CHAPTER 5

CIVIC SENSE OF ROAD USERS TOWARDS ROAD SAFETY

5.1 ROAD SAFETY AND PEOPLE’S PERSPECTIVE ABOUT ROAD SAFETY

The Indian road and traffic system is enriched now and then with rules and regulations which have been enforced by the government for the well being of the citizens. The concerned authorities have taken preventive steps to ensure the upkeep and safety of the pedestrians and vehicles on the road. Every citizen of the country like India which is democratic has the right to public property. Roads and highways are also public property and hence the maintenance of the same is a challenge faced by the Indian government.

Road travel has become an integral part of all of us and cannot be avoided in our day to day life. With increasing economy and population, there has been an immense increase in the traffic on the roads over a period of time. While on the one hand it has made things convenient for us, on the other hand it also increases our concerns on road safety.

Road safety is a major issue in many countries. A big country like India has various states which in turn have villages and concerned authorities would take care of the smooth running of the same. Hence it is very important to have a centralized system which can be reflected in the implementation of the rules and regulations of the country.

A Road safety programs in India is an essential matter which requires various amendments and implementations for the smooth functioning of the traffic. Rules have been set but whether using are followed or not is another issue altogether. Government has taken various preventive measures to ensure the safety of the citizens using the road. Usage can be in the form of driving or walking. Measures are rules which are enforced by the concerned authorities. The
enforcement in India is necessary because people violate the rules and this leads to road mishaps. As per the latest survey, India has the highest number of road accidents.

Several measures have been undertaken by the ministries for the safety of the travelers on road:

- Seat belt wearing is an important rule for the people traveling in the front seat of the four wheeled vehicles. Heavy penalties have been levied in certain states for the people who violate the rule. This is a major safety measure taken by the government. The wearing of the seat belt reduces the risk of major injury if accident happens and surveys have proved the fact.

- Two wheeled vehicle drivers have to wear helmets and failing to do so can lead to payment of heavy penalty. Measures are taken by the government for the benefit of the people.

- Use of cell phone while driving is prohibited. But hardly people try to follow the rule sometimes. To prevent this, preventive measures like fine payment has been levied on the citizens who are found driving and talking on the mobile simultaneously.

- Red light jumping and no lane driving is another hazard in maintaining road discipline. This is the reason why the government has taken the measure of penalty payment of red light jumpers.

- Over speeding also leads to punishment and many people end up paying fine for the same.

These are some of the road safety measures in India undertaken for preventing mishaps on road. Road safety assessment in India is necessary to evaluate the safety measures and the enforcement of the same. The assessment helps in making amendments if requires so that the optimum results of safety are obtained.

The main objective of the assessment is to evaluate the coverage and availability of the safety measures on the roads at the state and the national level at large. The data for the evaluation is attained from two main sources namely:
• National Crime Record Bureau (NCRB): the body was formed to access the mishaps happening on road across the country in terms of accidents and crime reported on road. The periodic surveys conducted by the organization are very helpful in evaluating the success of the road safety rules and regulations.

• Ministry of Road Transport and Highways (MORTH): the organization was formed with the purpose of assessing the road safety. The accidents amounting to the number of deaths across the country are recorded.

The requirement of the assessment is highly recommended so that the availability of the resources for the benefit of the citizens is also accounted. After all the record maintained is also accountable to the concerned governing bodies so that the success of road safety is achieved.

Road safety is the biggest challenge faced by India in the recent years and periodic regulations are done to achieve the goal. But not all the rules and measures are followed. Some fail to attain success in the grass root level. Hence it has become necessary to educate the people right from the initial level that is the school level. Young India is emerging as responsible set of people. So the government has decided to introduce road safety education in India at the school level.

Keeping in view the road accidents and violation of rules happening in the country, CBSE has decided to introduce road safety in the curriculum so that the safety rules and measures are educated to the school children. This will help in attaining literacy of the road signs and rules and the drivers will be aware of the responsibility while driving.

At least it is a trial method taken by the government for the safety of the commuters and travelers on roads. This is done through short film making in which kids actively participate with excitement and hence end up learning the various road rules which is helpful for them in the long run.

The inclusion of the road safety in the school curriculum is done effectively with books prescribed for classroom teaching of traffic sense, rules and
measures. The education of traffic signs also plays a major role in the school syllabus. Various workshops and seminars are conducted in schools in which total education of traffic rules in imparted to the students so that they become aware of the rules prevalent in their country and grow up to become responsible citizens of India.

Hence, it can be said that the government bodies are taking care to reinforce the rules and regulations among the people right from the grass root level. Certain responsibility lies in the hands of the citizens also and they have to fulfill those for the smooth functioning of the traffic rules and maintain safety on the roads.

It is a collective effort and until the entire country joins hands in making it a success, it cannot be achieved. Let all the people take a pledge to make Indian roads safe for everyone. This is the best way out. Every drop of water counts in the ocean. Same goes for everything in life.

The frequency of traffic collisions in India is amongst the highest in the world. A National Crime Records Bureau (NCRB) report revealed that every year, more than 135,000 traffic collision-related deaths occur in India.

From time to time, the governing body comes up with latest amendments in the system so that the traffic rules are maintained and road accidents are reduced. But still the realization of the goal is quite far. This is because India is the topmost country in terms of roads accidents and also tops the charts compared to other countries in terms of deaths caused by road mishaps. So it is important to have road safety signs in India. A lot of NGOs and other organizations also run road safety campaigns in India to make people aware about the significance of following road safety rules.

The task is quite a challenge but the governing bodies are looking for the best possible means to ensure proper signage on the roads all across the length and breadth of the country. Some other measures that needs to be taken are-

- License is a must for every citizen to obtain before driving on Indian roads.
• For educating and making people aware, events like road safety walk can also be organized in India.

• For the safety of everyone, the age limit for a person to drive should be made 18 and above failing which the person is liable to penalty.

• Pedestrians should walk only on the footpath and cross the road on zebra crossing only.

• The wearing of seat belt is another safety measure undertaken for the front seats of the four wheeled vehicles. This is for the safety of the passengers.

• Red light jumping is a punishable offence. This should be avoided as it can lead to road accidents amounting to deaths.

• Do not drink and drive. As a preventive measure, government has taken various steps like putting up hoardings do not mix driving with drinking.

• Better late than never. So be patient on the road as it belongs to every one and all the citizens have equal right on the road.

• Authorities have taken measures to punish the people who are found talking on the mobile while driving as it diverts the attention of the driver which can lead to road mishap.

• Awareness can also be increased by organizing road safety week in India.

• These measures are very important as they help the people in various ways. These are meant for the benefit of the people and the citizens should consider it as a boon.

Government has taken measures to introduce road safety in India in the schools. This will enhance the chances of traffic rules literacy among people right from a tender age. The youth of India will be mentally prepared to follow road safety rules and regulations there the well being as well as their fellow citizens. It is a collective effort and everyone needs to participate in this platform equally so that the success rate of traffic rules takes place.
Central Board of Secondary Education (CBSE) has made the inclusion of road safety as an independent subject. This has facilitated the literacy rate of traffic rules. The reinforcement of the subject is done in many ways:

- Short films are made in which the kids act to portray the traffic rules. This makes the concept interesting and the children love to explore the subject further.
- Various workshops and seminars are conducted for the children to make the road safety measures a success. This helps in implementation of the same in practical terms on the roads.
- The traffic signs are made to understand to the small kids and they find the subject rather interesting.
- Children are taken to traffic parks as a part of their excursion routine. This helps them to understand the concept better.

In this way, the road safety curriculum has been introduced at the grass root level in the schools.

The necessity of the road safety is obvious because it is important to find out the success of the rules and regulations among the states of the country. The evaluation helps in making necessary amendments in the rules and regulations of the traffic scenario in the country whenever required. The constitutional right of every individual is to voice their opinion about the various things happening in the country. In case any change can bring about a positive amendment in the country, the person has the right to speak.

To obtain the maximum result of the evaluation conducted on the road safety is the main objective of the assessment done by the Indian authorities. Two main governing bodies have been formed in the country to make evaluation a success:

- National Crime Record Bureau (NCRB): this organization was formed with the objective of recording the data of the road mishaps in the county. The crime happening on the roads across the country is also on record.
Surveys are conducted which helps in evaluation of the road safety measures and preventive steps are implemented. It is a decision making body.

- Ministry of Road Transport and Highways (MORTH): to assess the road safety norms, this body was formed. It is accountable for the road safety rules on the highways of the country. The mishaps happening on the highways are accountable to this body.

The resources available to make changes in the road safety rules and regulations are available for the benefit of the citizens. It becomes important that even the citizens understand their responsibility towards the country and hence help in maintaining the public property. The traffic signs on the roads are meant for the people so that they can be alert about the road while driving or walking.

Traffic rules are meant for the safety of the people. So for the best interest of the people, it is essential that the citizens act collectively to upkeep the road safety. The measures taken by the government is for the optimum benefit of the citizens and they need to understand that. The measures will be effective only if the people of the country become responsible and sensible.

The recently concluded India Road Safety Mission 2016 held by Maruti Suzuki suggested the good and bad aspects of select urban locations in India. The end result is that despite the incorporation of safety features in various vehicles, driving or riding sense is an area that needs to be addressed immediately.

Self-preservation or protecting oneself from harm or death is a natural instinct in human beings as well as animals. However, when it comes to driving a car or riding a motorcycle, this instinct takes a backseat with Indian commuters. Not only the people behind the steering wheel of a car or on the saddle of a two-wheeler, the instinct is also missing in pedestrians. The recently concluded Indian Road Safety Mission 2016 held by Maruti Suzuki indicated the improvement areas as well as the strength of infrastructure, awareness as well as traffic sense amongst people in select Tier I cities which were Delhi, Kolkata, Mumbai, Bengaluru, Pune, Chennai, Ahmedabad and Hyderabad.
Present at the event was Minister of Road Transport, Highways and Shipping, Nitin Gadkari who also pointed out that despite enforcing rules, the same are flouted by commuters every now and then. For many people, it is not a crime to jump a traffic light or use a phone, however, the end result in case anything goes bad proves to be fatal for all those who get involved in such an incident. There is a minute set of people who do follow rules and respect all road and safety regulations but this number needs to rise immediately.

Vehicles are becoming faster as well as safer. In fact, the recently announced super expressway between Delhi and Jaipur has a claimed travel time between the two cities of 90 minutes. On the existing NH8 or National Highway 8, it takes anywhere close to six hours including stops. But, is India really prepared for it? Agreement there is ABS or Anti-lock Braking System, airbags and other essential safety aids that are seen in most mass market cars. They will also become mandatory in two-wheelers as well as four wheelers soon, however, the areas of improvement are large and here is what the India Road Safety Index about the aforementioned cities suggests.

Broadly one major improvement aspect is the road sense for emergency vehicles which is missing in most cities. Exceptions include Chennai, Mumbai, Ahmedabad and Hyderabad. In other cities, the aspect of giving way to an ambulance or a fire tender or a police vehicle is missing which entails in delay of proper care to a patient or reaching an affected area. The strong points were also discussed which included reasonable improvement of infrastructure, but cities like Chennai are in a huge need of flyovers and foot-over bridges which would result in a smoother flow. The jury for the Road Safety Index included Indrani Malkani, Managing Trustee of V Citizens Action Network (VCAN), Anil Gupta, President and Head of Board Practice & Leadership Consulting for Cornerstone International Group- India and Ashok Datar, Founder Trustee of Mumbai Environmental Social Network (MESN).

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Car makers are also taking a step forward in making children, in particular, aware about understanding road signs and how to encourage safe driving. Other car makers are also initiating their steps, for example, Hyundai’s Be The Better Guy "campaign which makes people aware about breaking traffic rules which can simply be avoided. Other companies such as Zoom car also encourage in taking a shared mobility solution wherein customers can ask for a passenger vehicle and share the vehicle with other passengers going in the same direction. In addition, the start up tracks the driver’s accelerator as well as braking inputs. Cab companies like Ola and Uber are also training its drivers to be safer on the road.

5.2 EDUCATION AND AWARENESS IN MASS ABOUT ROAD SAFETY

Expansion of transport network is a necessary prerequisite for growth, and urbanization an almost certain corollary. So, as India charts a path of growth, we see an increasing level of urbanization and concentration of population in cities. As expected, we also see a rapid expansion of the road network in the country with an overall increase in motorization. India today has one of the largest road networks in the world. Motor vehicle population has grown here at Compounded Annual Growth rate of 10.5% during the period 2003-13. While this growth is perfectly in order and also necessary for a surging economy, what raises a cause for concern is the fact that we have not equipped ourselves to deal with this increased pressure on road space. We have not brought in modern traffic management systems and practices including development of contemporary traffic rules and creating awareness regarding adherence to these rules. As a result, we have a very high number of road accidents in the country and safety in road travel has become a cause of concern and a major public health issue. 56 Road Accidents take place and 16 Persons kill every hour in the country.

To ensure a “safe system” in road travel, it is imperative to augment road infrastructure, develop the safety mechanism in vehicles, change the behaviour of drivers and road users, and improve the emergency and other post-crash services. These are the five E’s in road safety, Education, Enfocement, Engineering, Environment and Emergency care.
The World Health Organisation (WHO) in 2009, in its first Global Status Report on Road Safety, identified road accidents as the “biggest killers” across the world. The report says about 1.2 million people die and 50 million get affected in road accidents globally every year. A decade of Action for Road Safety (2011-2020) has been adopted with a goal to reduce the fatalities from road accidents by 50 percent.

India has been identified by the WHO as a nation leading in road death, roughly one road accident per minute and one road accident death every four minutes. According to the Ministry of Road Transport and Highways, over one lakh persons lose their lives every year in road accidents. In 2014 alone, more than 1.39 lakh people died in road accidents.

The Government has adopted a National Road Safety Policy in 2010 which emphasizes the importance of creating awareness about the various aspects of road safety, and its socio-economic implications and developing a road safety information database.

The Government has also come up with a draft Road Transport and Safety Bill, 2014 with stronger punitive action and penalty for traffic violations and road safety forms a major component of the proposed Act. The 2014 Bill, now put up on the site of the Ministry of Road Transport and Highways for public comments, proposes modernisation of the road transport infrastructure, improvement in the quality of vehicles on the roads and simplification in the procedure to obtain driving licence through a Unified Driver Licensing System for the entire country.

The use of safety equipment like helmets, seat belts for all passengers including those in rear seats and high visibility clothing for two wheelers has been made mandatory in the proposed Act. The safety of children has also been taken into account by requiring to make use of child safety and restraint systems. The proposed Bill has set a target of saving 2 lakh lives in the first five years, increasing the national GDP by 4% by improving safety and efficiency of road transport. Under ‘Make in India’, it aims at creating 10 lakh jobs with more investment in the road transport sector.
The Government has already launched a pilot project for cashless treatment of road accidents in a few stretches like Gurgaon-Jaipur stretch on NH-8 in 2013-14, Ranchi-Rargaon-Mahulia stretch of NH-33 and Vadodara-Mumbai stretch of NH-8 in 2014-15. This is to save lives of accident victims by providing prompt and appropriate medical care during the 'golden hour' that is the first 48 hours, within a limit of Rs.30,000/-. A 24/7 call centre with toll free number 1033 has also been activated on these stretches. The data from the pilot project would be utilised for formulating a Pan-India scheme for cashless treatment of road accident victims.

In order to reduce the number of accidents, the Government is identifying major accident “Black Spots” on the roads. An accident Black Spot is a stretch of road where the level of risk of accidents is higher than the surrounding areas. Crashes tend to be concentrated at these relatively high-risk locations. The data on black spots are now required to be reported by the states/UTs to the Ministry of Road, Transport and Highways. An analysis of these spots will help to identify the risk factor and put corrective safety measures in place. Details of 726 black spots have been compiled from across the country. Out of these, about 190 spots have already been analyzed and corrective measures have been put in place.

Road safety is for public good. The Road Safety Policy and the proposed Act, both put emphasis on enhancing public awareness and educating people about their roles in making the road travel safe. Keeping this in mind, every year in January, 'Road Safety Week' is organised for sensitisation of various stakeholders. The aim of this campaign is to highlight the need of safe road travel by just following simple rules.

Variety of programs about the methods and necessities of the road safety like the use of helmets or seat belts while driving, medical check-up camps, driving training workshops and competitive events at educational institutions are mounted for different target groups like the road travellers, drivers and also school children, students and youth. On the other hand, activities should be undertaken for improving public transport system, proper management of traffic system and strict observance of emission norms. Each year a specific theme
is chosen to create awareness. Some such themes like “Build a Safety Culture for Sustainable Supply Chain”, “Safety is not just a slogan, It’s a way of life”, “Walk for Road Safety”, “Stay Alive, don’t drink and drive” and “Road Safety A Mission, Not Intermission”, etc have already been highlighted during the observance of the week.

The 27th Road safety week was observed from 11th of January (Monday) to the 17th of January (Sunday). This year the Campaign focused on ‘Road Safety - Time for Action’. The Campaign for road safety can only be successful if all stakeholders such as transport, insurance, health, legal professionals, highway engineers and vehicle manufacturers. Children and school and college going students should be taught from the beginning about the road user behaviour. Road safety education should be a part of the school curriculum so that safety becomes a habit and a way of life from the beginning.

In an effort to create awareness among the motorists and the general public about the high incidents of road accidents in the country, the Ministry of Road Transport & Highways has kicked off the Road Safety Week today, January 9, 2017.

The government aims to prevent and control road accidents and reduce instances of over speeding, drunk driving, helmetless driving and not wearing seatbelts, through various promotional activities. The activities include usage of safety posters, banners, safety films, and so forth.

As a part of the programme, the ministry, in association with auto industry body Society of Indian Automobile Manufacturers (SIAM) and Delhi Police organised the ‘Walk for Safety’ – from India Gate to Shastri Bhawan – to initiate the ‘Road Safety Week’ earlier to in the capital.

Road accidents killed 1,48,000 people in 2015, up from 1,36,000 in 2011 and 1,41,526 in 2014, according to a report released by the National Crime Records Bureau (NCRB). The report stated that road accidents made up 83 percent of all traffic-related deaths last year and 43 percent of all accidental deaths in the country.
In fact, there was a 4.6 percent increase of road accidents in 2016 than the previous year, according to Nitin Gadkari, Minister of Roads, Transport, Highways and Shipping. Every year, five lakh accidents take place on Indian roads. The government is working on road engineering, road signage, creating safe barriers and building cement concrete roads to improve road safety, he added. However, the Motor Vehicles (Amendment) Bill with its far-reaching provisions which can help drastically improve road safety in India is yet to be passed in the Parliament. The bill levies far steeper penalties in case of traffic violations to crack the whip on errant motorists.

In fact, Coalition for Road Safety, a group of road safety NGOs and affected families from across India have appealed to the government to fulfill its promise of safer roads by passing the Bill in the upcoming budget session of the parliament.

The ministry is also launching two mobile applications called, E-challan and M-parivahan as a digital solution for traffic rule enforcement. While the former enables the traffic police to issue digital challans, the later permits motorists to replace the existing physical documents such as driving license and registration certificate with digital copies and access them via the app.

Meanwhile, automakers have stepped up with road safety initiatives and similar programmes. Renault India announced it will have road safety awareness campaigns during the week at all its dealerships across the country.

The campaign will delve into the need and essence of road safety rules, including traffic lights, speed limits, pedestrian rules, wearing seat belts while driving the car, according to the car maker. Other activities include drivers’ education programme and increasing road safety awareness among school children through various training workshops and modules, it added.

M/s Hyundai announced that it is conducting road safety awareness camps across all its service networks in India under its ‘Safe Move’ campaign. Last year, the Korean car maker launched a series of short films on certain key causes of road accidents such as drunken driving, over speeding, usage of cell-phone while
driving and not wearing a seatbelt under the road safety campaign. Additionally, customers can avail free 20-point safety checkup of their cars, free top wash and 5 percent discount on safety related parts and labour from Jan 11-17, 2017, according to the carmaker.

M/s Mahindra & Mahindra has undertaken a road safety awareness campaign for dealers as well as a driver education program through dealer workshops. In addition, the company said that it is also creating awareness drives through tie ups with local RTOs and rallies by school children.

Rubber and tyre major Bridgestone has launched a nation-wide tyre safety check-up camp in association with Tata Consultancy Services between January 17–27, 2017 at 58 TCS facilities across India to educate citizens on the importance of tyre maintenance and road safety. At the camp, Bridgestone’s will conduct free tyre check-ups and create awareness on appropriate tyre maintenance among all the participants, according to a company statement.

Around 3150 children age 3 to 15 are killed or seriously injured on Indian road every year; this is almost 60 children per week -To reduce these and keep your children safe your concern is considered necessary.

80% of Indian schools do not have road safety curriculum but as a parent or guardian you must play a big role in helping them to stay safe on roads. Children follow adults and copy their behavior, if they see you take risk on roads there will probably take risk too.

The best way that you can help out your child to stay safe on roads is to set a good example unto yourself when using roads. IFROS with its second-fiddle named as SAPROS (Student Assimilation Programme on Road Safety) by its methodology helps you to teach your child how to be safe pedestrian and teaching them about the importance of road safety code and how to stay safe when walking, cycling or riding a bike.

Research illustrates that your child can jot how fast vehicles are moving or how far away they are, children are most likely to die in a road collision than any other accident. In comparison with other countries India's overall road safety record is very poor. And its rate of child fatalities is high when compared to others countries.
Road Safety Awareness programme

TEWFI realize that the youth must be taught Road Safety. There are many accidents occurring in the ECR and also a few on the road towards Alamparai from ECR. Sadly one young boy died as a result of a local accident.

Of course the people who cause accidents are not only ones who suffer as many others are also affected when people are killed or injured in road accidents. TEWFI wants to organize an awareness programme for the Youth in the community. It was also observed among the youth groups using two wheelers that they travel too quickly and that may cause danger to the children who are walking to the school. The children in the school are being taught about Road safety along with the Health Education Classes. Following topics were covered through this programme.

- Various Traffic Signals
- Traffic Rules
- Road Traffic Legislations
- Motor Vehicles Act 1988
- Offences and penalties
- Using Helmets while driving two wheelers
- Fuel consumption etc.

So far this awareness programme has been organized for the young people in three villages. It is planned to organize this programme for the Auto drivers, the children and the youth groups in all the communities of Edaikazhinadu Panchayat.

Road safety education is very much essential in today's world as road traffic is becoming increasingly busy. Years ago, it was safe for your child to travel on the road without a care, but things have changed since then. Now there are more cars, scooters, motor bikes, buses etc. on the road.

Most of the educational institutions now organize road safety education for improving student road safety. This will contain educational activities that help you to gain more knowledge about road safety.
You should give appropriate education regarding student road safety to children as well as young ones to let them be aware about road safety and the importance of learning it. Just like other social things, road safety education is necessary and it should be started right from your kid's childhood.

As a parent, you will always try to wrap your children in your arms and take them away from all risky situations. By providing proper road safety education, you will be able to protect your child away from dangers caused by road accidents. You can give them certain facts, show the possible dangers and risks involved, explain ways to keep them safe and develop their skills in understanding consequences.

There are many interesting ways by which you can teach your children about road safety. You can create a traffic environment for your children, allow them to ride their own bikes or scooters and learn the rules of the road. Also, you can organize classes taken by police officials to make your children be aware of basic road safety rules.

- In most of the foreign countries, road safety education is considered as a necessary education. It will be better, if you provide basic road safety education by bringing it to early childhood, primary and secondary schools
- Your children will get an overall idea about the principles of crossing road, importance of helmets, how to use zebra crossings and awareness of basic safety rules. Through this education, you will be provided with knowledge and awareness about the safety of pedestrians, cyclists and passengers
- Education on student road safety can encourage you to take necessary action that will make your children safe, secure and thereby help them to have awareness about road safety. In road safety education, you have a vital role to play in forming and developing various skills related to road safety
Important Points on Student Road Safety and Suggestion for Improvements

- You will be able to know about your child's developmental skill and ability to distinguish between passenger, pedestrian, low traffic and heavy traffic. As a parent, your participation in safety programs can make it more effective and successful.

- As a parent, your role will have a great significance in safety programs. You can become a good role model to your children by wearing a seat belt while driving, reducing unnecessary speeding, avoiding careless driving, taking care of other passengers and pedestrians. This can have a positive impact on child's mind as they can follow you easily and thus get adequate supervision on road.

- By conducting safety programs, you will not only be able to create awareness among the younger ones, but also among elders about the traffic strategies.

- With the safety programs, you can reduce the number of injuries and deaths caused by road accidents. Involvement of road safety professionals helps you to better plan and support road safety programs and provide proper training to your children. For creating better awareness, you can seek the aid of internet facility.

Consequences and Solutions to Consider:

Road accidents are the leading cause of death and hospitalisation in today's world. It's not unusual that your children become the victim of road-related injuries. You will be able to solve this issue by providing proper road safety education to your children. Also, you should learn to use road responsibility and make your children be aware of the road system from an early age.

Road safety education plays a vital role in shaping the attitude and behavior of children as well as young people, thereby ensuring that they become a responsible driver, passenger, pedestrian, and cyclist.
5.3 BEHAVIOR AND ATTITUDE OF ROAD USERS, ROAD RAGE

Behaviour is defined in number of ways and much progress has occurred in our understanding of this issue. Simply put, it refers to actions people take in different situations. Our behaviours are a product of our knowledge - attitudes and beliefs, the physical and social environment we live, travel, play and work, nature of products with which we interact and larger societal norms and values. Thus, safety and behaviour has physical, social, psychological and economic dimensions. Human behaviours are varied, unpredictable, difficult to understand (many two wheeler riders are aware that helmets are useful, but only lock it to their bikes) and hard to change.

Behaviour with respect to injuries includes a set of values and principles that the individuals are expected to follow and adapt resulting in their safety and reduction of injuries. However, the presence and application of these behaviours are influenced by most of factors like age, sex, education, residence, values, nature of product used, and the construct of safety in the minds of people. Risky behaviours are common among people all over the world, more in younger age groups, and are influenced by nature of product and environment (even the most educated do not drive slowly on highways). One can stand on a busy or a lonely road to observe a myriad of human behaviours, and the way people use roads and vehicles. Consider some of these issues:

- Everyday, millions of people (atleast 6 millions Bengalureans) use roads that are of different types, sizes, standards and shapes. Thus, there are arterial roads, nonmaterial roads, roads passing through slums, highways passing in front of residential areas, educational institutions, temples, hospitals, markets, shopping areas, play grounds, etc., In all these places variety of activities take place that generate traffic. There are also roads with lights and many without lights, and many with other characteristics.

- We also have children, young adults, elderly, sick, physically challenged, pregnant mothers, mentally preoccupied, in a hurry, road maniacs, road
racers, road sporties, and several others on our roads and all these people use roads regularly. These people, in the road environment, become pedestrians, two wheeler riders, car drivers, bus drivers, auto drivers, cyclists, animal cart drivers, bus drivers, auto drivers, cyclists, animal cart drivers, drivers of other four wheeled vehicles, passengers of different vehicles: nearly 24 categories can be observed often. These people also change their roles, as vehicle drivers become pedestrians, and vice versa, for short or long distances based on their need and purpose of travel.

- Among vehicles, the roads of India witness the most technologically advanced fast moving - zooming vehicles sharing space with slow moving bullock cart in a heterogeneous traffic environment. A look at our roads reveals different types of vehicles among the 3,400,000 registered vehicles in the city.

- Most importantly, we have thousands of people traveling from rural areas to the city for a variety of activities, who are unfamiliar with the complexities of urban roads or highway traffic. Using these roads for many is a herculean task indeed.

In this complex scenario, driving and using roads is a complex and unstructured activity subject to adaptation to different situations, their driving and of others on road. One also needs to perform multiple coordinated tasks subject to interaction of multiple factors. Our behaviours are influenced by some or all of the external factors mentioned above in addition to many internal factors of our own. This is just an example of the complex issues operating for just travel and road safety. Similar observations on our behaviours and interactions with day to day products in homes, work places, play areas and others is possible and has been done. These complex interactions, in turn, lead to injury producing situations and injure people when safety is relegated to the periphery. In addition, people are generally risk taking (part of our evolution and developmental process), believe that RTI's and other injuries happen only to others (till it happens to them), are acts of fate (in the absence of proper understanding) and several other widely held popular beliefs. Everyone knows that driving a two wheeler without wearing a
helmet is risky, but "the one ride around the corner without a helmet" never seems to matter. This belief impairs people from adoption a safe behaviour.

The challenge in our situations for everyone aiming at road safety, injury prevention and people's safety is "how can we understand and change people's attitudes and practices, and make them safer?", which can reduce deaths, hospitalizations, disabilities and costs to society.

5.4 PEDESTRIANS AND TWO WHEELER DRIVERS AND THEIR SAFETY

Pedestrians and their Safety

Though Pedestrians are the most important constituent of traffic, they belongs to the high risk group on road. In order to remain safe pedestrians should cultivate the habit of using road infrastructure in a safe manner. Subways, Zebra Crossings, footover bridges should be used to cross the road. Short cuts and easy options of crossing roads can be dangerous and should not be resorted to.

Simple actions on road will keep you safe:

- Walk with care.
- Look towards oncoming traffic.
- Never assume that driver has seen you when you are about to cross the road, take it as your responsibility to save yourself.
- Avoid crossing road where drivers may not be able to see your.
- Wait for suitable gap in the traffic flow before crossing the road.
- Never jump over the divider railings. You may tumble on to the traffic.
- Always hold hands of children while crossing the road.
- Avoid using roads for morning walks and jogging.
- Take extra care if you have to cross the road on or near a crest or curve.
- Avoid crossing road between parked cars.
- Crossing road by the shortest and most direct route reduces your time on road.
Teaching your Child safe crossing behaviour

Till the age of 10 years children may not have developed the skills and abilities to keep themselves safe. It is therefore, necessary that they should always be accompanied by an adult when in or around traffic. An adult should invariably hold child's hand while crossing the road.

- It is important to teach your child from an early age to STOP, LOOK, LISTEN and THINK before crossing.
- STOP one step back from the kerb.
- LOOK in all directions for approaching traffic. Encourage your child to turn his head, looking in all directions - not just left and right.
- LISTEN for approaching traffic.
- THINK whether it is safe to cross. Make an eye contact with drivers to ensure that they have seen you.

Face the approaching traffic and keep LOOKING and LISTENING for traffic while crossing. Children take notice of what adults do. So set a good example and STOP, LOOK LISTEN and THINK every time you cross.

Two wheeler drivers and their safety in India

As per the data from National Crime Records Bureau, in 2007 there were 21,872 deaths amongst two-wheelers. This number may be unrealistic as the impacting vehicle is documented rather than the road user category of the injured or killed person. In Karnataka, in the same year there were 1,931 deaths. In India, as per the police reports, 346 people were killed and 2798 injured in two-wheeler crashes.

Data from the India injury Surveillance Programme revealed that :

- Two-wheeler deaths and injuries are on the increase from nearly 200 deaths in 2000, it has increased to nearly 400 in the last few years.
- Two wheeler riders and pillion were the second leading road user category for both deaths (38%) and injuries (51%).
• 346 persons died and 13,400 were injured in the city. The actual number of deaths could be around 400 with hospitalization of 20,000 persons, due to under-reporting and coverage of 21 hospitals under the programme.

• Nearly three fourth of fatal and 82% of the non fatal two-wheeler injuries were in the age group of 16-45 years with majority of them in 20-30 years with majority of them in 20-30 years.

• Three fourths (87%) of both fatal and non-fatal injuries in two wheeler riders occurred among men. Women in <15 yrs and > 40 yrs were involved also involved in road crashes in larger number.

• Among non-fatal injuries, almost 60% were educated beyond the secondary school and 36% were graduates. 14% of them were either skilled labour or professionals and 17% were engaged in business.

• 54% of the injured were married.

• Killed and injured riders were represented in 26% fatal and 42% nonfatal crashes, while pillions were present in 11% and %, respectively.

• Nearly 65% of crashes occurred on city / municipal roads and 15% were on highways.

• More than half the death among two-wheeler riders and pillion was due to collision with trucks (32%) and buses (23%). Injuries were severe in these crashes and hence, deaths were higher. Other two wheeler (28%) and car (8%) collided with the vehicle of injured person in one fourth of crashes.

• Rear end collisions (40%) (major majority of roads becoming one ways), side angle collisions (15%), head on collisions (13%) and skid and fall (12%) were the common collision patterns.

• Among those who had suffered fatal injuries, more than half of the two-wheelers were moving at high speed at the time of crash.

• More than half of the injured and killed motorcyclists had not worn helmets, indicating need for up scaling enforcement.
• 7% of the non-fatal injuries and 2% of the fatal injuries occurred under the influence of alcohol at the time of crash. This number could be much higher as this information was not documented in all crashes. The earlier India drinking and driving programme documented alcohol in 11% of police checks and 38% of hospital registrations.

• Only 20% of the fatally injured had received some type of first aid; among non-fatal injuries, 54% had received first aid. For those with fatal injuries, only 3.4% had been given first aid at the place of the injury, while almost 45% of those given first aid had been taken to nearby private or government hospital.

• 55% of the injured patients were transported to the hospital in a private vehicle or taxi with 20% of them being brought in an auto rickshaw; only 20% had used ambulance services.

• 92% of the injured had visited at least 1 hospital before being referred to the study hospital.

• 34% of the injured reached a hospital within 1 hour.

In the coming years, the numbers of two-wheelers are likely to increase phenomenally along with an increase in motorcars. Hence, efforts should be made to make two-wheelers safer on the roads and mandate/educate drivers to adopt safe behaviours during driving. Safety of two wheeler riders and pillions should be an integral part of larger city based road safety programme. To promote safety of two wheeler riders and pillions, some specific known/proven interventions include:

• Formulating road safety policies with a focus on safety of two-wheeler riders and pillions.

• Scientific design and maintenance of roads.

• Separating two-wheelers and other slow moving traffic from heavy and speeding vehicles (on all possible roads).

• Strict enforcement of traffic regulation.
• Broader and focused speed control mechanisms.
• Avoiding carrying children on two wheelers.
• Control of drinking and driving.
• Strict driver licensing mechanism and systems (graduated driver licencing system are found to give benefits).
• Mandatory helmet legislation and enforcement.
• Design of safer vehicles.
• Increasing visibility of two wheeler riders and pillions (bright coloured helmets, use of reflective materials, etc.)
• Banning unlicensed and young drivers on roads.
• Improved trauma care practices.
• Increasing research to understand situation - circumstances - characteristics and risk factors of two wheeler crashes.

It is important to note that road users graduate from using roads under parental/care givers supervision to independent usage on their own. As teenagers they acquire a two-wheeler and start using it independently along with their friends. Use of motorcycles continue till alternative transport patterns emerge in their life. Given teenage behaviours of risk taking, seeking pleasure, thrill on roads and others, it is essential to make them safe on roads by combined measures of road engineering, safe vehicle, visible enforcement and increasing awareness. Driving without drinking at lesser speeds, wearing helmets and proper driving habits should be instilled in their minds from the early days. Parents, teachers, law makers, police officials, road engineers, transport officials and other should actively take part in reducing road deaths.

5.5 UNAUTHORIZED VEHICLES (MOTORIZED AND NON MOTORIZED)

Road Safety is a safety concept for traffic. There is no appropriate definition of traffic in Indian statues. Firstly, traffic includes all types of road users
who use carriage way. The carriage way users include motorized and non motorized users. The concepts of road safety involve both of things motorized and non motorized users. Motorized users are all automobiles whether it is two-wheeler or three, four, six or more. Non Motorized users are pedestrian, bicyclist and animal carts etc. The research problem is a process to solve a catastrophe of road accidents, a sustainable road safety is necessary for all road users: Safe vehicle, Safe Road, Safe Road user with safe environment. This research is introducing more implementation of present standards of vehicle, road and road users to ensure the safety measurement of the traffic.

The following is the first attempt at a comprehensive review of the best practices in regulation and design of two-and-three-wheelers in urban traffic. While it mostly concentrates on the motorized two-and-three-wheelers in Asian cities, the review treats this mode of transportation as only one among many. It recognizes that even tightly targeted measures will affect other modes, most directly pedestrians and non-motorized two-and-three-wheelers. Therefore, in the spirit of promoting the conception of complete streets and livable cities, the review treats street and road space as a whole, discusses motorized two-and-three-wheelers in relation to other modes, and touches upon issues relevant to other modes but analogous to those of two-and-three-wheelers. As part of the Institute for Transportation and Development Policy’s (ITDP) work for the Clean Air Initiative for Asian Cities (CAIAC) and Sustainable Urban Mobility for Asia (SUMA) programs, the review offers a set of recommended policy and design guidelines for discussion with all stakeholders.

Most road design and regulatory standards originated in Western developed countries where the use of two-and-three-wheelers has been quite low. In Asia and a growing number of cities in other regions, however, two-and-three-wheelers represent the majority of traffic, which renders the existing design standards and regulations increasingly inadequate.

The phenomenon of urbanization and motorization, driven to a significant extent by two-and-three-wheelers, has put a serious stress on the already overcrowded transportation systems and led to the acceleration of urban sprawl. Many cities are also facing increasing external costs of two-and-three-wheeler
operation. For example, research from Hanoi indicates that vehicular emissions represent as much as 40% of the known local emission sources in terms of particulate matter. More specifically, motorcycles, which are the primary contributors to local traffic emissions, account for 43% of the total particulate emissions, 54.5% of carbon monoxide, and 54.1% of hydrocarbon. The impact of this transportation mode is further driven home by the complete ban on certain categories of two-and-three-wheelers in many cities across Asia.

In London, the Mayor’s initiative of allowing motorcyclists to share the Transport for London bus lanes with bicycles, taxis, and buses has been met with mixed reactions. Though it has satisfied motorcycle advocates, it has also disappointed bicycle and pedestrian advocates, who argue that sharing space with heavy and powerful motorized two-wheeler is a threat to their safety.

Motorized and non-motorized two-and-three-wheelers are a major mode of transportation and are expected to remain so at least for the next three decades because (1) they provide excellent mobility solutions in the range of up to several dozen kilometers and (2) are inexpensive to manufacture, sell, operate, and repair compared to cars.

However, due to their growing numbers in cities worldwide, the intrinsic benefits of two-and three-wheelers are increasingly offset by significant problems including, but not limited to, air and noise pollution, congestion, and safety and regulation issues. Many local governments have asked for guidance in optimizing their policies and design standards to maximize the benefits and minimize the problems of this growth.

According to the current estimates, there are 300 million motorized two-and-three-wheelers on the roads worldwide. The precise number remains unknown due to unreliable registration statistics in many countries. It is known, however, that: 1) in 2006 over 44 million units were sold; 2) between 2003 and 2006, sales grew at the rate of approximately 14% per year; 3) Asia accounts for 85% of the total estimated number of two-and-three-wheelers.

The fastest growing fleets of motorized two-and-three-wheelers are also found in Asia, though significant growth is occurring on other continents, too, including highly motorized North America and Western Europe. Several Asian
countries with very large populations including China, India, and Indonesia still have a relatively small number of motorized two-wheelers on the road per capita; however, the market in these countries is expected to grow rapidly in the near future.

Meanwhile, in the European Union, the fleet of motorcycles reached 28.4 million vehicles in 2005, which constitutes a 28% increase since 2000. In the United States, though starting from a low baseline and after a long, if slow, decline until the mid-1990s, motorized two-wheelers have become the fastest growing mode of transportation. Between 1997 and 2003, the number of newly registered two-wheelers rose by 262%.

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The phenomenon of urbanization and motorization, driven to a significant extent by two-and three-wheelers, has put a serious stress on the already overcrowded transportation systems and led to the acceleration of urban sprawl. Many cities are also facing increasing external costs of two-and-three-wheeler operation. For example, research from Hanoi indicates that vehicular emissions represent as much as 40% of the known local emission sources in terms of particulate matter. More specifically, motorcycles, which are the primary contributors to local traffic emissions, account for 43% of the total particulate emissions, 54.5% of carbon monoxide, and 54.1% of hydrocarbon. The impact of this transportation mode is further driven home by the complete ban on certain categories of two-and-three-wheelers in many cities across Asia.

Whatever the effect of such ad-hoc traffic mitigation measures, it is clear that the growing use of two-and-three-wheelers must be adequately managed through enlightened urban transportation policies to reduce the environmental, social, and economic consequences.

These consequences include, but are not limited to, worsening congestion, increasing air and noise pollution, declining safety of travel, and displacement of
people by road widening. The main recommendation for policy makers is that regulations and policies governing two- and three-wheelers on urban roads be consistent with a sustainable access and mobility policy framework. Such a policy framework should strive to take advantage of all transportation modes, encourage their use for the most appropriate circumstances, while prioritizing access and mobility provision that is the least costly in terms of emissions and nuisances, safety and security, energy and space consumption.

Personal motor vehicle operators (e.g., automobiles, motorized two-and-three wheelers, etc.) should be charged the full social cost of their use. Revenues raised from any taxes, licensing fees, parking fees, or road user charges imposed on such vehicles should be prioritized for rehabilitation of the degraded walking and cycling environments as well as public transport infrastructure. Any such charging mechanism should be proportional to the social costs of the use of that type of vehicle.

Much remains to be done, however, to understand and measure the full social cost and benefits of every transportation mode. From the point of view of traffic congestion, single occupant four-wheeled motor vehicles, for example, are the least optimal, but newer four-wheeled cars may be cleaner than motorcycles with two-stroke engines

So far, motorcycles and motorized three-wheelers have firmly occupied a significant place in transportation systems because they offer very convenient and comfortable high-speed travel at a very low cost. Generally they use less fuel than four-wheeled vehicles, and hence generate fewer greenhouse gas emissions. In some cities there is no public transportation system, and two-and-three-wheelers fill a critical gap in meeting the mobility needs of low and moderate income people serving as para-transit, moto-taxis, motor-rickshaw taxis, auto-taxis, and short-term rentals. As alternatives to personal motorization, their role in the transportation system needs to be recognized, while problems relating to the supply of such services should be mitigated.

Motorized and non-motorized two-and-three-wheelers are also highly efficient users of road space compared to four-wheeled vehicles, such as private automobiles. If all the current users of motorized two-and-three-wheelers were to
switch to motorized four-wheeled vehicles, gridlock would increase significantly in many Asian cities.

Not all two-and-three-wheelers are the same. The social impacts of heavy, noisy, polluting, expensive, and fuel-inefficient two—and-three-wheelers are quite different from the effects of lighter, cleaner, quieter, fuel-efficient, and less expensive models. Policies should, therefore, affect not only modal choice but also vehicle choice within the two-and-three-wheeled motorized vehicle sector the total number of each type of vehicle in the area under consideration. For instance, if there are many more three-wheelers than private four-wheeled vehicles in a given city, it is likely that the emissions from the three-wheelers will be higher. See the Hanoi example in ‘Problems’ section.”

The economic impact of the two-and-three-wheelers should not be underestimated and under-regulated either. In some cities, both motorized and non-motorized two-and-three-wheelers are used as shared taxis. Improperly regulated, their use results in over supply on some corridors and an under supply on others, leading to destructive competition and unnecessary traffic congestion. Effective public management and regulation of commercial two-and-three-wheelers is necessary to ensure that the fleets remain in ample supply, that it serves the compact urban areas as evenly as possible, and that it provides clean, fair, and safe service without congesting the roads and undercutting the profitability of the business (i.e., where operators cannot afford to modernize their vehicles with cleaner engines). It is also necessary that regulation of commercial two-and-three-wheelers be coordinated with the regulation of the public transit system.

Ideally, regulation and optimization of any vehicle use should be based on a clearly defined road classification system and vehicle classification system. Historically, however, many cities in developing countries have not developed even a rudimentary road classification system—or if they have, it has been arbitrarily adopted from the developed countries without any real analysis of the local situation. In the absence of rational regulatory principles, city administrations have often based their regulatory decisions on mistaken impressions of political leadership.
Any analysis that intends to be the basis of functional road and vehicle classification systems - and thus of a functional regulatory process – should start with the understanding that roads are public space, and in modern societies public space is generally open and accessible to all. This right of access is critical to people’s ability to travel efficiently between their homes and places of work and commerce. However, this right does not historically extend free access to every possible vehicle and mode of travel because such access could compromise the safe, healthful, and efficient functioning of the public space. Governments, therefore, tend to retain ownership of the right of access to public space so that they can fully regulate its use for the greater social good and also fully control the nature of public investment in it.

Regulating and optimizing road use for the greater social good must reflect an understanding of different functions of different roads. For example, some roads are residential access streets, and their function may differ little from that of a playground or a front porch. Other roads primarily provide commercial access, and their function may be little different from that of the walkway in a shopping mall. At the other extreme, a road may be primarily used for hauling freight from a port onto an interstate highway system to distribute goods as quickly and as economically throughout the country as possible. It makes no more sense to have trucks speed through residential streets than have pedestrians walk on limited access express ways. For this reason, municipalities reserve the right to regulate access to different roads for different types of vehicles. Accordingly, any restrictions on vehicle use, especially as radical as bans, should be linked to the road classification system and based on optimizing the social benefits of the roads’ usage.

Restricting and Banning Two-and-Three-Wheelers

Some cities have banned various types of two-and-three-wheelers on specific roads and under specific conditions. Some of these bans have been based on legitimate concerns, while others have been based on lack of understanding and prejudice towards certain modes. As is the case with any policy, approach to bans should be rational, flexible, and in touch with the social reality of its application. A case in point is mode-specific economic restrictions and charging
that have become an increasingly standard measure of traffic management in cities around the world. For example, such restrictions are now widely practiced and accepted in such Latin American cities as Bogota, Mexico City, and Sao Paulo, where motor vehicles with specific license plates are restricted on specific days. In Jakarta, private motor vehicles with less than three passengers are banned during peak hours on one primary arterial.

In Asia, it has been more common to ban, rather than restrict, both motorized and non-motorized two-and-three-wheelers. Politicians widely view them as a cause of traffic congestion, though there is generally no engineering basis for this view. Bans on access by motorized and non-motorized rickshaws, bicycles, and motorcycles in entire cities, zones, or on major arterials are quite common. Traditional (push or pull) rickshaws have mostly disappeared in Asia.

Whether illegal or simply fallen out of favor, we are not sure. Calcutta is one of the few cities where traditional rickshaws continue to operate on a large scale, although there have been periodic attempts to ban them too.

Cycle rickshaws face the most restrictions and are the subject of intense protest and debate in many countries. In China and Vietnam, cycle rickshaws generally operate in a legal limbo. They are not strictly legal or regulated in many cities, but they exist and are tolerated to varying degrees by local police. In Indonesia, Jakarta banned them in the late 1980s, then relaxed the ban with the economic crisis and the fall of Soeharto only to re-impose it in 1998 under Governor Sutiyoso. They remain legal and regulated in Yogyakarta and Solo. Though they are still popular on Yogyakarta’s winding streets, cycle rickshaws have rapidly lost mode share to motorcycles and motorcycle taxis in recent years. In Surabaya, they are banned from primary and some secondary arterials but remain legal on most local streets. In India, they are still legal and nominally regulated in Agra, Hyderabad, Jaipur, Bharatpur, Mathura, Vrindavan, and several other cities in central India. They are either banned or, for some reason, not used in Ahmedabad, Mumbai, and Bangalore. Until 2007, cycle rickshaws were banned in New Delhi and allowed in Old Delhi, where they were subsequently also banned by the Supreme Court to reduce traffic congestion. After having been unsuccessfully challenged in court, the ban remains in effect but is never
enforced. Dhaka has begun to gradually ban cycle rickshaws from major arterials as well.

Just like their cycle counterparts, motor rickshaws are also banned in many Asian cities. Jakarta bans motor rickshaws on some primary and secondary arterials but not others. In China, they are not generally allowed, though they have sprung up as ancillary taxi services. Namely, in Shanghai motor rickshaw operators have taken advantage of a legal loophole and now operate as ambulatory vehicles for the disabled while providing, in fact, a general taxi service and being subject to occasional i. In most South Asian cities motor rickshaws are ubiquitous, legal, and imperfectly regulated as commercial vehicles.

a. Basic Definition

A bicycle is any two-wheeled vehicle that is driven only by pedaling. An electrically assisted bicycle or e-bike is thus not a bicycle but an ultra-light motorcycle (see category I motorcycle below).

A cycle rickshaw is any three-or-four-wheeled passenger- or load-carrying vehicle driven only by pedaling. For the purposes of these recommendations, all becaks, pedicabs, and other local names for vehicles meeting this description will be called “cycle rickshaws”.

A motorcycle is any two-wheeled vehicle propelled by any type of power other than pedaling (including but not restricted to internal combustion engines and electric motors). For the purposes of these definitions, any two-wheeled motor-propelled vehicle, whether it is a single- or double-track one, will be considered a motorcycle. Thus the Segway PT and motorized scooters are here defined as motorcycles. This is important because, in the US, the Segway Corporation has attempted to obtain an “electric wheelchair” designation for their signature vehicle so that it could be allowed to operate on sidewalks where it has frequently been found a nuisance.

Motorcycles can be divided into the following sub-categories:

Category I motorcycle (or ultra-light moped): has a maximum speed of 20 km/h, a maximum weight of 40 kg, and meets the most stringent air quality and noise standards. Category II motorcycle (or moped): has an engine displacement
of no more than 50 cm³, a maximum speed of 45 km/h, and a maximum weight of 65 kg. Category III motorcycle: has an engine displacement of no more than 125 cm³, a maximum speed greater than 45 km/h, and a maximum weight greater than 65 kg. Category IV motorcycle: has an engine displacement of more than 125 cm³.

A motor rickshaw is any three-wheeled vehicle propelled by a motor, generally used for the commercial transport of passengers. Motor rickshaws should also be subdivided into three categories:

Category I motor rickshaw: has a maximum speed of 20 km/h, a weight standard to be defined, and meets the most stringent air quality and noise standards (to be defined). Category II motor rickshaw: has a maximum speed of more than 20 km/h but less than 45 km/h and a standard weight yet to be defined. Category III motor rickshaw: has a maximum speed of more than 45 km/h and a maximum weight that has yet to be defined.

Restrictions and Traffic Congestion

The most typical explanation for categorical bans on two-and-three-wheelers in Asia is that they cause traffic congestion. Municipal authorities certainly need to retain the power to mitigate traffic congestion through restrictions on the use of specific vehicle types in specific locations or on specific lanes. Banning specific vehicle types under certain conditions may indeed be justified if a proper cost-benefit analysis were to prove that such a measure does mitigate congestion and reduce travel time. Such analysis always begins with the understanding that the congestion impact of a specific mode on a specific road depends on the operating characteristics of the mode such as maximum speed, passenger occupancy, and the load factor (passenger per vehicle), all of which vary according to local traffic conditions.

The PCU adopted for motorcycles in Malaysia is 0.75 for roundabout design and 0.33 for signal design (Ahmad, etc., 2000). In Vietnam it is 0.5 (Dao, etc., 2002). In Taipei, China, 0.33 is normally adopted as the official PCU value for transportation engineering. In mainland China, most traffic engineers assign a passenger car unit (PCU) equivalent of 1 to a cycle rickshaw, while in Jakarta it is standard to assign a PCU of 0.5 to cycle rickshaws. One study of a cycle rickshaw
lane in Dhaka yielded 1000 passengers per meter per hour, or 3000 passengers per standard 3 meter lane width per hour, assuming 1.6 passengers on average (Gallagher, 1992). Because the cycle rickshaws measured were in homogenous rather than heterogeneous traffic, this is not a fair apples-to-apples comparison, so this measurement has been adjusted downwards.

In India, the PCU values of motorized two-and-three-wheelers range from 0.5 to 0.75 and from 1.2 to 2 respectively (the values are derived for the less than 5% and 10% or more mode share). However, research from Asia indicates that PCU for a vehicle type decreases with an increase in its own proportion in the traffic stream, suggesting that the Indian code needs to be revised.

Whenever a vehicle category is banned on specific routes, the existing passengers are forced to choose an alternative mode to reach their destination. This switch causes the traveler to use an alternative mode that is likely to be less optimal from the point of view of generalized cost, due to an increase travel time and cost. This shift, however, may have an aggregate positive impact as it may reduce the generalized cost for all other modes more than it increases the generalized cost to the operator of the restricted vehicle. Based on the above capacity ranges, the following can be concluded:

In general, banning buses or pedestrians would almost never be a good idea from the congestion mitigation point of view. However, restructuring a bus route, for example, might dramatically increase the load factors per bus, reduce the number of buses per hour, and thus significantly reduce roadway congestion.

With regard to bans on all other vehicle categories, it is conceivable that there will be specific sets of circumstances where such restrictions will have an aggregate positive impact. Detailed analyses of the motorcycle ban’s impact on traffic congestion in Guangzhou and of the cycle rickshaw ban’s impact on traffic congestion in Dhaka corroborate this point of view.

Very few passengers shifted to private cars because they were too poor. However, within three years, the peak hour travel time benefit resulting from the removal of cycle rickshaws evaporated as the capacity was consumed by the growth of the private motor vehicle and taxi use of the road. These new motorists
were disproportionately wealthier individuals who traded up from their motorcycle and taxi trips.

The ban also led to a 32% loss of net income by rickshaw pullers, who on average earned $2 per day, with some of them earning less than $1.25 per day, which is the World Bank’s definition of poverty. Thus, while the ban clearly made a population of poor people worse off, it brought very marginal benefits. In our view, the optimal solution to traffic congestion in this case would have been to reduce the number of cycle rickshaws operating in the corridor by regulating their numbers through commercial licensing procedures; controlling other obstacles to smooth traffic flow like illegal vehicular parking and consideration of priority lanes for buses, ordinary cyclists, and possibly motorcycles could have also helped.

Banning cycle and motor rickshaws on any road with direct access to origins or destinations (1) disproportionately increases the generalized travel costs of low-to-moderate income populations; (2) leads to a loss of income among the poor; (3) creates only a marginal and Banning bicycles as a traffic mitigation measure will not be successful.

Guangzhou is the only city for which we have data on the modal shift patterns that resulted from banning motorcycles. Traffic mitigation was not the cited reason for the ban. Two years before motorcycles were banned, they accounted for 20% of total trips. At the same time, walking accounted for 25%, buses for 30%, bicycles for 10%, cars for 5%, taxis for 5%, and other modes for 5% of total trips. After the ban, of the 20% motorcycle trips, 51% shifted to buses, 18% shifted bicycles, 18% shifted to cars or taxis, 9% shifted to walking, 2% shifted to the metro, and 2% shifted to other modes. Average traffic speeds on several major arterials that were measured before and after the ban showed a sharp decline.

Another reason that government officials often use as a justification for banning both motorized and non-motorized two-and-three-wheelers in specific locations is that the vehicles are unsafe both for the operator and others to operate. Indeed, in the cities where we have data, and where motorcycling is prevalent, motorcycles account for a disproportionate number of traffic fatalities.
Particularly in China, motorcycles are banned in a growing number of cities in part for safety reasons.

It is important to understand, however, that safety conditions along any given roadway for any given vehicle are an aggregate of:

- The speed of traffic
- Roadway design including visibility
- Roadway condition
- Operator behavior

When a pedestrian, a bicyclist, a motorcyclist or the user of a three-wheeler collide with a motor vehicle, there is a sharp increase in the likelihood that the accident will be fatal at speeds over 40 km/h. At 30 km/h, there is about a 20% chance that the accident will lead to a fatality. At 50 km/h, the chance is 80%. Therefore, on any road with a speed limit of less than 30 km/h, there is no safety justification for banning any of the above-mentioned two-and-three-wheeler modes. The road must, of course, be designed to encourage travel at not more than 30 km/h. Ideally, road design should be based on their function, and any road providing direct access to any origins and destinations (that is any road other than a limited access highway) should be designed for safe operation by all of the vehicle categories allowed on that road link. There exist design solutions that allow for the operation of all vehicle types in the same right of way even at very high vehicle speeds.

Motorized accidents research in Delhi shows that accidents involving motorized three-wheelers most often involve other three-wheelers, followed by cars. Among the accidents involving two-wheelers, buses are the most frequent other vehicle involved, followed by cars, bicycles and other two-wheelers. While detailed analysis has not been done, it is the conflict between motorcycles and buses stopping for passengers or re-entering traffic that seems the most likely cause. One of the principal benefits of median bus ways is that they mitigate conflicts between buses and both motorized and non-motorized two-wheelers.

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