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**INVESTIGATION OF THE EFFECTS OF VISION ZERO
APPROACH ON ROAD TRAFFIC SAFETY:**

GAZİANTEP

M.Sc. THESIS

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**Investigation of the Effects of Vision Zero Approach on
Road Traffic Safety: Gaziantep**

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in

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Hasan Kalyoncu University

Supervisor

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ABSTRACT

INVESTIGATION OF THE EFFECTS OF VISION ZERO APPROACH ON ROAD TRAFFIC SAFETY: GAZİANTEP

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Vision Zero strategy was developed as an effective solution to traffic accidents and the number of injuries and fatalities in Sweden in 1997 and spread worldwide.

Turkey is among the ten countries constituting almost half of the global traffic accident deaths. Turkey started to implement Vision Zero strategies and activities in 2013, such as infrastructure enhancements including double-lane highways, law and enforcement revisions, post-crash emergency response, and care and realized positive results. Previous studies have examined these applications for inter-urban roads but not inner-city streets.

In this study, the effect of vision zero applications was investigated for the first time in Turkey on urban roads in Gaziantep. Speed controls applied for speed control, the first cause of traffic accidents in Turkey and the world, were evaluated. Only one year after the start date of speed inspections, an 87.5 % decrease in traffic accidents in urban death rates was determined. As a result of the coup in Turkey in 2016, the EDS system was turned off for security reasons. There has been an increase of five times in urban death rates in traffic accidents in the following year, 2017. Later, due to various administrative reasons, only red light violation cameras were put into service, and speed corridor enforcements were not implemented. During this period, an 37,5 % decrease was observed in the urban death rates in traffic accidents, according to 2015 results.

Key Words: Vision Zero, Road Safety, Traffic Accidents, Speed Enforcement, Red-light Violation

ÖZET

VİSİON ZERO YAKLAŞIMININ KARAYOLU TRAFİK GÜVENLİĞİNE ETKİLERİNİN ARAŞTIRILMASI: GAZİANTEP

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79 Sayfa

Vizyon sıfır stratejisi 1997 yılında İsveç'te bu soruna etkili bir çözüm olarak geliştirilmiş ve tüm dünyaya yayılmıştır.

Türkiye'nin küresel trafik kazası ölümlerinin neredeyse yarısını oluşturan on ülke arasında yer alıyor. Türkiye, 2013 yılında çift şeritli otoyollar dahil altyapı geliştirmeleri, kanun ve uygulama revizyonları, kaza sonrası acil müdahale ve bakım gibi Vizyon sıfır stratejilerini ve faaliyetlerini uygulamaya başlamış ve olumlu sonuçlar elde etmiştir. Bu uygulamaların sonuçları daha önceki çalışmalarda şehirlerarası yollar için incelenmiştir, ancak şehir içi yollar için incelenmemiştir.

Bu çalışmada Türkiye'de ilk kez Vision Zero uygulamalarının Gaziantep'te kentiçi yollar üzerindeki etkisi araştırılmıştır. Türkiye'de ve dünyada trafik kazalarının ilk sebebi olan hız kontrolü için uygulanan hız kontrolleri değerlendirilmiştir. Hız denetimlerinin başlama tarihinden sadece bir yıl sonra kent içi ölüm oranlarında trafik kazalarında %87,5'lik bir azalma tespit edilmiştir. Türkiye'de 2016 yılında yaşanan darbe sonucu güvenlik nedeniyle EDS sistemi kapatılmıştır. 2017 yılının ertesi yılında trafik kazalarında kentiçi trafik kazalarındaki ölüm oranlarında 5 kat artış olmuştur. Daha sonra çeşitli idari nedenlerden dolayı sadece kırmızı ışık ihlali kameraları devreye alınmış ve hız koridoru uygulaması yapılmamıştır. Bu dönemde kırmızı ışık ihlal kameraları kullanılarak 2015 yılı sonuçlarına göre trafik kazalarında kentiçi ölüm oranlarında %37,5 azalma gözlenmiştir.

Anahtar Kelimeler: Vizyon Sıfır, Trafik Kazaları, Yol Güvenliği, Hız Denetimi, Kırmızı Işık İhlali



To my dearest family...

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TABLE OF CONTENTS

	Page
ABSTRACT	v
ÖZET	vi
ACKNOWLEDGMENTS	viii
TABLE OF CONTENTS	ix
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER 1	1
INTRODUCTION	1
1.1 Introduction	1
CHAPTER 2	3
LITERATURE REVIEW	3
2.1 Literature Review	3
2.2 The Safe System Approach: Accommodating Human Error	5
2.2.1 Speeding	5
2.2.2 Distracted Driving	6
2.2.3 Unsafe Road Infrastructure	6
2.2.4 Safe Vehicles	6
2.2.5 Inadequate Post-Crash Care	7
2.2.6 Inadequate Law Enforcement of Traffic Laws	7
2.3 Previous Studies on Vision Zero	7
2.3.1 Vision Zero in Sweden and Norway	8
2.3.2 Vision Zero in European Union Countries	11
2.3.3 Vision Zero in Canada and The USA Cities	13
CHAPTER III	17
METHODOLOGY	17
3.1 Methodology	17
3.1.1 Traffic Safety and Statistics in Turkey	17
3.1.2 Study Area; Gaziantep	22
3.1.3 Traffic Safety and Statistics in Gaziantep	22
3.1.4 EDS System in Gaziantep	23
3.1.5 Data Collection in Gaziantep	27
3.1.6 Vision Zero Safe System Approach	28
CHAPTER IV	30
RESULTS AND DISCUSSION	30
4.1 Results and Discussions	30
4.1.1 Data Analysis	30
4.1.2 2015 Local Accident Analysis	31
4.1.3 2016 Local Accident Analysis	31
4.1.4 2017 Local Accident Analysis	33
4.1.5 2018 Local Accident Analysis	34
4.1.6 2019 Local Accident Analysis	34
4.1.7 2020 Local Accident Analysis	35
4.3 Effects of Vision Zero in Gaziantep	37
4.3.1 Application of Vision Zero on Selected Intersections	38
CHAPTER V	42

CONCLUSIONS.....	42
REFERENCES.....	44
APPENDIX.....	47
APPENDIX 1 Number of traffic accidents involving death or injury, by province 2013	47
APPENDIX 2 Number of traffic accidents involving death or injury, by province 2014	48
APPENDIX 3 Number of traffic accidents involving death or injury, by province 2015	49
APPENDIX 4 Number of traffic accidents involving death or injury, by province 2016	50
APPENDIX 5 Number of traffic accidents involving death or injury, by province 2017	51
APPENDIX 6 Number of traffic accidents involving death or injury, by province 2018	52
APPENDIX 7 Number of traffic accidents involving death or injury, by province 2019	53
APPENDIX 8 Number of traffic accidents involving death or injury, by province 2020	54
APPENDIX 9 Deaths and injured in 2015, Gaziantep	55
APPENDIX 10 Deaths and injured in 2016, Gaziantep	56
APPENDIX 11 Deaths and injured in 2017, Gaziantep	57
APPENDIX 12 Deaths and injured in 2018, Gaziantep	58
APPENDIX 13 Deaths and injured in 2019, Gaziantep	59
APPENDIX 14 And injured in 2020, Gaziantep	60
APPENDIX 15 Accident Statistics in Gaziantep, 2015-2016	61
APPENDIX 16 Accident Statistics in Gaziantep, 2016-2017	62
APPENDIX 17 Accident Statistics in Gaziantep, 2017-2018	63
APPENDIX 18 Accident Statistics in Gaziantep, 2018-2019	64
APPENDIX 19 Accident Statistics in Gaziantep, 2019-2020	65

LIST OF TABLES

	Page
Table 2.1. Number of fatalities on Swedish roads	10
Table 2.2. Deaths rate per 1.000.000 in Canada.....	14
Table 3.1. Traffic accident statistics in Turkey.....	18
Table 3.2. Speed limits locations in Gaziantep	24
Table 4.1. Total Fatal and Injury Accidents, Deaths and Injured in 2015 to 2020.....	36
Table 4.2. According to a year, total deaths in Gaziantep	37



LIST OF FIGURES

	Page
Figure 2.1. Yearly fatalities 1990-2016.....	9
Figure 2.2. Less speed less death strategy.....	11
Figure 2.3. Traffic fatalities in Norway 2006-2019	11
Figure 2.4. Road traffic fatalities 2010-2019	13
Figure 2.5. Pedestrians and cyclists killed or seriously injured on Toronto streets ...	15
Figure 2.6. Fatalities 2000-2019 in New York before Vision Zero/ after Vision Zero	16
Figure 2.7. Pedestrian-vehicle collisions in Los Angeles, 2015-2020	16
Figure 3.1. Deaths at the accident site of TUIK 2009-2020	20
Figure 3.2. Number of injured / TUIK 2009-2020.....	20
Figure 3.3. Number of deaths / TUIK 2009- 2020.....	21
Figure 3.4. Rate % in total / TUIK 2007-2018	21
Figure 3.5. Gaziantep of Turkey	22
Figure 3.6. License Plate Recognition System in Gaziantep	25
Figure 3.7. EDS cameras in Gaziantep Map	25
Figure 3.8. EDS system cameras in Gaziantep 2018-2019	26
Figure 3.9. Traffic accident report in Turkey (adopted from official document by A.Ş. Cengiz)	28
Figure 3.10. Complement in Vision Zero.....	29
Figure 4.1. Points of fatal accidents in Gaziantep.....	32
Figure 4.2. Accident types TUIK 2015-2020.....	36
Figure 4.3. Total deaths increases in Gaziantep	38
Figure 4.4. İbrahimli Intersection	39
Figure 4.5. University Intersection.....	39
Figure 4.6. Mehmet Şimşek Intersection	40
Figure 4.7. Çimento Intersection.....	41

LIST OF ABBREVIATIONS

BAC	Blood Alcohol Concentration
EDS	Electronic Inspection System
EU	European Union
GIS	Geographic Information System
OECD	Organization for Economic Co-Operation and Development
POLNET	Police Information
PTS	License Plate Recognition System
UN	United Nations
VZ	Vision Zero
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Introduction

According to World Health Organization data, 1.3 million people die in traffic accidents per year. Between 20-50 million more people are injured, many of them remain disabled due to their injuries. The economic losses of individuals and families injured in road traffic accidents are significant. These losses are the cost of treatment and loss of productivity for individuals who have died or been disabled due to their injuries and for family members who need to take time off from work or school to care for the injured. More than 90% of deaths in road traffic accidents occur in low- and middle-income countries. Traffic accident mortality rates are highest in the African region, which is low-income. Mortality rates are also high in high-income countries. Because people with a lower socioeconomic background are more likely to be involved in traffic accidents. In Dec accidents, children and young people aged 5-29 years are injured. Despite the misconception that women are more likely to have an accident in traffic, research has shown that men are more likely to be involved in traffic accidents. About three quarters (73%) of road accident deaths occur among young men under 25.

Sweden's Vision Zero road safety policy is illustrated in the literature and various programs (Corben et al., 2010; Elvebakk and Steiro, 2009; Johansson, 2009; Larsson et al., 2010; OECD/ITF, 2008; Racioppi et al., 2004). In 1995, the Swedish Highway Administration started to develop a safe system approach. The results of this development work are documented in 'Vision Zero - The idea of a road transport system without loss of health' (Vägverket, 1996). The principles of the widely known policy about Vision Zero are that many other road safety policies globally provide for zero deaths as the ultimate road safety goal (Johansson, 2009; Larsson et al., 2010).

In this study, the general purpose of Vision Zero was explained, and the applications of Vision Zero in Turkey were examined. The operation of the electronic control

system, which is one of the Vision Zero applications, and its effect on traffic accidents were investigated on urban roads in Gaziantep city applications. The Vision Zero strategy proved to be a successful application in road safety.



CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

On October 9, 1997, Sweden adopted Vision Zero, the long-term goal for safety in road traffic. Vision Zero was adopted by all political parties (Tingwall., 1998).

Vision Zero is a Secure System. Responsibility for traffic accidents does not extend to people who use the roads. People who design roads are responsible for road accidents. Work has been started to create a secure system that forgives human error. The structure of an effective Vision Zero strategy consists of a Secure System Approach.

Different efforts have been made in many government periods to reduce traffic accidents from the past to the present. Many measures have been implemented. Our country's view of the traffic issue has gained a strategic dimension after July 15, which is, in a sense, a security milestone.

Some people claim that an increase in speed in traffic is the real danger. This claim shows that vehicles that moved faster or slower than average on two-lane rural roads in the 1960s were more likely to be involved in accidents. However, this research has shown that participation in violent accidents has increased rapidly (Solomon, 1964).

Kerimoğlu (2009) is the most important indicator that Vision Zero will succeed in Turkey. It has been concluded that the population between the ages of 10-24 has about 19 million. In the future, this age group, which can be trained and adapt to attitude-behaviour change, will witness zero death for a maximum of 10 years.

Will have positive results in traffic safety.

According to Punase (2006), a Vision Zero plan has been developed in Alexandria with many data sources. The risk-taking behaviour of an individual driving in traffic also shows a statistically significant relationship with the risk of UHI. Increased alcohol levels and speeding during a crash event increase the risk of KSI. It has been studied

d in this study that using safety equipment in a traffic accident reduces CSI risk.

Goldenbeld et al. (2005) many studies have examined the effects of mobile speed cameras in rural areas. In Canada, the effects of mobile cameras on rural roads have been studied. The study results showed a decrease of 25% in traffic accidents during the day, 11% in serious accidents during the day, and 17% in accident deaths during the day.

According to Keall (2016), it was studied that there was an increase in 20% of hidden mobile cameras, a 17% decrease in injury accidents and a 31% decrease in deaths in 2 years in New Zealand.

Vision Zero was unsuccessful in the first years of its implementation in Sweden. The reason for his failure to succeed was the economic crisis that occurred. A few years after Vision Zero was made official policy, road traffic accidents have increased. Sweden's goal was to reduce road traffic deaths by 50 per cent from 1997 to 2007. However, it seems that this goal is no longer achievable. In Norway, the number of deaths in road traffic has decreased significantly over the past three years. However, a similar development can be observed in many Northern European countries, and a causal chain cannot be established definitively (Elvebakk, 2007).

Despite the mixed results, Vision Zero is in many ways a success story, as the vision has made significant progress in the discursive field. Vision Zero is now very well known in road safety management, especially in Europe, and its principles are forming the basis of road safety policies in many countries and organizations. It is, for instance, possible to recognize some concepts and ideas from Vision Zero in the European Union's latest Action Programme for Road Safety, Saving 20 000 Lives on our Roads. A Shared Responsibility.

Özen et al. (2014) age level in opinions on determining the causes of traffic accidents, educational status, occupation, whether people own a vehicle, the distance traveled by the vehicle annually, and there are differences in the opinions of individuals about whether they have had an accident with the vehicle in the last one year. Opinions on determining the causes of traffic accidents although it is expected that education affects thinking more, education is only two created a difference of opinion.

Hassan et al. (2017) success of road safety in the UAE mainly relies on improving traffic safety education, rehabilitation programs for violators, continuous awareness campaigning, training of government officers, and installment of more monitoring devices. An exclusive independent organization for traffic safety is urgently needed for better coordination among stakeholders. This organization can be responsible for managing the whole traffic safety sector. Meanwhile, a strong political will and determination can lead to improving traffic safety in the country.

According to AAA Foundation for Traffic Safety (2020), the 2019 national telephone survey was conducted by the AAA Foundation for Traffic Safety. Nearly half of the drivers reported exceeding the speed limit by 15 mph on a highway last month, and more than 40 percent reported exceeding the speed limit by ten mph.

Male drivers are more likely than women to speed (Waller, 1991).

According to data from the Turkish Statistical Institute (2020), some 984,000 traffic accidents occurred in Turkey in 2020, down from 1.2 million in the previous year.

Currently, the speed limit for passenger cars on highways is 120 kilometres per hour (km/h). It is 100 km/h for buses and 90 km/h for trucks 7,530 people were killed in road accidents in 2015, but the death toll declined to 4,866 in 2020. According to research, driver's licenses increased by more than 36 per cent, while motor vehicles increased by 49.6 per cent. Despite these increases, traffic accidents and deaths from accidents have decreased.

2.2 The Safe System Approach: Accommodating Human Error

The Safe System approach to road safety aims to ensure a safe transport system for all road users. Such an approach considers people's vulnerability to severe injuries in road traffic crashes and recognizes that the system should be designed to forgive human error. The cornerstones of this approach are safe roads and roadsides, safe speeds, safe vehicles, and safe road users, all of which must be addressed to eliminate fatal crashes and reduce serious injuries (WHO, 2021).

2.2.1 Speeding

- An increase in average speed is directly related to the likelihood of a crash occurring and the severity of the consequences of the crash. For example, every

1% increase in mean speed produces a 4% increase in the fatal crash risk and a 3% increase in the severe crash risk.

- The death risk for pedestrians hit by car fronts rises rapidly (4.5 times from 50 km/h to 65 km/h).
- In car-to-car side impacts, the fatality risk for car occupants is 85% at 65 km/h.
- Driving under the influence of alcohol and other psychoactive substances
- Driving under the influence of alcohol and any psychoactive substance or drug increases the risk of a crash that results in death or serious injuries.
- In the case of drink-driving, the risk of a road traffic crash starts at low blood alcohol concentration (BAC) levels and increases significantly when the driver's BAC is ≥ 0.04 g/dl.
- In the case of drug driving, the risk of incurring a road traffic crash is increased to differing degrees depending on the psychoactive drug used. For example, the risk of a fatal crash occurring among those who have used amphetamines is about five times the risk of someone who has not (WHO, 2021).

2.2.2 Distracted Driving

Many factors can cause a driving disorder. Especially the distraction caused by mobile phones is one of the riskiest elements for road safety.

The accident risk of drivers using mobile phones is approximately four times higher than drivers who do not use mobile phones—using a phone while driving slows down the driver's reaction times. In particular, brake response time increases the risk of accidents (WHO, 2021).

2.2.3 Unsafe Road Infrastructure

The design of roads can have a significant impact on road safety. Ideally, roads should be designed for the safety of all road users. These road users are pedestrians, cyclists, and motorcyclists. Trails, bike lanes, safe crossing points, and other traffic calming practices reduce the risk of accidents (WHO, 2021).

2.2.4 Safe Vehicles

Safe vehicles play an essential role in preventing accidents and reducing the likelihood of serious injury. Several UN regulations regarding vehicle safety could potentially save many lives. These include ensuring that vehicle manufacturers

comply with front and side-impact regulations, include electronic stability control (to prevent excessive steering), and all vehicles are fitted with airbags and seat belts. Without these standards, the risk of injury in traffic increases significantly for both occupants and those outside the vehicle (WHO, 2021).

2.2.5 Inadequate Post-Crash Care

Delays in identifying those involved in a traffic accident and emergency response increase the severity of injuries. Early intervention is significant after an accident has occurred (WHO, 2021).

2.2.6 Inadequate Law Enforcement of Traffic Laws

In 2019, 846 people were killed in crashes that involved red-light running. One hundred forty-three thousand people were injured. Road traffic fatalities and injuries will not be reduced unless traffic laws regarding drink-driving, seat belt wearing, speed limits, helmets, and child restraints are enforced. Therefore, the risk of accidents increases if traffic laws are not enforced. Effective implementation includes creating, regularly updating, and enforcing national, municipal, and local laws on the risk mentioned above factors. It also includes the definition of appropriate penalties (WHO, 2021).

2.3 Previous Studies on Vision Zero

The Vision Zero approach believes traffic collisions are not 'accidents' but are predictable and preventable. Road users inevitably make mistakes, but these mistakes should not result in severe or fatal injuries. Some countries globally have the most deaths and injuries caused by road accidents they have developed various security approaches to minimize. These approaches to transportation have changed the traditional view of the system, especially the highway. Prior research has analyzed this approach and application of vision zero.

Özgün (2015) examined the geographical locations of the accidents. In her study, it was aimed to determine accident hot spots according to geographical conditions. 2013 Gaziantep accident data was analyzed in terms of days and hours. She analyzed the data with the Geographic Information System (GIS). These accidents are shown on the map. Locations with Geographic Information System (GIS) were examined according to accident coordinates, accident time, weather conditions, road type and

showed the findings. In her study, when she examined the traffic accidents according to the seasons and months, it was examined that the accidents mainly occurred in summer and least in winter. Accidents mainly occurred in October, at least in December. In her study, it was seen that most of the accidents occurred during the daytime.

Ulu (2015) examined the EDS systems in Istanbul. According to the statistical data in the study, the speed-related death rate in Turkey is 41%. In Istanbul, this rate is 33%. According to these data, the province of Istanbul, which he included in his study, ranks first in Turkey regarding speed-related deaths. He observed a severe decrease in traffic accidents in the EDS system's regions. He examined 7918 red light violations in Istanbul three months before the EDS system was implemented. After the EDS system was implemented, this number decreased to 1327.

Erdoğan (2021) Turkey is one of the two countries that achieve the target of a 50 per cent decrease in the world's loss of life in traffic accidents. He analyzed that the loss of life will decrease by 33% in 2020. A pedestrian priority traffic system was introduced in Turkey. While the loss of life per 100 thousand populations in our country was 13,4 in 2010, the loss of life in 2019 was 7,5. European Transport Safety Council 2020-2030: The EU has reduced road deaths by 50% by 2020.

2.3.1 Vision Zero in Sweden and Norway

Sweden

The Vision Zero (VZ) was conceived in 1994. The Parliament passed a Road Traffic Safety Bill that put the Vision Zero into Swedish law three years later. Sweden had the highest death rate in 1997 when it passed this law. Figure 2.1 shows the annual death rates of Sweden in the graph. Since 1997, when Sweden adopted Vision Zero, many places have also taken this approach. After the vision zero application, there was a decrease in accident rates. The lowest accident rates were seen in 2019 and 2020. Table 2.1 below shows the decrease in the accidents rate. Because of the implemented road safety programs, fatalities have decreased since 2000 in Sweden and many other countries. In the EU, for example, fatalities have decreased by 20% since 2010. The reduction in Sweden was from 1,307 fatalities in 1970 to 440 in 2005; in Norway, from 560 fatalities in 1970 to 304 in 1999. In 1975, seat belts were

made mandatory in the front seats in Sweden. Also, in the 1980s, the use of belts in the back seats and child seat belts was made mandatory. These changes examined significant increases in seat belt use (Elvik et al., 2004). Recent studies in Sweden show that more than 80% of the severe injuries for urban roads occurred among pedestrians and 11 cyclists (Värnild et al., 2019). A published study shows that although the number of seriously injured vehicle occupants fell from 2003 to 2014, the incidence of seriously injured unprotected road users, especially in urban areas, has increased (Vision Zero, 2014).

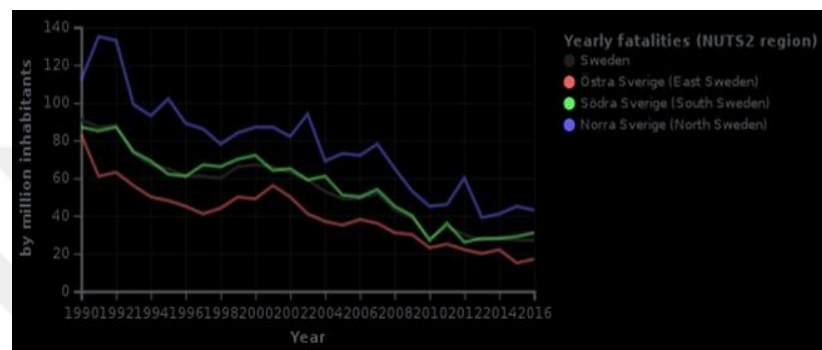


Figure 2.1. Yearly fatalities 1990-2016

Table 2.1. Number of fatalities on Swedish roads

YEAR	FATALITIES	DECREASES
1997	541	-
1998	531	-%2
1999	580	%9
2000	591	%1
2001	583	-%2
2002	532	-%9
2003	529	-%0.5
2004	480	-%10
2005	440	-%9
2006	445	%1
2007	471	%5
2008	396	-%16
2009	355	-%11
2010	266	-%26
2011	319	%19
2012	285	-%11
2013	260	-%9
2014	270	%3
2015	259	-%5
2016	270	%4
2017	253	-%7
2018	324	%28
2019	221	-%32
2020	204	-%8

If there is one thing that can save lives from traffic crashes, it is slowing speeds (Figure 2.2). It is also because the faster a driver goes, the smaller a driver's field of vision is, and the less time a driver has to react and prevent a crash (Vision Zero Network, 2015).

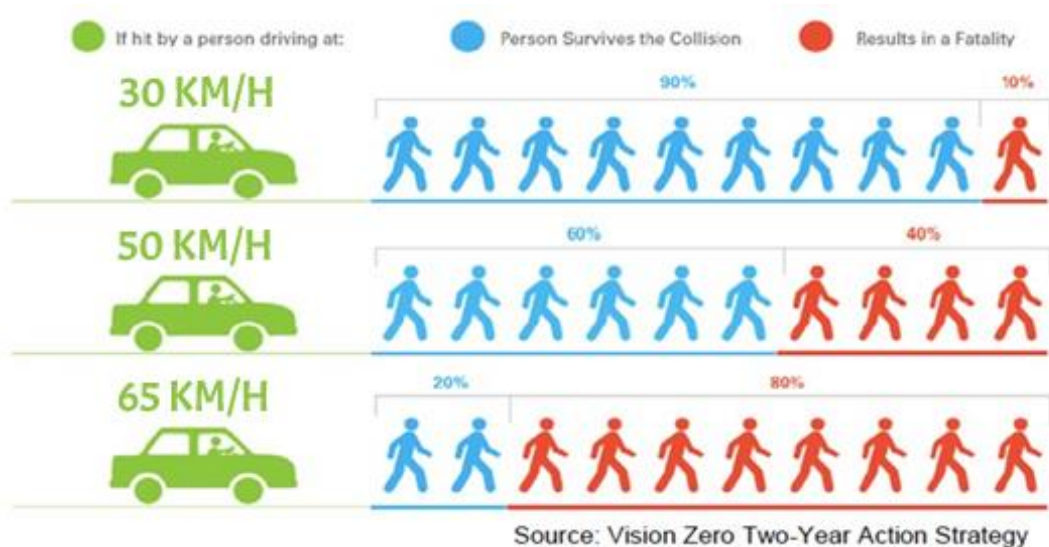


Figure 2.2. Less speed less death strategy

Norway

Norway accepted its version of Vision Zero in 1999. Ninety-five people died on Norwegian roads that year. The highest traffic fatality was in 2008. There were 108 traffic deaths in Norway in 2019 (Figure 2.3). The lowest traffic accident rate was the rate in Europe (Statista, 2020).

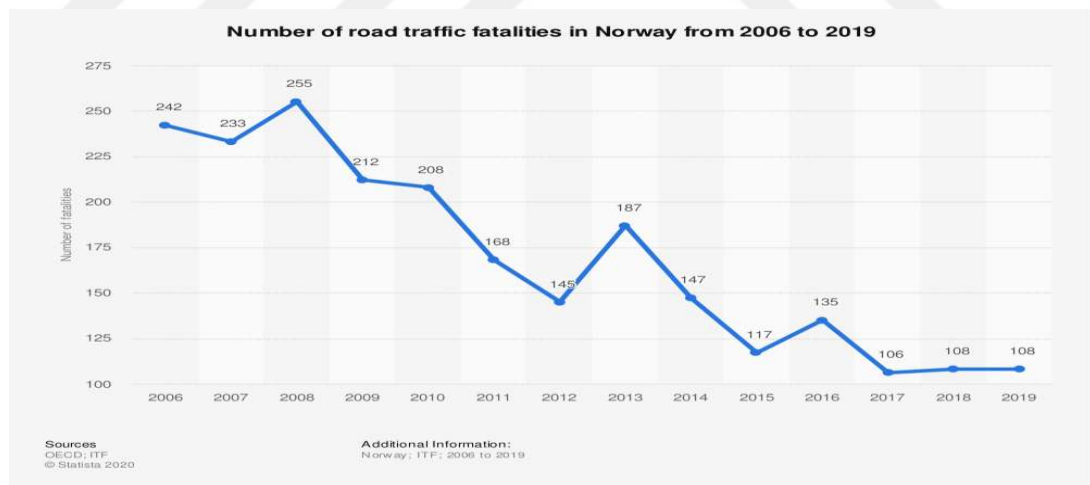


Figure 2.3. Traffic fatalities in Norway 2006-2019

2.3.2 Vision Zero in European Union Countries

In May 2018, the European Commission presented a third and final set of actions to modernize Europe's transport system. The European Commission wants to achieve the EU's long-term goal of approaching zero deaths and serious injuries by 2050. An estimated 18,800 people were killed in a road crash, an unprecedented annual fall of

17% in 2019. It means almost 4,000 fewer people lost their lives on EU roads in 2020 compared to 2019. As the result of the COVID-19 pandemic, lower traffic volumes had a clear, though unmeasurable, impact on the number of road fatalities. Based on preliminary figures, 18 Member States registered their lowest ever road fatalities in 2020. EU- wide deaths fell by an average of 17% compared to 2019. However, the reduction was far from uniform, with the most significant decreases (20% or more) occurring in Belgium, Bulgaria, Denmark, Spain, France, Croatia, Italy, Hungary, Malta, and Slovenia (Figure 2.4). In contrast, five Member States (Estonia, Ireland, Latvia, Luxembourg, and Finland) recorded an increase in fatalities, although the number in small countries tends to fluctuate from year to year. In contrast, five Member States (Estonia, Ireland, Latvia, Luxembourg, and Finland) recorded an increase in fatalities, although the number in small countries tends to fluctuate from year to year (Euractiv, 2021).

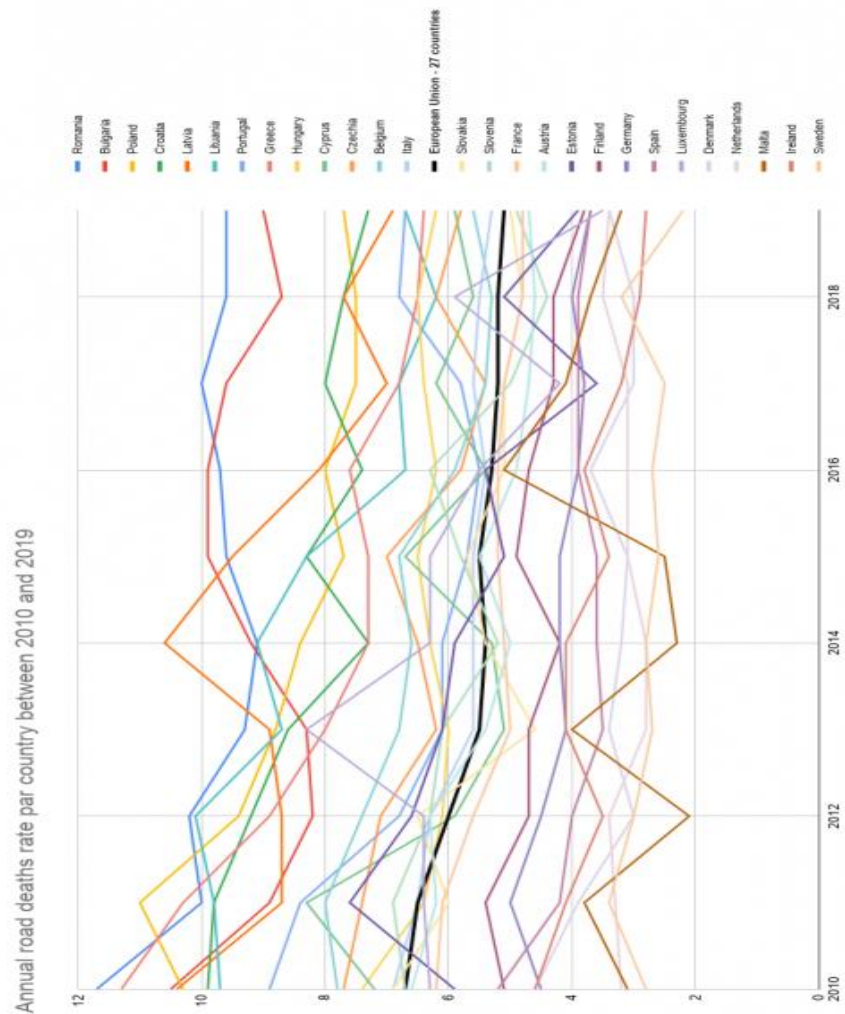


Figure 2.4. Road traffic fatalities 2010-2019

2.3.3 Vision Zero in Canada and The USA Cities

Canada

The Canadian Injury Prevention Association Parachute presented its Vision Zero in December 2015. Table 2.2 shows that the accident rates decreased in 2017. In 2008, Canada ranked tenth among other member states of the Organization for Economic Co-operation and Development (OECD) in terms of deaths (Parachute, 2021).

Table 2.2. Deaths rate per 1.000.000 in Canada

.YEAR	DEATHS
2003	2.777
2004	2.735
2005	2.898
2006	2.871
2007	2.753
2008	2.431
2009	2.216
2010	2.238
2011	2.023
2012	2.075
2013	1.951
2014	1.841
2015	1.889
2016	1.889
2017	1.856
2018	1.922

Acknowledging the rise in traffic-related fatalities, the City of Toronto developed a 5-year Vision Zero plan. It successfully achieved these goals in 2018. This success continued in 2019 and 2020. Forty-four people died in 2016. It is the highest figure between 2008 and 2018. Eighteen people died in 2011, and the year with the lowest death rate is shown in figure 2.5. Traffic volume on Toronto roads decreased by 45% and 65% due to the Covid-19 outbreak. In February and April 2020, a severe

decrease is observed in death rates. It is the implementation of the curfew due to the Covid-19 epidemic. We can say that 2020 is the year with the lowest death rate for Toronto (Figure 2.5).

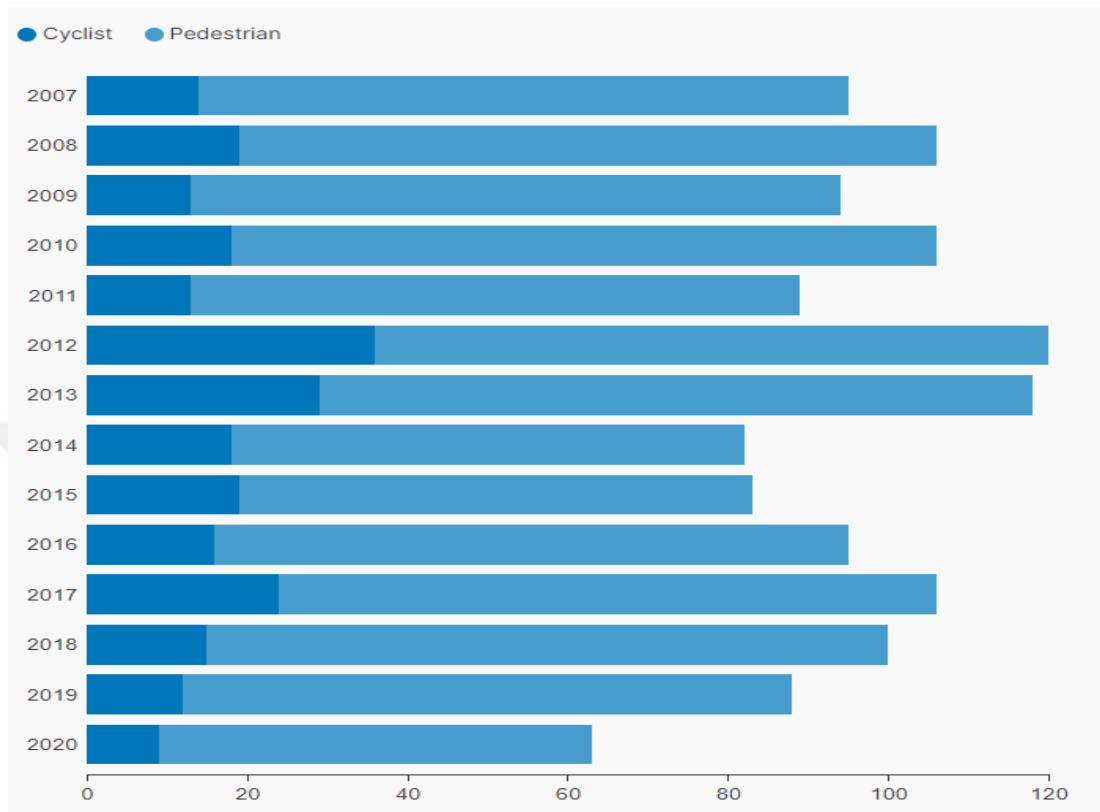


Figure 2.5. Pedestrians and cyclists killed or seriously injured on Toronto streets

New York

Vision Zero is a program created by New York City Mayor Bill de Blasio in 2014. The first four years after the adoption of Vision Zero was the safest 4-year period for traffic collisions in New York City's history. Fatalities in 2018 are at their lowest rate since 1910 when record-keeping began. Pedestrian deaths have fallen 42 percent, and overall traffic-related deaths fell 26 percent from the year before Vision Zero began. Figure 2.6 shows the data before and after the vision zero application in New York. Vision zero application resulted in a significant reduction in mortality rates (NYC, 2019).

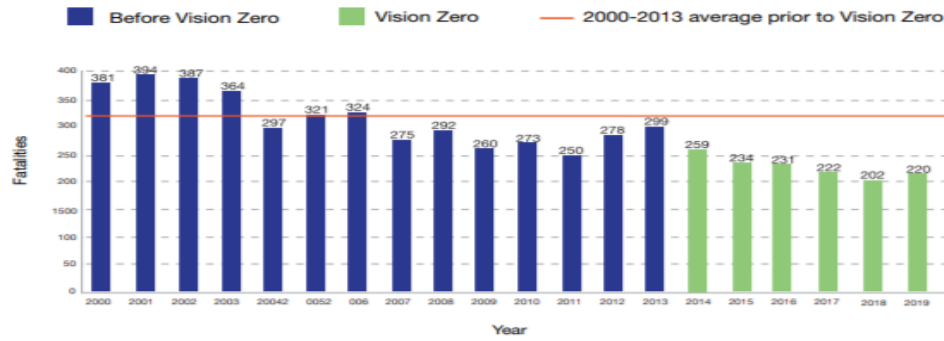


Figure 2.6. Fatalities 2000-2019 in New York before Vision Zero/ after Vision Zero

Los Angeles

Los Angeles mayor Eric Garcetti released a target zero strategy plan in September 2014. There are two targets. The first of these goals is to reduce citywide traffic deaths by 20 percent by 2017. The second is to eliminate citywide traffic deaths by 2025. Successful results of these targets are shown in figure 2.7. In Los Angeles in 2020, there was a severe decrease in traffic accident rates. The Covid-19 epidemic has had a significant impact on this decline (Crosstown, 2021).

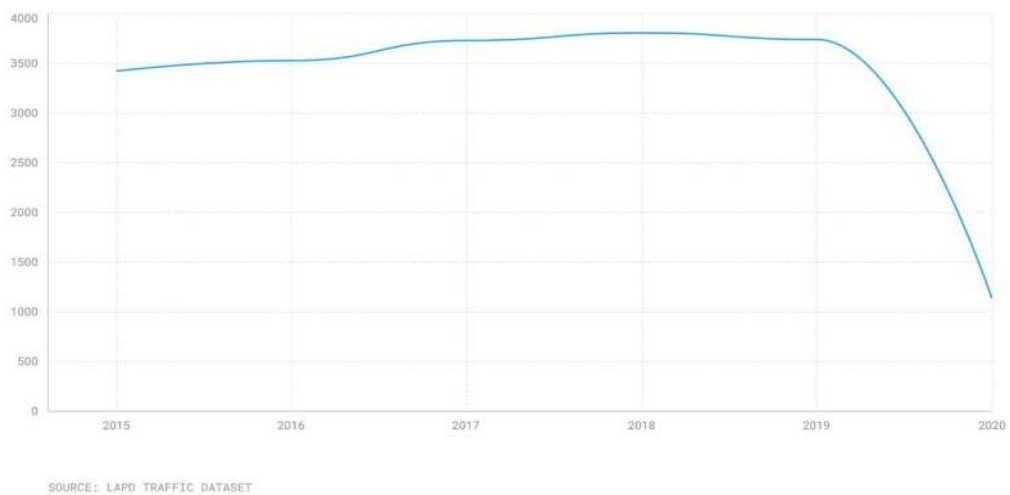


Figure 2.7. Pedestrian-vehicle collisions in Los Angeles, 2015-2020

CHAPTER III

METHODOLOGY

3.1 Methodology

3.1.1 Traffic Safety and Statistics in Turkey

In this section, accident statistics for Turkey are examined. Data on traffic accidents, deaths, and injuries in Turkey from 2009 to 2020 were analyzed (Table 3.1). The most serious accident, death, and injury rate were in 2015. The lowest accident, death, and injury rate was in 2020.

Turkey is among the ten countries constituting almost half of the global traffic accident deaths. Regarding their frequencies, health, and economic outcomes, traffic accidents must prioritize the public health agenda. According to the accident statistics, drivers have the biggest defect share with a 95 % ratio. The main components of the driver defect are; speed, alcohol, and drug use, sleep and fatigue, not using a safety belt, child car seat, and helmet. Turkey is dealing with the problem of road safety due to the annual average loss of 6000 lives because of traffic accidents. The increase has been analyzed in traffic accident numbers up to 2012 every year. There was a decrease in accidents in 2013 and 2014 (TUIK, 2015). Accidents increased again in 2015. Accidents decreased by 6.39% in 2018. And 1,229,364 accidents occurred (TUIK, 2019). In our country's road network in 2019, a total of 1 million 168 thousand 144 traffic accidents occurred. 993 thousand 248 of these accidents are property damage, and 174 thousand 896 are traffic accidents with fatal injuries. Five thousand four hundred seventy-three people died (TUIK, 2020). In 2020, a total of 983 thousand 808 traffic accidents occurred in our country's road network. 833 thousand 533 of these accidents are property damaged, 150 thousand 275 of them are traffic accidents with fatal injuries. Four thousand eight hundred sixty-six people died (TUIK, 2021).

Vision Zero aims to reduce the fatal and injured accidents described in this chapter to zero. In 2013 Turkey announced a Decade of Action for Road Safety and adopted a Road Safety Action Plan to prevent road traffic crashes, minimize road traffic

fatalities and injuries, and mitigate their impact on road users. The Government of Turkey adopted a Vision Zero concept, first introduced in Sweden in 1997 and proved to reduce road fatalities and injuries toward zero. Turkey's 2050 vision zero targets include half of the current death rates by 2030 and zero death rates by 2050. Together with better road crash statistics, road safety management, and adequate investments in road safety measures, this ambitious goal will help Turkey reach its goal.

Table 3.1. Traffic accident statistics in Turkey

YEAR	TOTAL ACCIDENTS	Fatal and injured accident	Property damage accident	Total fatalities	Injured
2009	1 053 346	111 121	942 225	4.324	201 380
2010	1 106 201	116 804	989 397	4.045	211 496
2011	1 228 928	131 845	1 097 083	3 835	238 074
2012	1 296 634	153 552	1 143 082	3 750	268 079
2013	1 207 354	161 306	1 046 048	3 685	274 829
2014	1 199 010	168 512	1 030 498	3 524	285 059
2015	1 313 359	183 011	1 130 348	7 530	304 421
2016	1 182 491	185 128	997 363	7 300	303 812
2017	1 202 716	182 669	1 020 047	7 427	300 383
2018	1 229 364	186 532	1 042 832	6 675	307 071
2019	1 168 144	174 896	993 248	5 473	283 234
2020	983 808	150 275	833 533	4 866	226 266

According to the 2010-2018 data of the Turkish Statistical Institute (TUIK), the population growth rate in the cities is 33%, while the rate of increase in private

vehicles is 64.33%. Urbanization, automobile ownership, and increases in drivers create demand for road transports and traffic density. To ensure coordination in the studies, the Ministry of Transport and Infrastructure (MOTI) monitors the policies, strategies, goals, and rules of procedures and implementation.

MOTI has also been conducting studies to ensure that identified standards are used across the country, that the communication infrastructure of these systems is expanded, and those necessary international relations are conducted. Within this framework, the first strategy document and action plan for intelligent transportation systems prepared by The Ministry of Transport and Infrastructure entered into force after being published in the Official Gazette no. 29156 dated October 25, 2014. The Action Plan, the annex of the strategy document covering the 2014-2016 period, consists of five strategic goals, 21 objectives, and 38 actions. Nine of these actions in the action plan for the 2014-2016 period were defined as continuous actions, and the remaining 29 were planned to be completed within that period. Highway deaths and injuries are a significant public health problem in Turkey and worldwide. Worldwide, approximately 1.35 million lives are lost per year due to road accidents; approximately 3.700 lives are lost per day. Turkey is also a country dealing with the problem of road safety due to the annual average loss of 6000 lives because of traffic accidents.

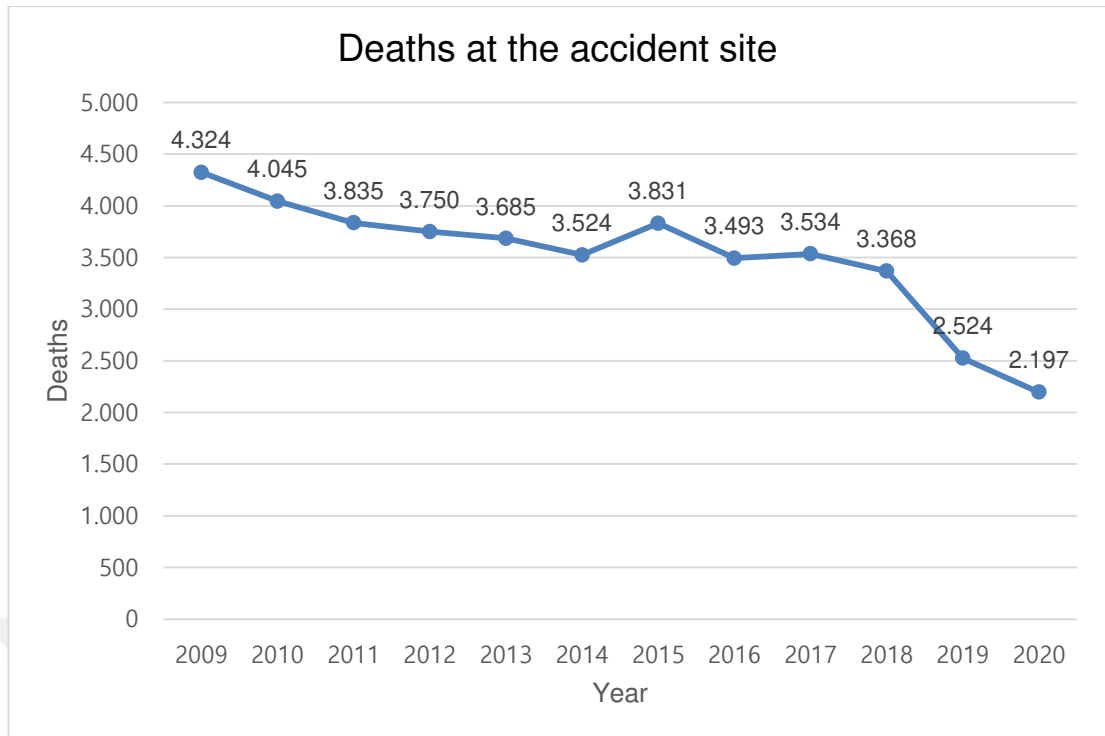


Figure 3.1. Deaths at the accident site of TUIK 2009-2020

Figure 3.1 shows that mortality rates in 2020 have fallen to almost half of those in 2009.

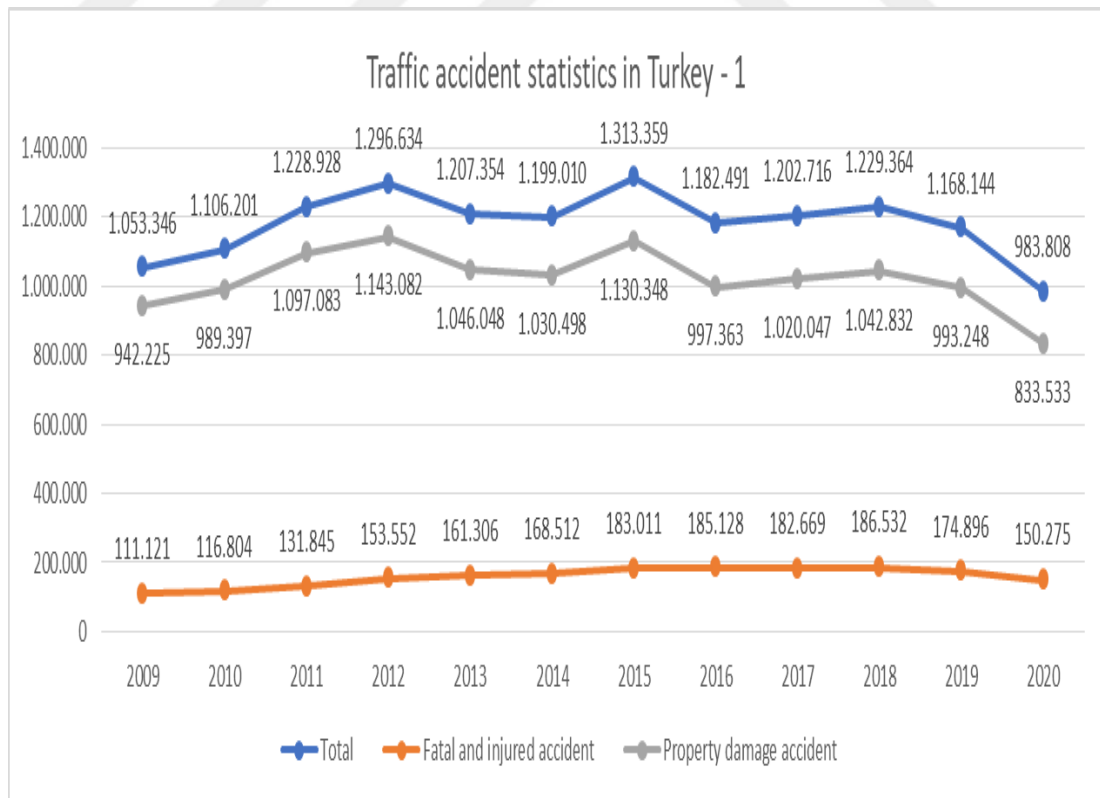


Figure 3.2. Number of injured/ TUIK 2009-2020

Figure 3.2 shows the rates of injuries and property-damage accidents in 2015. In 2020, a decrease in the number of injured and property damage accidents was studied.

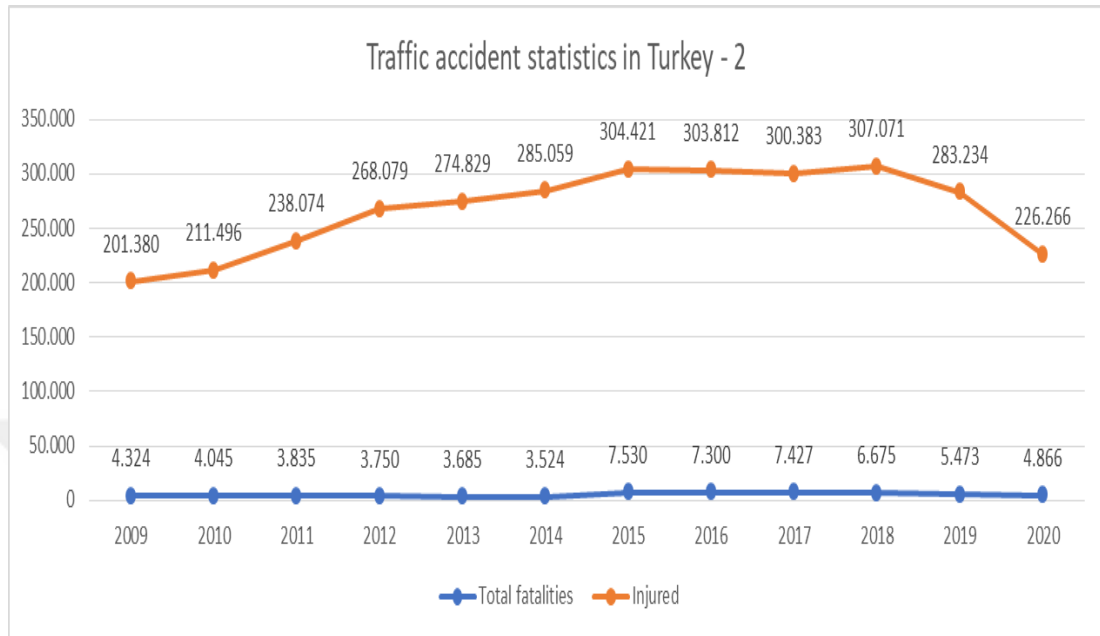


Figure 3.3. Number of deaths/ TUIK 2009-2020

In figure 3.4, the number of casualties caused by traffic accidents. From 2007 to 2014, there was a significant decrease in the number of casualties from road accidents. There was a significant increase in the number of casualties in 2015. However, since 2015 there has been a decline in road accidents. In figure 3.3, the total number of deaths was the highest in 2015. The total number of injured also increased in 2018.

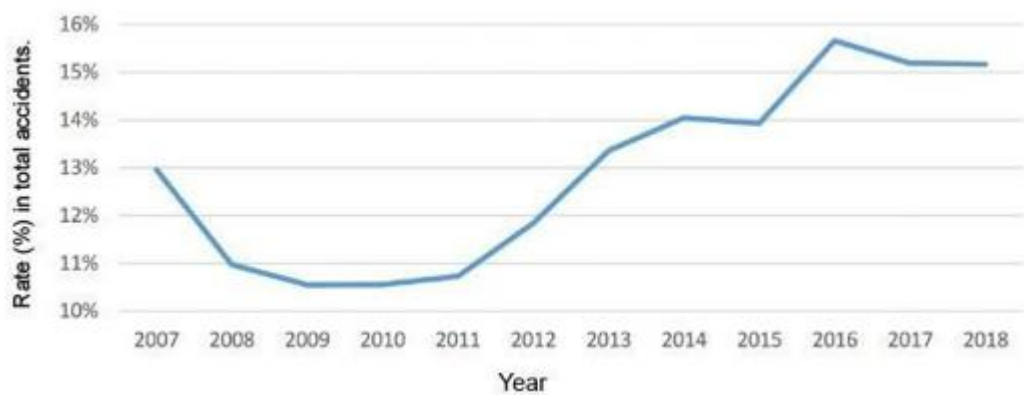


Figure 3.4. Rate % in total / TUIK 2007-2018

3.1.2 Study Area; Gaziantep

Gaziantep is among the largest provinces of Turkey with a population of 2,5 million with about 500 thousand refugees due to migration from the border war (Figure 3.5).



Figure 3.5. Gaziantep of Turkey

Efforts are proceeding to reduce fatal and injury accidents. In particular, the continuity of the city's following traffic has been ensured by the newly constructed grade-separated intersections and the left-turn bans implemented in urban areas of the city. Gaziantep, a traffic control center, was built in 2015. The system was restructured in 2017. It is a center where traffic flow in the city can be monitored 24 h a day with general vision cameras. Gaziantep Metropolitan Municipality continues its efforts to reduce fatal and injured accidents. The newly constructed crossover road ensured the continuity of the city's traffic and the left turn bans imposed in certain parts of the city.

3.1.3 Traffic Safety and Statistics in Gaziantep

According to accident data of recent years, Gaziantep is in the top 10 in the number of accidents in 81 provinces.

Therefore, specific applications have been needed to reduce the number of accidents. The most effective of these applications is the EDS system. In 2015, the Electronic Inspection System (EDS) provided road and driving safety reduced traffic violations. Moreover, significant reductions in traffic accidents are observed in addition to the

electronic control system (EDS). PTS (License Plate Recognition System) has been prevented by considering the start and end time of incorrect parking in areas where vehicles are prohibited from parking.

EDS is a control system developed to control traffic flow and optimize transportation, provide a specific normative structure following the rules of urban life, and ensure the safety of life and property by preventing accidents caused by vehicles that disrupt the order in traffic. With EDS, there are many areas such as parking violation, red light violation, pedestrian violation, security lane violation, reverse direction violation, violation of preferred roads used by public transport, violation of level crossing, violation of tramway, access control. EDS has unique cameras with night vision lenses to see long distances in high resolution. The vehicle's license plate is determined by image processing on the digital image taken with the camera. Speed control can be done with the same camera or additional radar sensors. Data collected and matched in EDS are securely stored with digital signature techniques. Data including time, date, location, type of violation, photographs of violations are transferred to the EDS center via a private wired network. Turn is forbidden. EDS application to ensure traffic safety is a system that detects vehicles that make wrong turns at intersections with no turn restrictions (Ministry of Transportation and Infrastructure, 2021).

3.1.4 EDS System in Gaziantep

Gaziantep has an EDS system installed as a red light at ten different signalized intersections throughout the city and an instantaneous and speed violation detection system on six divided roads. The system, in which 124 cameras, 66 in red light violation detection systems, 36 and 22 general view cameras in speed violation detection systems, were installed, was integrated with PolNet (Police Information System) and became operational. The EDS system records the license plates, entry and exit times by taking photos of the vehicles with the cameras placed at the entrance and exit points of the speed corridors (Figure 3.6). The system calculates the speeds of the registered vehicles with the formula ($\text{Speed} = \text{Path} / \text{Time}$). In the EDS, Red light system, a protection period of 1500 MS has been determined to minimize possible accidents after the red light is on. Penalties are applied if the photographs

and video recordings of the vehicles exceeding this period are taken (Gaziantep Güneş, 2021).

Sestrem et al. (2021). The Infringement detection cameras at EDS points also have License Plate Recognition System feature.

It is examined in this thesis that one of the leading causes of traffic accidents is driving at high speed. In many countries, such as our country, accidents caused by driver errors account for a large part of the total accidents. High-speed accidents account for a third of the total accidents. As speed increases, the probability of an accident increases. Furthermore, the severity of the accident grows. Various speed control systems are applied against accidents caused by high speed in traffic. For example, many accidents have occurred due to high speed on Gaziantep, Nizip Highway. Therefore, the Transportation Coordination Center has reduced the speed limit from 90km to 70 km (Table 3.2) (Pusula, 2019).

Table 3.2. Speed limits locations in Gaziantep

LOCATIONS	KM
Sani Konukoğlu Boulevard	70 km
Tugay Basra Road	70 km
Abdülkadir Aksu Boulevard	70 km
Abdülkadir Konukoğlu Boulevard	70 km
Halep Boulevard	70 km
Burç Road	70 km
Airport Road	70 km
Araban Road	70 km
Ordu Road	70 km
University Road	70 km
Durdu Yetkinşekerci Road	70 km

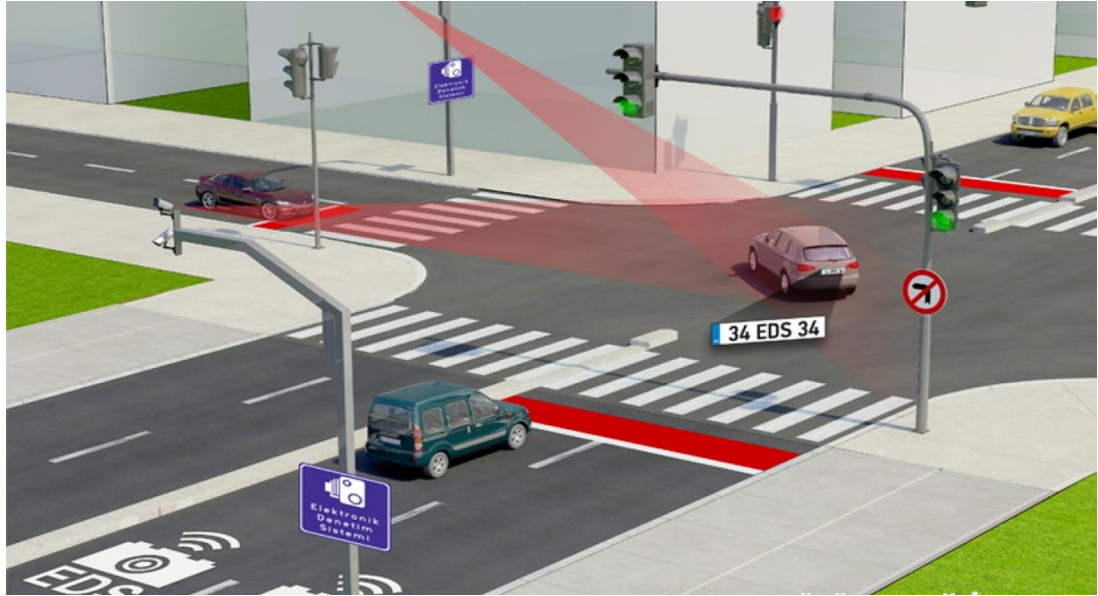


Figure 3.6. License Plate Recognition System in Gaziantep

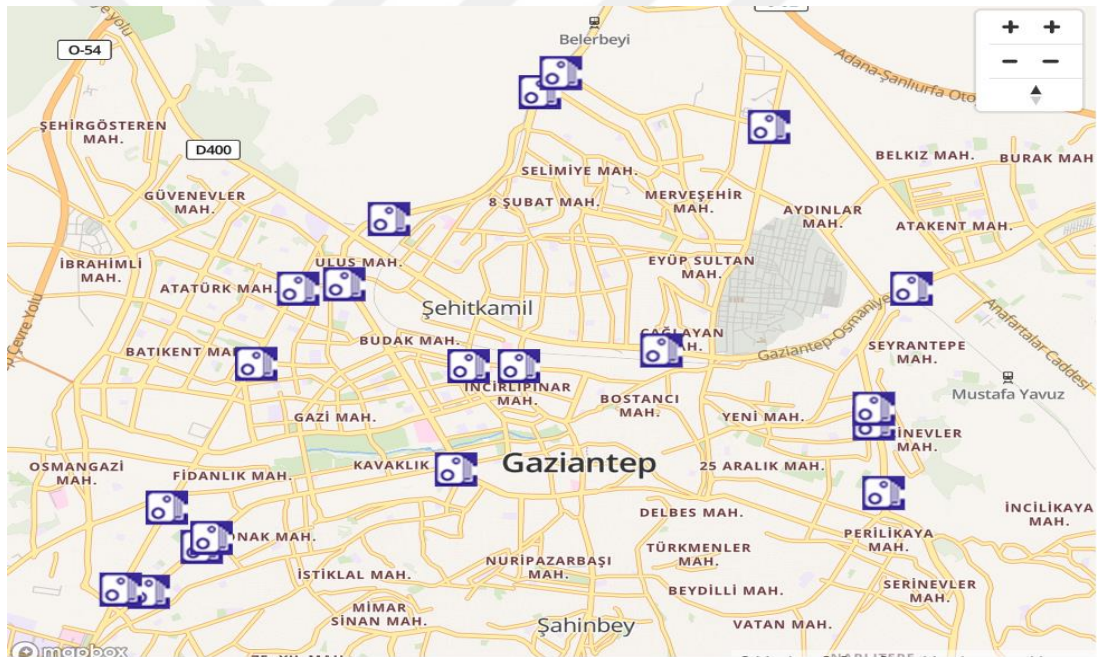


Figure 3.7. EDS cameras in Gaziantep Map



Figure 3.8. EDS system cameras in Gaziantep 2018-2019

The EDS system, consisting of 10-speed corridors and ten red light violation detection systems in Gaziantep, was also studied in this thesis. One hundred twenty-four camera systems have been installed, including 66 in red light violation detection systems, 36 in speed violation detection systems, and 22 in general view camera systems (Figure 3.7). Speed limit applications have been widely used to overcome speed management. Speed detection systems are highly effective and safe.

A speed violation detection system cannot be installed repeatedly on the same route.

Speed violation detection system detects location, speed, time information at the beginning of the entrance corridor of vehicles to the EDS system thanks to cameras and sensors. Thus, the license plate of vehicles exceeding the speed limit is detected. The presence of unique cameras that provide license plate recognition in most Gaziantep locations has given positive speed management results (Figure 3.8). Average speed detection points are shown below.

- Çevik Kuvvet
- Binevler
- Atakres
- Adliye
- MNS

- Basra
- Turgut Özal Junctions
- Çimento
- Sultana
- Et Balık

A red light violation system is a system that detects vehicles that violate rules by passing through a red light. This system minimizes accidents caused by violations and contributes to improving traffic safety. 10 red light violation system locations in Gaziantep are shown below. In August 2021, 341 drivers were fined for a red light violation. 1.004 drivers were fined for high speed.

- Başkarakol Intersection
- Grand Hotel Intersection
- Yüksek bina Intersection
- Çetinkaya Intersection
- İller Bank Intersection
- Sultana Intersection
- Binevler Intersection
- Duisburg Intersection
- Basra Intersection
- Otogar Intersection

3.1.5 Data Collection in Gaziantep

- The accident report is shown in figure 3.9 helps us collect data about where and at what time the accident occurred and the drivers involved in the accidents.
- Information about the date and place of the accident will be written in fields 1 and 2.
- Infield number 3, the contact information of the eyewitnesses will be written.
- Fields 4, 5, and 6 will have written information about the driver, the vehicle, and the traffic policy.
- Mark the appropriate one with (x) in field number 8. This field is not required to be filled. However, it was important for the company to evaluate the event quickly.
- Make sure to sketch the place and time of the collision in field number 9.

- Infield number 10, drivers will write their opinions about the accident.
- Signing of area 11 by drivers is mandatory.

TRAFFIC ACCIDENT REPORT IN TURKEY

1- Accident data		Time		2-Accident		Province:		Neighborhood:	
						District:		Street:	
								Street:	

3-Eyewitness		
Name Surname	Address	Telephone number

A		8- Tick the appropriate boxes (x)		B	
Vehicle A		Violate the red light		Vehicle B	
4- Drivers Information		Vehicle cannot enter sign		4- Drivers information	
Name Surname:		Entering the road used by traffic from the opposite direction		Name Surname:	
T.C. ID:		Passing ban		T.C. ID Number:	
Driver License Number and Class:		Failure to comply with the priority of crossing at the intersection		Driver License Number and Class:	
Province/District:		Passing a stop sign		Province/ District:	
Address:		Rear render		Address:	
Telephone Number:		Not following right turn rules		Telephone Number:	
5- Vehicle Information:		Not following left turn rules		5- Vehicle Information	
Brand and model:		Failure to comply with back maneuvering rules		Brand and model:	
Plaque:		Failure to comply with passing rules		Plaque:	
Usage:		Failure to comply with transition priority		Usage:	
6- Traffic Insurance Policy Information		Not following parking rules		6- Traffic Insurance Policy Information	
Name of Insured:		Not following pause rules		Name of Insured:	
T.C. ID No:				T.C. ID Number:	
Name of Insurance Company:		km/h	Speed	km/h	Name of Insurance Company:
Agent Number:		m		m	Agent Number:
Policy Number:				Policy Number:	
TRAMER Document Number:				TRAMER Document Number:	
Policy Start/ Finish date:				Policy Start/ Finish date:	

9- Sketch the moment of the collision	

10- Driving opinion		10-Driving opinion	

11 Driving signature		11	
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Figure 3.9. Traffic accident report in Turkey (adopted from official document by A.Ş.Cengiz)

3.1.6 Vision Zero Safe System Approach

Everyone involved in the transport system shares responsibility with road users in designing a road system that does not allow human error to have severe or fatal consequences. A Safe System is mobility that promotes healthier, fairer, and more sustainable communities while increasing safety for all. It helps to build the network.

Comprehensive speed management and safe street design should be given priority to reduce the risk of accidents. Areas of action to reduce the risk of accidents include improvements in public transport, reducing reliance on private vehicles, and providing safe, low-carbon, active, and accessible transport for all. These areas complement the more traditional aspects of a road safety strategy, such as enforcement, vehicle safety, emergency response, and education (Figure 3.10) (Vision Zero Challenge, 2021).

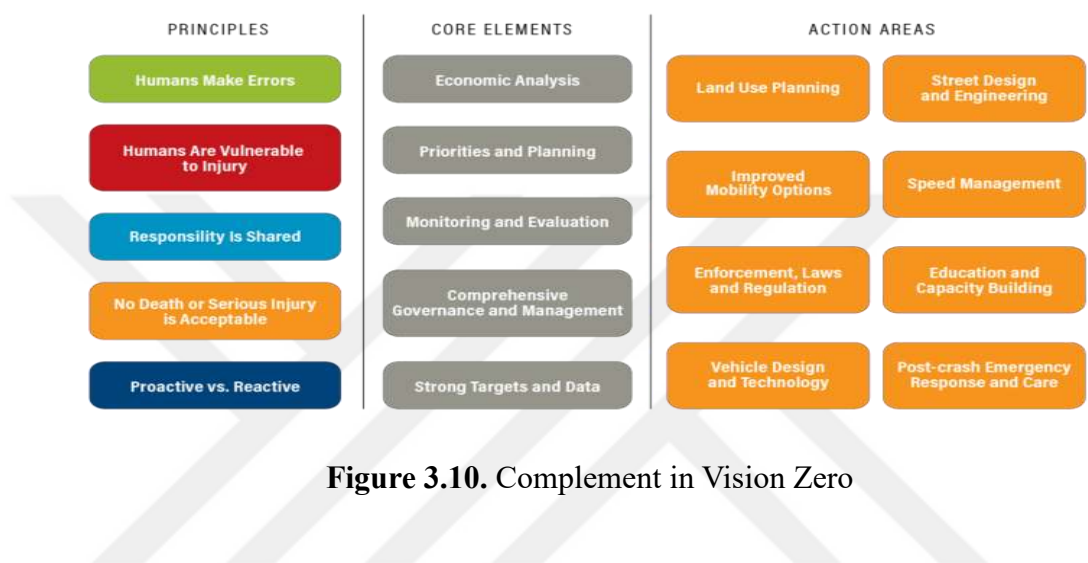


Figure 3.10. Complement in Vision Zero

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Results and Discussions

Our country shows a rapid increase in material and spiritual losses in traffic accidents. The average number of accidents per year in Gaziantep is 3000. Ninety-nine of these accidents are human-caused. 61% of this rate is driver-related accidents, and 38 percent in pedestrian-related accidents. These data show that drivers and pedestrians' largest share of accidents occurs.

For this reason, the institutions and organizations providing traffic training should provide more information on driver and pedestrian training. The issue of driving courses that provide post-license training should also be investigated. Traffic is entirely an education system. Traffic is purely an educational system. Education that starts first in the family should also be taught seriously in primary classes. Children's traffic education parks are essential in making these training more fun and lasting. Renovating and increasing the number of children's traffic education parks worldwide is an essential step for future generations. There are 90 Children's Traffic Training parks in 42 provinces in Turkey. All drivers involved in traffic, especially public transport and taxi drivers and pedestrians, should be constantly trained in traffic.

4.1.1 Data Analysis

In this study, decreases in death and local accident rates were reported in Gaziantep after Vision Zero applications. This thesis analyzed accidents and death rates between 2015-2020 Dec. in Gaziantep.

4.1.2 2015 Local Accident Analysis

In January 2015, there were two fatal accidents and 152 injury accidents. 2 people died. Two hundred people were injured. There were three fatal accidents and 175 injury accidents in February. 4 people died. Two hundred twenty-eight people were injured. In March, there were one fatal accident and 242 injury accidents. One person died. Three hundred one was injured. In April, there were 307 injury accidents. Three hundred eighty-four people were injured. In May, four fatal accidents and 285 injury accidents. 4 people died. Three hundred fifty-four people were injured. There were four fatal accidents and 327 injury accidents in June. 4 people died. Four hundred eight people were injured. There were two fatal accidents and 318 injury accidents in July. 2 people died. Four hundred thirty-one people were injured. In August, there were one fatal accident and 275 injury accidents. One person died, and 340 people were injured. In September, there were one fatal accident and 303 injury accidents. One person died, and 394 people were injured. There were two fatal accidents and 230 injury accidents in October. 2 people died, and 280 were injured.

There were two fatal accidents and 225 injury accidents in November. 2 people died, and 273 were injured. There were two fatal accidents and 223 injury accidents in December. 2 people died, and 281 were injured. May and June are the months with the highest number of deaths, according to the 2015 accident data. A total of 3874 people were injured during the year. The highest number of injured was in July. The least number of injuries is in January.

4.1.3 2016 Local Accident Analysis

In January 2016, there were 146 injury accidents. One hundred eighty-eight people were injured. In February, there were 160 injury accidents. Two hundred seventeen people were injured. In March, there were 194 injury accidents. 234 were injured. In April, there were one fatal accident and 273 injury accidents. One person died, and 349 people were injured. In May, there were 241 injury accidents. Two hundred ninety-eight people were injured. In June, there were 235 injury accidents. Three hundred six people were injured. In July, there were one fatal accident and 211 injury accidents. One person died. Two hundred eighty people were injured. In August, there were 217 injury accidents. Two hundred eighty-three people were injured. In September, there were 196 injury accidents. Two hundred fifty-five people were

injured. In October, there were one fatal accident and 204 injury accidents. One person died, and 270 were injured.

In November, there were one fatal accident and 194 injury accidents. One person died, and 250 people were injured. In December, there were 130 injury accidents. One hundred sixty-six people were injured. According to the 2016 accident data, the highest number of injured people was in April. The least number of injuries is in December. According to the accident data for 2015-2020, the least number of deaths is in 2016.

Moreover, a total of 3096 people were injured. EDS systems were disabled due to the July 15, 2016 coup attempt. Unfortunately, the significant decrease in accident and death rates in 2016 increased in 2017 and 2018.



Figure 4.1. Points of fatal accidents in Gaziantep

Figure 4.1 The points marked on the map show the addresses of fatal accidents in 2016. During the transition from 2015 to 2016, the EDS system map, implemented for the first time and with full performance, is being seen. All accidents made in the same year are excluded from the EDS operating system. As can be seen from this

map, the most significant impact of the 87% reduction in deaths appears to be the EDS system. For these deaths to be reduced to zero, implementing the EDS system on the road route where accidents are marked will be of great benefit.

4.1.4 2017 Local Accident Analysis

In January 2017, there were one fatal accident and 155 injury accidents. One person died. One hundred seven drivers, 109 passengers, and 25 pedestrians were injured. There were 142 injury accidents in February. One hundred two drivers, 81 passengers, and 28 pedestrians were injured. In March, there were two fatal accidents and 169 accidents with injuries. Two people died. 111 drivers, 108 passengers, and 43 pedestrians were injured. There were two fatal accidents and 184 injury accidents in April. 2 people died. One hundred thirty drivers, 109 passengers, and 43 pedestrians were injured. In May, there was one fatal accident and 194 injury accidents. One person died. One hundred twenty-one drivers, 110 passengers, and 39 pedestrians were injured. There were two fatal accidents and 189 injury accidents in June. 2 people died. One hundred thirty-five drivers, 134 passengers, and 34 pedestrians were injured. In July, there were two fatal accidents and 232 injury accidents. Three people died. One hundred thirty-eight drivers, 142 passengers, and 39 pedestrians were injured. There were two fatal accidents and 192 injury accidents in August. 2 people died. One hundred thirty-five drivers, 121 passengers, and 53 pedestrians were injured. There was one fatal accident and 203 injury accidents in September. One person died. One hundred twenty-eight drivers, 128 passengers, and 41 pedestrians were injured. In October, there was one fatal accident and 213 injuries. One person died. One hundred fifty drivers, 105 passengers, and 46 pedestrians were injured. In November, one fatal accident and 175 injured accidents occurred. One person died. One hundred twenty-five drivers, 88 passengers, and 45 pedestrians were injured. In December, there was one fatal accident and 167 injuries. One person died. Ninety-eight drivers, 114 passengers, and 47 pedestrians were injured. A total of 17 people died in 2017. Three thousand three hundred twenty-five people were injured. While there were four deaths in 2016, according to 2017 data, a significant increase in the number of both deaths and injuries was examined. It is because the EDS systems were disabled in 2017 (Table 4.1).

4.1.5 2018 Local Accident Analysis

In January 2018, there were one fatal accident and 157 injury accidents. One person died. Ninety-eight drivers, 94 passengers, and 37 pedestrians were injured. There were 133 injury accidents in February. Eighty-four drivers, 68 passengers, and 34 pedestrians were injured. In March, there was one fatal accident and 178 injury accidents. One person died. One hundred thirty-three drivers, 108 passengers, and 30 pedestrians were injured. There were 176 injury accidents in April. One hundred twenty-one drivers, 100 passengers, and 37 pedestrians were injured. In May, there were three fatal and 147 injured accidents. Three people died. Ninety-nine drivers, 108 passengers, and 32 pedestrians were injured. There were two fatal accidents and 178 injury accidents in June. 2 people died. One hundred eight drivers, 124 passengers, and 44 pedestrians were injured. In July, there were two fatal accidents and 205 injury accidents. Three people died. One hundred thirty-seven drivers, 136 passengers, and 50 pedestrians were injured. There were 198 injury accidents in August. One hundred thirty drivers, 134 passengers, and 38 pedestrians were injured. In September, there were one fatal accident and 199 injury accidents. One person died. One hundred nineteen drivers, 102 passengers, and 55 pedestrians were injured. In October, there were 192 injury accidents. One hundred eighteen drivers, 121 passengers, and 48 pedestrians were injured. There was one fatal accident and 162 injury accidents in November. One person died. One hundred two drivers, 71 passengers, and 38 pedestrians were injured. There were 135 injury accidents in December. Eighty-one drivers, 66 passengers, and 40 pedestrians were injured. A total of 12 people died in 2018. Three thousand forty-five people were injured. The decrease in the number of deaths and injuries in 2018 compared to 2017 is related to the re-commissioning of EDS systems on July 17, 2018. We can see the importance of the EDS system from these data (Figure 4.2).

4.1.6 2019 Local Accident Analysis

There were two fatal accidents and 150 injuries accidents in January. Eighty-three drivers, 66 passengers, and 51 pedestrians were injured. 2 people died. There were one fatal accident and 145 injury accidents in February. Seventy-eight drivers, 75 passengers, and 48 pedestrians were injured. One person died. There were 173 injury accidents in March. One hundred two drivers, 103 passengers, and 39 pedestrians were injured. No one was killed in accidents in March. In April, there were 198

injury accidents. One hundred thirteen drivers, 124 passengers, and 66 pedestrians were injured. There were no fatalities until October. In May, 196 accidents with injuries occurred. One hundred thirty-two drivers, 110 passengers, and 56 pedestrians were injured. In June, there were 197 injury accidents. One hundred ten drivers, 143 passengers, and 66 pedestrians were injured. In July, there were 231 injury accidents. One hundred sixty drivers, 151 passengers, and 60 pedestrians were injured. In August, there were 197 injury accidents. One hundred twenty-two drivers, 138 passengers, and 48 pedestrians were injured. In September, there were 221 injury accidents. One hundred forty-three drivers, 138 passengers, and 57 pedestrians were injured. In October, two fatal accidents occurred. 4 people died in these two accidents. There have been 191 accidents with injuries. One hundred twenty-two drivers, 137 passengers, and 48 pedestrians were injured. There were 183 accidents with injuries in November. One hundred nine drivers, 111 passengers, and 52 pedestrians were injured. There were 151 accidents with injuries in December. Eighty-five drivers, 67 passengers, and 43 pedestrians were injured. In 2019, there were five fatal accidents and 2233 injury accidents. A total of 7 people died. Three thousand three hundred fifty-six people were injured.

4.1.7 2020 Local Accident Analysis

A total of 171 accidents occurred in January 2020. Two hundred people were injured. Two fatal accidents occurred, and two people died. A total of 145 accidents occurred in February. One fatal accident occurred. Two hundred one people were injured. One person died. One hundred seventy-three accidents occurred in March. Two hundred fifty people were injured. One hundred ninety-eight accidents occurred in April. Three hundred four people were injured. Two hundred twenty-four accidents occurred in May. Two hundred ninety-seven people were injured. Two hundred sixty-four accidents occurred in June. Three hundred nine people were injured. Two hundred ninety-six accidents occurred in July. Three hundred seventy-three people were injured. Two hundred fifty-six accidents occurred in August. Three hundred eight people were injured. Two hundred seventy-six accidents occurred in September. Three hundred thirty-seven people were injured. Two hundred eighty-seven accidents occurred in October. Two fatal accidents occurred. Three hundred one people were injured. Two people died. One hundred eighty-five accidents occurred in November.

Two hundred seventy-four people were injured. One hundred fifty-six accidents occurred in December. Two hundred people were injured. The decrease in accidents and deaths in 2019 and 2020 is associated with the Covid-19 pandemic. In particular, the restrictions imposed throughout our country since March 2020 have directly affected the accident rates. The curfew led to a significant decrease in accident rates. A total of 5 people died in 2020. Although the Covid-19 pandemic has had a good impact on accident rates in our country, the number of people who have died from the epidemic is much higher than the number of people who have died in traffic accidents in our country (Table 4.1).

Table 4.1. Total Fatal and Injury Accidents, Deaths and Injured in 2015 to 2020

YEAR	TOTAL FATAL ACCIDENTS	TOTAL INJURY ACCIDENTS	DEATHS	INJURED
2015	24	3062	25	3874
2016	4	2400	4	3096
2017	16	2215	17	3325
2018	11	2060	12	3045
2019	5	2233	7	3356
2020	5	2115	5	3124

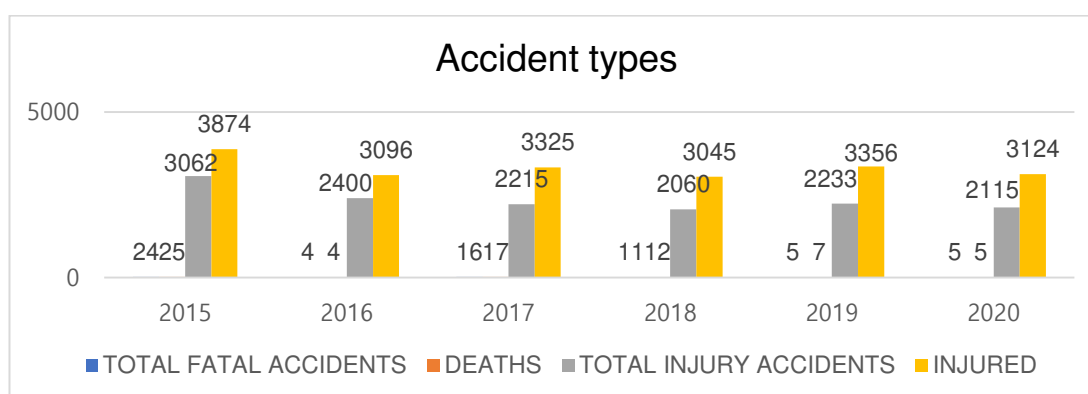


Figure 4.2. Accident types TUIK 2015-2020

4.3 Effects of Vision Zero in Gaziantep

Gaziantep has been among our country's leading institutions with its Traffic Control Center structure, traffic signaling infrastructure, and electronic decontamination system. Due to maintenance, EDS systems, which were disabled for a while, became operational again on July 17, 2018. There is a significant decline in death rates in 2016, Gaziantep. 85% decline is observed. In 2017, there was a significant increase in the accident rate and death rate. Another reason for the increase in accident and death rates in 2017 was the July 15, 2016 coup attempt. About two years after the coup attempt, EDS systems became operational. There were 12 deaths in the year it started operating. The decrease in mortality rates between 2019- 2020 is directly related to the EDS system. 7 people died in 2019. Five people died in 2020. The lowest death rate occurred in 2019- 2020 (Table 4.2).

Table 4.2. According to a year, total deaths in Gaziantep

YEAR	TOTAL DEATHS
2015	25
2016	4
2017	17
2018	12
2019	7
2020	5

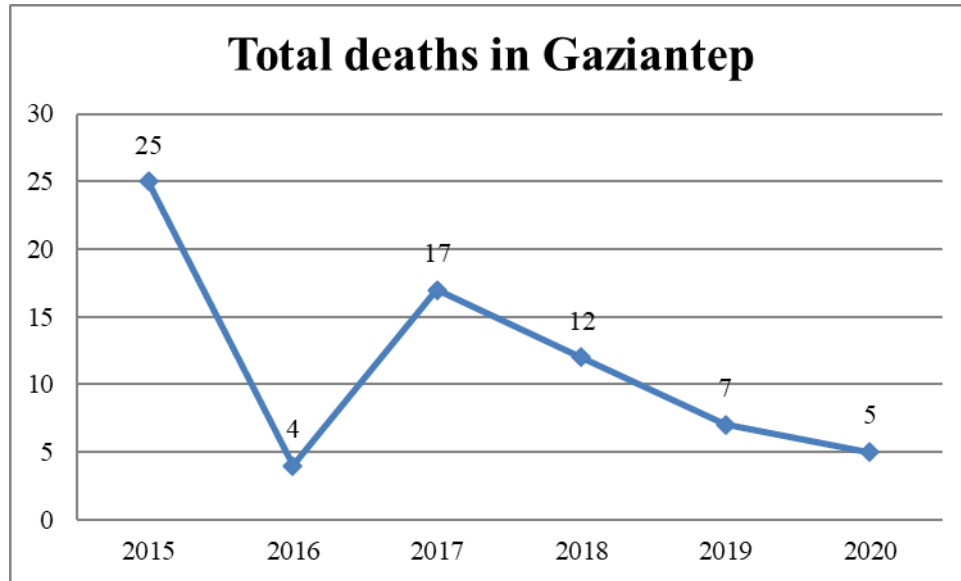


Figure 4.3. Total deaths increases in Gaziantep

Speed corridors were created with 20 EDS cameras in total (Figure 3.7). Moreover, traffic lights are kept under control. A speed limit of 70 km/h was applied in these speed corridors. There is an EDS system; there has been an 80% reduction in accidents. The EDS System started to be implemented in 2016. After the coup attempt on 15 July 2016, the camera system did not work for two years. The EDS system does not work in 2016 means a severe increase in accident and death rates. With the effect of the Covid-19 epidemic, a decrease was observed in traffic accident rates between 2019 and 2020 (Figure 4.3).

4.3.1 Application of Vision Zero on Selected Intersections

Since the intersections separated by degrees in Gaziantep provide a continuous flow in terms of traffic, they do not pose a problem. We examined the intersections at grade intersections with and without lights in terms of traffic safety. Also, a good intersection design depends on the geometric shape of the intersection. Therefore, there are problems with the better operation of some intersections; side roads cannot be opened for right-hand turns. Moreover, the risks of traffic accidents at these intersections are very high (Figure 4.4). The geometric designs of some intersections should be reconstructed. In particular, there are no U-turn areas and traffic flow directions at intersections on roads crossed by the rail system. These intersections are Abdulkadir Aksu Boulevard and the Binevler intersection.



Figure 4.4. İbrahimli Intersection

Intersections without lights are the intersections where accidents occur most often. For example, there are not enough routers and traffic signs leading to the Karatas intersection.



Figure 4.5. University Intersection

The intersections with the most accidents are shown below.

- Fevzi Çakmak Boulevard
- University Intersection (Figure 4.5)

- Karatas Intersection Way
- Abdulkadir Aksu Boulevard, Binevler Intersection.

Since the number of traffic tracks and the number of road tracks are incompatible, the risk of accidents increases and reduces the intersection's capacity. According to the traffic counts at intersections, the number of rails and their directions should be determined. If there are too many traffic traces, the areas should be scanned and kept closed to vehicle movement. Existing lines and arrows carry a risk of accidents. We can cite the Old Insurance Hospital Intersection as an example of this.

Geometric designs of some intersections should be redone. Especially at intersections located on the roads through which the rail system passes, the turning radii (U-turn areas) and flow directions do not match. Abdulkadir Aksu Boulevard, Binevler Intersection, is an example of this intersection. At some illuminated intersections (daily, hourly), it should be updated using sensors and switched to automation. In addition, Mehmet Şimşek Intersection, which connects five neighborhoods, has also significantly reduced accident rates (Figure 4.6).



Figure 4.6. Mehmet Şimşek Intersection

There were 151 accidents on the D-400 highway. There were 63 accidents at Karatas Intersection. Work is underway to reduce these accidents. One of these studies is to build a pedestrian bridge intersection to the Hasan Kalyoncu University Intersection. The Çimento Intersection on the airport road is that all the connecting flights with the

intersections will turn into transit traffic, and accidents will also be prevented with this intersection (Figure 4.7).



Figure 4.7. Çimento Intersection

CHAPTER V

CONCLUSIONS

Vision Zero is a road traffic safety project first developed in Sweden in 1997 to prevent deaths or severe injuries in road traffic accidents. After the project's success in Sweden, it was accepted and implemented by other countries and the EU. Turkey was included in the vision zero project in 2013, and critical studies have been carried out on road safety since 2013.

One of the essential application subjects of vision zero is speed control. Speed control systems in Turkey have been implemented as EDS or MOBESE systems since 2013. Previous studies have examined these applications for inter-urban roads but not inner-city roads. In this study, the effect of vision zero applications was investigated for the first time in Turkey on urban roads in Gaziantep.

In this study, speed controls applied for speed control, which is the first cause of traffic accidents in Turkey and the world, were evaluated. Only one year after the start date of speed inspections, an 87,5% decrease in traffic accidents in urban death rates was determined. As a result of the coup in Turkey in 2016, the EDS system was turned off for security reasons. There has been an increase of 5 times in urban death rates in traffic accidents in the following year, 2017. Later, due to various administrative reasons, only red light violation cameras were put into service, and speed corridor enforcements were not implemented. During this period, an 37,5% decrease was observed in the urban death rates in traffic accidents, according to 2015 results. Accident statistics for Gaziantep show that accidents occur in areas built outside the plan, where they are heavily involved. People living in these areas and drivers moving in these areas need to be specially trained. For example, in social and cultural facilities in the region, these lessons should be explained. All speed management measures should be evaluated. It is necessary to inform and educate decision-makers and the public about excessive speed. According to all road types, the appropriate speed and the speed limit should be examined. Drivers should be informed about the speed limit to be observed.

The study results showed that the death rate in traffic accidents decreased by 85% due to the use of speed control and red light violation cameras together, and it proved that reaching target zero is not a dream. For this reason, the development of zero vision studies in Gaziantep and other cities will reduce the number of deaths and injuries in traffic accidents. Suppose new speed corridors, intersections, red light violation detection cameras, and other applications that prevent traffic accidents are made for Vision Zero. In that case, it will be seen that Vision Zero is not a dream. Especially red light violation detection cameras are among the most critical applications that reduce traffic accidents. Future studies should examine the results of speed controls and the effects of other vision zero practices on the number of deaths and injuries in traffic accidents.

In conclusion, when the intersections with an increase in accidents between 2019 and 2020 were examined, it was observed that most of the movement was free. Although many intersections were effective in narrowing the road and reducing the speed, it was not very successful in preventing accidents. In other words, even the controlled intersection arrangement has been insufficient. In cases where such arrangements have been made and are insufficient, the use of traffic-illuminated intersections will significantly reduce accidents. Traffic lights will be the most effective safety method in societies where drivers who are unaware of the superiority of passage are located.

REFERENCES

- AAA Foundation for Traffic Safety. 2020, “2019 Traffic Safety Culture Index (Technical Report)”. Washington, D.C.: AAA Foundation for Traffic Safety. <https://aaafoundation.org/2019-traffic-safety-culture-index/>. 08.09.2021.
- Corben, B. F., Logan, D. B., Fanciulli, L., Farley, R. and Cameron, I., (2010). Strengthening Road Safety Strategy Development: Towards Zero 2008–2020 – Western Australia's Experience of Scientific Research On Road Safety Management, *Safety Science*, **48**(9), 1085–1097.
- Crosstown. (2021). COVID-19 is making LA safer for pedestrians. <https://xtown.la/2021/01/05/pedestrian-safety-covid-19/> 06.03.2021.
- Effects of Speed, 2019, Directorate of Traffic Training and Research. <https://www.nhtsa.gov/risky-driving/speeding>. 14.02.2021.
- Elvebakk, B. (2007). “Vision zero: remaking road safety”. *Mobilities*, **2**(3), 425–441.
- Elvebakk, B. and Steiro, T., (2009). First Principles, Second Hand: Perceptions and Interpretations of Vision Zero in Norway, *Safety Science Journal*, **47**(7), 958–966.
- Elvik, R. and Truls, V. 2004. *The Handbook of Road Safety Measures*, Amsterdam: Elsevier.
- Euractiv. (2021). EU has world's safest roads, recorded fewest traffic-related deaths in 2020. <https://www.euractiv.com/section/road-safety/news/eu-has-worlds-safest-roads-recorded-fewest-traffic-related-deaths-in-2020/> 12.07.2021.
- Gaziantep Güneş. (2021). Gaziantep'te TEDES nasıl çalışıyor? <https://www.google.com/amp/s/www.gaziantepgunes.com/amp/haber/7159417/gaziantep-te-des-nasil-calisiyor> 09.10.2021.
- Goldenbeld, C., and van Schagen, I. (2005). The effects of speed enforcement with mobile radar on speed and accidents: An evaluation study on rural roads in the Dutch province Friesland. *Accident Analysis & Prevention*, **37**(6), 1135–1144.
- Hassan, M. and Hawas, Y., (2017). A Methodology for Rearranging Transit Stops for Enhancing Transit Users Generalized Travel Time, *Journal of Traffic and Transportation Engineering (English Edition)*, **4**(1), 14–30.
- Johansson, R. (2009). Vision Zero—Implementing a Policy for Traffic Safety, *Safety Science*, **47**(6), 826–831.
- Keall, M. (2016). Further Results from a Trial Comparing a Hidden Speed Camera Programme with Visible Camera Operation: December 2002 Accident, *Analysis and Prevention*, **34**(6), 773–777.
- Kerimoğlu, Ö., 2009, Trafik Planlaması ve Uygulanması. Master's Thesis. Gazi University, Ankara. <https://dspace.gazi.edu.tr/bitstream/handle/20.500.12602/149750/?sequence=1&isAllowed=y>. 22.05.2021
- Larsson, P., Dekker, S. W. A. and Tingvall, C., (2010). The Need for A Systems Theory Approach to Road Safety, *Safety Science*, **48**(9), 1167–1174.
- National Highway Traffic Safety Administration, 2017, “Traffic Safety: National Statistics”. Retrieved 2018/03/18, from U.S. Department of Transportation.

- NYC. (2019). Vision Zero Year Five Report. <https://www.google.com/url?sa=t&source=web&rct=j&url=https://www1.nyc.gov/assets/visionzero/downloads/pdf/vision-zero-year-5-report.pdf&ved=2ahUKewjr0aXX5tH1AhUeQvEDHUb4D2MQFnoECAMQAAQ&usg=AOvVaw0VkSQOoqpALqxnMcAsHwtm> 29.05.2021.
- Özen, E., Genç, E. and Kaya, Z., (2014). Remark on the Causes of Traffic Accidents and Traffic Awareness: Examples of Uşak Province, *Optimum Ekonomi ve Yönetim Bilimleri Dergisi*, **1**(1), 1-19.
- Özen, M., (2018). Trends in Road Traffic Crashes in Turkey 1980-2016. *Niğde Ömer Halisdemir University Engineering Sciences Journal*, **7**(2), 732-740.
- Özgün, S., 2015. “Analysis of Fatal and Injury Crashes by Geographical Information Systems: A Case Study of Gaziantep”. *M.Sc. Thesis in University of Gaziantep Graduate School of Natural and Applied Sciences*, Gaziantep, Turkey. https://acikbilim.yok.gov.tr/bitstream/handle/20.500.12812/427175/yokAcikBilim_10085912.pdf?sequence=-1. 24.05.2021
- Parachute. (2021). Vision Zero. <https://parachute.ca/en/program/vision-zero/> 25.07.2021.
- PROCEED. (1960). Institute of Traffic. U.S.A
- Punase, S., 2016, “Utilizing Multiple Data Sources in the Preparation of a Vision Zero Plan for the City of Alexandria: Investigating the Relationship Between Transportation Infrastructure, Socio-Economic Characteristics, and Crash Outcomes in The City”. *Doctoral dissertation*, Virginia Tech.
- Pusula. (2019). ‘Nizip Yolu’nda hız limiti değişti. <https://gazianteppusula.com/haber/nizip-yolunda-hiz-limiti-degisti-haberi-72670.html> 05.10.2021.
- Racioppi, F., Eriksson, L., Tingvall, C., Villaveces, A. and World Health Organization, 2004, “Preventing road traffic injury: a public health perspective for Europe (No. EUR/04/5046197)”. WHO Regional Office for Europe, Copenhagen.
- Sestrem O, I., Reis Q, L, V., Calbusch, L., De Paz Santana, J. F., Delcio Parreira, W., Oriel Seman, L. and Zeferino, C. A., (2021). Performance and Security Evaluation on a Blockchain Architecture for License Plate Recognition Systems, *Applied Sciences*, **11**(3), 1255.
- Statista. (2020). Number of people non-fatally injured in road traffic accidents in Norway from 2006 to 2019. <https://www.statista.com/statistics/438287/number-of-road-traffic-injuries-in-norway/> 08.01.2021.
- Sweroad, Report., 2001. “Traffic Safety Project SWEROAD”, *International General Directorate of Highways*.
- Tingvall, C., 1998, “The Swedish ‘Vision Zero’ and How Parliamentary Approval Was Obtained”, *Keynote Address at Researchers Conference*, NZ, and ‘Road Safety Summit’, 57–61.
- TUIK. (2015). Karayolu Trafik Kaza İstatistikleri, 2014. <https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2014-18760> 02.03.2021.

- TUIK. (2019). Karayolu Trafik Kaza İstatistikleri, 2018. <https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2018-30640> 05.01.2021.
- TUIK. (2020). Karayolu Trafik Kaza İstatistikleri, 2019. <https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2019-33628> 02.07.2021.
- TUIK. (2021). Karayolu Trafik Kaza İstatistikleri, 2020. <https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2020-37436> 03.07.2021.
- Ministry of Transportation and Infratructure. (2021). Gaziantep Büyükşehir Belediyesi Akıllı Ulaşım Sistemleri Çalışmaları. https://www.google.com/url?sa=t&source=web&rct=j&url=https://hgm.uab.gov.tr/uploads/pages/akilli-ulasim-sistemler-aus/gaziantep-aus-calismalari-60192a70938a4.pdf&ved=2ahUKEwiQo67D9dH1AhUcR_EDHskkB0UQFnoECDgQAQ&usg=AOvVaw2bQz9xJJb4rBh0KKbXFC52 03.08.2021.
- Ulu, S., 2015, “Elektronik Denetim Sistemi (Tedes) Uygulamalarının Sürücü Davranışları Ve Trafik Kazaları Üzerindeki Etkisinin Değerlendirilmesi: İstanbul Örneği”, *Master’s Thesis, Bahçeşehir University, İstanbul*. <https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=jNkOHTm4Qh82nECsnNZSUA&no=urN4WUrDSqGfRlfAnwdKig>. 02.06.2021.
- Vägverket, 1996, “Nollvisionen – En Idé Om Ett Vägtransportsystem Utan Hälso Förluster”, *Sverige, Vägverket*.
- Värnild, A., Larm, P. and Tillgren, P., (2019). Incidence of seriously injured road users in a Swedish region, 2003–2014, from the perspective of a national road safety policy. *BMC Public Health*, **19**(1), 1-10.
- Vision Zero. (2014). https://en.m.wikipedia.org/wiki/Vision_Zero 16.02.2021.
- Vision Zero Challenge. (2021). What Is Vision Zero? <https://visionzerochallenge.org/vision-zero?locale=en> 12.09.2021.
- Vision Zero Network. (2015). 10 Stats that Show the Promise of Safety Cameras to Manage Speed. <https://visionzeronetwork.org/10-stats-that-show-the-promise-of-safety-cameras-to-manage-speed/> 09.10.2021
- Waller, P. F., (1991). “The older Driver”, *Human Factors*, **33**, 499–505.
- WHO. (2021). Road traffic injuries. <https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries>, 12.08.2021.
- Zero, T., 2008, “Ambitious road safety targets and the Safe System approach”. *Transport Research Center, OECD/ITF, Paris*.

APPENDIX

INDEX

APPENDIX 1 Number of traffic accidents involving death or injury, by province 2013

[INDEX](#)

Number of traffic accidents involving death or injury, persons killed and injured by province, 2013

Province	Total			Inhabited area			Uninhabited area		
	Number of accidents	Number of persons killed	Number of persons injured	Number of accidents	Number of persons killed	Number of persons injured	Number of accidents	Number of persons killed	Number of persons injured
Total	161 306	3 685	274 829	120 095	1 372	183 307	41 211	2 313	91 522
Adana	4 859	87	7 751	3 886	33	5 667	973	54	2 084
Adıyaman	1 026	30	2 014	641	5	1 062	385	25	952
Afyonkarahisar	1 777	92	3 610	1 023	20	1 840	754	72	1 770
Ağrı	685	32	1 429	365	15	608	320	17	821
Amasya	950	26	1 912	536	8	890	414	18	1 022
Ankara	11 883	160	19 327	10 267	77	15 880	1 616	83	3 447
Antalya	7 078	131	10 956	5 874	63	8 634	1 204	68	2 322
Artvin	335	10	616	103	1	158	232	9	458
Aydın	2 831	56	4 575	2 031	15	3 036	800	41	1 539
Balıkesir	3 458	103	5 882	2 209	28	3 362	1 249	75	2 520
Bilecik	547	22	1 061	311	6	564	236	16	497
Bingöl	423	18	905	241	8	425	182	10	480
Bitlis	412	10	952	188	4	364	224	6	588
Bolu	879	35	1 831	388	6	645	491	29	1 186
Burdur	905	22	1 602	492	2	702	413	20	840
Bursa	5 524	90	8 725	4 460	42	6 411	1 064	48	2 314
Çanakkale	1 441	28	2 509	750	5	1 114	691	23	1 395
Çankırı	607	26	1 487	248	9	453	359	17	1 034
Çorum	1 556	40	3 211	884	6	1 451	672	34	1 760
Denizli	2 945	53	4 734	2 253	24	3 317	692	29	1 417
Diyarbakır	2 059	44	4 345	1 297	13	2 260	762	31	2 085
Edirne	756	34	1 240	448	12	685	308	22	555
Elazığ	1 279	30	2 250	904	5	1 325	375	25	925
Erzincan	652	19	1 333	377	4	650	275	15	683
Erzurum	1 337	31	2 808	784	8	1 411	553	23	1 397
Eskişehir	1 949	52	3 361	1 424	13	2 168	525	39	1 193
Gaziantep	3 607	79	6 241	2 766	16	4 334	841	63	1 907
Giresun	817	37	1 593	508	16	879	309	21	714
Gümüşhane	363	16	852	145	5	296	218	11	556
Hakkari	221	12	440	111	3	199	110	9	241
Hatay	3 298	67	5 368	2 567	31	3 909	731	36	1 459
İsparta	1 472	27	2 482	1 116	10	1 697	356	17	785
Mersin	5 394	99	8 249	4 536	52	6 584	858	47	1 665
İstanbul	15 224	260	22 460	13 575	187	19 593	1 649	73	2 867
İzmir	9 687	134	13 967	7 936	63	10 763	1 751	71	3 204
Kars	364	6	791	163	2	257	201	4	534
Kastamonu	850	58	1 694	438	12	732	412	46	962
Kayseri	4 146	58	7 084	3 474	22	5 396	672	36	1 688
Kırklareli	763	23	1 353	446	3	699	317	20	654
Kırşehir	612	13	1 312	353	4	576	259	9	736
Kocaeli	3 276	64	5 640	2 622	37	4 273	654	27	1 367
Konya	6 450	135	10 947	5 138	32	7 660	1 312	103	3 287
Kütahya	1 295	60	2 412	726	15	1 122	569	45	1 290
Malatya	1 415	46	2 745	901	10	1 489	514	36	1 256
Manisa	3 961	109	6 720	2 898	40	4 420	1 063	69	2 300
K. Maraş	2 187	50	3 955	1 580	10	2 566	607	40	1 389
Mardin	1 122	49	2 116	627	14	1 015	495	35	1 101
Muğla	3 806	70	5 895	2 932	31	4 311	874	39	1 584
Muş	387	28	908	201	7	390	186	21	518
Nevşehir	937	28	1 670	610	12	992	327	16	678
Niğde	860	37	1 532	606	10	948	254	27	584
Ordu	1 368	45	2 538	1 027	26	1 732	341	19	806
Rize	754	16	1 282	517	6	779	237	10	503
Sakarya	2 495	45	4 198	1 918	22	2 980	577	23	1 218
Samsun	2 808	79	5 007	2 201	42	3 618	607	37	1 389
Siirt	473	10	802	303	6	401	170	4	401
Sinop	464	18	857	242	5	402	222	13	455
Sivas	1 350	48	2 788	678	7	1 108	672	41	1 680
Tekirdağ	1 720	48	3 118	1 056	18	1 669	664	30	1 449
Tokat	1 447	46	2 615	934	15	1 409	513	31	1 206
Trabzon	1 461	30	2 700	1 048	13	1 798	413	17	902
Tunceli	168	5	302	93	3	144	75	2	158
Ş. Urfa	2 212	83	4 198	1 253	19	1 934	959	64	2 264
Uşak	1 077	27	2 023	753	8	1 203	324	19	820
Van	1 377	50	2 687	962	5	1 600	415	45	1 087
Yozgat	1 014	35	2 360	502	8	978	512	27	1 382
Zonguldak	970	23	1 865	716	13	1 244	254	10	621
Aksaray	1 208	30	2 211	816	10	1 299	392	20	912
Bayburt	175	6	362	74	0	129	101	6	233
Karaman	790	8	1 348	628	3	969	162	5	379
Kırıkkale	898	23	1 812	578	7	1 014	320	16	798
Batman	655	31	1 158	494	16	796	161	15	362
Şırnak	576	34	1 016	289	12	415	287	22	601
Bartın	479	10	808	330	4	515	149	6	293
Ardahan	153	6	375	63	0	111	90	6	264
Iğdır	329	4	551	224	2	309	105	2	242
Yalova	606	9	957	465	4	678	141	5	279
Karabük	476	11	915	277	5	473	199	6	442
Kilis	441	6	659	343	1	462	98	5	197
Osmaniye	1 653	21	2 540	1 305	7	1 862	348	14	678
Düzce	1 042	32	1 925	647	9	1 034	395	23	891

APPENDIX 2 Number of traffic accidents involving death or injury, by province 2014

Number of traffic accidents involving death or injury, persons killed and injured by province, 2014

Province	Total			Inhabited area			Uninhabited area		
	Number of accidents	Number of persons killed	Number of persons injured	Number of accidents	Number of persons killed	Number of persons injured	Number of accidents	Number of persons killed	Number of persons injured
Total	168 512	3 524	285 059	126 537	1 243	191 653	41 975	2 281	93 406
Adana	4 899	98	7 612	4 056	23	5 820	843	75	1 792
Adıyaman	1 054	36	2 010	665	6	1 039	389	30	971
Afyonkarahisar	1 989	85	3 911	1 167	20	1 999	822	65	1 912
Ağrı	715	42	1 455	378	15	619	337	27	836
Amasya	992	21	1 917	595	4	933	397	17	984
Ankara	11 745	152	19 269	9 927	67	15 184	1 818	85	4 085
Antalya	7 142	151	10 998	5 853	77	8 535	1 289	74	2 463
Artvin	367	15	640	165	4	245	202	11	395
Aydın	3 078	44	4 884	2 333	13	3 407	745	31	1 477
Balıkesir	3 650	73	6 172	2 404	8	3 489	1 246	65	2 683
Bilecik	616	17	1 071	374	3	540	242	14	531
Bingöl	497	9	1 107	290	4	516	207	5	591
Bitlis	510	27	1 109	246	9	529	264	18	580
Bolu	935	32	2 103	430	4	721	505	28	1 382
Burdur	959	49	1 874	544	7	899	415	42	975
Bursa	6 123	80	9 593	5 044	28	7 323	1 079	52	2 270
Çanakkale	1 423	43	2 463	732	6	1 104	691	37	1 359
Çankırı	588	31	1 364	254	3	414	334	28	950
Çorum	1 661	42	3 321	936	5	1 527	725	37	1 794
Denizli	3 147	60	5 404	2 390	28	3 858	757	32	1 546
Diyarbakır	2 161	47	4 352	1 377	10	2 443	784	37	1 909
Edirne	881	27	1 515	516	6	773	365	21	742
Elazığ	1 318	42	2 245	969	6	1 437	349	36	808
Erzincan	750	20	1 439	446	4	683	304	16	756
Erzurum	1 403	32	2 852	857	9	1 483	546	23	1 369
Eskişehir	1 943	52	3 415	1 454	11	2 217	489	41	1 198
Gaziantep	3 731	85	6 155	2 914	38	4 431	817	49	1 724
Giresun	956	22	1 771	604	6	944	352	16	827
Gümüşhane	384	8	810	144	0	224	240	8	586
Hakkâri	195	17	518	81	4	132	114	13	386
Hatay	3 644	60	5 853	2 945	32	4 460	699	28	1 393
Isparta	1 467	54	2 573	1 129	6	1 759	338	48	814
Mersin	5 374	117	8 370	4 461	65	6 568	913	52	1 802
İstanbul	15 577	208	22 621	13 904	147	19 803	1 673	61	2 818
İzmir	10 703	168	15 109	8 355	65	11 884	1 848	103	3 225
Kars	394	2	831	165	0	254	229	2	577
Kastamonu	875	39	1 786	480	13	882	395	26	904
Kayseri	3 876	76	7 001	3 171	16	5 080	705	60	1 921
Kırklareli	779	16	1 379	440	9	718	339	7	661
Kırşehir	618	14	1 338	387	7	753	231	7	585
Kocaeli	3 552	59	6 070	2 972	32	4 820	580	27	1 250
Konya	6 520	127	10 846	5 154	50	7 579	1 366	77	3 267
Kütahya	1 354	25	2 462	836	7	1 294	518	18	1 168
Malatya	1 491	40	2 756	1 018	5	1 680	473	35	1 076
Manisa	4 173	112	6 963	2 986	29	4 507	1 187	83	2 456
K. Maraş	2 475	42	4 494	1 865	15	3 074	610	27	1 420
Mardin	995	36	1 853	554	11	856	441	25	997
Muğla	4 109	63	6 160	3 210	25	4 497	899	38	1 663
Muş	442	20	1 023	225	9	443	217	11	580
Nevşehir	941	25	1 689	657	5	1 028	284	20	661
Niğde	839	27	1 565	588	6	970	251	21	595
Ordu	1 420	18	2 452	1 134	10	1 839	286	8	613
Rize	809	16	1 373	562	2	885	247	14	488
Sakarya	2 582	36	4 455	1 977	16	3 091	605	20	1 364
Samsun	3 155	69	5 625	2 514	31	4 031	641	38	1 594
Siirt	570	14	1 012	358	2	467	212	12	545
Sinop	420	8	786	244	1	400	176	7	386
Sivas	1 408	60	2 862	777	15	1 273	631	45	1 589
Tekirdağ	1 915	45	3 394	1 256	16	2 005	659	29	1 389
Tokat	1 592	44	2 849	1 072	19	1 597	520	25	1 252
Trabzon	1 430	36	2 494	1 018	13	1 610	412	23	884
Tunceli	152	7	324	85	4	154	67	3	170
Ş. Urfa	2 232	73	4 380	1 269	22	1 985	963	51	2 395
Uşak	1 123	29	2 011	796	17	1 312	327	12	699
Van	1 652	44	3 145	1 274	25	2 087	378	19	1 058
Yozgat	1 039	42	2 309	545	6	1 058	494	36	1 251
Zonguldak	1 076	28	1 961	761	13	1 230	315	15	731
Aksaray	1 243	27	2 381	891	7	1 420	352	20	961
Bayburt	266	7	596	127	1	218	139	6	378
Karaman	784	12	1 292	579	2	888	205	10	424
Kırıkkale	904	12	1 854	569	5	1 000	335	7	854
Batman	626	6	1 208	422	4	656	204	2	552
Şırnak	609	23	997	340	8	466	269	15	531
Bartın	504	3	895	317	1	513	187	2	382
Ardahan	230	3	472	118	2	212	112	1	260
Iğdır	258	8	423	160	1	221	98	7	202
Yalova	597	7	915	378	3	513	219	4	402
Karabük	518	16	1 105	312	2	551	206	14	554
Kilis	577	10	905	439	1	589	138	9	316
Osmaniye	1 740	13	2 654	1 403	4	1 970	337	9	684
Düzce	1 071	19	1 839	693	10	1 055	378	9	784

APPENDIX 3 Number of traffic accidents involving death or injury, by province 2015

Number of traffic accidents, persons killed and injured by province, 2015

Province	Total number of accidents	Number of accidents involving material loss only	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	1 313 359	1 130 348	183 011	7 530	3 831	3 699	304 421
Adana	32 933	27 496	5 437	226	114	112	8 298
Adıyaman	3 224	1 931	1 293	31	19	12	2 458
Afyonkarahisar	8 549	6 266	2 283	133	72	61	4 443
Ağrı	2 211	1 343	868	39	24	15	1 729
Amasya	4 046	2 924	1 122	59	28	31	2 178
Ankara	143 942	131 923	12 019	387	189	198	19 382
Antalya	47 760	39 922	7 838	295	133	162	11 936
Artvin	1 681	1 315	366	22	11	11	635
Aydın	14 357	10 748	3 609	150	63	87	5 582
Balıkesir	16 075	12 092	3 983	165	88	77	6 539
Bilecik	2 437	1 846	591	32	19	13	1 036
Bingöl	1 528	940	588	25	9	16	1 197
Bitlis	1 603	1 084	519	18	15	3	1 096
Bolu	4 875	3 882	993	77	45	32	2 076
Burdur	3 251	2 153	1 098	74	40	34	1 962
Bursa	62 352	56 180	6 172	204	91	113	9 760
Çanakkale	6 331	4 682	1 649	96	51	45	2 620
Çankırı	2 056	1 438	618	45	31	14	1 349
Çorum	7 371	5 611	1 760	99	54	45	3 568
Denizli	18 736	15 426	3 310	144	80	64	5 491
Diyarbakır	10 410	8 191	2 219	39	34	5	4 449
Edirne	4 993	4 078	915	49	25	24	1 803
Elazığ	6 218	4 689	1 529	85	26	59	2 524
Erzincan	2 986	2 137	849	36	30	6	1 645
Erzurum	8 835	7 313	1 522	104	50	54	2 957
Eskişehir	14 156	12 184	1 972	87	50	37	3 346
Gaziantep	22 081	17 579	4 502	232	96	136	7 229
Giresun	4 566	3 444	1 122	46	30	16	2 079
Gümüşhane	1 168	725	443	25	16	9	898
Hakkâri	435	272	163	14	12	2	408
Hatay	13 463	9 356	4 107	161	51	110	6 433
Isparta	5 393	3 831	1 562	62	27	35	2 593
Mersin	25 519	19 495	6 024	218	103	115	9 029
İstanbul	366 757	350 676	16 081	582	262	320	22 661
İzmir	102 434	91 078	11 356	341	154	187	15 920
Kars	1 616	1 154	462	31	14	17	934
Kastamonu	3 730	2 790	940	78	48	30	1 828
Kayseri	24 497	20 689	3 808	166	76	90	7 044
Kırklareli	3 478	2 642	836	31	18	13	1 574
Kırşehir	2 617	1 919	698	27	13	14	1 368
Kocaeli	38 687	34 403	4 284	95	45	50	7 139
Konya	34 515	27 323	7 192	307	136	171	12 023
Kütahya	6 143	4 668	1 475	77	38	39	2 592
Malatya	7 931	6 376	1 555	81	34	47	2 860
Manisa	17 445	12 857	4 588	228	112	116	7 221
K. Maraş	10 715	8 037	2 678	99	43	56	4 898
Mardin	3 247	2 221	1 026	61	37	24	1 948
Muğla	17 117	12 651	4 466	138	83	55	6 730
Muş	1 396	956	440	35	27	8	945
Nevşehir	3 502	2 500	1 002	43	25	18	1 809
Niğde	3 450	2 483	967	51	32	19	1 700
Ordu	8 458	6 926	1 532	44	31	13	2 750
Rize	4 366	3 506	860	25	17	8	1 448
Sakarya	15 798	12 742	3 056	108	69	39	5 232
Samsun	19 376	15 722	3 654	171	82	89	6 183
Siirt	1 299	805	494	12	7	5	765
Sinop	1 930	1 397	533	22	11	11	959
Sivas	7 359	5 720	1 639	117	52	65	3 434
Tekirdağ	12 882	10 755	2 127	89	52	37	3 750
Tokat	5 605	3 840	1 765	71	41	30	3 259
Trabzon	10 326	8 644	1 682	56	22	34	2 850
Tunceli	515	336	179	5	3	2	383
Ş. Urfa	7 581	5 058	2 523	141	109	32	4 756
Uşak	5 469	4 287	1 182	66	43	23	2 023
Van	5 249	3 638	1 611	97	58	39	3 060
Yozgat	3 856	2 627	1 229	79	60	19	2 615
Zonguldak	6 663	5 501	1 162	53	23	30	2 094
Aksaray	4 937	3 526	1 411	36	29	7	2 782
Bayburt	730	497	233	7	6	1	423
Karaman	3 410	2 602	808	31	17	14	1 405
Kırıkkale	4 332	3 253	1 079	50	33	17	2 094
Batman	2 837	2 200	637	10	8	2	1 222
Şırnak	1 521	914	607	51	27	24	1 118
Bartın	1 882	1 362	520	20	9	11	908
Ardahan	680	476	204	16	8	8	419
İğdir	924	627	297	20	12	8	481
Yalova	5 119	4 321	798	17	11	6	1 150
Karabük	3 291	2 712	579	33	18	15	1 139
Kilis	1 022	447	575	13	3	10	886
Osmaniye	5 402	3 411	1 991	70	30	40	3 082
Düzce	5 722	4 577	1 145	50	17	33	2 011

APPENDIX 4 Number of traffic accidents involving death or injury, by province 2016

Number of traffic accidents, persons killed and injured by province, 2016							
Province	Total number of accidents	Number of accidents involving material loss only	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	1 182 491	997 363	185 128	7 300	3 493	3 807	303 812
Adana	28 631	23 368	5 263	211	87	124	8 069
Adıyaman	3 014	1 755	1 259	54	25	29	2 301
Afyonkarahisar	7 615	5 292	2 323	173	96	77	4 327
Ağrı	2 051	1 212	839	49	25	24	1 624
Amasya	3 580	2 495	1 085	51	26	25	1 945
Ankara	129 697	117 510	12 187	387	172	215	19 613
Antalya	40 307	32 692	7 615	317	117	200	11 356
Artvin	1 488	1 091	395	19	16	3	697
Aydın	13 389	9 729	3 660	147	68	79	5 643
Balıkesir	15 069	10 716	4 353	211	107	104	6 759
Bilecik	2 216	1 642	574	23	15	8	1 025
Bingöl	1 643	989	654	29	19	10	1 291
Bitlis	1 575	1 005	570	30	19	11	1 227
Bolu	4 610	3 568	1 042	49	26	23	2 166
Burdur	2 959	1 801	1 158	67	37	30	2 092
Bursa	58 314	51 681	6 633	212	96	116	10 259
Çanakkale	5 985	4 208	1 777	99	44	55	2 956
Çankırı	1 807	1 162	645	45	20	25	1 434
Çorum	6 772	4 895	1 877	107	55	52	3 486
Denizli	17 553	14 010	3 543	141	66	75	5 626
Diyanbakır	9 554	7 321	2 233	62	49	13	4 291
Edirne	4 499	3 568	911	50	25	25	1 476
Elazığ	5 496	4 033	1 463	71	34	37	2 599
Erzincan	2 950	2 042	908	27	23	4	1 773
Erzurum	8 096	6 636	1 460	84	37	47	2 916
Eskişehir	13 401	11 185	2 216	78	29	49	3 657
Gaziantep	16 310	14 522	3 788	59	49	40	6 212
Giresun	4 113	3 019	1 094	42	34	8	1 893
Gümüşhane	1 217	766	451	20	13	7	872
Hakkari	315	201	114	12	9	3	288
Hatay	11 736	7 685	4 051	166	65	101	6 190
Isparta	4 952	3 321	1 631	55	26	29	2 742
Mersin	23 934	17 589	6 345	256	117	139	9 452
İstanbul	327 494	311 392	16 102	551	219	332	22 679
İzmir	92 913	82 011	10 902	333	159	174	15 075
Kars	1 568	1 095	473	26	7	19	871
Kastamonu	3 312	2 246	1 066	81	46	35	2 103
Kayseri	22 137	18 319	3 818	124	56	68	6 772
Kırklareli	3 342	2 448	894	30	14	16	1 502
Kırşehir	2 477	1 749	728	36	17	19	1 538
Kocaeli	35 075	30 540	4 535	126	49	77	7 438
Konya	31 261	23 776	7 485	333	147	186	12 363
Kütahya	5 203	3 744	1 459	86	41	45	2 657
Malatya	7 379	5 748	1 631	77	31	46	2 982
Manisa	16 294	11 619	4 675	239	101	138	7 624
K. Maraş	9 149	6 393	2 756	95	38	57	4 929
Mardin	2 757	1 858	899	33	27	6	1 580
Muğla	15 124	10 655	4 469	159	58	101	6 529
Muş	1 410	925	485	16	11	5	1 095
Nevşehir	2 927	1 996	931	50	24	26	1 638
Niğde	3 269	2 212	1 057	55	23	32	1 810
Ordu	7 500	5 956	1 544	36	20	16	2 610
Rize	3 594	2 707	887	32	17	15	1 434
Sakarya	14 649	11 405	3 244	77	49	28	5 270
Samsun	17 805	14 137	3 668	152	62	90	6 124
Siirt	1 205	702	503	11	7	4	876
Sinop	1 744	1 177	567	45	25	20	1 006
Sivas	6 903	5 192	1 711	96	35	61	3 535
Tekirdağ	11 964	9 762	2 202	119	66	53	3 713
Tokat	5 130	3 343	1 787	83	47	36	3 052
Trabzon	9 357	7 544	1 813	66	38	30	3 037
Tunceli	400	278	122	5	3	2	242
Ş. Urfa	7 119	4 488	2 631	91	68	23	5 158
Uşak	4 825	3 522	1 303	35	21	14	2 266
Van	4 255	2 841	1 414	62	36	26	2 723
Yozgat	3 599	2 320	1 279	66	51	15	2 823
Zonguldak	5 633	4 501	1 132	48	24	24	1 905
Aksaray	4 473	3 026	1 447	44	31	13	2 653
Bayburt	778	533	245	13	6	7	481
Karaman	3 164	2 259	905	29	14	15	1 489
Kırıkkale	3 890	2 836	1 054	32	21	11	2 051
Batman	2 451	1 793	658	10	8	2	1 338
Şırnak	1 140	691	449	18	12	6	729
Bartın	1 685	1 152	533	16	2	14	886
Ardahan	664	421	243	15	6	9	500
İğdir	879	582	297	13	5	8	523
Yalova	4 004	3 294	710	17	9	8	1 034
Karabük	2 970	2 363	607	37	18	19	1 185
Kilis	846	296	550	11	8	3	811
Osmaniye	4 706	2 776	1 930	82	42	40	2 905
Düzce	5 222	4 011	1 211	54	28	26	2 029

APPENDIX 5 Number of traffic accidents involving death or injury, by province 2017

Number of traffic accidents, persons killed and injured by province, 2017							
Province	Total number of accidents	Number of accidents involving material loss only	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	1 202 716	1 020 047	182 669	7 427	3 534	3 893	300 383
Adana	27 714	22 831	4 883	200	78	122	7 499
Adıyaman	2 959	1 707	1 252	51	25	26	2 268
Afyonkarahisar	7 690	5 453	2 237	154	47	107	4 264
Ağrı	1 944	1 118	828	57	37	20	1 594
Amasya	3 936	2 810	1 128	61	32	29	2 117
Ankara	132 913	120 555	12 358	391	180	211	19 537
Antalya	40 446	32 790	7 656	346	148	198	11 626
Artvin	1 567	1 119	448	42	28	14	779
Aydın	13 339	9 785	3 574	147	68	79	5 336
Balıkesir	15 548	11 366	4 182	143	83	60	6 605
Bilecik	2 339	1 675	664	26	16	10	1 171
Bingöl	1 646	1 061	585	9	6	3	1 123
Bitlis	1 573	976	597	27	14	13	1 298
Bolu	4 482	3 552	930	61	41	20	1 847
Burdur	3 201	1 955	1 248	74	36	38	2 229
Bursa	60 742	54 262	6 480	213	102	111	9 954
Çanakkale	6 106	4 537	1 569	73	36	37	2 476
Çankırı	1 807	1 243	564	30	17	13	1 164
Çorum	7 172	5 306	1 866	84	47	37	3 658
Danizli	17 534	14 145	3 389	173	87	86	5 350
Diyarbakır	10 336	7 946	2 390	78	64	14	4 599
Edirne	4 737	3 799	938	48	21	27	1 480
Elazığ	5 851	4 403	1 448	82	28	54	2 511
Erzincan	2 913	2 028	885	46	32	14	1 664
Erzurum	8 532	6 933	1 599	88	47	41	3 196
Eskişehir	13 373	11 229	2 144	119	72	47	3 631
Gaziantep	18 208	14 696	3 512	136	86	50	5 861
Giresun	4 247	3 149	1 098	34	26	8	2 071
Gümüşhane	1 162	787	375	13	7	6	735
Hakkari	453	282	191	6	4	2	435
Hatay	11 930	7 986	3 944	162	51	111	6 180
Isparta	5 006	3 525	1 481	69	25	44	2 449
Mersin	23 757	17 661	6 096	222	85	137	9 062
İstanbul	328 248	312 751	15 497	544	212	332	21 707
İzmir	92 298	81 922	10 378	332	166	166	14 308
Kars	1 688	1 177	511	34	17	17	985
Kastamonu	3 270	2 286	984	55	28	27	1 931
Kayseri	21 867	17 963	3 904	162	60	102	6 813
Kırklareli	3 301	2 549	752	31	15	16	1 321
Kırşehir	2 455	1 709	746	26	11	15	1 485
Kocaeli	36 516	32 241	4 275	134	60	74	7 039
Konya	31 064	24 384	6 680	325	116	209	11 632
Kütahya	5 600	4 163	1 437	76	39	37	2 612
Malatya	7 905	6 134	1 771	101	47	54	3 214
Manisa	16 544	11 929	4 615	210	90	120	7 420
K. Maraş	9 369	6 635	2 734	111	41	70	5 010
Mardin	3 098	2 043	1 055	59	41	18	2 030
Muğla	15 653	11 106	4 547	187	86	101	6 838
Muş	1 412	928	484	25	14	11	980
Nevşehir	3 444	2 371	1 073	53	23	30	1 823
Niğde	3 603	2 440	1 163	51	31	20	1 934
Ordu	8 600	6 771	1 829	40	29	11	3 155
Rize	3 437	2 599	838	31	21	10	1 432
Sakarya	15 736	12 537	3 199	64	40	24	5 091
Samsun	18 622	14 998	3 624	143	58	85	6 032
Siiirt	1 250	716	534	14	5	9	939
Sinop	1 828	1 248	580	37	20	17	1 069
Sivas	7 184	5 477	1 707	123	50	73	3 359
Tekirdağ	12 966	10 691	2 285	96	54	42	3 839
Tokat	5 156	3 381	1 795	76	40	36	3 287
Trabzon	9 778	7 908	1 870	77	36	41	3 094
Tunceli	457	294	163	5	0	5	316
Ş. Urfa	7 689	4 803	2 886	87	58	29	5 598
Uşak	5 363	3 970	1 393	44	27	17	2 285
Van	4 089	2 752	1 337	66	22	44	2 568
Yozgat	3 684	2 408	1 278	50	36	14	2 695
Zonguldak	5 889	4 749	1 140	58	25	33	2 009
Aksaray	4 814	3 363	1 451	45	34	11	2 610
Bayburt	792	552	240	11	7	4	487
Karaman	3 310	2 382	928	48	25	23	1 565
Kırıkkale	3 804	2 800	1 004	55	31	24	1 887
Batman	2 719	1 996	723	10	7	3	1 466
Şirnak	1 559	880	679	32	24	8	1 153
Bartın	1 854	1 322	532	19	11	8	865
Ardahan	663	435	228	12	4	8	434
İğdır	1 020	665	355	26	20	6	651
Yalova	4 036	3 257	779	17	12	5	1 131
Karabük	2 925	2 361	564	23	7	16	989
Kilis	914	356	558	19	8	11	812
Osmaniye	4 680	2 825	1 855	71	30	41	2 792
Düzce	5 400	4 222	1 178	47	20	27	1 922

APPENDIX 6 Number of traffic accidents involving death or injury, by province 2018

Number of traffic accidents, persons killed and injured by province, 2018

Province	Total number of accidents	Number of accidents involving material loss only	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	1 229 364	1 042 832	186 532	6 675	3 368	3 307	307 071
Adana	29 099	24 140	4 959	165	68	97	7 534
Adıyaman	2 948	1 678	1 270	38	22	16	2 296
Afyonkarahisar	7 978	5 780	2 198	157	63	94	4 184
Ağrı	1 876	1 084	792	46	25	21	1 665
Amasya	3 865	2 806	1 059	52	30	22	2 034
Ankara	136 585	123 927	12 658	392	198	194	19 689
Antalya	43 313	34 754	8 559	305	137	168	12 837
Artvin	1 413	1 003	410	20	12	8	758
Aydın	14 129	10 373	3 756	140	71	69	5 639
Balıkesir	16 568	12 358	4 210	154	97	57	6 662
Bilecik	2 466	1 817	649	22	15	7	1 095
Bingöl	1 608	1 039	569	20	16	4	1 144
Bitlis	1 534	878	656	27	21	6	1 455
Bolu	4 803	3 862	941	49	29	20	1 916
Burdur	3 073	1 894	1 179	46	19	27	2 220
Bursa	62 177	55 575	6 602	153	78	75	10 160
Çanakkale	6 165	4 622	1 643	65	38	27	2 612
Çankırı	1 949	1 313	638	41	27	14	1 334
Çorum	7 519	5 712	1 807	64	55	9	3 343
Denizli	18 514	15 030	3 484	132	68	64	5 717
Diyarbakır	10 682	8 149	2 533	73	55	18	5 033
Edirne	4 756	3 827	929	48	25	23	1 529
Elazığ	5 957	4 352	1 605	56	22	34	2 718
Erzincan	3 123	2 157	966	31	15	16	1 848
Erzurum	8 248	6 789	1 459	65	50	15	2 989
Eskişehir	13 088	10 784	2 304	117	68	49	3 843
Gaziantep	18 417	15 013	3 404	89	57	32	5 727
Giresun	4 363	3 240	1 123	50	39	11	2 068
Gümüşhane	1 165	749	416	28	20	8	841
Hakkari	537	288	249	11	9	2	556
Hatay	12 786	8 688	4 098	129	37	92	6 346
Isparta	5 213	3 672	1 541	55	28	27	2 495
Mersin	24 076	17 891	6 185	194	86	108	9 250
İstanbul	327 981	311 480	16 501	441	154	287	23 158
İzmir	95 933	85 543	10 390	319	160	159	14 567
Kars	1 511	1 043	468	16	7	9	961
Kastamonu	3 402	2 394	1 008	54	27	27	2 020
Kayseri	22 139	18 482	3 657	147	51	96	6 414
Kırklareli	3 487	2 663	824	54	40	14	1 359
Kırşehir	2 593	1 831	762	34	14	20	1 487
Kocaeli	38 296	33 989	4 307	95	47	48	6 949
Konya	31 477	24 897	6 580	294	131	163	11 133
Kütahya	5 854	4 405	1 449	76	36	40	2 464
Malatya	8 072	6 280	1 792	93	48	45	3 173
Manisa	16 852	12 259	4 593	209	94	115	7 419
K.Maraş	9 442	6 756	2 686	114	59	55	4 979
Mardin	3 495	2 235	1 260	33	24	9	2 372
Muğla	17 488	12 611	4 877	143	66	77	7 432
Muş	1 321	768	553	21	16	5	1 291
Nevşehir	3 425	2 311	1 114	52	23	29	2 065
Niğde	3 466	2 331	1 135	56	24	32	1 997
Ordu	9 044	7 103	1 941	26	20	6	3 275
Rize	3 701	2 882	819	23	11	12	1 385
Sakarya	15 686	12 661	3 025	54	31	23	4 856
Samsun	18 682	15 225	3 457	136	53	83	5 832
Siirt	1 248	707	541	11	5	6	997
Sinop	1 954	1 322	632	35	19	16	1 135
Sivas	7 327	5 553	1 774	84	31	53	3 454
Tekirdağ	13 287	10 848	2 439	97	61	36	4 019
Tokat	5 304	3 574	1 730	83	52	31	3 028
Trabzon	10 004	8 121	1 883	69	30	39	3 280
Tunceli	530	347	183	9	5	4	390
Ş. Urfa	8 038	5 071	2 967	141	67	74	5 496
Uşak	5 613	4 114	1 499	44	25	19	2 564
Van	4 050	2 800	1 250	61	32	29	2 774
Yozgat	3 774	2 428	1 346	42	29	13	2 824
Zonguldak	6 197	4 985	1 212	48	25	23	2 130
Aksaray	4 812	3 393	1 419	51	35	16	2 767
Bayburt	710	496	214	13	11	2	425
Karaman	3 078	2 283	795	41	22	19	1 285
Kırıkkale	3 927	2 893	1 034	27	14	13	1 994
Batman	2 699	1 935	764	8	5	3	1 426
Şirnak	1 669	964	705	42	27	15	1 295
Bartın	2 042	1 496	546	27	10	17	915
Ardahan	636	427	209	16	6	10	403
İğdır	888	565	323	28	23	5	579
Yalova	3 856	3 126	730	27	21	6	1 041
Karabük	3 171	2 532	639	32	20	12	1 181
Kilis	950	397	553	9	6	3	851
Osmaniye	4 712	2 802	1 910	62	29	33	2 902
Düzce	5 548	4 360	1 188	44	22	22	1 991

APPENDIX 7 Number of traffic accidents involving death or injury, by province 2019

Number of traffic accidents, persons killed and injured by province, 2019							
Province	Total number of accidents	Total number of road motor vehicles	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	1 168 144	23 156 975	174 896	5 473	2 524	2 949	283 234
Adana	28 176	657 202	4 723	165	72	93	7 327
Adıyaman	3 036	105 856	1 222	34	10	24	2 279
Afyonkarahisar	7 581	223 265	2 053	113	41	72	3 885
Ağrı	1 732	31 692	635	29	15	14	1 295
Amasya	3 818	117 601	949	24	13	11	1 841
Ankara	133 003	2 033 935	11 588	286	110	176	17 698
Antalya	45 015	1 101 056	8 140	235	104	131	12 143
Artvin	1 415	38 933	399	22	14	8	706
Aydın	13 866	456 056	3 681	107	52	55	5 410
Balıkesir	15 584	484 475	3 952	129	81	48	6 194
Bilecik	2 336	68 934	574	16	10	6	953
Bingöl	1 386	17 111	444	6	4	2	924
Bitlis	1 380	22 235	506	25	19	6	1 226
Bolu	4 639	114 889	845	49	39	10	1 568
Burdur	3 151	134 884	1 089	49	20	29	1 973
Bursa	58 531	902 981	6 392	133	68	65	9 847
Çanakkale	5 993	231 148	1 467	50	32	18	2 399
Çankırı	1 834	52 617	540	36	15	21	1 170
Çorum	7 184	171 377	1 661	57	26	31	2 915
Denizli	16 814	410 598	3 202	96	46	50	5 220
Diyarbakır	9 790	122 143	2 305	43	31	12	4 299
Edirne	4 608	160 603	887	53	27	26	1 518
Elazığ	5 422	126 387	1 132	50	13	37	1 968
Erzincan	2 861	59 815	793	18	12	6	1 434
Erzurum	7 761	119 108	1 407	62	36	26	2 706
Eskişehir	12 664	287 142	2 110	79	41	38	3 373
Gaziantep	18 695	518 415	3 550	84	53	31	6 042
Giresun	4 199	91 540	1 076	30	20	10	1 835
Gümüşhane	1 061	24 772	335	13	7	6	653
Hakkâri	526	9 188	222	8	7	1	523
Hatay	12 673	492 988	3 779	89	21	68	6 018
Isparta	5 120	178 205	1 419	32	17	15	2 349
Mersin	23 274	619 418	5 946	164	62	102	8 717
İstanbul	306 452	4 187 776	16 737	368	128	240	22 889
İzmir	89 758	1 425 302	9 919	250	129	121	13 889
Kars	1 414	45 160	449	19	10	9	908
Kastamonu	3 379	130 296	920	61	36	25	1 726
Kayseri	20 594	378 771	3 317	115	39	76	5 908
Kırklareli	3 342	133 401	779	23	9	14	1 307
Kırşehir	2 241	68 323	628	29	19	10	1 165
Kocaeli	33 576	399 064	3 670	84	30	54	5 667
Konya	29 277	724 397	5 975	259	103	156	10 107
Kütahya	5 550	210 652	1 345	65	35	30	2 314
Malatya	7 490	176 389	1 531	40	23	17	2 798
Manisa	15 552	590 671	4 254	161	79	82	6 813
K. Maraş	9 338	235 383	2 489	93	35	58	4 506
Mardin	3 507	75 935	1 210	34	20	14	2 067
Muğla	17 202	506 829	4 626	118	55	63	6 826
Muş	1 333	33 608	517	19	8	11	1 021
Nevşehir	3 687	121 818	1 076	46	27	19	1 905
Niğde	3 398	107 255	1 095	53	26	27	1 915
Ordu	8 488	136 111	1 919	50	27	23	3 190
Rize	3 431	80 210	755	19	10	9	1 258
Sakarya	14 742	287 793	2 619	54	29	25	4 110
Samsun	17 686	359 612	3 133	105	38	67	5 264
Siirt	1 226	20 493	526	17	6	11	807
Sinop	1 851	59 475	601	30	18	12	1 139
Sivas	6 757	160 963	1 563	82	30	52	3 031
Tekirdağ	12 104	269 373	2 228	84	45	39	3 515
Tokat	5 259	179 184	1 582	58	29	29	2 733
Trabzon	9 550	197 471	1 764	60	25	35	2 838
Tunceli	561	9 359	140	9	7	2	300
Ş. Urfa	7 983	253 375	2 995	127	48	79	5 409
Uşak	5 106	137 574	1 319	55	25	30	2 236
Van	4 482	77 311	1 422	63	33	30	3 012
Yozgat	3 698	106 682	1 217	51	34	17	2 616
Zonguldak	5 793	155 221	1 087	44	18	26	1 812
Aksaray	4 761	125 951	1 389	61	28	33	2 649
Bayburt	612	15 589	186	7	4	3	397
Karaman	2 789	91 378	730	14	5	9	1 262
Kırıkkale	3 502	68 142	901	39	11	28	1 640
Batman	3 002	44 882	831	11	10	1	1 490
Şirnak	1 618	29 310	711	16	7	9	1 287
Bartın	1 904	51 553	496	19	12	7	823
Ardahan	564	19 192	178	11	3	8	351
Iğdir	940	28 069	337	9	4	5	536
Yalova	3 823	65 991	717	12	5	7	1 033
Karabük	3 025	65 686	589	30	13	17	1 061
Kilis	973	47 244	606	9	5	4	855
Osmaniye	4 654	164 595	1 793	51	19	32	2 681
Düzce	5 042	111 587	1 002	53	27	26	1 732

APPENDIX 8 Number of traffic accidents involving death or injury, by province 2020

Number of traffic accidents, persons killed and injured by province, 2020

Province	Total number of accidents	Total number of road motor vehicles	Number of accidents involving death or injury	Number of persons killed			Number of persons injured
				Total	At accident scene	Accident follow-up ⁽¹⁾	
Total	983 808	24 144 857	150 275	4 866	2 197	2 669	226 266
Adana	23 963	684 135	4 153	159	81	78	6 001
Adıyaman	2 645	110 433	975	27	9	18	1 590
Afyonkarahisar	6 626	230 313	1 729	123	51	72	2 951
Ağrı	1 441	31 055	573	35	18	17	1 097
Amasya	3 270	122 457	843	33	11	22	1 409
Ankara	103 051	2 158 111	9 601	261	127	134	13 815
Antalya	36 655	1 158 758	6 914	174	82	92	9 638
Artvin	1 263	40 826	313	12	6	6	531
Aydın	12 272	475 929	3 106	112	56	56	4 377
Balıkesir	13 411	502 231	3 321	117	61	56	4 768
Bilecik	2 078	70 947	549	9	7	2	882
Bingöl	1 265	17 432	422	14	8	6	791
Bitlis	1 385	22 304	488	20	13	7	1 003
Bolu	3 878	118 375	659	33	19	14	1 083
Burdur	2 432	138 275	802	39	17	22	1 304
Bursa	49 346	948 468	5 418	119	61	58	7 793
Çanakkale	5 226	239 658	1 333	44	16	28	1 885
Çankırı	1 631	54 202	484	27	12	15	942
Çorum	6 461	176 716	1 384	54	23	31	2 349
Denizli	14 523	427 378	2 645	88	44	44	3 932
Diyarbakır	8 734	124 672	2 040	40	20	20	3 505
Edirne	3 853	165 164	772	25	15	10	1 165
Elazığ	5 447	133 025	943	32	11	21	1 540
Erzincan	2 535	61 478	700	22	12	10	1 301
Erzurum	6 514	121 371	1 086	49	17	32	1 911
Eskişehir	11 084	297 977	1 843	60	30	30	2 740
Gaziantep	16 782	540 397	3 239	70	42	28	5 054
Giresun	3 769	95 592	838	33	23	10	1 313
Gümüşhane	843	25 383	298	10	3	7	580
Hakkari	581	9 050	220	20	14	6	413
Hatay	11 586	509 542	3 548	90	38	52	5 246
Isparta	3 715	184 461	1 058	48	17	31	1 747
Mersin	20 737	647 365	5 091	164	56	108	7 102
İstanbul	248 727	4 388 118	15 449	322	100	222	20 014
İzmir	78 201	1 495 082	8 888	235	118	117	11 509
Kars	1 236	45 491	375	21	2	19	654
Kastamonu	2 888	134 533	791	43	30	13	1 400
Kayseri	18 161	352 834	2 953	112	58	54	4 882
Kırklareli	3 088	137 615	717	34	17	17	1 113
Kırşehir	1 989	70 183	538	26	12	14	948
Kocaeli	29 479	420 605	3 138	81	29	52	4 522
Konya	24 087	746 080	4 722	254	91	163	7 472
Kütahya	4 739	215 654	1 046	45	25	20	1 672
Malatya	6 982	185 694	1 460	54	24	30	2 431
Manisa	14 146	611 062	3 620	128	59	69	5 294
K. Maraş	8 418	246 201	2 216	80	28	52	3 582
Mardin	2 974	76 605	969	36	20	16	1 561
Muğla	14 622	528 276	3 878	121	69	52	5 305
Muş	1 279	33 722	446	10	4	6	839
Nevşehir	2 898	126 210	763	32	18	14	1 273
Niğde	3 241	110 859	936	39	23	16	1 469
Ordu	7 860	144 228	1 620	45	22	23	2 454
Rize	2 845	83 507	631	21	11	10	980
Sakarya	12 696	299 175	2 174	39	19	20	3 124
Samsun	15 645	379 238	2 828	72	24	48	4 466
Siirt	981	20 394	406	7	1	6	625
Sinop	1 563	61 545	493	23	12	11	796
Sivas	6 073	165 697	1 421	85	31	54	2 527
Tekirdağ	11 186	278 192	1 876	68	38	30	2 837
Tokat	4 682	186 979	1 398	48	22	26	2 341
Trabzon	7 811	209 014	1 494	57	37	20	2 322
Tunceli	646	9 667	180	10	4	6	338
Ş. Urfa	7 338	255 664	2 814	105	39	66	4 786
Uşak	4 171	141 541	972	42	23	19	1 606
Van	3 715	76 584	1 145	30	10	20	2 121
Yozgat	3 134	108 696	975	46	23	23	1 910
Zonguldak	4 663	159 177	877	34	9	25	1 396
Aksaray	4 236	130 874	1 145	45	19	26	2 129
Bayburt	529	15 798	151	5	3	2	288
Karaman	2 643	93 470	619	17	5	12	991
Kırıkkale	2 927	69 380	709	28	16	12	1 185
Batman	2 552	45 916	670	13	8	5	1 091
Şırnak	1 409	29 145	529	29	10	19	936
Bartın	1 525	52 836	383	11	5	6	591
Ardahan	444	19 092	152	5	1	4	304
Iğdır	868	28 365	267	10	3	7	395
Yalova	3 408	68 542	688	20	11	9	911
Karabük	2 321	67 165	400	20	9	11	636
Kilis	900	48 524	548	13	6	7	804
Osmaniye	4 268	172 334	1 617	47	19	28	2 444
Düzce	4 612	115 814	802	35	10	25	1 234

APPENDIX 9 Deaths and injured in 2015, Gaziantep

2015	Deaths	Injured
January	2	200
February	4	228
March	1	301
April	-	384
May	4	354
June	4	408
July	2	431
August	1	340
September	1	394
October	2	280
November	2	273
December	2	281

APPENDIX 10 Deaths and injured in 2016, Gaziantep

2016	Deaths	Injured
January	-	188
February	-	217
March	-	234
April	1	349
May	-	298
June	-	306
July	1	280
August	-	283
September	-	255
October	1	270
November	1	250
December	-	160

APPENDIX 11 Deaths and injured in 2017, Gaziantep

2017	Deaths	Injured
January	1	241
February	-	211
March	2	262
April	2	282
May	1	270
June	2	303
July	3	339
August	2	309
September	1	297
October	1	301
November	1	258
December	1	259

APPENDIX 12 Deaths and injured in 2018, Gaziantep

2018	Deaths	Injured
January	1	229
February	-	186
March	1	271
April	-	258
May	3	239
June	2	276
July	3	323
August	-	302
September	1	276
October	-	287
November	1	211
December	-	187

APPENDIX 13 Deaths and injured in 2019, Gaziantep

2019	Deaths	Injured
January	2	200
February	1	201
March	-	244
April	-	303
May	-	298
June	-	319
July	-	371
August	-	308
September	-	338
October	4	307
November	-	272
December	-	195

APPENDIX 14 And injured in 2020, Gaziantep

2020	Deaths	Injured
January	2	192
February	1	151
March	-	230
April	-	272
May	-	244
June	-	279
July	-	349
August	-	301
September	-	305
October	2	304
November	-	278
December	-	209

APPENDIX 15 Accident Statistics in Gaziantep, 2015-2016

Accidents	2015	2016	Difference	%DECREASES
Fatal accidents	24	4	-17	-83,34
Deaths	25	4	-1	-84



APPENDIX 16 Accident Statistics in Gaziantep, 2016-2017

Accidents	2016	2017	Difference	%DECREASES
Fatal accidents	4	16	-13	+400
Deaths	4	17	-3	+425

APPENDIX 17 Accident Statistics in Gaziantep, 2017-2018

Accidents	2017	2018	Difference	%DECREASES
Fatal accidents	16	11	-5	-32,25
Deaths	17	12	-5	-30



APPENDIX 18 Accident Statistics in Gaziantep, 2018-2019

Accidents	2018	2019	Difference	%DECREASES
Fatal accidents	11	5	-4	-55
Deaths	12	7	-5	-42



APPENDIX 19 Accident Statistics in Gaziantep, 2019-2020

Accidents	2019	2020	Differences	%DECREASES
Fatal accidents	5	5	-	0
Deaths	7	5	-2	-29