

The Role of Bicycles in Driver Assistance Regulations and NCAP – Status and Outlook

Patrick Seiniger ^{*}, Adrian Hellmann [#], Jost Gail [†]

^{*} Division of Automotive Engineering
Federal Highway Research Institute (BASt)
Brüderstraße 53, 51427 Bergisch Gladbach
email: seiniger@bast.de

[#] Division of Automotive Engineering
Federal Highway Research Institute (BASt)
Brüderstraße 53, 51427 Bergisch Gladbach
email: hellmann@bast.de

[†] Division of Automotive Engineering
Federal Highway Research Institute (BASt)
Brüderstraße 53, 51427 Bergisch Gladbach
email: gail@bast.de

Keywords: driver assistance systems, active safety, regulations, UN ECE, Euro NCAP

1 INTRODUCTION

Over the last years, bicycles have been addressed in newly developed driver assistance systems for passenger cars on a voluntary basis, and beginning with the blind spot assist systems, this tendency has been picked up by vehicle regulations and systems are made mandatory.

This paper intends to give a detailed summary of which vehicle regulations are currently addressing bicycles, when they come into force and if they will be mandatory in the EU. Also, the performance of already available active safety systems for bicycles (not covered by regulatory requirements) and their technological potential will be included.

2 VEHICLE REGULATIONS COVERED IN THE PAPER

The first vehicle regulation developed at UN ECE regarding bicycles was the blind spot information system for heavy vehicles, UN R151, which will be mandatory from July 2022 for newly type-approved vehicles (new registrations from July 2024) in Europe. It requires the vehicle to give a signal for those cyclists that would be endangered if the vehicle would start a right turn. The latest supplement amended the regulation with a new test procedure that not only checks if the information signal is given in time to avoid the accident, it also would allow testing of automated braking in right-turn situations.

Automated braking systems for passenger cars and light commercial vehicles are required to brake for bicycles, those systems will be mandatory in the EU for newly type-approved vehicles from July 2024 (new registrations from 2026). Accidents have to be avoided with crossing bicycles (15 km/h) up to driving speeds of up to 40 km/h.

For all those regulations, the theoretical background that lead to the performance requirements will be explained in detail. Also, new regulations do not specify single worst-case test cases anymore, but they specify a broad range of situations where the systems need to fulfil the performance requirements. This new style of regulation-writing will be explained as well.

The German national automated driving regulation requires automated vehicles (typically fleet-operated shuttles) also to address bicycles; collisions with crossing bicycles have to be avoided up to a travelling speed of 25 km/h.

3 EURO NCAP BICYCLE TESTS

Euro NCAP measurements for bicycle assistance functions are included in Euro NCAP's star rating for new passenger cars since 2018. The performance of rated cars from the beginning up to the latest vehicles will be (anonymously!) analysed, showing a massive increase in performance since 2018. Also, NCAP adjusts the

scenarios for accidents between bicycles and passenger cars over the years, an overview of the development of those scenarios will be included in the paper.

4 OUTLOOK

Based on what is presented, the authors will perform an outlook towards what can be achieved by active safety systems (=automated braking for bicycles) and what typical and relevant accident situations are not yet covered (for instance: heavy vehicles with crossing / stationary bicycles in front of the vehicle).

5 CONCLUSIONS

Bicycles are addressed by a variety of active safety systems in vehicle regulations (all of which had been introduced into European legislation by the “General Safety Regulation” 2144/2019) and also in Euro NCAP. This paper aims at showing the community what is available, why the performance requirements are selected the way they are, and what is missing.

6 INVOLVEMENT OF THE AUTHORS INTO THE TOPIC

The authors themselves did participate in detail in the development and writing of all relevant regulations (Patrick Seiniger, Jost Gail: R151, R152, revision of R131) and Euro NCAP (Patrick Seiniger, Adrian Hellmann), so they are able to provide first-hand knowledge. Presenter and lead author will be Patrick Seiniger.