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ROAD ACCIDENT AND TRAFFIC CONDITIONS IN RAJASTHAN STATE

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Abstract – In road accident case of study, road accident have been reported by state and union territories. Claiming 147913 lives and causing injuries to 470975 persons in 2018. In terms of accidents on road categories, the National Highways accounted for 30.4 percent of total accident and 36.0 percent of deaths. In traffic conditions, the ever increasing population has aggravated the vehicle density on roads, vehicular congestion is now the driving issue in modern day world. Improper traffic management is one of the leading causes of this issue. The paper also present some general recommendation about road accidents and traffic conditions.

Keywords **-** Deaths, Fatality Rate, Fatality Risk, Road Accidents, Severity Index. Well management, proper traffic lights, traffic controller department.

1. INTRODUCTION

Today's road traffic injuries are one of the leading causes od death, disability and hospitalization in the country. Road traffic injuries constitute the 8th leading causes of death in India. Rajasthan state is one of the most attractive destinations in India and has a prominent place on the tourist map of the world. Rajasthan is the largest state in the country in terms of geographical area, which constitutes 10.41 per cent area of the country and 5.67 per cent of national. Well developed and evolved transportation system is a pre-requisite for development of an urban system. It is used to determine the number of movements, pedestrian on vehicular traffic flow & classification of roadway vehicles & it also helps to identify critical flow & time period. The traffic volume data should be collected during peak & non-peak hour with time interval 30 min. This study is conducted to examine the existing traffic data and to identifyanyimprovement necessarily to accommodateexisting or projected traffic volume and traffic calming device.

2. BACKGROUND

The year 2011 saw registration of 79,86,265 motor vehicles in the state of Rajasthan, which shows a rise of 11.4% over the previous year where it was 71,65,662.These figures are highest in terms of percentage growth in the country and it accounted for 5.6% of the total registrations in India, though in numbers it ranked sixth overall. Within Rajasthan, Jaipur was the leading city where 16,93,972 were registered with the RTO which account for 21.2% of the total registrations in the state. Rajasthan had a total road network of 125652 kms and accounted for a total of 10072035 registered vehicles.

Table 1: Registered vehicles in Rajasthan state 2018

	Road length(in km)	**Registered vehicles**	**Road length per 100 vehicle**
Rajasthan	125652	17342439	1.248

Table 2: Table showing road and vehicle density Rajasthan 2018.

	Area(in sq km)	**Road Length per 100 sq km area**	**Vehicles per sq km**
Rajasthan	342240	36.71	2943

3. ROAD ACCIDENTS

Rajasthan ranked fifth in the country in the number of deaths due to road accidents in year 2015. A report released by the ministry of road transport and highways on Thursday revealed that Rajasthan had a

share of 4.8% in total accidents in the country, in which 10,510 people lost their lives.On an average 28 people died, while 71 people were injured every day in 2015. Total accidents registered were 556 less than those in 2014 but the total number of deaths increased by 221. Among the total injured, nearly 6,069 were grievously injured while little over 20,084 had minor injuries. The government, however, is patting its back, claiming that it has been able to bring down the total number of accidents. The yealy wise road accident data as follow:

Table 3: Road accidents in the Rajasthan year wise

Year	No of register vehicles	No.of accident	No. of death	No. of injured
2010	7787493	24302	9163	31033
2011	8733560	23245	9232	28666
2012	9803283	22969	9528	28135
2013	10915452	23592	9724	27424
2014	12102223	24628	10289	27453
2015	13350646	24072	10570	26153
2016	14586283	23066	10465	24103
2017	15930643	22112	10444	22071
2018	17342439	21741	10320	21545

Table 4: Road accident in rajasthan by Districtwise in 2018.

Accident rates and fatality rate based on vehicle owernship:

AR=TA*100000/V

Where AR-accident rate per 10000 vehicle registerd
TA- Total Accident
V- Vehicle Regiser

FR=FA*100000/V
Where FA- Fatal Accident
V- Vehicle Registered

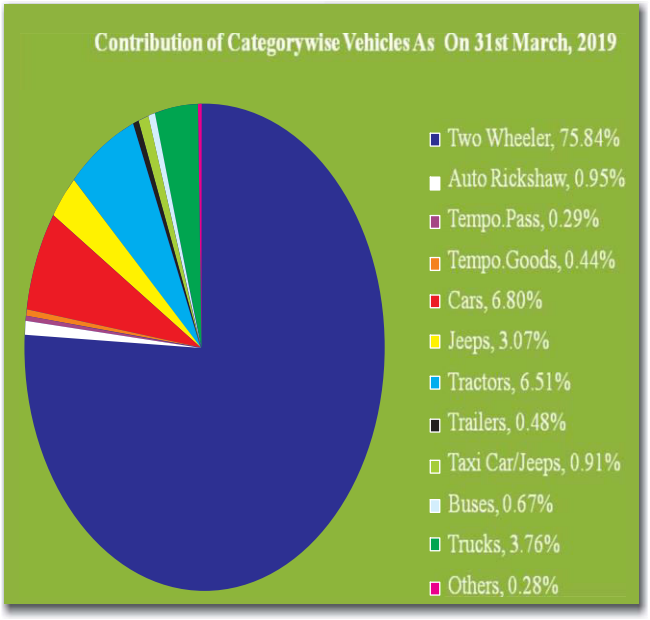
Revenue District	No.of register vehicles	Accident	Death	Injured
Jaipur	3209057	3912	1271	3344
Dausa	280045	537	312	554
S.Madho.	253906	327	134	375
Karauli	170379	250	110	238
Sikar	466356	837	422	846
Jhunjhun	383799	570	264	491
Churu	237010	367	248	392
Alwar	903690	1344	632	908
Bharatpur	465603	649	362	477
Dholpur	176019	343	174	331
Ajmer	993152	1037	536	969
Nagpur	667795	626	425	610
Tonk	290777	437	222	373
Jodhpur	1214879	924	506	716
Barmer	304929	524	333	594
Jaisalmer	95607	169	106	250
Pali	519611	625	356	632
Sirohi	219240	377	229	496
Jalore	267086	271	165	269
Udaipur	938692	1247	565	1336
Durgapur	270611	455	214	479
Banswara	333337	460	237	506
Rajsamand	235542	544	258	733
Chittorgarh	491306	542	270	569
Pratapgarh	108434	193	120	210
Bhilwara	750163	892	419	824
Kota	933161	792	227	868
Bundi	287074	539	182	637
Jhalawar	284766	498	170	765
Baran	267106	392	142	504
Bikaner	515474	416	299	365
Ganganagar	522188	329	207	307
H.garh	279645	296	203	377
TOTAL	**17342439**	**21741**	**10320**	**21545**

National highways remained more accident-prone compared to state highways. Total accidents on NHs were 6,821, in which 7,526 people were injured and 3,709 people were killed. Death figures were the fifth highest in the country. In 2014, accidents recorded were 6,991, injuring 7,980 and killing 3,598 people. On state highways a total number of accidents were 3,683, in which 1,908 people were killed, making it the seventh highest in India.

As per the records, rural areas proved more accident-prone with a total of 6,643 fatal accidents while roads in urban areas had 2,663 fatal accidents. Among all fatalities, hit and run figured as the prime reason. A total of 5,006 cases were reported in 2015 in which 2,284 people died and 2,755 were injured.Road accidents take away the right to life of 3,000 people every day. This is a global humanitarian disaster, and it is man-made. (Global Road Safety Partnership Annual Report 2011) Road safety is one of the furthermost serious problems in our society. Every year around 1.2 million of people are killed and between 20 and 50 million people are injured in road traffic accidents. If current tendencies continue road traffic accidents are estimated to be third top provider to the global burden of Disease and injury by 2020

3.1 Vehicle Wise Distribution Of Accident

Type Of Vehicle	2017	%	2018	%
BUS	1534	6.94	1304	6.00
TRUCK	3608	16.32	3460	15.91
CAR/JEEP	7206	32.59	7272	33.45
TWO WHEELER	5456	24.67	5406	24.87
OTHER VEHICLE	4308	19.48	4299	19.77
TOTAL	**22112**	**100.00**	**21741**	**100.00**



3.2 Road Accident On National Highway

	2017			2018		
National Highway No.	No. of accident	Death	Injury	No. of accident	Death	Injury
NH3	82	35	101	82	40	71
NH8	1550	895	1494	1633	908	1529
NH11	1196	689	1199	1075	565	1002
NH11(A)	129	69	125	110	65	112
NH11 (AA)	0	0	0	0	0	0
NH11(B)	189	112	201	160	87	177
NH11(C)	19	12	22	22	10	22
NH12	601	252	678	560	248	651
NH14	275	209	250	230	157	324
NH15	343	257	430	348	276	391
NH65	286	186	298	308	210	347
NH76	541	348	611	450	272	500
NH79	344	218	335	337	193	300
NH79(A)	52	33	45	42	21	63
NH89	158	101	188	138	95	167
NH90	67	20	98	65	23	81
NH112	151	101	136	133	84	140
NH113	158	102	165	187	100	248
NH114	121	108	115	101	84	105
NH116	22	17	30	39	20	105
TOTAL	**6284**	**3764**	**6521**	**6020**	**3458**	**6335**

4. CAUSES OF ROAD ACCIDENTS

Causes	2017	%	2018	%
Driver Fault	19393	87.70	19414	89.30
Passesnger Fault	25	0.11	33	0.15
Bad Rod Condition	298	1.35	178	0.82
Bad Weather	102	0.46	156	0.72
Mech.Def. In Vehicle	71	0.32	112	0.52
Cattle & Carts	85	0.38	185	0.85
Others	2138	9.67	1663	7.65
TOTAL	**22112**	**100**	**21741**	**100**

Road accident is most unwanted thing to happen to a road user, though they happen quite often. The most unfortunate thing is that we don't learn from our mistakes on road. Most of the road users are quite well aware of the general rules and safety measures while using roads but it is only the laxity on part of road users, which cause accidents and crashes. Main cause of accidents and crashes are due to human errors. We are elaborating some of the common behaviour of humans which results in accident.

1.Over Speeding
2.Drunken Driving
3.Distractions to Driver
4.Red Light Jumping
5.Avoiding Safety Gears like Seat belts and Helmets
6.Non-adherence to lane driving and overtaking.

OVER SPEEDING

Most of the fatal accidents occur due to over speeding. It is a natural psyche of humans to excel. If given a chance man is sure to achieve infinity in speed. But when we are sharing the road with other users we will always remain behind some or other vehicle. Increase in speed multiplies the risk of accident and severity of injury during accident.

Faster vehicles are more prone to accident than the slower one and the severity of accident will also be more in case of faster the severity of accident will also be more in case of faster vehicles. The ability to judge the forthcoming events also gets reduced while driving at faster speed which causes error in judgment and finally a crash.

DRUNKEN DRIVING

Consumption of alcohol to celebrate any occasion is common. But when mixed with driving it turns celebration into a misfortune. Alcohol reduces concentration. It decreases reaction time of a human body. Limbs take more to react to the instructions of brain. It hampers vision due to dizziness. Alcohol dampens fear and incite humans to take risks. All these factors while driving cause accidents and many a times it proves fatal. For every increase of 0.05 blood alcohol concentration, the risk of accident doubles. Apart from alcohol many drugs, medicines also affect the skills and concentration necessary for driving. First of all, we recommend not to consume alcohol. But if you feel your merrymaking is not complete without booze, do not drive under the influence of alcohol. Ask a teetotaler friend to drop you home.

DISTRACTION OF DRIVER

Though distraction while driving could be minor but it can cause major accidents.Distractions could be outside or inside the vehicle. The major distraction now a days is talking on mobile phone while driving. Act of talking on phone occupies major portion of brain and the smaller part handles the driving skills. This division of brain hampers reaction time and ability of judgement. This becomes one of the reasons of crashes. One should not attend to telephone calls while driving. If the call is urgent one should pull out beside the road and attend the call. Some of the distractions on road are:

1.Adjusting mirrors while driving
2.Stereo/Radio in vehicle
3.Animals on the road

RED LIGHT JUMPING

It is a common sight at road intersections that vehicles cross without caring for the light. The main motive behind Red light jumping is saving time. The common conception is that stopping at red signal is wastage of time and fuel. Studies have shown that traffic signals followed properly by all drivers saves time and commuters reach destination safely and timely. A red light jumper not only jeopardizes his life but also the safety of other road users. This act by one driver incites other driver to attempt it and finally causes chaos at crossing. It has also been seen that the red light jumper crosses the intersection with greater speed to avoid crash and challan but it hampers his ability to judge the ongoing traffic and quite often crashes.

AVOIDING SAFETY GEAR LIKE: Seatbelt, Helmet

Use of seat belt in four-wheeler is now mandatory and not wearing seat belt invites penalty, same in the case of helmets for two wheeler drivers. Wearing seat belts and helmet has been brought under law after proven studies that these two things reduce the severity of injury during accidents. Wearing seat belts and helmets doubles the chances of survival in a serious accident. Safety Gears keep you intact and safe in case of accidents. Two wheeler deaths have been drastically reduced after use of helmet has been made mandatory. One should use safety gears of prescribed standard and tie them properly for optimum safety.

ROAD AND ROAD CONDITION

Faulty geometric design components like sight distance, shoulders, super-elevation, transitions and inadequate traffic control devices cause accidents, as do slippery road conditions with inadequate friction leading to skidding and pot holes, ruts and damaged conditions of the surface.Uneven road surfaces can cause a driver to lose control of their vehicle, leading to a crash or rollover accident injuring the driver, passengers, and pedestrians.Some pictures of bad road are given below-

Some times a blind turn are also cause of road accident.

DUE TO IMPROPER TRAFFIC CONTROL

Sometimes parking the vehicle in no parking zone are also main causes of road accident and also avoid and break the traffic rules.

5. PREVENTION OF ROAD ACCIDENT AND TRAFFIC CONDITIONS

Road deaths and injuries are preventable. A wide range of effective road safety interventions exist and a scientific system approach to road safety is essential to tackle the problem. This approach should address the traffic system as a whole and look into interactions between vehicle, road users, and road infrastructure to identify solution.

VEHICLE

1. Well-maintained vehicles with good breaks, lighting, tyres etc. will reduce accidents.
2. Older vehicles and highly polluting vehicles should be phased out.
3. Vehicles should be provided with seat belts and other necessary safety provisions (like airbags).

CONDITION OF ROAD

1. Roads should be well maintained with frequent relaying of road surfaces and markings of road safety signs.
2. Provide proper footpaths for pedestrians and pedestrian crossings at intersections.
3. Provide separate lanes for slow-moving and fast-moving vehicles.
4. Roads and junctions should be wide and well lit so that visibility is good.

HUMAN FACTOR

1. Drivers can significantly contribute to reducing the accidents.
2. Issuing of the driving license should be strictly based on the minimum proficiency acquired by the learners from designated driving schools.
3. Minimum qualifications should be fixed for different categories of drivers.
4. All drivers should be properly trained and should posses a valid driving license.
5. Educate the drivers and traveling public about traffic rules.
6. Carry out periodic medical checkup especially vision and hearing for the drivers.
7. Training on first aid should be compulsory along with heath education and traffic education for the general public to prevent accidents.

To sum up, the road traffic injury prevention can be achieved by

1. Avoiding overspeeding and following speed limits
2. Avoiding drunken driving
3. Use of helmets by two-wheeler drivers
4. Use of seat belts and child restraints in cars
5. Improving visibility, appropriate headlights and road lightings
6. Obeying traffic rules.

TRAFFIC MANAGEMENT SYSTEM

Infrastructure-It should essentially have will lighted broad & spacious roads, connecting bridges, road markings, all-weather roads & streets, navigation boards, road signage,

Safety-Traffic signs, traffic lights, dynamic & static signage systems, crash cushions, barrier systems (boom, bollard etc.), cones & speed humps, safety clothing, emergency equipment, event & incident management, consultancy, research and training, etc.

Parking-Proper parking equipment, route guidance system - park & ride information systems - operating systems for garages - ticketing & payment systems - parking information services - parking reservation systems - barriers & columns - entrance control systems - visual systems - parking reports & statistics – consultancy, research & training – etc.

Traffic Management- Dynamic traffic management - real-time traffic information - congestion management - event & incident management - monitoring & control systems - enforcement systems - dynamic & static signage systems - park & ride -ramp-metering systems - in-car information systems - fare and toll systems - traveler information services - traffic analysis - smart card technology - urban planning - traffic consultancy & research

Smart Mobility-Personal mobility services - autonomous & cooperative driving - driver assistance systems - connected car data & services - multimodal transport systems - intelligent parking systems - in-car safety systems - in-car breakdown & emergency systems - smart payment systems - integrated ticketing & smart payments systems - electric & hybrid vehicles - driving and coaching - charging infrastructure and Smart grids - sustainable logistics & urban distribution - social media and mobility - remaining innovative mobility solutions.

7. CONCLUSION

Road accidents are a human tragedy. They involve high human suffering and monetary costs in terms of untimely death, injuries and loss of potential income. The present paper provides the magnitude and various dimensions of deaths of road accidental data in districts of Rajasthan.Fatality rate, fatality risk and severity index of Rajasthan are high in compared to India. The fatality risk of 13 districts is above than the

average of Rajasthan, while 11 districts having fatality rate below the average of Rajasthan. The range of severity index of districts and National Highways of Rajasthan increased in 2012 as compared to previous year. An attempt has been made to predict situation of fatalities among the districts of Rajasthan. This paper can help policy makers to make accidental management policy and implement remedial in the field of traffic safety.

The bove discussed measures are not the only solution, but only some are discussed here in this paper. Solutions must be sought in the light of social acceptance, economic feasibility and practical applicability in local context.

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