

Impact on traffic operation by cyclists sharing two-lane rural roads from naturalistic observation

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On Spanish two-lane rural roads cycling as a sport has increased both individually and in groups. Most Spanish rural roads were designed exclusively for motor vehicles without considering the presence of cyclists, and, although in recent years there has been an increasing awareness, there are still many conflicts between cyclists and motor drivers on rural roads. Spanish regulations indicate how cyclist must ride and how drivers have to overtake them. Despite sharing the same network motorists and cyclists have different characteristics, cyclists are more vulnerable and ride at lower speed. In fact, this speed difference between bicycles and motorized vehicles can create risky manoeuvres, and cyclists circulating in groups can affect the behaviour of motorists overtaking.

All these characteristics generate conflictive interactions between bicycles and motorized vehicles, affecting not only road safety, but also traffic operation. Currently, the operation of two-lane rural roads is determined with the methodology described in the Highway Capacity Manual (HCM), which does not consider the circulation of bicycles.

The objective of this study is to determine how the presence of cyclists affects the operation on two-lane rural roads. A naturalistic study was carried out to characterize the traffic, both motorized and cyclist, determining the effect of bicycles on the traffic operation in different studied sections with different geometric and traffic characteristics. To carry this out, two segments of rural roads with a high presence of cyclists have been studied through simultaneous video recordings both at the start and at the end of the sections. From this field work, the entry and exit time stamp of each user, both of motorized vehicles and bicycles, as well as the configurations in which the groups of cyclists circulate, are recorded respectively.

From these data, different performance measures are analysed to determine which of them correctly incorporate the effect of cyclists in the traffic operation on two-lane rural roads. Results shown that cycle traffic affects motorized average travel speed and percent followers, and that new performance measures are needed to characterize the impact on traffic operation by cyclists sharing rural roads.