

Relation Between Traffic Mix and Traffic Accidents in a Mixed Industrial Urban Area

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Abstract : The traffic accidents study usually contemplates the relation between factors such as the type of vehicle, its operation, and the road infrastructure. Traffic accidents can be explained by different factors, which have a greater or lower relevance. Two zones are studied, a mixed industrial zone and the extended zone of it. The first zone has mainly residential (57%), and industrial (23%) land uses. Trucks are mainly on the roads where industries are located. Four sensors give information about traffic and speed on the main roads. The extended zone (which includes the first zone) has mainly residential (47%) and mixed residential (43%) land use, and just 3% of industrial use. The traffic mix is composed mainly of non-trucks. 39 traffic and speed sensors are located on main roads. The traffic mix in a mixed land use zone, could be related to traffic accidents. To understand this relation, it is required to identify the elements of the traffic mix which are linked to traffic accidents. Models that attempt to explain what factors are related to traffic accidents have faced multiple methodological problems for obtaining robust databases. Poisson regression models are used to explain the accidents. The objective of the Poisson analysis is to estimate a vector to provide an estimate of the natural logarithm of the mean number of accidents per period; this estimate is achieved by standard maximum likelihood procedures. For the estimation of the relation between traffic accidents and the traffic mix, the database is integrated of eight variables, with 17,520 observations and six vectors. In the model, the dependent variable is the occurrence or non-occurrence of accidents, and the vectors that seek to explain it, correspond to the vehicle classes: C1, C2, C3, C4, C5, and C6, respectively, standing for car, microbus, and van, bus, unitary trucks (2 to 6 axles), articulated trucks (3 to 6 axles) and bi-articulated trucks (5 to 9 axles); in addition, there is a vector for the average speed of the traffic mix. A Poisson model is applied, using a logarithmic link function and a Poisson family. For the first zone, the Poisson model shows a positive relation among traffic accidents and C6, average speed, C3, C2, and C1 (in a decreasing order). The analysis of the coefficient shows a high relation with bi-articulated truck and bus (C6 and the C3), indicating an important participation of freight trucks. For the expanded zone, the Poisson model shows a positive relation among traffic accidents and speed average, biarticulated truck (C6), and microbus and vans (C2). The coefficients obtained in both Poisson models shows a higher relation among freight trucks and traffic accidents in the first industrial zone than in the expanded zone.

Keywords : freight transport, industrial zone, traffic accidents, traffic mix, trucks

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