

*Archive of SID****Spatial Analysis of Accidents with Climatic Hazards Approach******Case Study: Karaj-Chalous Road*****Farajzadeh Asl M.\***

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**Extended Abstract****Introduction**

Road accidents are among the major causes of death, injuries and financial problems of Iran. The important climatic causes of road accidents in Iran are such as slippery of road surfaces due to frost, snow, rainfall, occurrence of fog, avalanches, etc. The object of this study is to analysis the effect of weather conditions on road accidents and rating of the studied areas based on road accidents in relation to weather conditions. This study analyzed the influence of hazardous climate factors on road accidents on the road between Karaj and Chalus axis, one of important relational roads in Iran.

**Materials and Methods**

The Karaj - Chalus road axis has 70 km. long and is one of the most important roads passing through the Alborz range mountain and connecting Tehran region to the northern regions of Iran (Caspian Sea). In this study a spatial database of the road created according to different data collected including climate data, the locations of accident occurrence points, associated with the attribute data of each accidents separately on 1:250000 scale topographic basemap. In order to analysis of climatic conditions, two weather station data including Karaj and Siahbisheh weather stations have been used. The Karaj weather station is used as a representative of first part of the axis and Siahbisheh weather station as representative of mountainous areas. The created spatial database used to evaluate the sensitive points for the occurrence of road accidents in relation to various climatic factors specially sunny, cloudy, foggy conditions etc.

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### Results and Discussion

The characteristics of occurred accidents in studied area showed that about 54 percent of accident occurred in summer and spring seasons in relation to high traffic conditions. Also about 80 percent of all accidents occurred in sunny conditions as a result of high traffic conditions. The results indicate that in all uncomfortable meteorological conditions, the frequency of accidents is equal, but in the cloudy weather is higher than other conditions. An analysis of road accidents showed that several accidents happened under the following climatic conditions and locations. In sunny days, at kilometers 17, 20, 41, during cloudy days at 62, in rainy days at 40, 70, during snowy days, 40, 60, 62 and during foggy days at 60, 62, 65 km. from Karaj city occurred respectively. These roads' positions can be considered as dangerous hot points that need special attention to decrease the number of accidents. Spatial distribution of accidents showed that there are positive relations between altitude and the number of accidents. Correlation coefficient between these two parameters is 0.6390 that is significant in statistical consideration. In other words, in mountainous areas of studied area, with increasing the altitude, the rate of accident increases, the important factor for this condition is changing of climatic conditions in mountainous regions of Karaj-Chalus road. Therefore it can be said that the weather change caused from changes in topography, have essential role in creating the accidents.

Finally the zoning map provided using GIS ability indicates that the range of 10 to 30, 30 to 40 and 50 to 60 show the least accident, in bad weather conditions, while the remains of sections face with medium accident hazards because of weather and topographic conditions. The prepared map can be used to manage the road accidents consideration and it is clear that the areas with high hazards potential can be considered to accurate study.

### Conclusion

In order to comparing the relations between climate and accidents, the entire studied axis classified into two categories: first from 1 to 35 km. from Karaj based on Karaj weather station and the second from 35 to 70 km. based on Siah Bisheh weather station. The comparing results showed in the second section of axis (from 35 to 70) the rate of accident increased according to climatic changes. Comparing the weather in two classified sections showed all uncomfortable weather conditions in second section are very intensive.

The studied axis showed that the mentioned axis is one of the hazardous roads in Iran that faces with high number of accidents that climate factors have intensive effects on it. Hence to decrease the accident caused with uncomfortable climate conditions presents some solves such as establishing warning systems and, considering road climatic sensors are among necessary factors.

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**Keywords:** Road safety, Road accidents, Karaj-Chalus Road, Hazardous Climatic.