

The Relationship Between Accidents and Conflicts Recorded by Drive Recorders

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ABSTRACT

Traditionally road accident statistics are used to assess the level of road safety and evaluate road safety programs. In some cases, the lack of good and reliable accident records have hampered proper analyses. Drive recorder (DR) with high performance appeared in recent years, which can record objectively and precisely various data including image of traffic environment, status and operations of drivers, velocity and acceleration of vehicles. The conflicts recorded by DRs could be used to assess the level of road safety or evaluate road safety programs. The relationship between accidents and conflicts recorded by DRs must be known in order to analyze traffic accident according to the conflicts recorded by DRs. 50 DRs were installed on 50 cars in Beijing to collect the conflicts. There were 1366 conflicts collected which recorded by DRs when the deceleration was more than 0.3G in 193 days. The hourly distribution of conflicts and accidents in Beijing in 2001 and 2002 were analyzed. The correlation coefficient between conflicts and number of accidents in Beijing 2001 on hourly distribution is 0.836. The correlation coefficient between conflicts and number of accidents in Beijing 2002 on hourly distribution is 0.823. They indicate that there was a significant linear correlation between conflicts and accidents in Beijing on hourly distribution. A = Average Accidents per 10,000 Vehicles per Hour Everyday Annually, and E = Average Conflicts per 10,000 Vehicles per Hour Everyday were defined. The linear model between the conflicts and accidents was established. When the number of conflicts is zero, the traffic accident may be zero. The linear model can not express it. According to the figure of traffic accidents and conflicts, traffic accidents were increasing as conflicts increased, but the degree of increasing were weakening as conflicts increased. $P_{EA} = E/A$ was defined to describe the degree of increasing. The correlation coefficient between P_{EA} and E was 0.938 for the accident data in 2001, and 0.950 for the accident data in 2002. So the relationship between A and E would be described as $A = E/(\alpha E + \beta)$. According to the nonlinear model, when the number of conflicts is zero, the number of accidents is zero. The nonlinear model can be used to describe more features of relationship between conflicts and accidents.