders differ in relevant aspects from accidents involving cyclists. New risk groups seem to emerge for which appropriate prevention measures need to be developed.