

# Road Safety: Issues and Challenges in Vijayawada

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## Abstract

One of the most challenging problems in India is the rapid growth of urbanization and the increasing number of vehicles which intend leads to traffic congestion. India has observed a rise in the Number of road accidents and most of them are due to violating traffic rules and regulations; improper driving behavior; lack of proper road infrastructure; bad weather conditions; etc. Road traffic accident fatalities and injuries are becoming a point of concern related to road users' health in India.

This paper focus into the comprehensive analysis of the road accident scenario in India, with a specific focus on Vijayawada. Vijayawada emerges as a focal point due to its significant contribution to road accidents in state of Andhra Pradesh. The city's road network, including major regional roads, is scrutinized, highlighting concerns such as inadequate road spaces, improper signage's, and poor infrastructure in major corridors. The study examines the existing road conditions, identifies the causes of accidents, and assesses traffic congestion on the core network in the region. Notably, the research reveals a disturbing increase in road accidents and fatalities, raising concerns about the health and well-being of road users. It Concludes with recommendations to address road safety concerns, including the importance of adhering to traffic regulations, avoiding distractions, and promoting safe driving behavior. The study underscores the urgency of proactive measures to ensure the safety and well-being of road users in Vijayawada and India at large.

**Key Words:** Urban Road Safety, Road Infrastructure, Traffic Management

## 1.INTRODUCTION

Every minute, around 2.57 persons are dying because of road accidents around the world. Road Transportation is India's most popular means of transport system and majorly contributes to the national economy. The number of private vehicles and the road network has risen over time to accommodate the demand for road transportation. The increasing trend in road accidents and crash fatalities is a negative externality related to the country's expanding road network, motorization, and urbanization. Road traffic accidents are now one of the main causes of mortality, disability, and hospitalization in the country, resulting in significant socioeconomic expenditures. According to the (Global Status report)on Road Safety 2018, road traffic continues to be a major developmental issue, a

public health concern, and a leading cause of death and injury worldwide, killing more than 1.35 million people, with 90 percent of these fatalities occurring in developing countries.

## 2. ROAD ACCIDENTS IN INDIA

Various accident studies have described that the rate of accidents in India is high compared to already-developed countries. As per the Road Accidents in India 2021 Report by Transport Research Wing, Ministry of Road Transport & Highways, Government of India a total of 403.1 (in thousands) road accident cases were recorded. According to these statistics road accidents have increased by 13.6% in the year 2021 when compared to 2019 and 2020. The fatalities contribute 16.8% share while the persons injured contributed 11.0% during 2021. It was observed that the death rate has increased from 0.48 to 0.65.

**Table -1:** Profile of Road Accidents in India

Year	Road Accidents	Injured	Died	No. of Vehicles	Rate of Deaths
2017	445.7	456.2	1,50,093	2,53,311	0.59
2018	445.5	446.2	1,52,780	2,72,587	0.56
2019	437.4	439.2	1,54,732	2,95,772	0.52
2020	354.8	335	1,33,201	2,77,000	0.48
2021	403.1	371.9	1,55,622	2,39,000	0.65

Source: MoRTH, GoI 2021 (In Thousand)

## 3. ROAD ACCIDENTS IN ANDHRA PRADESH

It's both heartening and concerning to see the statistical trends in road accidents and fatalities in India and Andhra Pradesh. On one hand, the decrease in road accident fatalities from 2009 to 2021 is a positive development, suggesting that efforts to improve road safety and awareness are making an impact. However, the increase in the accident severity index fatalities per 100 accidents is a cause for concern and indicates that there's still work to be done in terms of reducing the severity of accidents.

It was observed from the data analysis that 1,55,622 persons died and 3,71,961 got injured in 4,03,102 accidents in India wherein 8053 persons died and 21,169 got injured in 19,729 accidents in the state of Andhra Pradesh in the year 2021. Andhra Pradesh ranked 8th in the number of road accidents and 7th in the number of fatalities in the All-India

Statistics. The cities of Vijayawada and Vishakhapatnam in Andhra Pradesh ranked 16th and 23rd respectively in respect of the number of fatalities in million-plus (50) cities in India.

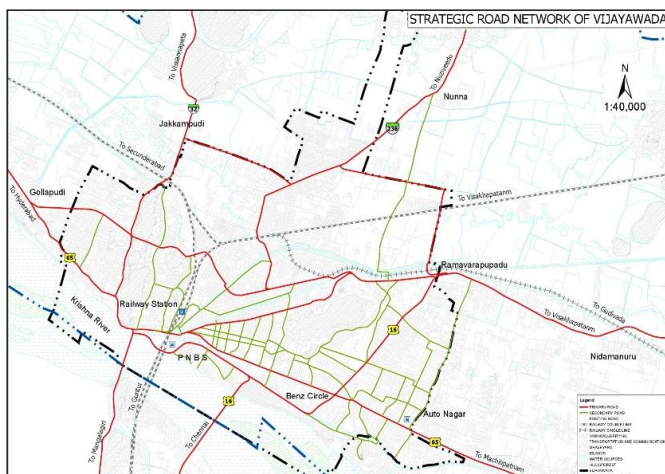
Road accident fatalities have decreased by 47.00%, i.e., from 43,600 numbers in the 2009 year to 19,729 numbers in 2021 year. A decreasing trend has been observed in fatalities and injuries from 2009 to 2021. During 2009 and 2021, the accident severity index fatalities per 100 accidents increased by 10%. Consequently, fatality risk per 100,000 people, has decreased from 17.75 in 2009 year to 9.17 in the 2021 year but there is an increase in risk when compared to earlier years i.e. 2019. Although the fatality rate, road accidental deaths per 10,000 vehicles has decreased over the years from 87.5 in 1970 year to 8.6 in 2013 year, it is still quite high in comparison to developed countries.

**Table -2 : Profile of Road Accidents in Andhra Pradesh**

Year	Road Accidents	%	Injured	%	Killed	%
2017	25727		27475		8060	
2018	24475	-4.87	23456	-14.63	7556	-6.25
2019	20755	-15.20	24777	5.63	7834	3.68
2020	17910	-13.71	19612	-20.85	7059	-9.89
2021	19729	10.16	21169	7.94	8053	14.08

#### 4. STUDY AREA - VIJAYAWADA

Vijayawada is the second largest city in the state of Andhra Pradesh. It lies on the banks of the River Krishna surrounded by the hills of Eastern Ghats, known as Indrakeeladri Hills, and is reported as the political, commercial, cultural, and educational capital of Andhra Pradesh.



**Fig -1: Strategic Road Network of Vijayawada**

The Vijayawada Municipal Corp is the largest city by population and second largest by area within the Andhra Pradesh Capital Region. The city has a population of 17,23,000 in 2021 spread over an area of 61.88 sq. km. The city witnessed a 22% growth in population from 2001 to

2011. The sex ratio is 995 females per 1000 males which is better compared to cities of similar scale in India. The average literacy rate is 81.00%. It is one of the fastest-growing urban areas in India and among the top 10 fastest-growing cities in the world according to an Oxford Economics report. The major regional roads from Vijayawada are listed below:

1. NH 16 - Chennai to Kolkata via Guntur, Vijayawada
2. NH 65 - Machilipatnam to Pune via Vijayawada, Hyderabad
3. SH 236 - Vijayawada to Nuziveedu via Agiripalle
4. SH 32 - Vijayawada to Visannapeta via Velagaleru

The city has a well-developed road network with relatively better Road right of way along the major roads. The MG Road, Eluru Road, and the NH length 65 Road act as the major spines of the city. One of the major concerns of the city road network is that the three canals (Bandar Canal, Eluru Canal, and Ryves Canal) running through the city create barriers reducing internal connectivity to some extent.

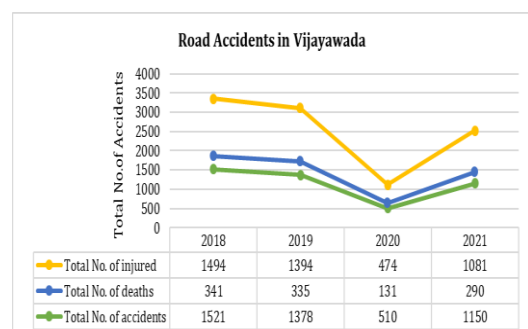
No	Name of the Road	Lane Configuration
1	MG Road (Bandar Road)	Varies between 4 Lane and 6 Lane Divided carriageway
2	NH 16	Varies between 4 Lane and 6 Lane Divided carriageway
3	NH 65	Varies between 4 Lane and 6 Lane Divided carriageway
4	Eluru road	4 Lane Divided carriageway
5	BRTS road	6 Lane Divided carriageway
6	Ring road	2 Lane / 4 Lane Divided/Undivided carriageway
7	GS Raju road	4 Lane Divided carriageway
8	Vijayawada bypass road	2 Lane / 4 Lane Divided/Undivided carriageway

**Table -3 : Existing Roads in the Study Area**

#### 4.1 ROAD ACCIDENTS TRENDS IN VIJAYAWADA

From the analysis, it was observed that a total of 2521 road accidents were recorded in 2021, out of this 42.81% were injured and 11.50% were considered as fatal accidents. Despite the 16.00% decrease in the trend of total road accidents, there are still inadequate road spaces, improper road signage's, and poor infrastructure in the city's major corridor which are unaddressed.

**Chart -1: Road Accidents trends in Vijayawada**



### 4.2 MODE-WISE ROAD ACCIDENTS

The study area has a large proportion of fatalities from all road user categories because of impacts with two-wheelers, LCVs followed by three-wheelers. From the analysis, it was observed that two-wheelers crash contributes a major share i.e. 37.00% followed by light motor vehicles 26.00% in the year 2021. Despite the COVID-19 situation in 2020, the accident share is comparatively low by all modes of transport whereas it was noticed that the crashes of LCVs are the same over the period. The proportion of vulnerable road users that is pedestrians, bicycles, and two-wheelers contribute to almost 50% of total accidents in the city.

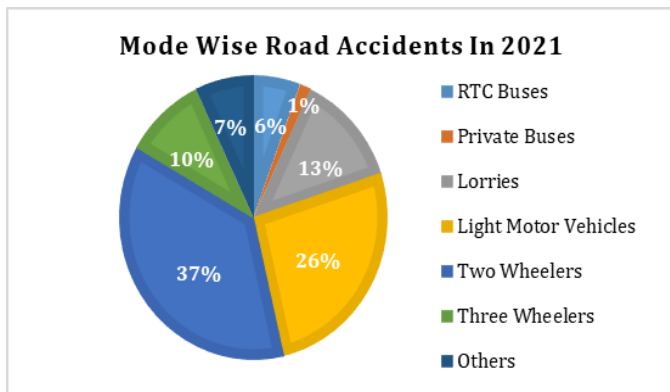


Fig -2: Mode Wise Road Accidents in 2021

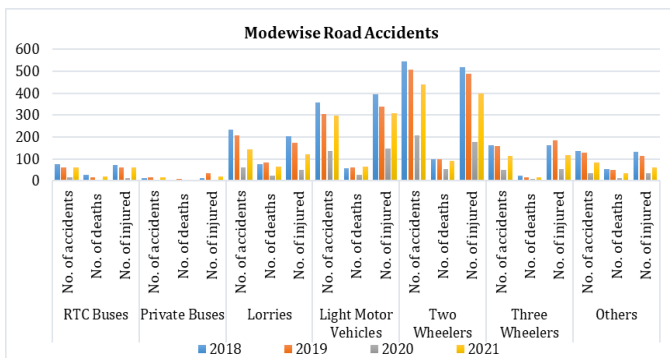


Chart -2: Mode Wise Road Accidents trends in Vijayawada

### 4.3 ROAD ACCIDENTS ON DIFFERENT ROAD CATEGORIES

The figure shows the proportion of total accidents on different categories of roads over a period. The fatality rate is highest on national highways at 50.95% followed by the other roads in the city at 43.21%. Road Accident fatalities are high on National Highways due to mixed passenger and freight traffic. A comparison based on exposure rates cannot be made because the information regarding vehicle kilometres travelled on different categories of roadways is not accessible.

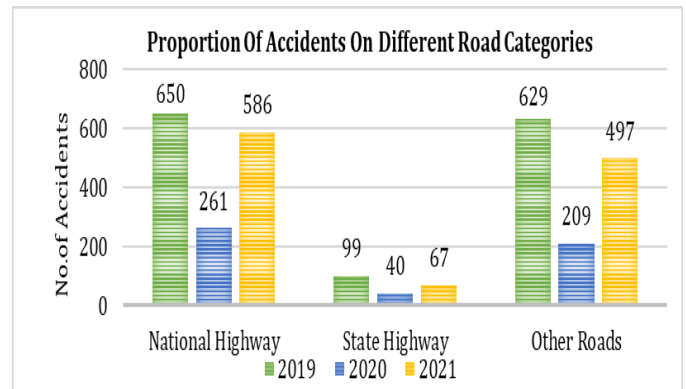


Fig -3: Proportion of Accidents on Different Road Categories

### 4.4 MONTH-WISE ROAD ACCIDENTS IN VIJAYAWADA

The month-wise distribution of road accidents presented in Table – reveals that the month which recorded the maximum number of accidents i.e. 37.39% and accident deaths i.e. 31.72% were December, January, August, and September. However, road accidents and fatalities are comparably low from April to July and then rise from August to December. Despite most accidents being in the winter seasons, most of the deaths are in August and September due to overspeeding and poor infrastructure on the major corridors.

Many accidents occur on National Highway No. 16 which has service roads and at the busiest junctions in the city. Even though the National Highways account for only 20 km of the total road network in the core area, they have the greatest number of black spots and witness more accidents. The National Highways which have a share of only 0.30% of total length account for the highest road accidents contributing 51.00% of total road accidents and state highways have a share of 0.45% of total road length reported 5.82 % of road accidents in Vijayawada city.

Table 1- Month wise Road Accidents in Vijayawada

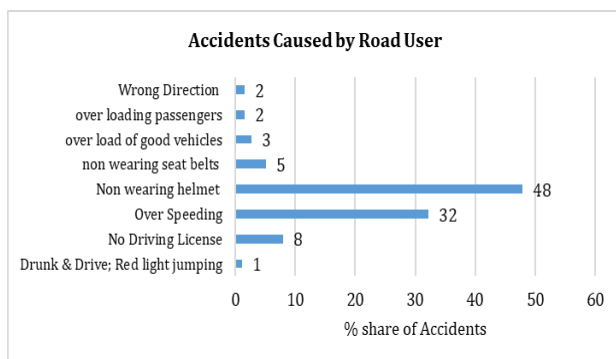
Month	Total Number of					
	Accidents	Deaths	Injured	National Highway	State Highway	Other roads
January	102	15	110	49	6	46
February	101	26	99	57	5	39
March	101	26	99	57	5	39
April	74	22	65	40	7	28
May	75	22	65	40	7	28
June	86	24	77	46	3	37
July	86	24	77	46	3	37
August	107	31	94	61	8	38
September	101	30	88	47	7	47
October	97	26	88	39	5	53
November	100	19	101	44	6	50
December	120	25	118	60	5	55
<b>Total</b>	<b>1150</b>	<b>290</b>	<b>1081</b>	<b>586</b>	<b>67</b>	<b>497</b>



#### 4.5 Accident causal factors

Most of the road accident fatalities and injuries in study area are growing rapidly due to numerous factors and are broadly classified into Road user factors, Vehicular factors, and Engineering factors

**1. Road User Factors:** It was observed from the analysis that the major cause of accidents in the study area was violating the traffic rules. However, 48 % share of road accidents is caused by not wearing helmets which was followed by 32% of accidents due to overspeeding. Cause-wise distribution of road accidents is shown below, other violations like overloading of goods vehicles, overloading passengers, no driving license, and red light jumping, etc., accounted for 12.00% - 14.00% of the total percentage with the figures for 2019 showing a substantial reduction as compared to those caused by human factors. Vulnerable road user behaviour leads to assaults and collisions that result in serious Death and injuries. Pedestrians are not crossing the roads on the designated pedestrian areas but jumping from the median and crossing in between vehicles causing to increase in the share of road accidents.



**Fig -4 :** Road Accidents caused by Vulnerable Road Users

**2. Vehicular factors:** It was observed from the analysis that road accidents caused due to overloading trucks/LCVs contribute a 3% share in the study area. Overloading of goods vehicles tends to loss of control over the vehicle which in tend results in collisions with other vehicles on the road especially when the vehicle is at high speeds, at uncontrolled junctions. The other cause of accidents is due to the age of vehicles. Old vehicles are relatively more prone to road accidents and therefore require high maintenance and more care. It was observed the analysis – of 2019 reveals that vehicles greater than 10 years of age range accounted for 8.00% of total road accidents and 5.00% of deaths in the study area.

#### 3. Engineering factors:

It was observed from the reconnaissance survey that roads have no proper signage's and road markings. The shoulder length is less than the standard length on major corridors of the city and the bitumen layers are uneven causing minor road accidents. The national highway has no pedestrian facility and only one stopping sign all along the corridor. Almost all the service roads along the highways are completely damaged. There is a lack of infrastructure facilities for NMT, Pedestrian which is leading to accidents.

### 5. CONCLUSIONS & RECOMMENDATIONS

Road safety is of utmost importance to ensure the well-being of drivers, passengers, and pedestrians. Here are some recommendations for promoting road safety:

- **Traffic Management:** Improving traffic flow and managing congestion in key areas of Vijayawada in the stretches like Eluru road, GS Raju road, NH 16 can enhance road safety. Implementing intelligent traffic management systems and optimizing signal timings could be beneficial.
- **Infrastructure Maintenance:** Ensuring the proper maintenance of roads and other infrastructure is crucial. Potholes and damaged roads can contribute to accidents, so a focus on timely repairs is essential on Eluru road and Mahanadu junction, Ramesh Hospital Junction (NH 16 Stretch)
- **Pedestrian Safety:** Creating safe pedestrian zones, sidewalks, and crosswalks can significantly reduce accidents involving pedestrians. Raising awareness about pedestrian safety and enforcing traffic rules for both drivers and pedestrians are important measures.
- **Public Transportation Integration:** Promoting the use of public transportation can help reduce the number of private vehicles on the road. Efficient and well-connected public transport systems can contribute to a safer and more sustainable urban environment.
- **Education and Awareness:** Conducting public awareness campaigns on road safety, including the dangers of speeding, driving under the influence, and using mobile phones while driving, can have a positive impact.
- **Enforcement of Traffic Rules:** Strict enforcement of traffic rules and regulations can deter reckless driving and improve overall road safety. This includes measures such as speed limits, seat belt

enforcement, and penalties for traffic violations. Encourage NGOs and other expert agencies in spreading road safety measures, education, and awareness programs in schools, communities, and workplaces. This helps raise awareness and stills safe driving habits from an early age.

- **Emergency Services Accessibility:** Ensuring quick access to emergency services in case of accidents is crucial. Improving the response time of emergency services and enhancing communication systems can save lives.
- **Technology Integration:** Leveraging technology such as smart traffic lights, surveillance cameras, and intelligent transportation systems can contribute to better traffic management and accident prevention.

There is a need for encouraging and promoting safe driving behaviour among community members by increasing awareness through road safety campaigns.

More by establishing integrated surveillance systems, information regarding road traffic injury burden and their causal/risk factors can be generated, which hopefully help in developing preventive measures. Enforcement of stringent laws by implementing penalties and imprisonment if required for those violating traffic rules.

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