

Abstract

The topic of this paper is the traffic safety and complexity when turning left at traffic signal installations. Urban junctions with traffic signal systems can have a different number of traffic light sequences. The number of traffic light sequences determines the turn indication for drivers turning left. In the case that all drivers turning left are to have a protected turn at a four way junction, four sequences are needed. To have less than four sequences means that left turn traffic flows have to perform non-protected left turns. A protected turn means that there is no conflicting traffic. Turns that include conflicting traffic are called permissive turns. Then, drivers are only able to perform a left turn either when there is an accepted gap in the conflicting traffic flow or while change of sequence of the traffic lights. If left turn drivers fail to recognize an appropriate accepted gap, i.e. if they do not understand that they have to wait until the time interval between two cars of the conflicting traffic is big enough, serious accidents are possible. This paper includes an accident survey of the cities Solingen and Remscheid. Two percent of all car accidents were left turn accidents at junctions. The majority of which were serious accidents. During this survey an analysis of ten junctions is being carried out in order to investigate risk potentials and levels of complexity of left turns. For each junction the analysis includes amongst other things an entry of traffic volume, an evaluation of the accident number and an examination of traffic signs and marking set in road surface. Traffic simulations are being used as the basis for examining if the phase sequences can be raised. The result of the analysis is that if there is high traffic volume either in the left turn traffic flow or in the conflicting traffic flow, car accidents are more likely. Often, the introduction of an additional light sequence is possible. Considering safety it also makes sense. At junctions with a low traffic volume, an improvement of the marking set in the road would better clarify for the left turn drivers that they have to wait. Traffic signal installations are at each junction. Finally has to be mentioned that there is no absolute security from accidents as even traffic signals can be ignored. The safety standard of protected turns is nevertheless very high. In the case of a permissive turn serious car accidents can happen despite a good marking and traffic lights because drivers do make mistakes.