

The Relationship between Divided Roads and Traffic Safety

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Abstract: Many people die or become disabled for the rest of their lives due to traffic accidents. 1.3 million people die and approximately 50 million people are injured in a year all over the world. Traffic accidents cause socio-economic losses also. The goal of this research is to look into the link between divided roads and traffic safety in Turkey over the years. By analyzing of the statistical data, the relationship between divided roads and fatal traffic accident is evaluated. As a result, there is a 19% decline in the number of fatal and injured traffic accidents between 2018 and 2020, and a 27% decrease in mortality after the construction of the divided roads. Finally, it can easily be said that divided roads contribute to traffic safety and are one of the key factors that decrease the fatal traffic accidents on roads.

Keywords: Traffic safety, Traffic accident, Divided road, Fatal accident.

1. Introduction

Traffic safety is one of the most crucial issues for countries. Many people die or become disabled for the rest of their lives due to traffic accidents. According to the World Health Organization (WHO), 1.3 million people die and approximately 50 million people are injured in a year all over the world. In addition, traffic accidents are the most common cause of death for people between the ages of 5 and 29 (WHO, 2018).

According to a Ministry of Development study on socio-economic losses caused by road accidents, the socio-economic cost of traffic accidents in 2009 was estimated at 10.3 million Turkish Liras based on crime scene data. (Ministry of Development, 2012). A direct and indirect cost of 2.2 percent of GNP is incurred as a result of traffic accidents (Ministry of Development, 2018). According to the analysis, the share of the socio-economic losses due to road accidents in Gross National Product in all over the world is varies between 1% and 2%. However, this rate is higher than the global average in Turkey (EUR-Lex, 2015).

A lot of studies in the field of traffic safety have recently been completed. Educational research, public awareness campaigns, and high-quality road building, for example. Construction of high-quality and divided roadways are two of them. The goal of this research is to look into the link between divided roads and traffic safety. Statistical data will be provided in the following phase of the research, and the investments made in the divided road will be briefly discussed. After that, the length of the divided roads and the number of fatal accidents which causes death and injury will be assessed. Opinions and ideas will be offered in the study's final chapter.

Statistics

According to the statistical data of 2020, while 13 of our citizens lost their lives due to traffic accidents every day, 4, 866 of our citizens lost their lives in traffic accidents. Analyzing the number of fatal traffic accidents shows that while the passenger-km value increases, the number of accidents decreases significantly (Table 1). As a result of

regulation made within the scope of European Union harmonization process in 2014, those who lost their lives due to an accident within 30 days after being injured in an accident and sent to the hospital started to be included in the statistics. Before the year 2014, such a practice did not exist. While those who lost their lives at the time of the accident were included in the statistics as dead, those who lost their lives only in the hospital immediately after the accident were treated as dead independently of the accident.

Table 1: Fatal traffic accident statistics by years (TurkStat, 2021)

Year	Number of Fatal Accidents	Number of deaths		Number of injuries
		At the crash site	After the crash	
2009	111 121	4 324	-	201 380
2010	116 804	4 045	-	211 496
2011	131 845	3 835	-	238 074
2012	153 552	3 750	-	268 079
2013	161 306	3 685	-	274 829
2014	168 512	3 524	-	285 059
2015	183 011	3 831	3 699	304 421
2016	186 999	3 493	3 807	303 812
2017	182 669	3 534	3 893	300 383
2018	186 532	3 368	3 307	307 071
2019	174 896	2 524	2 949	283 234
2020	150 275	2 197	2 669	226 266
		Total number of deaths: 4 866		

The majority of the faults that cause traffic accidents are originated from humans. With respect to Turkish Statistical Institute (2021) data, in Turkey during the year 2020, there were 177, 867 total faults causing accidents resulting in death or injury, with 88.3% of faults being driver faults, 7.0% being pedestrian faults, 2.7% being vehicle faults, 1.4% being passenger faults, and 0.5% being road faults. Consequently, approximately 96.7% of the faults belong to human beings.

On the other hand, according to the data obtained from TurkStat (2021), type of vehicle most involved in fatal accidents is private car which is shown in Figure 1. Approximately 1 out of every 2 vehicles involved in fatal accidents is a private vehicle. The second kind of the vehicle

is motorcycle with 19% share. Nowadays, the usage of motorcycle increases and the result of the motorcycle crash can be more very dangerous than others.

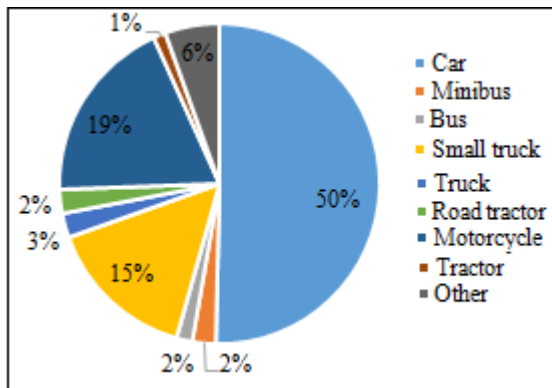


Figure 1: Number of vehicles involved in fatal accidents

As the use of the road increases, the risk of road traffic accidents mentioned above will also increase. For this reason, traffic safety becomes an important issue that needs to be solved for the states that show a road-dependent development. A road-dependent development has been observed not only in Turkey but also in Europe. Figure 2 displays the modal split of inland passenger transport and the share of the road passenger transport is the highest.

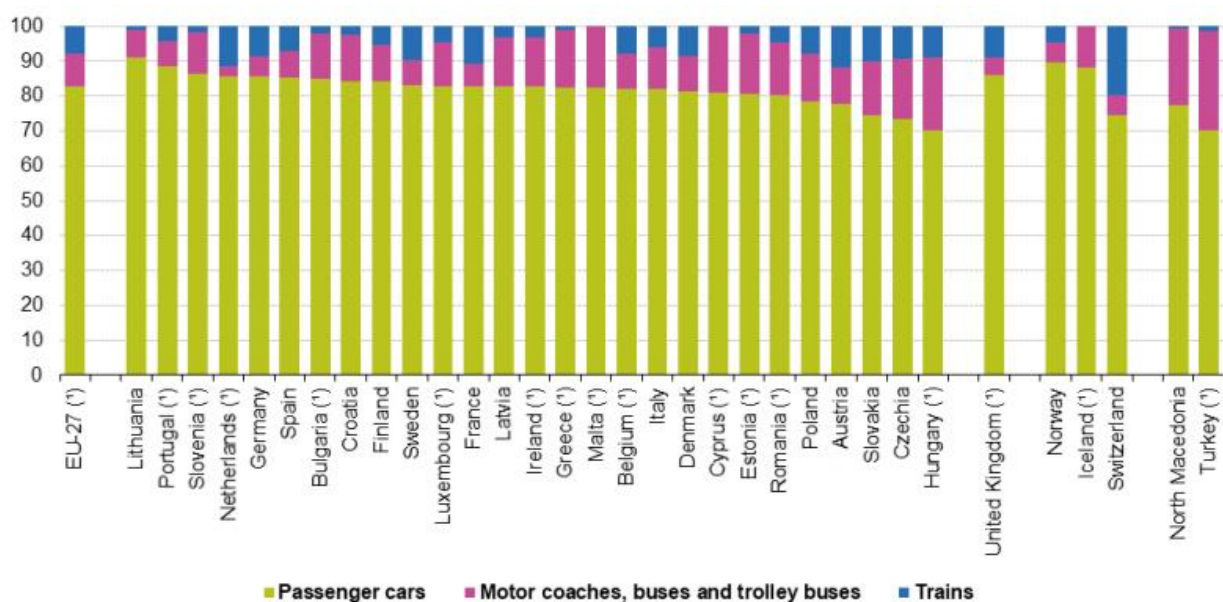


Figure 2: Modal split of inland passenger transport, 2017. (% share in passenger – km) (Eurostat, 2021)

Throughout Europe, road-based transportation is used. Private automobiles account for 80% of trips, while buses and rubber-tired public transportation account for roughly 10%. Approximately 10% of the rail system is in use. In comparison to European countries, passenger rail transit in Turkey is essentially non-existent.

Investments

Recently, in addition to highway investments, investments in different modes have started to be made intensively, especially for the purpose of harmonization with the

European Union and the development of transportation corridors for the freight transportation. The share of the airline in Turkey, which was 1.8% in 2000, increased to 9.4% in 2018, and the share of the highway, which was 95.9% between the same years, decreased to 88.8%. From 2.2 percent in 2000 to 1.2 percent in 2018, the railway share has declined. In 2018, seaway had a 0.56 percent share in passenger travel (EUCC, 2021). Details are given in Figure 3. Especially after 2012, a significant decrease is observed in road passenger transport.

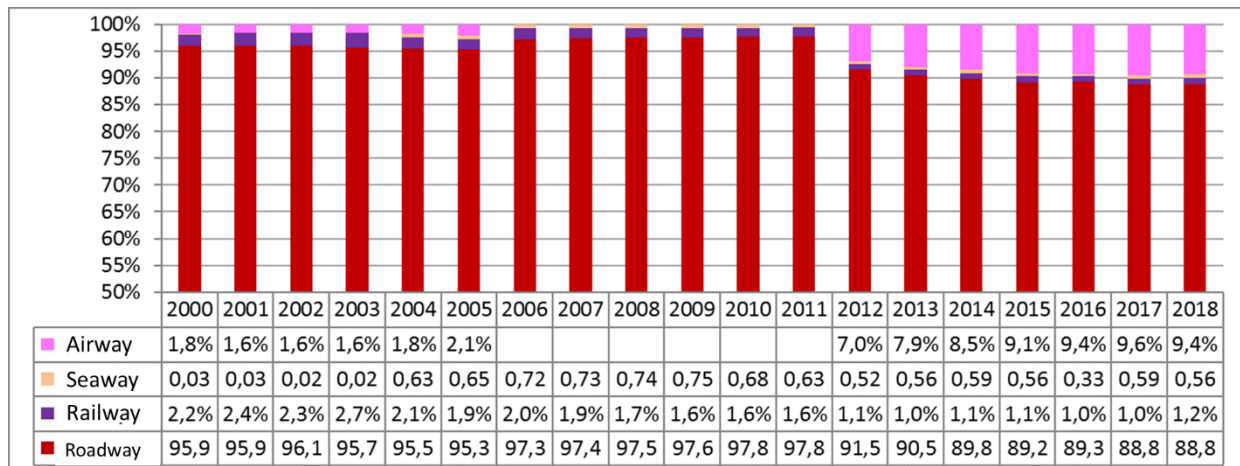


Figure 3: Modal split of passenger transportation in Turkey by years.

Investments in airlines have attracted passengers not only from roads but also from railways.

On the other hand, investments on the roads continues in Turkey. Tunnels connecting big cities, bridges connecting continents and two separated settlements, and roads but especially the divided and high standard highways and roads. In the table below, it is shown that there is a strong relationship between divided roads and fatal traffic accidents. The number of fatal accidents since 2014 are taken into consideration just because of the law regulation that mentioned before.

Evaluation

Transportation investments in Turkey were first focused on the railway axis, particularly until the 1940s, as the country's

economic condition and policies changed, the focus shifted to the highway investment (Arslan and Ozturk, 2021). While the investments help to build a high-quality road network for freight transportation, they also help to improve traffic safety for passenger transit. The good impact of divided roads on traffic safety is particularly noteworthy. Figure 4 depicts the evolution of the link between the length of divided roads and the number of fatal and injury accidents over the years. Despite an increase in the population and number of motor vehicles, the number of fatal and injury accidents remained constant as the length of the divided road increased, and then a significant decrease was observed, especially after 2018. There is a 19% decline in the number of fatal and injured traffic accidents between 2018 and 2020, and a 27% decrease in mortality.

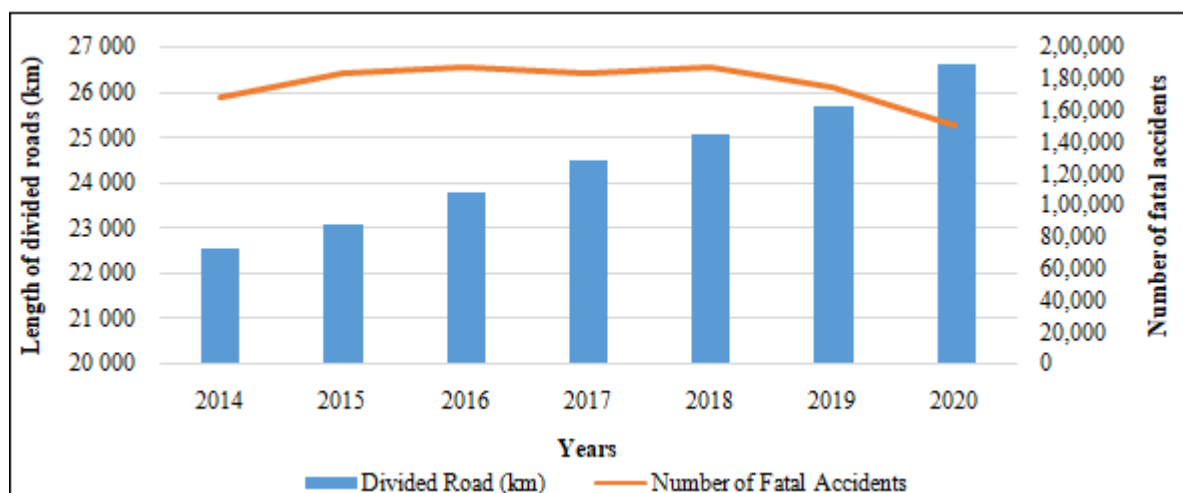


Figure 4: The relationship between divided roads and fatal accidents

2. Conclusion

In terms of traffic safety, divided roads and road standards are critical. The forgiving road, the suitability of the road geometry, and the implementation of road elements such as guardrails in accordance with the standards are factors that increase traffic safety. According to the results, divided roads contribute to traffic safety and are one of the key factors that decrease the fatal traffic accidents on roads. Many benefits of divided roads can be mentioned, especially in intercity travels. The biggest benefit is undoubtedly that it

significantly reduces the risk of fatal and injury traffic accidents by preventing head-on collisions. In addition, it can save fuel and time as it allows faster travel on safer roads due to its division. What needs to be done from now on is to increase the divided road network more, but not to be condemned to a development dependent only on highways. Much attention should be paid to the rail system, which is one of the cleanest modes of transportation, as well as the importance given to the highway.

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