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ROAD SAFETY AUDIT FOR NIGDI - DAPODI BRT'S ROAD

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ABSTRACT

Rapid increase in number of vehicles in cities leads to various traffic problems. Out of which road accidents are major aspect. Mixed traffic condition and variable profile user's create situation of accidents in the cities. Apart from this several other reasons like over speeding, drink and drive, blip road design etc. are also responsible for the fatalities. As a Planner or Civil engineer, one has only a few interventions like Road and vehicle design to reduce the road fatalities, because none of them can regulate the travel behavior of drivers and pedestrians. Pimpri-Chinchwad Bus Rapid Transit System is a proposed bus rapid transit project for the city of Pimpri-Chinchwad. The system has wider roads (61m) and grade separators, underpasses merge in and merge out, BRTS bus stops and foot over bridges. The system comprises eight lanes with a total length of 112 km. The Nigdi-Dapodi stretch is the PCMC's first BRTS project. Construction work on a 12 km pilot route between Nigdi and Dapodi had been completed. At this stage, PCMC has decided to study the safety aspects of proposed BRTS system before starting the operation of BRTS. In this regard, one has to undertake a Road safety audit Study for proposed BRTS pilot study

stretch between Nigadi and Dapodi. The BRT system generally has specialized design, services and infrastructure to improve system quality and remove the typical causes of bus delay. The system consists of total 8 lanes. The four lanes in the centre are to cater to the normal traffic of the region. The two lanes adjacent on either side are the lanes for the bus rapid transit. Buses should be flow without hindrance in this lane. Service roads (where the traffic is minimal) make the boundary lane of the system.

This study explores the primary concern for developing countries like India having huge network i.e., road safety. Although there are several other recognized practices for identifying road safety deficiencies or risk factors involved, Road Safety Audit (RSA) can be considered as a cost - effective and proactive method used for improving road safety by checking whether the roads are having the highest safety standards for all types of road users.

Keywords: ***BRT'S, Safety Audit, Vulnerable Road users, risk - factors, assessment, critical spots, countermeasures.***

INTRODUCTION:

In today's world, road and transport has become an integral part of every human being. Everybody is a road user in one shape or the other. The present transport system has minimized the distances but it has on the other hand increased the life risk. Every year road crashes result in loss of lakhs of lives and serious injuries to crores of people. In India itself about eighty thousand people are killed in road crashes every year which is thirteen percent of the total fatality all over the world. The accident is of three types due to their effects or seriousness of accident, fatal accident, injury and property damage only. Man behind the wheel plays an important role in most of the crashes. In most of the cases crashes occurs either due to carelessness or due to lack of road safety awareness of the road user. Hence, road safety education is as essential as any other basic skills of survival.

Transport is a necessary ingredient of almost every aspect of economic, social, and cultural development. The road transport sector plays a vital role in developing any country, especially a developing country like India. The road transport sector has assumed an important role in the Indian economy. Road transport is the backbone of the Indian economy. People and goods are transported properly via the internal road system, which consists of National Highways, State Highways, Major District Roads, and Village Roads. Road transportation plays a critical role in the country's surface transportation system, both in terms of passenger and freight movement. India's roads transport approximately 60% of freight and 80% of passengers. With a total length of 6,215,797 kilometers, India has the world's third-largest road network. Traffic management refers to the orderly movement of people and goods on various types of roads. As a result, traffic regulations and enforcement are necessary all over the world and are an important part of traffic management.

Ironically, this is the deadliest sector, responsible for the deaths and injuries of millions of people worldwide,

particularly among the young working population. "Road travel provides social benefits, but it comes at a very significant cost to society," according to the World Health Organization. In 2010, 1.35 million people were killed and 20 to 50 million were injured on the world's roads, according to a World Health Organization report.

Road safety refers to the absence of any accidents or unsafe feelings during all journeys and trips to a specific location. To keep themselves, passengers, motorists, and pedestrians safe, all drivers must use the road safely and cautiously. According to the Planning Commission of India, it is a multi-dimensional and multi-sectoral issue. In its multi-dimensional features, it therefore involves the creation and administration of various types of roads, legislative provisions, law enforcement, mobility planning, health-care provision, and creating awareness among road users about road safety laws and regulations. One of the factors that plays a crucial role in reducing road accidents is road safety education. Drivers' errors, a lack of information, and awareness of how to obey the norms and regulations of safe driving are claimed to be the causes of road accidents. The World Health Organization and the World Bank recently released a study on road traffic injury prevention that emphasizes the need of road safety knowledge and education for safer road users.

ROAD SAFETY

In today's society, road safety is an increasing social concern. In India, the increase in vehicle population has led in an increase in the frequency of accidents due to a lack of proper road infrastructure. According to the World Health Organization's (WHO) worldwide status report on road safety, road traffic fatalities are the eighth top cause of death for all age groups and the leading cause of death for young people aged 5-29 years. As a result, over a million people die on the world's roads each year. If current trends continue, road traffic deaths will overtake cancer as the fifth leading cause of death within a few decades. Many nations, including the WHO, are putting in place a number of laws and processes to prevent traffic accidents and fatalities. Many countries have successfully used a number of techniques to prevent road traffic injuries. Eighty-eight countries can cut the number of persons killed or wounded on their roadways. Despite this, the global total number of deaths remains high, at 1.35 million per year, due to the rising incidence of traffic accidents in poor and emerging nations. The Indian federal and state governments have suggested several road safety measures to reduce road accidents, but no meaningful results have yet been obtained. The Indian Union government enacted the National Road Safety and Traffic Management Act 2007 to create National and State-level Road Safety and Traffic Management Boards to oversee the orderly development, regulation, promotion, and optimization of modern and effective road safety and traffic management systems and practises, including improved safety standards in road design, construction, operation, and maintenance of mechanically operated vehicles. Due to the seriousness of road accidents, India's Supreme Court has created a road safety committee to gather advice from diverse persons and sectors in order to improve road safety (The Hindu Newspaper). The incidence of road accidents in India has grown dramatically as a result of irresponsible driving, negligence on the part of other road users, and a lack of awareness of road usage norms

and regulations.

Table International level comparison of Road Traffic Fatalities

Sr. no.	Country	Population '000	Vehicle '000	Vehicle per capita (Total vehicles per 1000 persons)	Road death	Death per 1,00,000 population	Death per 10,000 vehicles	Income group
1	Argentina	43847	21633	493.37	5530	12.61	2.56	Middle
2	Australia	24125	18326	759.63	1296	5.37	0.71	High
3	Bangladesh	162951	2879	17.67	2376	1.46	8.25	Middle
4	Belgium	11358	7330	645.36	637	5.61	0.87	High
5	Brazil	207652	93867	452.04	38651	18.61	4.12	Middle
6	Canada	36289	23923	659.24	1858	5.12	0.78	High
7	China	1411455	294694	208.79	58022	4.11	1.97	Middle
8	Colombia	48653	13477	277.00	7158	14.71	5.31	Middle
9	Croatia	4213	1996	473.77	307	7.29	1.54	Middle
10	Denmark	5711	3131	548.24	211	3.69	0.67	High
11	Egypt	95688	8412	87.91	8211	8.58	9.76	Middle
12	Finland	5503	5217	948.03	252	4.58	0.48	High
13	France	64720	42363	654.56	3477	5.37	0.82	High
14	Germany	81914	56622	691.24	3206	3.91	0.57	High
15	Greece	11183	9489	848.52	824	7.37	0.87	High
16	Hungary	9753	4022	412.39	607	6.22	1.51	High
17	India	1324171	210023	158.61	150785	11.39	7.18	Middle
18	Indonesia	261115	128398	491.73	31282	11.98	2.44	Middle

19	Iran	80277	30377	378.40	15932	19.85	5.24	Middle
20	Ireland	4726	2573	544.44	188	3.98	0.73	High
21	Israel	8191	3239	395.43	335	4.09	1.03	High
22	Italy	59429	52581	884.77	3428	5.77	0.65	High
23	Japan	127748	81602	638.77	4682	3.67	0.57	High
24	Malaysia	31187	27613	885.40	7152	22.93	2.59	Middle
25	Mexico	127540	40205	315.23	16039	12.58	3.99	Middle
26	Nepal	28982	2339	80.71	2006	6.92	8.58	Low
27	Netherlands	16987	10757	633.25	621	3.66	0.58	High
28	New Zealand	4660	3656	784.55	327	7.02	0.89	High
29	Pakistan	193203	18352	94.99	4448	2.30	2.42	Middle
30	Saudi Arabia	32275	6855	212.39	9031	27.98	13.17	High
31	Singapore	5622	933	165.96	141	2.51	1.51	High
32	Spain	46347	32986	711.72	1810	3.91	0.55	High
33	Sri Lanka	20798	6795	326.71	3003	14.44	4.42	Middle
34	Thailand	68863	37338	542.21	21745	31.58	5.82	Middle
35	Great Britain	65788	38388	583.51	1804	2.74	0.47	High
36	USA	322179	281312	873.15	35092	10.89	1.25	High


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BACKGROUND

To reduce deaths due to RTI, we should be able to predict the effectiveness of various interventions and then prioritize them to optimize our efforts in every location. While accident analysis is a reactive technique, proactive safety assessment such as Road Safety Audit (RSA) is a very effective technique to identify potential road safety problems in such scenarios (Sudipa Chatterjee et al., 2020). The unique objective of the RSA process is to minimize the future road accident count and severity of the road accidents by systematically identifying potential risk factors for existing or new roads by an independent audit team at different stages of project.

SCOPE

- Scope of this study is to understand the importance of road safety auditing which is listed as follows in order to minimize the risk of the accidents
- Road Safety Audit: Performing a stage road safety audit (as there are five stages at which RSA can be conducted) of the selected project so that potential road safety problems can be identified as per the manual IRC: SP: 88 – 2019.
- The audit report includes a clear description of all safety concerns which have been identified. It contains practical recommendations for each safety concern which shall be of an appropriate and specific nature.

INDIAN SCENARIO FOR ROAD SAFETY:

India is a developing country with higher population density in urban areas. The use of two- wheelers and four-wheelers has become necessary due to advances in science and the changing patterns of people's lives. With the rapid advancement of technology and the construction of new roads, the road transportation industry faces a significant threat to its safety. Even after the invention of numerous safety devices such as airbags, seat bells, and helmets, the safety issues have not improved in terms of reducing fatalities. Table below depicts the global trend in road safety. Every year, the number of people killed in car accidents decreases in most developed countries. However, as shown in the table, India has one of the highest rates of road accident fatalities in the world. In India, the number of accidental deaths fell from 1,51,417 in 2018 to 1,51,113 in 2019. The decrease rate is calculated to be 0.20 percent, which is extremely low. This is alarming and requires immediate attention in order to prevent road fatalities by implementing appropriate road safety measures, which are an integral part of road engineering, traffic management, vehicle regulations, driver behaviour, environmental protection, and the laws that govern these areas. Accidental death can occur for a variety of reasons, both natural and unnatural. Every year, natural death decreased in India, while unnatural death increased, which is a concerning factor because they can be avoided if a suitable method is devised.

Table : International level comparison of Road Traffic Fatalities

Country/Year	2016	2017	2018	2019	% Change 2019-2018
Argentina	5550	5611	5493	4892	-10.94
Australia	1294	1225	1136	1184	4.23
Austria	432	414	409	416	1.71
Belgium	670	609	604	644	6.62
Canada	1900	1861	1939	1762	-9.13
Denmark	211	175	171	199	16.37
Finland	258	238	239	211	-11.72
France	3477	3448	3248	3244	-0.12
Germany	3206	3180	3275	3046	-6.99
Greece	824	731	700	688	-1.71
Hungary	608	625	634	602	-5.05
India	150785	147913	151417	151113	-0.20
Israel	377	364	316	355	12.34
Italy	3283	3378	3334	3173	-4.83
Japan	4698	4431	4166	3920	-5.90
New Zealand	327	378	378	352	-6.88
Spain	1810	1830	1806	1755	-2.82
Sweden	270	252	324	221	-31.79
Switzerland	216	230	233	187	-19.74
United Kingdom	1792	1793	1784	1752	-1.79
United States	37806	37473	36835	36096	-2.01

Table: Percentage Share of various causes of Accidental deaths in India in 2019

(Natural and Un-Natural Causes)

Causes	Percentage
Traffic Accidents	43%
Miscellaneous Causes	20.30%
Sudden Deaths	11.20%
Drowning	7.80%
Poisoning	5%
Falls	5%
Electrocution	3.20%
Accidental Fire	2.60%
Forces of Nature	1.90%

A total of 4,13,103 (98.1 percent) of the 4,21,104 accidental deaths in 2019 were due to unnatural causes, with the remaining 1.9 percent (8,001) due to natural causes. In comparison to 2018, the number of accidental deaths in the United States increased by 2.3 percent in 2019. The number of 'Accidental Deaths' caused by natural forces has risen by 18.2 percent.Table 1.3 shows that traffic accidents (43 percent), sudden death (11.20 percent), drowning (7.80 percent), poisoning (5 percent), and fire accidents (2.60 percent) were the leading causes of unnatural deaths (NCRB) [8]. Unnatural-cause accidents are typically regarded to be avoidable, and they can be decreased by increasing road safety awareness and implementing efficient road safety measures. As an example, consider the following.

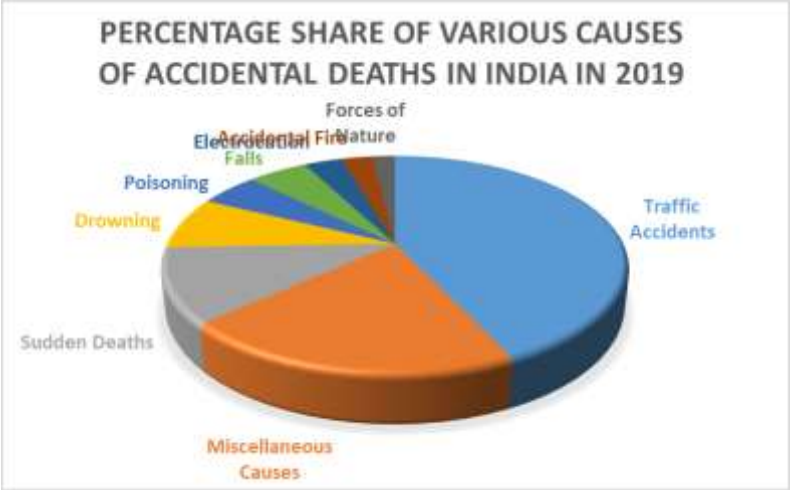


Fig. Percentage Share of various causes of Accidental deaths in India in 2019

ROAD ACCIDENTS

A road is a thoroughfare, route, or way on land between two places, which has been paved or otherwise improved to allow travel by some conveyance, including a horse, cart, or motor vehicle. An accident is an unplanned and uncontrolled event, which occurred on a road open to a public traffic resulting in personal injury, damages to the property and loss of life in which at least one moving vehicle was involved. Road traffic accidents which are generally unintended and preventable are a common risk every day to life that can happen to almost every one, anywhere. The problem of road traffic accident is increasingly becoming a threat to public health and national development in many developing countries. Road traffic accidents contribute to poverty by causing deaths, injuries, disabilities, grief, loss of productivity and material damages. It is surprising to know that India has only 1 % of the total world's vehicles which accounts for 16% of the total world's accidental deaths. Statistical projections show that during the period between 2000 and 2020, fatalities related to traffic accidents will decrease with about 30% in high income countries. The opposite pattern is expected in developing countries, where traffic accidents are expected to increase at a fast rate in the years to come. Road Safety Audits are in essence, crash prevention.

The purpose is to make new roads as safe as possible before the projects are implemented, and before any crashes happen. Road Safety Audit require an independent and systematic formal procedure for assessing or checking the crash potential and safety performance of a new road project or existing roads. Safety should be considered throughout the entire project from planning and development, to construction and operations and maintenance. The application of road safety audits and procedures to tailor the process to local audit issues in the urban areas were provided. Procedures used to tailor the process to conduct road safety audits of existing local road conditions are believed to be essential for use by local agencies to begin a positive safety improvement program.

Apart from humanitarian road safety, injuries and fatality occurs from road accidents have serious implications for a country in both social and economic terms. Medical expenses and lost incomes of the

victims have been taken into account. Administration cost incurred by legal entities that oversee accident investigation and the Property damages such as vehicle repair costs were added up to the total resources lost. An amount for the pain grief and suffering of the victim and their dependents was also taken as effect of accident. The vehicle damages insurance and health insurance also taken into account as economic effect. For the fatal type of accident, the death compensation is given which is also one of the economic effects to the country. The losses of national economy caused by all accidents may amount to figures as high as 8 to 10% out of the GNP. Because accidents are caused by external factors, their prevention by regulating the causative agents is possible. The great human health and economic values of the consequences of accidents make accident prevention one of the most promising priority areas of preventive health policy, both for public health and for occupational health and safety.

ROAD SAFETY AUDIT

A Road Safety Audit (RSA) is defined as "the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users Road safety audits differ from conventional traffic safety studies in two key ways: road safety audits are often pro-active investigations, rather than reactive investigations of sites with histories of complaints or poor safety performance, and the investigation team is independent from the staff that is designing the project or maintains the road A key feature of a road safety audit is the use of a team of professionals with varied expertise. The team should include highway safety engineers, highway design engineers, maintenance personnel, and law enforcement. Additional specialties should be added to the team as needed. The team members must not be involved in the design or maintenance of the facility being examined, so that they can have an objective point of view.

BLACK SPOT ANALYSIS

An accident Black spot (often synonymously known as a crash hotspot) is a section of road where the frequency of occurrence of several types of road accidents or a particular type of road accident is comparatively higher than other similar sections on the road. Accidents may occur on such sections of a road

due to several factors such as faults in engineering design, failures in traffic rule enforcement, rash driving etc. but road accidents repeatedly occur at a location due to faults and inconsistencies in design which lead creation of an ambiguous road environment that fails to provide a positive guidance to road users. For rectifying of such road sections, it is important to identify such locations based on likelihood of occurrence of road accidents and past accident history. There are many definitions of accident black spots available worldwide. However; there is no comprehensive and universally accepted definition of an accident black spot. In general, when several road accidents frequently occur in close proximity to a location, it is described as a hazardous location, more commonly known as an accident black spot.

PASSENGER CAR UNIT

Different classes of vehicles such as cars, vans, buses, trucks, auto rickshaws, motors cycles, bullock carts, etc. are found to use the common roadway facilities without segregation on most of the roads in developing countries of India. The flow of traffic with unrestricted mixing of different vehicle classes on the roadway forms the heterogeneous traffic flow or the mixed traffic flow. The different vehicle classes have a wide range of static characteristic such as length, width etc. and dynamic characteristic such as speed, acceleration etc. Apart from these, the driver behavior of different vehicle classes is also found to vary considerably. Therefore, the mixed traffic flow characteristics are very much complex when compared to homogeneous traffic consisting of passenger car only. It is rather difficult to estimate the traffic volume and capacity of roadway facilities under mixed traffic flow, unless the different vehicle classes are one common standard vehicle unit. It is common practice to consider the passenger car as the standard vehicle unit to convert the other vehicle classes and this unit is called Passenger Car Unit or PCU. Thus, in mixed traffic flow, the traffic volume and capacity are generally expressed as PCU as per hour or PCU/lane/hour and the traffic density as PCU per kilometer length of lane.

The PCU may be considered as a measure of the relative space requirement of a vehicle class compared to that of a passenger car under a specified set of roadway, traffic and other conditions. If the addition of one vehicle of a particular class in the traffic stream produce the same effect as that due to the addition one passenger car, then that vehicle class is considered equivalent to the passenger car with a PCU value equal to 1.0. The PCU value of a vehicle class may be considered as the ratio of the capacity of a roadway when there are passengers only to the capacity of the same roadway

CAUSES OF ROAD TRAFFIC ACCIDENTS:

Human error seems to be the major cause in majority of road traffic accidents. Examination on the operator or human causes will be a critical component for accident analyses. Investigation on the part played

by the human component in the traffic system is to be considered very important among road safety problems. Skill of the operator and traffic scenario are other factors involved in collisions. It also caused because by stress, due to economic or family problems. These state of mind makes people more vulnerable to cause road traffic accidents (Muthusamy et al., 2015). Carelessness is one of the causes of road traffic accidents in our country. Some of the examples include using mobile phone while driving, ignoring the red signals, not using seatbelts, not wearing helmets, overtaking to other vehicles, not giving proper side to pedestrians etc. In between these, over speeding is one of the reasons as severe injury which increases with collision speed and the lack of protection accounts for the most severe but preventable injuries after any of incidents. The most important cause for alarming increase in number of road accidents is driving of vehicle in drunken state. Under the influence of alcohol and other intoxicated substances, driver lose the self-consciousness and control over the vehicle which ultimately forms the reason for road traffic accidents. At last, Environmental factors such as, road conditions, visibility, weather condition, hilly and slopy roads and road texture plays important role in causing road traffic accidents. Other factors such as, age of the vehicle, safety measures, drivers' fault, time and place, lack of awareness, decides the fatalities and the seriousness of the road traffic accidents.

LITERATURE REVIEW

G. Kondala Rao (2013) The increasing frequency and severity of recent Road Traffic Accidents (RTAs) in India involving modern vehicles have caused grave concern for road safety, posing serious challenge to transport policy makers, planners, regulators, police, engineers and civil society alike. With just 1% of world's vehicles, India leads with 10% of world's total Road Traffic Fatalities (RTFs) of 1.3 million, resulting in untold misery to lakhs of people, the nation losing about 3% of its GDP. Data with the Transport Research Wing (TRW) of the Ministry of Road Transport and Highways (MORTH) and the National Crime Records Bureau (NCRB) of India indicate an alarming rising trend during 2002-2011 in the number of RTAs, the leading cause of unnatural death in India. RTAs constitute the 8th leading cause of deaths in the world in 2011, 77% of them being men. The UN General Assembly Resolution 64/255 of 2010 declared 2011-20 as the 'Decade of Action for Road Safety'. Less than 35% of low and middle income countries have policies in place to protect the road users. Road safety was recognized in global environmental policy deliberations at the recent Rio+20 UN Conference on Sustainable Development. The increasing frequency and severity of recent Road Traffic Accidents (RTAs) in India involving modern vehicles have caused grave concern for road safety, posing serious challenge to transport policy makers, planners, regulators, police, engineers and civil society alike.

Parikh Vaidehi Ashokbha et.al (2014) In an era of continuous growth in mobility and demand for transportation, safety is an issue of major social concern and an area of extensive research and work. The rate of accident in developing countries like India increases year by year. To reduce this adverse effect of

transportation the work towards road safety is become necessary now a day. Study of the road network and geometric feature are essentially to tackle problems of accident in a city. The occurrence of accident not only causes immediate loss in term of property and life but may also cause a long-term pain or grief. The paper attempts to achieve the road safety by black spots analysis which are identified based on accident detail of stretch selected. For this research paper the study area selected is corridor of Narol to Naroda national highway-Ahmedabad city of Gujarat state.

N. Naveen (2017) From the actual conditions of rural road accident in our country, it shows that the current rural road safety is facing the grim situation and emphasizes the need of conduct rural road safety audit. This article analyzes the factors effecting safety in rural road accidents from human, vehicle, road, external environment and the other factors, summarizes the connotation and the steps of rural road traffic safety audit. It divides the contents of rural road traffic safety audit into two parts: newly built and rebuilt rural roads & the existing rural road traffic safety audit. Finally, this project aims at these problems existing in implementation process of rural road & proposes the corresponding solutions to support the work of rural road traffic safety audit.

M. Rajesh(2017) Road safety audit has the greatest potential for improving safety when it is applied to a road or traffic design before the project is built. Purpose of the audit is to look at the accident potential and safety performance of the proposal. It is a formal process using a defined procedure and not an informal check. To be effective, it must be conducted by persons who have appropriate expertise, experience and training and who are independent of the design team. An audit may also be conducted on an existing road, since it permits hazards to be identified and opportunity becomes available to identify preferred road engineering measures to improve safety From the actual conditions of rural road accident in our country, it shows that the current rural road safety is facing the grim situation and emphasizes the need of conduct rural road safety audit. This article analyzes the factors effecting safety in rural road accidents from human, vehicle, road.

Kelvin Chun Keong Goh et.al (2019) The provision of bus priority is often a major consideration in on-street bus rapid transit design. However, the research is limited and suggests mixed outcomes. This paper explores the impact of bus priority treatments on road safety. An empirical analysis of accident data about bus rapid transit routes in Melbourne, Australia, was conducted. The analysis included an aggregate crash frequency analysis that accounted for statistical effects and a disaggregate analysis that used a safety audit and review of accident types. Overall, bus priority treatments reduced accidents, with a statistically significant reduction of 14.0%. The number of fatal and serious incidents dropped considerably (42 to 29 per annum). The disaggregate safety audit showed reductions in intolerable risks, but some concerns such as interaction of buses and traffic at bus lane setbacks (section of a curbside lane where traffic may enter to make a turn as the bus lane reaches an intersection). The shifting of stopping buses from the traffic lane into a bus lane was shown to reduce accidents. Bus lanes were thought to increase sight distances at unsignalized intersections and

consequently reduce accidents with vehicles to the side. Some treatments were thought to increase traffic density, creating safety benefits through slowed traffic.

Robin Mariita Aondo (2019) Studies have shown that road traffic accidents are common in emerging economies and low-income countries which accounts for over 90 percent of the global road traffic fatalities. World Health Organization report (2016) places Africa as the worst performing continent with an average over 27 deaths per 100,000. The United Nations declaration that 2011 to 2020 as the decade for road safety. The United Nations projects road traffic fatalities to rise by 2020 up to 8.4 million; this is due to the current statistics that show that over seventeen percent globally. The transport sector in Kenya has grown immensely especially public transport in a short span of time. The data from NTSA as at July 2018 shows that 581 fatalities are pedestrians, 164 drivers, 463 are passengers, 27 bicycle and 286 are motorcycle related. Current spate of accidents in Kenyan roads calls for a diagnosis and management of the leading road traffic deaths and injuries that enables appropriate action and resource. The national government has adopted a five-year action plan that has been developed. Development of a national road traffic accidents database; the data base should be comprehensive and inclusive of medical cost, material and intervention cost and any other loses, injuries, deaths.

Suyog S. Pawar et.al (2020) Transportation plays a key role in the development of an area, but it happens only when the transportation is safe, rapid, comfortable and economy. A road is considered safe when only a few, or no accidents occur. Road and its surroundings, road users and vehicles are the elements contributing to road accidents. Road safety audit (RSA) is a formal procedure for assessing accident potential and safety performance in the provision of new road schemes and schemes for the improvement and maintenance of existing roads. In this project we are going to analysis the reduction of accidents and provide safe forgiving roads. For these surveys are performed at PCMC limit for Merging and Diverging, Underpasses, BRT'S bus stations and intersections. The study of safety measures which are mean to be implemented but not provided in actual and study of RSA will help to minimize the Injuries, Loss of Human and Public properties due to road accidents. The study of safety measures which are mean to be implemented but not provided in actual and study of RSA will help to minimize the Injuries, Loss of Human and Public properties due to road accidents.

Vipul Vikram Mathur(2021) The development of Public Transportation Infrastructure needs utmost attention to solve the issues related to congestion, accidents, and pollution. Bus Rapid Transit System (BRTS) has turned out to be one the effective and safe mode. For smooth functioning of the same, all the infrastructure elements linked to the corridor must also be designed accordingly. The current study focuses on redesign of an intersection of BRT Phase-II corridor in Jaipur city. The deficiency in the existing design related to

geometrics, traffic control features etc. were examined. The redesign of the selected intersection has been presented showcasing the safety gains. The development of Public Transportation Infrastructure needs utmost attention to solve the issues related to congestion, accidents, and pollution. Bus Rapid Transit System (BRTS) has turned out to be one the effective and safe mode. rations at the recent Rio+20 UN Conference on Sustainable Development. The increasing frequency and severity of recent Road Traffic Accidents (RTAs) in India involving modern.

HASSAN MUJTABA(2022) Recognizing the severe challenge that traffic, urbanization, and road safety pose for the country, the Government of Pakistan passed the 'National Transport Policy of Pakistan 2018' and 'Pakistan National Road Safety Strategy 2018-2030.' In this context, then, this paper aims to study the problems of Pakistan's road safety in detail and then dissect the government's policy response to them. This paper aims to study the problems of Pakistan's road safety in detail and then dissect the government's policy response to them.

Rakeshkumar Girdharlal Shankar (2022) This paper explains design of traffic monitoring and controlling system with advance road safety management. This advance technique is specially design by considering the current issue related to traffic problem and safety of human being

Problem Statement:

During road inventory survey the following major safety, concerned elements were observed and studied in detail: -

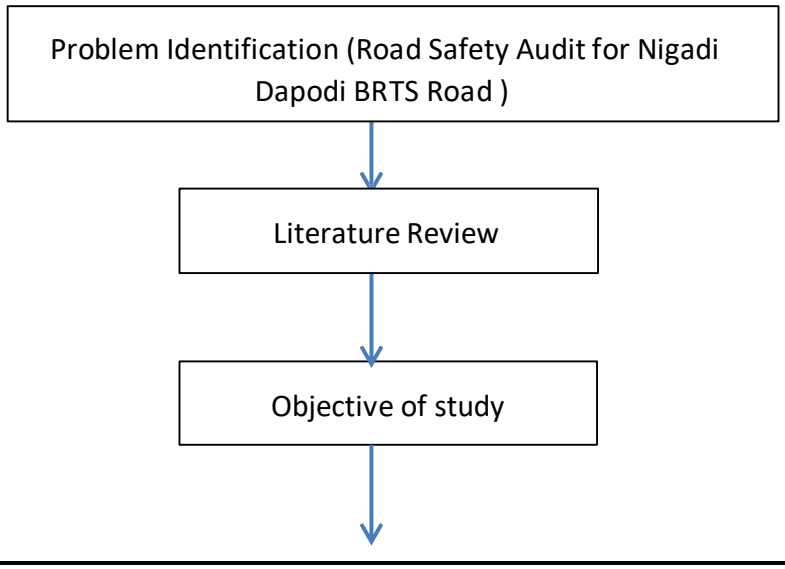
1. Intentional lane changes may occur when cars drive from the service road across the BRTS lane, or when cars drive from the service road into the concrete lane. Potential BRTS bus crashes might result from this.
2. Vehicles from one side of the highway must cross the BRTS lane twice to reach the other side, increasing the likelihood of confrontation.
3. BRTS Bus Stations: Inadequate crossing facilities for passengers accessing bus stations from the road.
4. Intersections: The ability of the BRTS bus and other vehicles to manoeuvre at intersections can lead to conflict.

Objectives:

1. To study the existing BRTS road network in Pune city.
2. To study the road safety audit process.
3. To perform Road Safety Audit (RSA) as a procedure for Nigdi - Dapodi BRT road.
4. To ensure a high level of safety inroad project, to minimize accident risk on the or Nigdi- Dapodi BRT road network.

Methodology:

METHODOLOGY



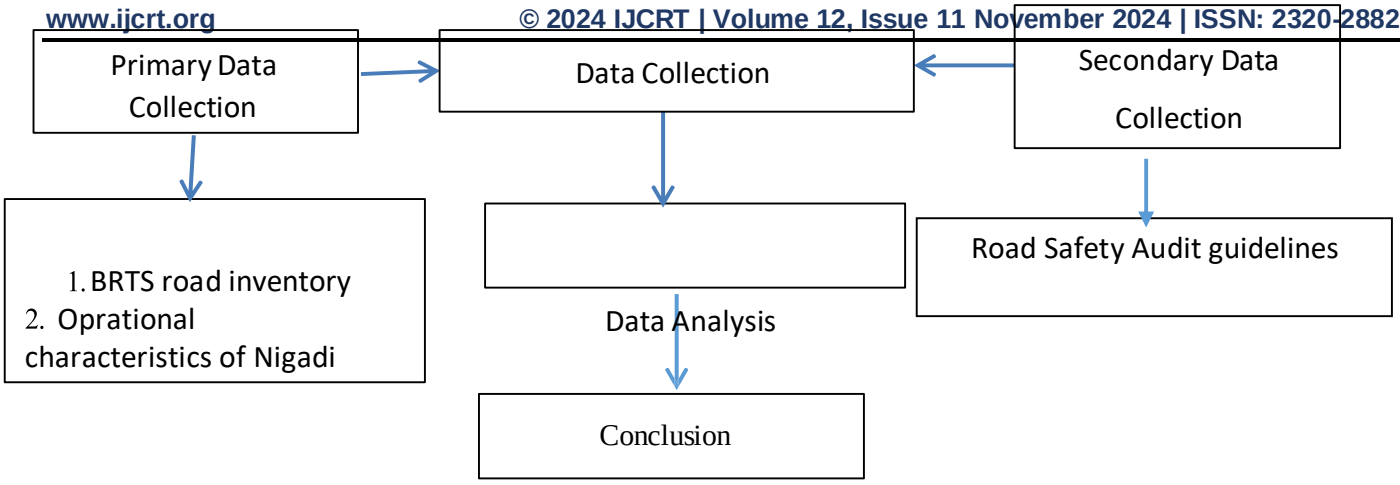


Figure Methodology Flow Chart

CONCLUSION:

The purpose of this study is to present an in-depth analysis and overview of the road accidents in India. The results of various field work done on the road traffic accident in various countries have been reported in this paper. This literature study will help the researchers to have a nut shell view about the effect of RTAs and the safety measures to be followed to avoid RTAs.

The collected empirical details and various important statistics related to the road accident severity and the measures to reduce RTAs discussed in various studies were presented. Multifaceted review of various literatures has shown that accidents occurrences are the effect of multiple human, vehicle and environmental elements often interacting in a complicated manner to generate the initiation of the event. The cause of road traffic accidents are not just human error or driver negligence. There is need to view road traffic accident as an issue that needs urgent attention aimed at reducing the health, social and economic factors.

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