

# Vehicle Type and Driver Age Analysis of Being Stranded on Road

Mahmut Esad Ergin

Istanbul Commerce University, Logistics Management, Istanbul, TURKIYE  
meergin[at]ticaret.edu.tr

**Abstract:** *Inclement weather has a significant impact on intercity highways in nations with rugged terrain. Turkey is one of these countries, and adverse weather has a detrimental impact on transportation virtually every year. Adverse weather results in not only being stranded on the road, but also traffic accidents, increased fuel consumption, and lost time, among others. The driver's experience of being stranded on the road in difficult winter periods will be disclosed in this study, along with the link between the age of the drivers and vehicle types. Survey was conducted with drivers in five cities of Turkey in order to capture drivers' behavioral patterns in circumstances where they were stranded on the road due to snow. As a consequence, 24 percent of the participants claimed that they have been stuck on the road; nonetheless, 10% of the participants do not wear winter tires even under the harshest winter conditions.*

**Keywords:** Winter tire, Traffic safety, Driver age, Stranded on road, Inclement weather

## 1. Introduction

In countries with rough terrain, inter-city roads are highly affected by bad weather conditions. Heavy rain precipitation causes geological activity such as landslides, vehicles have difficulty in moving in storm situations, visibility decreases considerably in cases such as fog, and roads can be closed in cases of heavy snowfall and vehicles may be stranded. Especially situations such as staying on the road provide information about the road quality in the country.

Almost every year, heavy winter conditions in Turkey affect the traffic negatively. There are long traffic queues on both urban and intercity roads, and users are exposed to these adverse conditions for hours. In some critical points which is highlighted in the following sections, almost every winter season, a plenty of cars and buses stuck into snow and wait for help for hours without any food or beverage. Nowadays, some of the points are improved by the government by building tunnels, however, the rest of the country, especially the far east part, still struggle with the snow.

Inclement weather causes not only being stranded on road, but also traffic accidents, fuel consumption, time loses, etc. These conditions affect almost every country without caring the level of being developed.

While severe winter storms, hurricanes, or excessive flooding can cause major transportation system shutdowns or evacuations, costing millions of dollars, everyday weather events like rain, fog, snow, and freezing rain can have serious consequences for roadway mobility and the safety of transportation system users. These weather phenomena can increase fuel consumption, cause delays, increase the number of accidents, and have a substantial influence on the

transportation system's operation (Hranac, et al., 2006). Alfelor and Yang (2011) claim that every year, rain, snow, ice, and other weather-related factors cause more than 1.5 million vehicle collisions, 600,000 injuries, and 7,000 fatalities on American highways.

Moreover, winter tires also contribute traffic safety and it is proven by some research. It is claimed that winter tires and studded tires reduced stopping distances on snowy conditions as compared to cars fitted with all-season tires, 8% and 8-10% respectively (Lu et al. 1994). In another study, Strandroth et al. (2012) aimed to look at the impact of studded tires on fatal collisions on ice or snow-covered roads in Sweden, as well as the additional advantages of electronic stability control (ESC) during the winter months. As a result of the study, it is revealed that when compared to non-studded winter tires, studded tires have been found to minimize the probability of a fatal collision.

In this study, the driver's experience of staying on the road in harsh winter times according to vehicle types and the relationship between the age of the drivers and this situation will be revealed.

## 2. Study Area

During the winter, the east part of Turkey is subjected to harsh weather conditions. The adverse weather affects not just the east, but also the country's highest cities. The 5 cities in Turkey were chosen to conduct the survey with the drivers in order to catch the behavioral patterns of the drivers based on the situations of being stranded on the road due to snow. Afyon, Balikesir, Bolu, Erzurum, and Kayseri are the cities in question which are displayed in Figure 1 below.

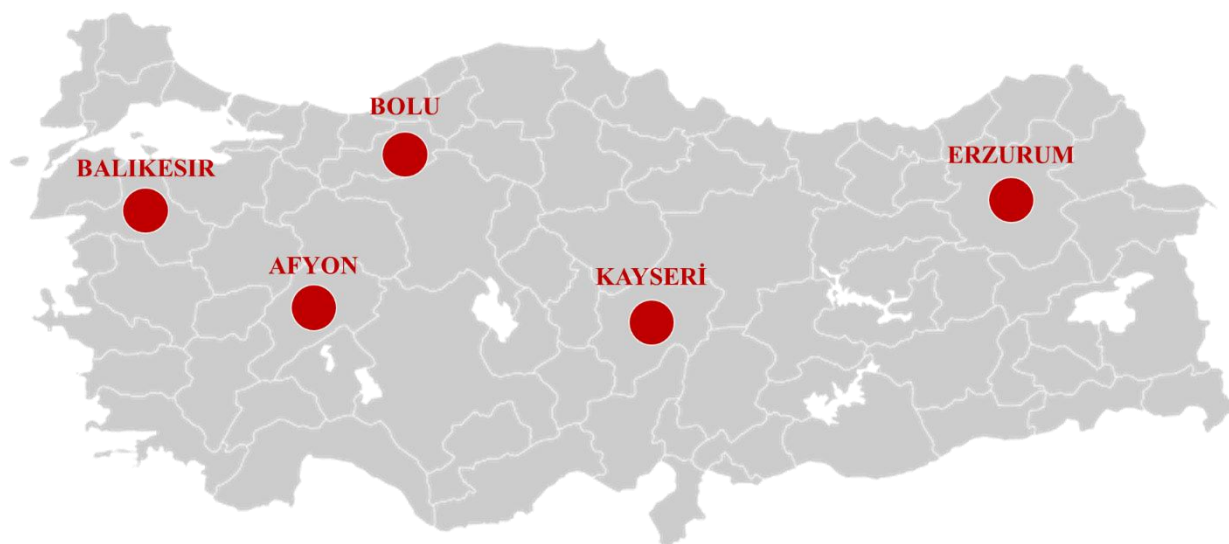


Figure 1: The selected cities for survey study

Generally, road users have challenges with the snow in these cities. The sample is intended to represent the entire country. Surveys are conducted in January 2015 which is one of the harshest periods of winter in Turkey.

### 3. Results

In the end of the comprehensive survey study, a great database was obtained. According to the results of the survey, people in the 30-34, 35-39, and 40-44 age groups constitute the major part of the participants with 15%, 18%, and 17%, respectively. On the other hand, the mean of active driving years of the drivers is 15.6 years. The observed vehicles are divided into groups in terms of their types. Considering the distribution of vehicles, it is seen that most of the questionnaires were conducted with automobile and articulated lorry types with respect to 32%, and 23%. The rest of the vehicles are grouped as truck, pick-up, minibus, and bus.

In the questionnaire, the experience of being stranded on the road due to the inclement weather condition is asked to the participants. As a result, 24% of the observation stated that they had experience of being stranded on the road. The experience can be defined as waiting for the help for hours. On the other hand, 10% of the participants do not use winter tires even during the most adverse winter times. In 2015, when the study was conducted, the use of winter tires was not a legal requirement in Turkey. However, as of 2017, the use of winter tires has been made mandatory in the winter months.

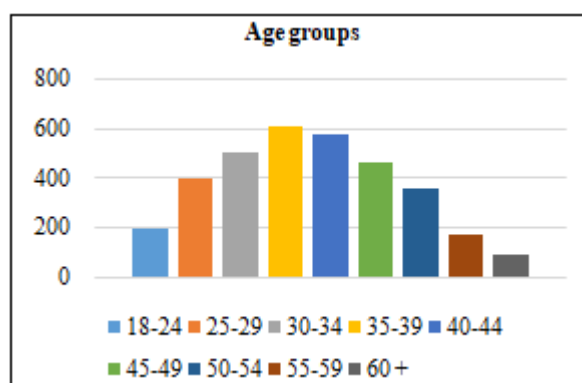


Figure 2: Age groups of drivers

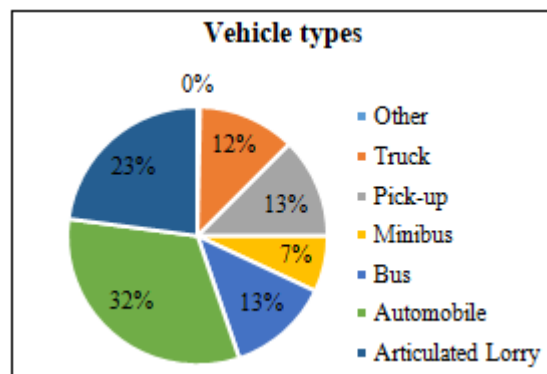


Figure 3: Vehicle types

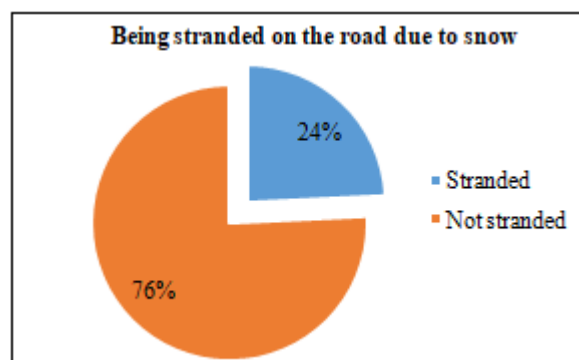


Figure 4: Being stranded on the road due to snow

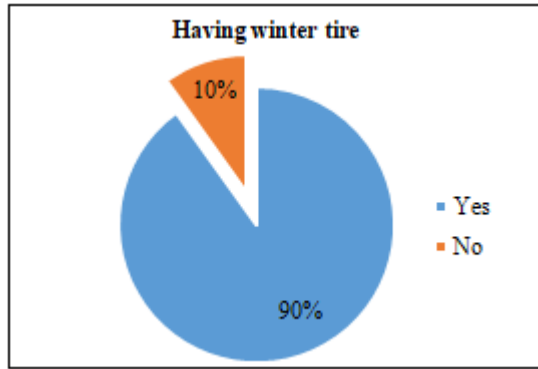


Figure 5: Having winter tire

#### 4. Discussion and Conclusion

Consequently, winter tires impact on traffic safety in a positive way according to the plenty of research studies. In view of the findings on the public's perspective of winter tires, Traffic Injury Research Foundation also recommends that education about the benefits of winter tires be offered, with the emphasis being on winter tires as one part of safe winter driving rather than solely on winter tires (TIRF, 2012). The drivers should be analyzed according to their driving skill in adverse weather conditions especially for the commercial drivers. On the other hand, winter tire is not the solely solution of not being stranded on the road. Using technology and safe driving route planning is also important for better and safer transportation.

#### References

- [1] Alfelor, M.R., and Yang, C.Y.D. (2011). Managing Traffic Operations During Adverse Weather Events, FHWA-HRT-11-002, 74 (4).
- [2] Hranac, R., Sterzin, E., Krechmer, D., Rakha, H., and Farzaneh, M. (2006). Empirical Studies on Traffic Flow in Inclement Weather. FHWA-HOP-07-073.
- [3] Lu, J.J., Junge, D., and Esch, D. (1994). Winter Tire Traction Evaluations. Fairbanks, AK. University of Alaska Fairbanks, and Alaska Department of Transportation and Public Utilities. September.
- [4] Strandroth, J., Rizzi, M., Olai, M., Lie, A., and Tingvall, C. (2012). The effects of studded tires on fatal crashes with passenger cars and the benefits of electronic stability control (ESC) in Swedish winter driving, Accident Analysis & Prevention, 45, 50-60. ISSN 0001-4575. <https://doi.org/10.1016/j.aap.2011.11.005>.
- [5] Traffic Injury Research Foundation (TIRF). (2012). Winter Tires: A Review of Research on Effectiveness and Use. Canada. ISBN: 978-1-926857-26-8