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Prioritizing Roads Safety Based on the Quasi-Induced Exposure Method and Utilization of the Analytical Hierarchy Process

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Abstract : Safety analysis of the roads through the accident rates which is one of the widely used tools has been resulted from the direct exposure method which is based on the ratio of the vehicle-kilometers traveled and vehicle-travel time. However, due to some fundamental flaws in its theories and difficulties in gaining access to the data required such as traffic volume, distance and duration of the trip, and various problems in determining the exposure in a specific time, place, and individual categories, there is a need for an algorithm for prioritizing the road safety so that with a new exposure method, the problems of the previous approaches would be resolved. In this way, an efficient application may lead to have more realistic comparisons and the new method would be applicable to a wider range of time, place, and individual categories. Therefore, an algorithm was introduced to prioritize the safety of roads using the quasi-induced exposure method and utilizing the analytical hierarchy process. For this research, 11 provinces of Iran were chosen as case study locations. A rural accidents database was created for these provinces, the validity of quasi-induced exposure method for Iran's accidents database was explored, and the involvement ratio for different characteristics of the drivers and the vehicles was measured. Results showed that the quasi-induced exposure method was valid in determining the real exposure in the provinces under study. Results also showed a significant difference in the prioritization based on the new and traditional approaches. This difference mostly would stem from the perspective of the quasi-induced exposure method in determining the exposure, opinion of experts, and the quantity of accidents data. Overall, the results for this research showed that prioritization based on the new approach is more comprehensive and reliable compared to the prioritization in the traditional approach which is dependent on various parameters including the driver-vehicle characteristics.

Keywords : road safety, prioritizing, Quasi-induced exposure, Analytical Hierarchy Process
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