Optimization of the Allowable Speed on Iran's Freeways to Reduce Violations and Accidents, Using Zero-Truncated Poisson Regression Model

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Abstract

Countries from all over the world including Iran, consider different maximum allowable speeds to control and maintain traffic safety on their freeways, but these actions have not been successful even with the police surveillance. Even though speeding is not the only cause of accidents, past studies indicate that speed plays a vital role in such events. Since respecting the speed limits have not prevented driving violations and traffic accidents, there's doubt among decision-makers, about the applicability and safety of these legal speed limits in different weather and traffic conditions. They think perhaps there is a need for an optimized and safe speed after doing required studies. Even in the police instructions and notifications in unfavorable weather conditions, the word "safe speed" is used more than the "legal speed" and its limit is not mentioned and its determination is assigned to drivers according to their mental and physical conditions, type of vehicle, and the weather condition. This matter leads to uncertainty for drivers in selecting the right speed. This research is intended to achieve a safe and optimized speed for freeways in Iran, by considering a reasonable adjustment which is acceptable by the drivers so that a substantial decrease in driving violations and accidents could be observed. This work is done by using models developed for predicting violations and accidents on Iran's freeways. The results indicate that by reducing the allowable speed of freeways from 125km/h to 105 km/h, a 48% and 23% reduction of violations and traffic accidents could be achieved.

Keywords: Freeways; Safe and Optimized Speed; Zero-truncated Poisson; Maximum Allowable Speed; Driving Violations; Traffic Accidents.

1. Introduction

Because of the relative advantages of freeways in comparison to other types of rural roads, construction of them is increasing. They are welcomed by private sectors and banks, due to the produced revenues. According to the last statistical yearbook of "Iran Road Maintenance and Transportation Organization" until 2015, 2401 kilometers of freeways, which connect several principal cities of the country, have been built. Freeways are constructed for many purposes, most important of which are speed and safety. Thus adequate knowledge about the influencing environmental factors is of particular importance and must be studied and scrutinized continuously. On the one hand, providing both high speed and traffic safety at the same time is not easy, because these two factors are not acting in the same direction, and on the other hand, to improve one of them, the other one cannot be overlooked. As a result, one must seek to optimize both factors by considering all the conditions and determine an optimized speed which is