

Potential impacts of the increased deployment of advanced driver assistance systems on the numbers of killed or seriously injured car occupants, pedestrians and cyclists in Norway

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Abstract: The potential of advanced driver assistance systems to reduce the number of killed or seriously injured passenger car occupants, pedestrians and cyclists in Norway has been investigated for the following systems: Automatic cruise control (ACC) with forward collision warning (FCW) and automatic emergency brake, pedestrian and cyclist warning with automatic emergency brake, lane departure warning (LDW), intelligent speed adaptation (ISA), as well as alcohol and drug ignition interlock. Scenarios that describe the future deployment of these systems were developed in a Delphi-survey in which a number of experts on driver assistance systems indicated the most likely percentages of new cars that will be equipped with each of the systems in five, ten, and fifteen years. The experts are also asked whether or not the systems will become mandatory for new cars. The Delphi-study is conducted as an online-survey in two rounds. The same questions are asked in both rounds, but in the second round the average results from the first rounds will be presented along with the questions.

Based on the results from the Delphi-survey and information about average vehicle ages and annual driving lengths, three scenarios are developed that describe the development of the percentage of all vehicle kilometers driven in Norway with each of the driver assistance systems: An optimistic scenario (fastest likely deployment), a “most realistic” scenario, and a least optimistic scenario. The expected effects of each system are estimated based on a literature survey of studies that have empirically investigated the effects of each of the systems on crash involvement or injury severity. Alternatively, when such studies are lacking, effects on crashes or injuries are estimated based on conflict or driver behavior studies. Finally, a baseline scenario (without increased deployment of the driver assistance systems) of the development of the number of killed or seriously injured light vehicle occupants, pedestrians and cyclists in Norway is developed based on Norwegian crash statistics.

Based on these results, the expected reduction of the number of killed or seriously injured light vehicle occupants, pedestrians and cyclists during the next 15 years are calculated. The presented results will be based on the first round of the Delphi survey, as the second round will be conducted in October.

Keywords: Advanced driver assistance systems, automatic cruise control, automatic emergency brake, pedestrian warning, lane departure warning, intelligent speed adaptation, alcohol ignition interlock, drug ignition interlock, Delphi