Management of Road Space and Traffic Control

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Abstract
The basic ingredient for the road traffic is road space. Unless this space is properly utilized it is not possible to achieve optimum results in the management of the road traffic. It is a fact that the urban population is increasing year on year and the need arising for the road space which is directly proportional to that of the increasing population of both humans as well as the automobiles. Roads should be constructed according to the road-engineering and with all required infrastructure with optimum utilization of the space available. There is need for examining multi-purpose road activities, in terms of safety, security and hazardous traffic. The effective check will be possible if the entire route is maneuvered with digital technology and also the installed security cameras and video recording.

Introduction
Everyday lakhs of people travel from one place to another in different directions and different modes of transportation like cycles, motor-bikes, cars, buses, trains, flights, ships etc. There are Roadways, Railways, Airways and Seaways. In the current topic, the Roadways and the associated general issues and problems are discussed. It is a common talk of the public about traffic jams on the roads. The traffic problem begins when someone starts from his home to work place or to his office or for shopping, to attend a function, on a business visit, to meet relatives, to go to cinema theatres so on and so forth. In the same way traffic congestion takes place when Goods are transported from producers to distributors, from stock points to wholesale or retail outlets or while goods are delivered to the Customers. When too many people want to use the same road at the same time, a bottleneck or traffic congestion develops. Each road has its own infrastructure and it has a maximum capacity or limitations. Traffic congestions can be solved with infrastructural adjustments and extensions which require large investments and takes lot of time. Therefore, the significance of alternative ways to solve these bottlenecks increases. One of the alternatives is traffic management. An integrated approach to traffic issues delivers the best results.

In the current scenario urban traffic is often chaotic in almost every city. It has become unmanageable and uncontrollable for the Traffic Police. The Road Traffic consists of Pedestrians, bikers, three-wheelers, four-wheelers and multi-axle Passenger, Goods and Special category vehicles. Everyone of this category utilizing the road for one’s own needs at the same time contributing problems of different nature to the issues of the traffic management. To overcome such hurdles it is essential to understand various key factors involved and take effective measures to regulate the traffic flow on the roads.

It is pertinent to note the message given at the Home Page of the Department of Transport, Govt. of Assam Website: “In the year 1914 the first legislation as “Indian Motor Vehicle Act, 1914” was passed in our country…since then the traffic pressure on the roads of our country multiply several times…in the later years “The Motor Vehicles Act 1988” was amended and revised several times by the Government of India. Traffic rules and regulations are devised to assure the smooth flowing of motor vehicles in the road. Moreover, traffic rules and regulations are not only for the driver of the vehicles but at the same time these rules are meant for the pedestrians, cyclist, motor-cyclist and other road users. The thorough knowledge of traffic rules/regulations, traffic signs and markings are very essential for the drivers and road users. The proper knowledge of these rules can reduce number of accidents and thus can establish a healthy and organized traffic system in our country.”

Review of Literature
It is essential to examine the Infrastructure of the Road. The roads classified as Rural or Urban Roads, City roads, District roads, State highways, National highways, Border roads etc. Before construction of any road it is necessary for the builders to undertake plan, survey and visualize all the required components of the road. For Pedestrians: Pavements, side-walks, cross-walks, pedestrian signals, foot-over-bridges etc. The pedestrians should be educated to follow traffic signals, pedestrian-signals. Bike Lanes are required for the use of two-wheelers. There are other components viz., road dividers, curbs, intersections, exit points and merging points, traffic signals, caution signs, information boards showing destinations and directions, mile stones, lane-markings, barricades, speed breakers, man-holes etc.

While constructing the roads, provisions should be made for water pipelines, sewage pipelines, communication network, telephone and power cables, electric poles, street lights, cable lines, hoardings, foot-over bridges, under-bridges, ROBs (Rail-over-bridge), railway crossings (gates operated manually or automated gate closures). In addition to these there will be Bus Terminals, bus-bays, bus-shelters, taxi-stands, parking lots, Pick-up points at Metro-railway Stations, rest-rooms/toilets, pet-
rol-bunks etc. This reminds us the principle that a place for everything and everything in its place.

It is not just concrete structures made up of cement and steel but one should think of protection of Environment with a view to provide pollution-free air. There is need to plant trees on the road sides for greeneries. The trees absorb carbon dioxide from the atmosphere and release oxygen which is life for the living beings. In the ancient Indian History c 273 B.C., we study about one of the India’s greatest emperors of the Mauryan Dynasty Ashoka, the Great. He ruled almost all of the Indian sub-continent. The Emperor planted trees on the road sides all over his empire. It was his great vision and mission for the next 2 to 3 millennia. So in the current polluted atmosphere there is no exception to forget about planting trees along road sides. A proper laid out road according to the road-engineering will solve all its problems in maintaining and regulating the free flow of vehicular traffic.

**Analysis of problems associated with traffic:**

There is no single solution to problems associated with traffic management. In order to address the problems it is necessary to deal with all the functional areas. A variety of measures are used sometimes in combination. Some of the common problems occurring in the day-to-day life are discussed hereunder, they are of two categories. The first category of problems is related to the Road conditions:

a) Road Space, road-shoulders, space on both sides of the road is being utilized by many Government Departments or Private parties for various purposes.

b) Various developmental works are undertaken for specific purposes like, laying municipal water pipelines across the road, Pipelines under ‘Mission Bhagiradha’, they dig trenches but do not cover them properly. Other works are telephone cables, communication network-cables, sewage and drainage works are undertaken but do not finish them properly.

c) On the road constructions like flyovers, foot-overbridges, metro-rail pillars and other infrastructure related constructions are carried out reducing the actual road space for traffic purposes.

d) In many of these works the trenches are dug but subsequent fillings of burrows or proper concealing works are neglected and or forgotten. As a result the road gets damages and become hurdles for the smooth flow of vehicular traffic.

e) The road space is occupied by the unauthorized casual traders, hawkers, cart-pullers, book sellers, vegetables and fruit vendors. They treat the road space as their own property for earning livelihood.

f) Another type of hindrance created by the taxi-drivers and auto-drivers park their vehicles on the middle of the road to relax.

The second category of the problems is related to the traffic movement on these city roads:

a) The assembling, formation and movement of the vehicles is not according to the category of vehicles. If all the light and heavy vehicles of four-wheelers (buses and cars) take Lane No.1 and 3/2-wheelers (Autos and bikes) take Lane No.2 then there will be discipline for the movement of vehicles and it will avoid all types of chaos on the road.

b) In practice all types of vehicles are mixed up, overlapping each other, moving with hair-line gap between cars, buses, bikes, autos and pedestrians in a haphazard manner. As a result of which tension, fear, apprehensions developing in the minds of the drivers especially new car owners due to the fact that their cars get denting for no fault of theirs.

c) The owners-cum-drivers of the cars developing fatigue even if they run for short distances in the chaotic traffic on the roads. It is high time to study the cause and effect of such driving conditions and take effective measures to regulate such traffic.

d) Sometimes the traffic signals do not function properly or stop working, or malfunctioning. These signals also create confusion for the vehicle drivers. Sometimes the automatic signals are operated manually by the traffic police.

e) The City Bus drivers take it for granted that the Traffic Police will not take any action against them. Their plea is that they are given targets to make certain number of trips within the time schedule to reach the destinations; therefore, they rush to their terminals without caring for other traffic on the road. If anybody observes these buses, certainly realize their rash driving, trying to negotiate other vehicles in high speed, sudden stops at the bus stages
and sudden entry or sudden crossing the lanes are common phenomenon.

f) The next hazardous drivers are the two wheelers or the bikers. Some of the youth enjoy the joy of speed-driving among the busy traffic zones. They want to attract the public attention and forget about their own safety and the safety of the public. They do not stop their vehicles at signal points. Whether it is amber light or RED signal it makes no difference for them but continue their speeding vehicles creating terror in the minds of other co-drivers of other vehicles.

g) Traffic signals are designed to optimize and control traffic at a junction by sharing out the time to different arms of the junction and to pedestrians. Traffic signals do not always solve accident problems.

All the Government Departments and other Interested Parties should be informed well in advance through public notices, individual notices and through Paper publications about the construction of a particular road requesting to undertake and finish their works well in advance before actual commencement of the proposed road construction. It will save subsequent road damages, expenditure on road repairs minimize burden on exchequer, avoid public inconvenience, save lives against serious accidents, and help in the time management.

The population is increasing, the number of vehicles plying on the roads is increasing, the automobile industry releasing year after year new brands new variants of two-wheelers, 3-wheelers, four-wheelers and multi-wheel or multi-axle passenger vehicles and goods vehicles into the market. For example, the South Korean auto major announced its ambitious plan aims for annual sales into the market. For example, the South Korean auto major announced its ambitious plan aims for annual sales of one million cars in India by 2021. In the same way the Japanese two-wheeler major also set a target to sell 6 million units a year. [Source: The Hindu, newspaper dated April 21, 2017] These are just examples of auto applications about the construction of a particular road request to undertake and finish their works well in advance before actual commencement of the proposed road construction. It will save subsequent road damages, expenditure on road repairs minimize burden on exchequer, avoid public inconvenience, save lives against serious accidents, and help in the time management. The basic ingredient required to accommodate the above developments is the ‘road space’ which is, of course, not expanding in the same ratio and same speed as the vehicles are running into the show-rooms in the Auto-market-sector. The road space available for the traffic operations will remain congested until and unless drastic steps are taken to dismantle the obstructions and reconstruct the road by widening the existing roads keeping an eye on next 30 to 50 years. By virtue of increasing demand for the road space, the widening of roads has become a continuous process involving huge expenditure and also litigations in land acquisition because we have NOT done planning for the next half a century. It is required to examine various options available for effective utilization of available road space, free flow of traffic, safety for everyone and focus on time management.

**Methodology for Improvement**

The management of the road space is to be done on a scientific method by dissecting the road into various components. It has become a fashion for the road constructors in building wide-walls as road dividers wasting the precious land space which ultimately resulting in the disuse. The width of the road divider should be minimal, instead of constructing big walls a metal barricades may be considered. In certain places trees are planted in between the road dividers. Every inch of space on the road is valuable and it should be subjected to optimum utilization. The pavements must be properly planned and constructed. The available space on the footpaths can be used for planting shaded trees which will be useful for pollution control as well as ecological balance.

In the City Roads, depending upon the width and road space on each direction, there can be one or two Tracks of equal size Track No.1 and 2. There may be a lesser width lane called Track No.3, meant for 2 or 3 wheelers. The pavement is exclusively meant for the pedestrians to walk safely along the road side. The unauthorized occupants of the pavements like hawkers and road side vendors should be evacuated. There should be road crossings for the vehicles and zebra-lines for the pedestrians with proper signaling. The pedestrians under no circumstances should be allowed to cross the roads according to their whims and fancies because they become hurdles, create traffic congestion, cause of accidents, develop obstructions to the free flow of traffic resulting in slow and halting the movement of vehicles.

The odd-even license number scheme undertaken by the Delhi Administration during the first half of 2016 was
one of the most ambitious programs in the direction to check air pollution in Delhi. However, despite the initiative general air pollution in the city rose by 15% and 23% during the first and second phase of the odd-even rule. But the vehicles moving on the roads were brought down to almost 50% during the trial run and it was one of the best novel experiments introduced in that direction by the Delhi Administration.

One more tested option available to contain the traffic congestion is the creation of high occupancy toll lanes, or HOT lanes. This refers to reserving one or more lanes on selected roads and high ways for cars carrying more than a single occupant. This ensures that single-occupancy vehicles are restricted to the remaining lanes, thereby making the HOT lanes relatively faster also through relaxation of speed limits for these lanes. While this was pioneered in the US in 1969, its effective implementation in other countries such as China and Indonesia has encouraged millions of commuters to opt for car-sharing as it ensured them a speedier and less costly journey.

Carpool Lanes: Let us consider the example of the US Carpool lanes which are successfully implemented for time management. When we are not travelling alone we will be allowed to drive through carpool lanes that help go faster than single-occupancy traffic. In LA County two freeways were converted to toll roads and require RFID transponders. The rules for carpool lanes are usually written on signs and they usually apply for rush hours. In Southern California the carpool lane rules generally apply at all times. In Northern California they apply between 6-9 am and 3-7 pm that is during rush hours. At the entrance of a carpool lane a sign always indicate how many people are required in each vehicle whether 2 or 3 persons to be eligible to travel in this lane. If the sign says: “CARPOOL ONLY-2 OR MORE PERSONS PER VEHICLE” which makes it clear that two or more persons per vehicle means persons including the driver.

Express Lane concept to clear traffic faster
Within the available options consider that there are two traffic lanes on our road. The first one adjacent to the divider called Primary Lane or EXPRESS LANE. The vehicles plying on this lane destined to go a long distance. The vehicles moving on the second lane called Secondary Lane. In this lane the vehicles travel to short distances and they change their destinations intermittently. The Express way will not be disturbed for a distance of at least a kilometer in the city limits. The traffic will run continuously without obstructing or without turn across in this lane. At the intersections the Express Lane traffic will wait for clearance and then proceed further and exit on the opposite side to its destination. The Right

of Way rules govern how traffic flows at these crossings, primary or secondary routes.

The vehicles travelling to long distances are eligible to enter the Express Lane. They may buy their way by paying a congestion-priced toll. Unauthorized entry of vehicles into this lane invites them to pay a fine, otherwise everyone tries to enter this lane and spoil the concept of fast moving track. Toll collection happens electronically and uses a compulsory transponder. In our context, during rush hours the vehicles permitted to travel in this Express Lane/Track No.1 by entering at the Entry Point and Exit at the Intersections only. In between no vehicle can either enter or leave the Express Lane. Then the traffic will move faster and maximum number of vehicles will be cleared within shortest time possible reducing congestion in the traffic. Secondly in order to permit the vehicles to travel in this track toll can be collected, from the vehicles. The toll collected will be additional revenue for the State. But the collection of toll must be through electronic system instead of manual system to eliminate misuse or abuse of the system. The Express Lanes in the defined routes, hours and days will also earn revenue for the State. For success of this system it is required to implement the Track or Lane system rigidly for the classification of vehicles and wide publicity is required to be given. The defaulters will be fined drastically. This Express Lane will be helpful for VIPs, Government Vehicles, Ambulances, Police, Defence, Fire Service and Emergency Vehicles which will be exempted from payment of any Toll unlike other private vehicles. This system can be implemented on the designated roads and defined timings after undertaking trial runs.

Traffic Consciousness is everybody’s Responsibility
The Traffic Police as a social responsibility have to educate the people at large. It is not sufficient to teach the vehicle drivers, it is also necessary to teach and train both educated and illiterate.

a) Educate the people, on traffic rules, traffic issues, right of way,

b) Take appropriate check-measures,

c) Defaulters will be fined after giving sufficient opportunities,

d) Prosecuting the habitual traffic-offenders;

e) Set up a traffic control centre and monitor 24/7;

f) Provide Traffic Information and Route Guidance through Mobile and Internet sources.

g) Issues to be addressed:

i. Many road users think of their own self, forget about others’ necessities or emergencies. It is generally observed that many a vehicle drivers neglect or do not care the Ambulance sirens; they do not give way to the Emergency vehicles.

ii. Attitudinal changes are required;
Pedestrians play a crucial role in traffic control in our cities unlike Western countries. The pedestrians must realize that they should not cross roads as they like, should use zebra-lines only to cross roads without obstructing the speeding vehicles. Normally the pedestrians are found crossing the roads exactly when the traffic Green-signal turned on for traffic. As a result of which obstructions are created to the moving vehicles. The next attention may be drawn on the riders of two wheelers. They run their vehicles much faster. They do not strictly confine to their bike-lane but move here and there horizontally, from this end to that end wherever they find space, try to fill the gap between the vehicles. Consequently obstructions are created in the free flow of traffic especially for the four wheelers. They negotiate through narrow spaces with hair-line gap in between the cars in between the heavy vehicles creating apprehensions in the minds of vehicle drivers and everyone. If 2 & 3 wheelers are confined to Track No.3 or bike-lane without obstructing other vehicles then not only safety is ensured but also free flow of traffic is assured save everybody’s time.

Safety Measures

Even today it is not surprising to note that in the Cities at times at places cattle move around. The stray-dogs, cows, buffalos are also wander on the roads which again create obstruction to the traffic. It is particularly observed on the Express-Highways and Toll Roads that the cattle are seen grazing at the road dividers and become serious hurdles for the high speeding vehicles. A slightest moment of missing attention or negligence on the part of the vehicle drivers it will result in serious accidents and loss of lives. The management of the BOT Scheme concerned has to take appropriate steps to check such hazardous situations to save the traffic from serious accidents. As a matter of fact the BOT agency is collecting huge Toll amount from the vehicles and it is their responsibility to provide hazard-free, hassle-free and comfortable road for its users. The High Way Authority is also responsible to inspect, maintain the physical measures and making necessary traffic orders. Then Enforcement of traffic orders is the responsibility of Police.

Speed breakers are laid on the roads even though there is no need for such things in such places. Traffic signals are needed at pedestrian crossings invariably to allow people to cross roads without fear of being run over this is the reason why the speed breakers are put up. But all the Speed breakers are not constructed according to the specifications and standards. There is a passion for the constructors of the speed-breakers in laying multiple and irregular speed breakers. Such speed breakers hurt the vehicle riders and cause serious internal as well as external injuries to the inmates of the 4-wheelers. Action should be initiated against the persons who laid unscientifically designed speed breakers. Such irregular speed breakers damage vehicle’s suspension, shock-absorbers, alignment and other machinery. The persons travelling in the vehicles get fractures of bones and ribs, spinal-cord injuries, heart patients and patients travelling in the Ambulances also suffer a lot. There may be other alternatives for speed breakers. Indian Road Congress has defined specifications for the height and slopes of speed breakers and should be followed scrupulously and non-compliant one should be removed. Research and Development is a continuous process to study the routes, timings, traffic-load and locations of road-congestion. The reasons for insufficient road space should be addressed by initiating appropriate measures.

Conclusion

The cause and effect of smooth flow of traffic would depend on public education about the law and traffic rules. Everybody living in the urban areas should realize the importance of time-management and traffic-consciousness. It is not just take care of self-interest but realize other’s interest too which are linked with the traffic movement. The best example is the mobility of Ambulances, Police, Fire and other Priority vehicles. Use of technology and speed checking cameras should be introduced to catch offenders. Lane-maintenance and Lane-crossings must be observed strictly according to the classification of vehicles. The drunk and drive checking operations are to be taken up at regular intervals. The Right of Way is one of the most important aspects of Traffic Rules. It needs to be followed by the drivers of vehicles and pedestrians for safety and security of everyone who make use of the road space.
Reference

Websites
[8] www.witnessinthecorridors.com
[10] https://travel.stackexchange.com
[12] www.trafficsigns.co.in/
[15] sbiplav@in.ibm.com