

Road Accidents in Dacca City

DEFICIENCY IN TRAFFIC ENGINEERING AND TRANSPORTATION PLANNING

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ABSTRACT :

Road accidents claiming human lives have become a regular feature in the Dacca city and other parts of the country causing grave concern to all, especially those who impelled by the urge of everyday business take to the road. This is such a frequent occurrence that one 'living' in the city can hardly feel secure to reach the destination safe and sound. In view of the frequency of such fatal accidents in the city it is time that effective measures are taken to identify the factors leading to accidents and find ways to check them.

As a future civil engineer I have tried to find out the causes and remedies of such accidents and have compiled facts and figures in this technical paper which may seem important from Traffic Engineering and specially Urban Planning point of view.

1. INTRODUCTION

1.1 General

Dacca, the capital city of Bangladesh has turned into a city of road accidents. The most striking side to some of the fatal accidents is that often the vehicle responsible for the accident reportedly speed away leaving the victims on the road to be picked up by passing members of the public, if any. The man committing the

crime thus keeps himself free from the arms of law.

Judging by traffic weeks observed and also by the general standard of vigilance and the active and elaborate metropolitan arrangement for vehicular and pedestrian traffic control, the rate of road accidents appear to be disproportionate. We insist that none responsible for an accident on roads should go with impunity and

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that the zebra-crossing should not be as vulnerable as any other spots on the road.

1.2 Growth Rate of Accidents in Dacca City

Number of accidents in Dacca city has increased alarmingly in the recent days.

Data of Accidents Occurring In Dacca City Between 1970-1977.

Year	Number of Accidents	Number of Injuries	
		Fatal	Non-fatal
(1)	(2)	(3)	(4)
1970	1251	49	65
1971	459	25	23
1972	592	30	33
1973	705	38	42
1974	745	111	67
1975	629	36	37
1976	699	73	54
1977	960	67	70

Source : Ref. (2)

Most recent data show that during the last nine months ending in the month of September, 1980, 124 persons have been killed in 1605 road accidents in Dacca city. Number of seriously wounded persons is 217 and more than a thousand people have been slightly injured (*). As these data are available from police sources, actual number of accidents is probably larger than this figure as all the accidents are not recorded. However, it is notable that official sources admit death of one person in two days on an average in the city road mishaps.

1.3. Unit Cost of Traffic Accidents

It is very important to record each of the road accidents occurring frequently either in urban

streets or rural highways and then to assess the economic loss being incurred every year. The most important objective of determining the economic cost of traffic accidents is to attain the economic justification for the proposed highway/road improvement programmes i.e. to determine the optimum cost effectiveness of the alternative proposals and also to discover ways to avoid road accidents. The unit costs of all types of accident that occurred in the U.S.A. in 1972 is as follows :

	Dollar	Taka
Fatal accidents	82000	1558000 (@ 1 doll.=19 Tk.)
Personal injury accidents	3400	646000
Property damage accidents	480	9120

Source : Ref. (4)

However, the actual cost of accidents can not be exactly determined and different authorities may estimate different costs for unit accidents. National Highway Traffic Safety Administration of U.S.A. estimated the highest cost for a fatal accident as 235000 dollars.

The aforementioned costs, of course, may not be applicable to Bangladesh but we are supposed to have some ideas regarding the economic loss incurred due to road accidents. Traffic engineers and highway engineers of Bangladesh should come forward to ensure the roadway safety, particularly in Dacca city by studying the causes of accidents and finding out ways to solve them.

2. ROOT CAUSES OF ROAD ACCIDENTS IN DACCA CITY

2.1 Growth of City Population Vs. Number of Transports

Dacca is a growing and developing city. Its population is increasing in an unusually high rate every year. The greater Dacca stretches upto Tongi, Mirpur and Narayanganj (3). The population of the city has multiplied about six times as compared to what it was on the eve of the liberation (4). Transport facilities have not increased at corresponding rate. In 1969, number of registered engine driven vehicles in Dacca city was 17466. It stands at about 69400 at present.

of people who are either very well-off or government employees. Thus the growing number of transports except bus in the city has no positive contribution towards the over all city transportation system. Its only contribution is in the increase of road traffic density as the road width has not increased proportionately. Again there is also very little scope for widening the road for want of open space by the sides of the roads which indicates the planners of the city roads in 1959 (5) while preparing the master plan of Dacca city could not probably foresee the traffic density as well as population increase of Dacca city in about 30 years of time. Thus due to the increase of traffic intensity much above road capacity, road accidents occur.

Statistics of Vehicles in Dacca City 1969-1980.

Year	1969	1974	1979	1980, June	Rate of growth in last decade
(1)	(2)	(3)	(4)	(5)	(6)
Private car	4942	12700	18400	20207	408.88%
Taxi car	235	468	429	440 (appr.)	187.23%
Bus	933	1605	2820	3000 (,,)	321.54%
Truck	2034	3629	5770	6000 (',)	294.98%
Auto rickshaw	2515	4592	5600	5842	232.56%
Jeep	1426	3400	5600	5759	403.85%
Microbus and Pick up	562	1434	2343	not available	419.92% (appr.)
Motor cycle	4149	11216	20410	24000 (appr.)	578.45%
Others	673	760	1382	not available	208.02%

Source: Ref. (7) upto column No. 4.
Ref. (8) for column No. 5.

Thus the number of buses has only multiplied three times during the last decade. Moreover a large number of these buses ply in the inter-district routes and do not help in the city transportation system. The increase in the number of cars, jeeps or motor cycles help only a class

2.2 Overloading of Transports :

Every transport is designed for a certain maximum load. But in our city roads the heavy vehicles viz. trucks and buses carry load far above their maximum limit. Due to this fact vehicles deviate from its standard behaviour

and mechanical failure occurs frequently resulting into road jams and fatal accidents. Accidents also occur due to the fall of a passenger hanging at the door during a hard stop or overtaking.

Lack of buses, large scale withdrawal of buses from city routes ⁽¹⁰⁾ to operate in the inter district routes for higher profit increase overloading of vehicles.

2.3 Speed Limit And Its Violation

According to the Dacca Metropolitan Police Commissioner, driving at excessive speed is the main cause of traffic accidents.

Speed Limit of Vehicles

Types of vehicle	Within City	Outside city (upto 12' width)	Highway Motor way
Car	35 m.p.h.	40 m.p.h.	50 m.p.h.
Bus	25 m.p.h.	—	35 m.p.h.
Truck	20 m.p.h.	—	30 m.p.h.

Source Ref : (11)

But to our greatest dismay we notice that the drivers seldom show respect to the maximum speed limit. The heavy vehicles allegedly have so far taken the heaviest toll of lives on the road and the speed question mostly relates to this type of vehicles ⁽¹²⁾. Most interesting thing is that speed control, which is one of the effective ways of controlling road hazards from vehicular traffic is observed to be loosely enforced which leads to increasing number of accidents.

Moreover, the maximum speed limit of some of the high grade roads of Dacca city is as low as 10m. p.h. (in Abdul Ghani Hazary Road) and compels motorists to violate it.

2.4 Traffic Police-Population Ratio

The traffic police-population ratio in Dacca city is so disproportionate as to leave a void in traffic control for a growing city. This paucity of personnel has made some of the areas of the city do without any traffic police whatsoever.

From recent data it is found that Dacca Metropolitan Police has only 620 traffic police to control transport in the 300 road crossings of the 500 mile city road network⁽¹³⁾. Moreover, only 500 of the above numbered traffic police are available for duty and so only 250 traffic police are present on duty in each shift. Thus about one third of the crossings are left uncared. Due to this fact number of accidents at these spots are maximum as the physical presence of a police is more effective than any other mechanical signalling in Dacca city.

2.5 Faulty Traffic Rule Enforcement

Considering the problem itself in view of an unusually increasing population of the city together with the increase in the number of vehicles the existing traffic department is heavily understaffed. It employs only 37 traffic sergeant instead of required 75 numbers and the number of wireless sets, motor cycles and jeeps stand far below the required number⁽¹⁴⁾. Consequently the driver committing an accident safely drives away taking the opportunity of the distressed state of Dacca Metropolitan Police. Thus as the drivers enjoy the freedom of committing accidents with least resistance, number of accident is increasing. Moreover, the inadequate enforcement of traffic laws naturally encourages rash driving by young, ill trained uneducated drivers and driving of road unworthy vehicles which contribute to frequent accidents.

2.6 Median Islands are Absent in Hazardous Roads : Existing Islands are Being Removed

In Dacca city median islands are rarely present. At present most of the roads are provided with painted dividing lines.

The drivers seldom respect them. As a result of this accidents due to direct collisions take place (Fig. 1). (Shown in Photograph No. 1)

One way roads are those in which motor-vehicle movement on any carriage way within the system is limited to one direction (¹⁵). It is advantageous for various reasons viz.

- (a) Increased speed
- (b) Increased capacity
- (c) Economic savings and

- (d) Increased safety : The introduction of one-way road scheme generally results in a reduction in the number of accidents, particularly between intersection accidents. Accidents of the head on variety are eliminated because of the removal of an opposing traffic stream. Accidents due to bad road lighting should also be reduced since there is now less headlight glare problem.

Certain types of accidents at intersections are greatly reduced because of the reduction in the number of possible points of conflict (Fig. 2).

Pedestrian accidents at intersections can also be reduced, since pedestrians can be given a fully protected crossing while traffic emerges from a side road without loss of time in the signal cycle.

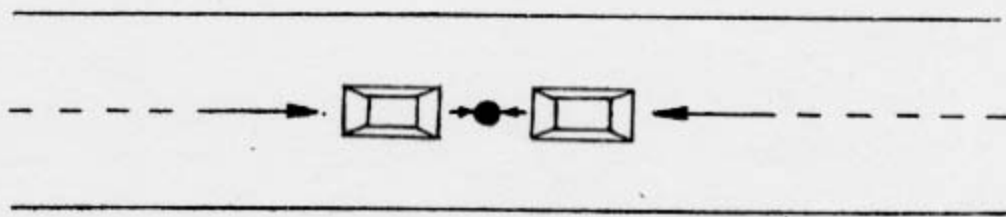


Fig. 1 : Direct collision between two vehicles.

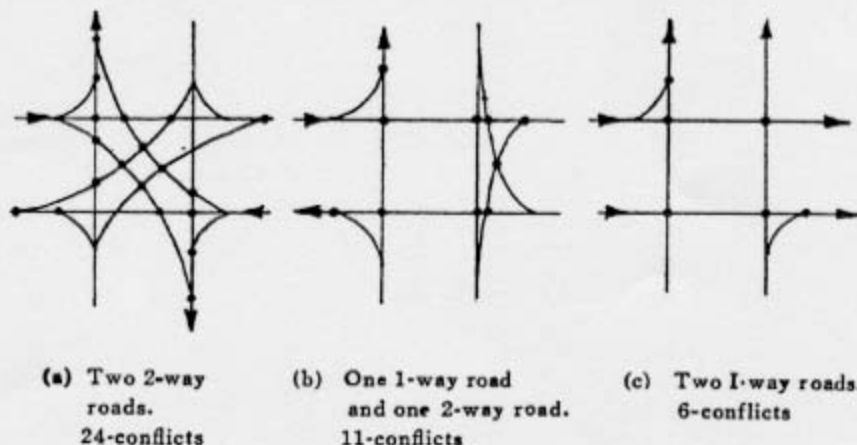


Fig. 2 : Potential points of conflict at an intersection.

In addition, signal controlled pedestrian crossings can often be provided at other points without interfering with vehicle progression. On one way roads controlled by linked signal, pedestrians are usually able to make safe crossings at intermediate intersections during gaps created by the signal timing (fig. 3).

At present the existing islands with bushes in the Airport Road are being removed and it is learnt that whole of the Dacca city road network will be made two-way in phases shortly. This is dangerously detrimental. It will lead to numerous fatal accidents as in Bangladesh in two-way roads motorists enjoy the freedom of racing and frequent overtaking.

The servcibility index of Airport Road is very high and the two basic criteria of traffic engineering i.e., (1) effective traffic management and (2) least freedom to the drivers, are being overlooked. Most of our city highways (27) including the section under consideration experience

interrupted flow i.e., intersectional flow interferes with continous traffic movement as all the intersections are atgrade. As such channelisation is very much required in Dacca city. One of the channelisation techniques is to provide central reservation (median-island) which effectively separates opposing traffic for the reasons mentioned earlier. It should be noted here that even in some of the western big cities roads/highways are divided into two parts by four feet high metal barrier to eliminate the possibilities of head on collisions.

2.7 Large Traffic Speed Range

The speed of some of the transport media in Dacca city are given below :

Transport media	Speed range
Car	30-40 m.p.h.
Bus	20-30 m.p.h.
Baby taxi	15-20 m.p.h.
Rickshaw	7-10 m.p.h.

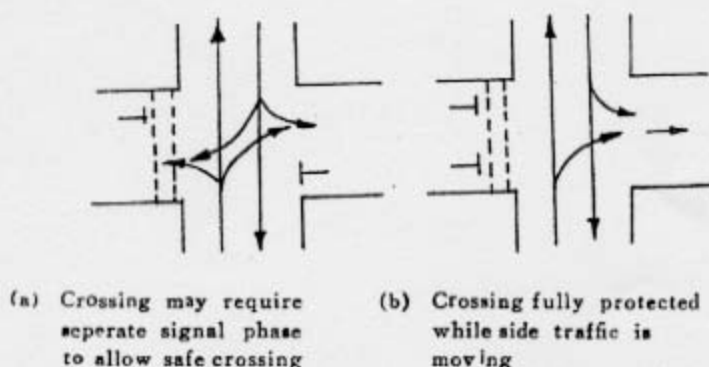
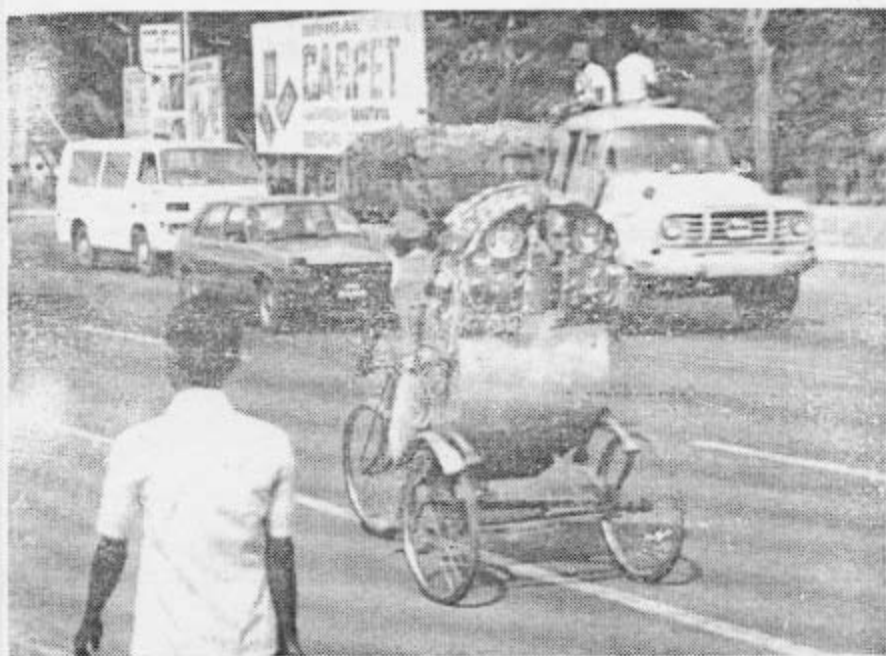


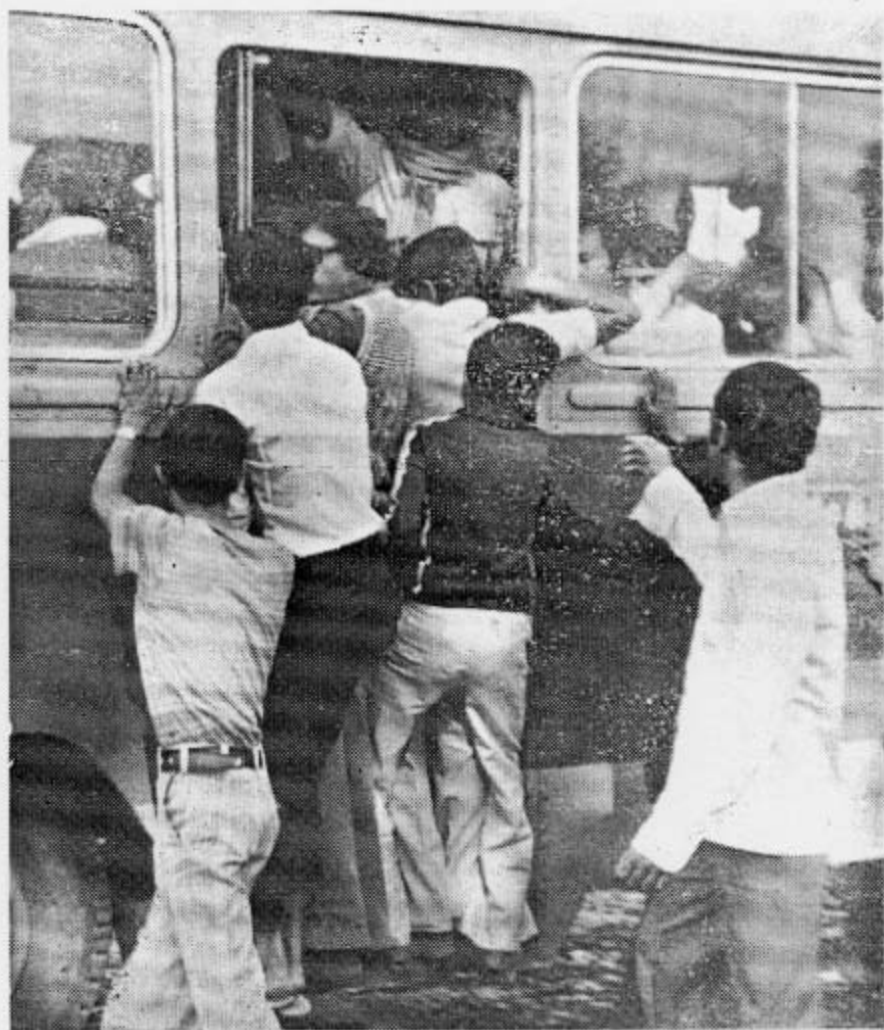
Fig. 3 : Pedestrian crossings on two-way and one-way roads.
Source Ref : 16



Photograph No. 1



Photograph No. 3



Photograph No. 2

The above mentioned speed range is measured by urban scale i.e. it is determined by considering the time required to traverse, for a transport, between two mile posts. Actually car speed reaches as high as 60 m.p.h. and that of bus 50 m.p.h. Thus Dacca city transports run between 07 m.p.h. to 60 m.p.h. which is wide enough to cause accidents. In western countries the range is very narrow due to the absence of slow moving transports like baby-taxi and specially rickshaw.

2.8 Highest Number of Slowest Moving Transport—Rickshaw

Rickshaw is one of the main factors of road accidents in the Dacca city (18). Only 14474 rickshaws are registered in Dacca Municipal Corporation. If we consider the rickshaws registered under the adjoining suburbs of Dacca city, only 30,000 rickshaws are supposed to be present in the Dacca city. But the Government officially declared in 1979 that actually a fleet of 80,000 rickshaws were present in the Dacca city (19). The present unofficial number of the same is about 110,000. In narrow roads this excessive number of rickshaw compels the high speed vehicles to reduce speed and if those high speed vehicles decline to do so, accidents occur.

The other reasons leading to accidents due to rickshaws are :

- (a) Usually rickshaws ply in the road occupying almost whole of it.
(Shown in Photograph No. 3)
- (b) Their overtaking attitude without any concern to the fast moving vehicles causes fatal accidents.
- (c) They take turns without proper signal and sometimes they stop suddenly.
- (d) Rickshaw pullers usually use important road junctions as parking place.

- (e) Rickshaw pullers' licence is given by the municipal corporation but police department enforces it which offers opportunity for procuring false licence.

2.9 Absence of Parking Place

Parking as a problem has contributed to the city transport problem, particularly in the busy areas of the city. Consequently, city roads are indiscriminately used as parking places by different types of vehicles. As such space available to the moving vehicles is reduced and traffic concentration increases to accelerate accident possibilities.

2.10 Temporary Market in Foot Paths/Roads

Normal traffic of vehicles and pedestrians is hindered due to the presence of temporary market in the footpath or along the road sides. These types of unauthorised shops are mostly present in the Farmgate, Baitul Mukarram, Gulistan bus terminal, Mouchak, Kamlapur Rail station and other parts of Dacca city which are highly vulnerable to accidental hazards. Law enforcing authority is seldom found to be concerned about this due to some unknown reasons. As pedestrians are compelled to walk along the road and as the vehicles enjoy only a fraction of the actual road width, accidents occur either due to collision between two transports or between a transport and a pedestrian which frequently turns fatal.

2.11 Multiple Administration in Road Planning

The administration and maintenance of the roads of our Dacca city are dependent upon a number of organisations. Dacca Municipal corporation has 440 miles of road under its supervision (20). Roads of Gulshan, Mirpur, Tongi, fall under the administration of their respective Municipality. Roads and Highways department

holds the charge of 18 miles of road. Dacca Improvement Trust maintains about 40 miles of road. Housing and Settlement Department also controls a few miles of Dacca city roads. Due to lack of co-operation and co-ordination between these departments the overall planning of Dacca city roads and highways is seriously affected.

Though the departments mentioned earlier are officially responsible for the roads under their control, some other organisations like Titas gas Transmission and Distribution, Dacca Water and Sewerage Authority, Power Development Board are empowered in the dissection and reconstruction. As a result roads once dug become useless for traffic and as the drivers try to avoid those affected parts of the road, actual width become narrow and if drivers become reckless in those places, accidents take place. Accidents also occur due to driving at night in those dissected parts of the road.

2.12 Weak Traffic Rules

In Bangladesh the traffic rules of 1939 are still

in force with slight moderations in some cases. As four decades have elapsed since 1939, the drivers are hardly afraid of the penalties of old traffic rules. Consequently, the drivers show little respect to the traffic rules and do not hesitate in overtaking, over speeding or driving a vehicle with mental imbalance. As a result accidents take place.

2.13 Signal and Signal Post

Automatic signal present in some of the turning points are not scientific. For example, green signal approves the passage of two oppositely moving vehicles and at the same time it allows right turns. This causes indiscipline at the road junction. Dacca city road junctions are deprived of any automatic signalling device in most of the cases. The few signal posts which we come across in the Dacca city road junctions are out of order in many cases due to inefficient maintenance, lack of spare parts and technical knowhow. Moreover, absence of a traffic police

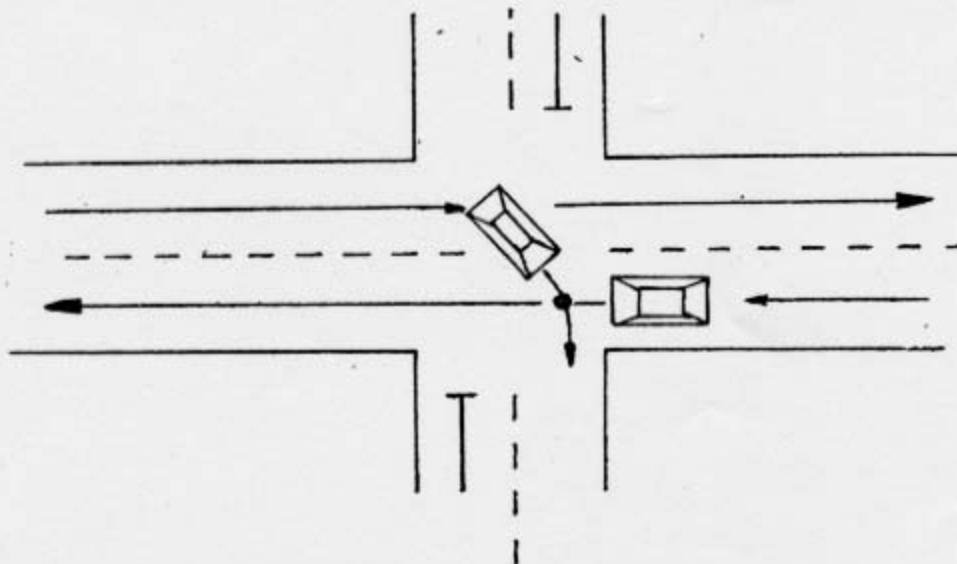


Figure 4: Point of collision at right turn

even at a point having signalling device inspires the motorists to cross the point at the time when red or yellow signal is visible. This is really dangerous and causes accidents.

2.14 Absence of Channelisation

The term channelisation ⁽²¹⁾ is used in highway engineering when discussing highway facilities at which two or more traffic streams are separated, each stream being confined to single roadway channel. At channelised intersections directional islands are used to divert the traffic into definite travel paths. These are each usually greater than about 4.5 m² in area and they do not necessarily have distinctly defined shapes or forms.

Dacca city roads and highways are atgrade at intersections. They are divided into following basic forms.

But unfortunately a large number of Dacca city roads are yet to be channelised, Consequently the number of fatal accidents is greater in those parts of the city.

Due to the absence of channelisation road accidents take momentum as channelisation has the following purposes ⁽²²⁾ :

- As the angle of conflict is reduced more and more, the danger of accident is lesser and lesser.
- Number of points of conflicts is reduced.
- Reduction of accident by regulating traffic and indicating proper use of intersection.

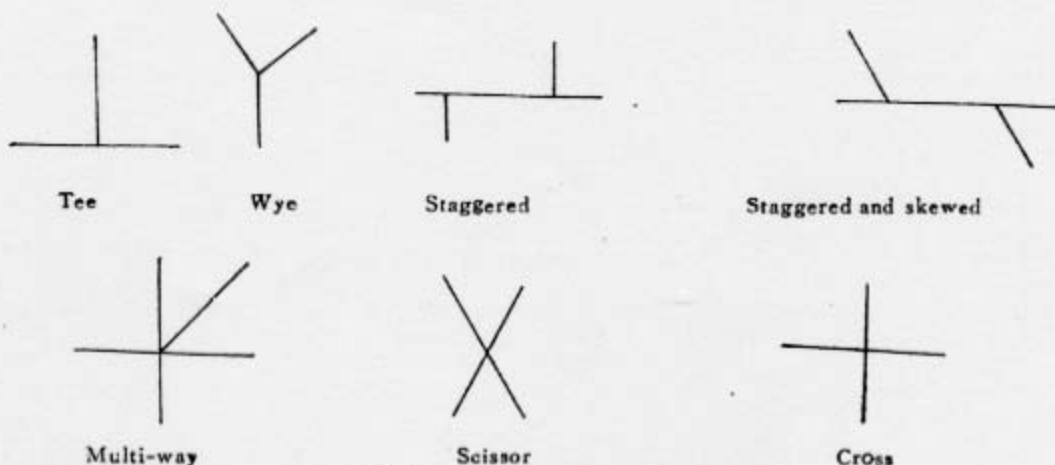


Figure 5 : Different forms of atgrade intersections

The accidents that naturally take place at intersections in Dacca city are of the following nature.

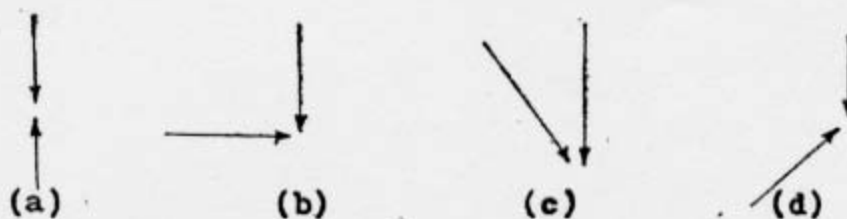


Figure 6 Nature of accidents at intersections.

- (d) Arrangement to favour predominant turning movements.
- (e) Gives protection and storage to turning and crossing vehicles.
- (f) Renders protection and refuge to pedestrian crossings.
- (g) Locates traffic control device.
- (h) Prohibition of specific movement.
- (i) Controls traffic speed.
- (j) Increases capacity.

2.15 Railway Crossing in Dacca City

There are as many as nine railway crossings in Dacca city⁽²³⁾. In order to avoid collisions, the practice is that the intersecting road ways are closed at each side of the railway track for all sorts of vehicles when train passes the crossing. This arrangement leads to traffic jams and due to manual operation of the gate accidents may occur as a result of mistakes done by the gateman. A severe road accident occurred at the Mahakhali rail crossing between a bus and a dislodged train compartment in the recent past.

3. REMEDIAL MEASURES TO STOP ROAD ACCIDENTS IN DACCA CITY

The idea of total elimination of road accidents in Dacca city is impossible. Engineers and Planners can only try to reduce the number of road accidents. In order to achieve the same, the following points may be taken into consideration.

(a) New urban roads should be constructed and old roads should be improved taking into consideration the factors like city population and number of transport of present and future Dacca city, physical features of highway viz. horizontal and vertical curvature, the cross sectional elements, highway grade, layout of intersections

etc., fundamental design principles to be applied at the network design stage viz. continuity of movement through-out the system (i.e. no unnecessary stop or changes of direction), lane balance (i.e. the same number of traffic lanes leaving an intersection as entering it) and the avoidance of confusing situation for the motorists, design standard and criteria viz. design speed, capacity and hence scale, width and number of roads to be constructed⁽²⁴⁾, and so many other factors.

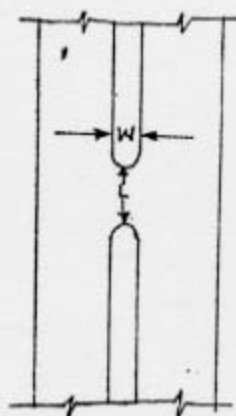
(b) Number of vehicles plying in the Dacca city roads should be increased to such an amount as can meet the transport need of the urban population without overloading. Necessary steps may be taken to ensure the compulsory plying of the inter-district buses in the city roads during off period of the buses of the day. Increase in the number of buses should accompany with a proportionate increase of the road width.

(c) Special kind of vigilance meant exclusively to control the habitual rash driving of vehicles will produce immediate improvement in the overall situation of traffic accident.

(d) The traffic-police, population ratio should be such as no important traffic point is left unattended. At every zebra crossing and intersectional point there need to be deployed some traffic police to supervise movement of pedestrians vis-a-vis passing vehicles.

(e) If existing understaffed traffic department tighten a little more on control side of traffic through stricter reinforcement in traffic managements and control are expected to be remarkable. Above all, a fool proof device must be there to identify, stop and catch a speeding vehicle committing accidents and deaths and preventing it from getting away with these.

- (f) Dacca city roads should essentially be provided with median island.



Central reservation or median island.

For urban roads desirable width is 6 feet.

Minimum width is 4 feet

In exceptional case, it may be 2 feet 3 inches.

Figure 7 : Median island

At central reservation crossings following relationship between length (L) and width (W) should be maintained.

$$W = 4' \quad 6' \quad 10' \quad 15' \quad 20'$$

$$L = 75' \quad 65' \quad 55' \quad 50' \quad 45'$$

Moreover one foot wide foot path should be provided along the sides of a road for 10-15 persons/minute. To this space 1'-6" is to be added when it is lying by the side of carriage ways, walls or side fences and 3' extra is to be added for the footpaths in front of shopping centres.

(g) Traffic speed range of various types of vehicles plying on city roads should be reduced. For this purpose number of manually operated vehicles should be fixed or eliminated, if possible. Government is thinking of introducing in the city routes electrically run trolley buses or tram service for this purpose ⁽²⁵⁾.

(h) It should, however, be remembered that the complete elimination of rickshaw in the city routes in the near future is a myth because lakhs of people are dependent upon

rickshaw for their livelihood and middle-class city population is greatly indebted to this vehicle and its absence in the city routes paralyses the city transport system. By introducing parallel roads exclusively for rickshaws in the new Dacca city roads this problem can be minimized. However, the narrow and overcrowded and often serpentine roads of the old city would probably demand the commissioning of mini-bus service.

(i) Vacant plots of the areas of Dacca city badly affected by parking problem should be converted into parking places.

(j) Temporary markets obstructing traffic movement should be abolished.

(k) City roads should be under the control of one administration and it should be solely responsible for all the development activities concerning roads and highways of the city.

(l) Traffic rule should be tightened so that motorists do not dare to commit an accident due to their negligence. Motor accident cases under section 304 BPC ⁽²⁶⁾ should be given top priority.

(m) If there is a heavy right-turning movement, the vehicles may be accommodated at intersections with signal control by inserting an extra-phase in the cycle; this however, should be avoided wherever possible since it usually results in a fairly long signal cycle with consequent delays. Early cut-off and late start signal arrangements which allows extra time for the right turning traffic either before or after opposing straight on movements are usually preferred since they result in less overall delay than a separate phase.

In possible cases, right turning may be entirely stopped during peak hours and following

alternative routine procedures which allow right turning vehicle to complete this manoeuvre without actually making a right turn at critical intersections,

Prohibited route—Alternative route

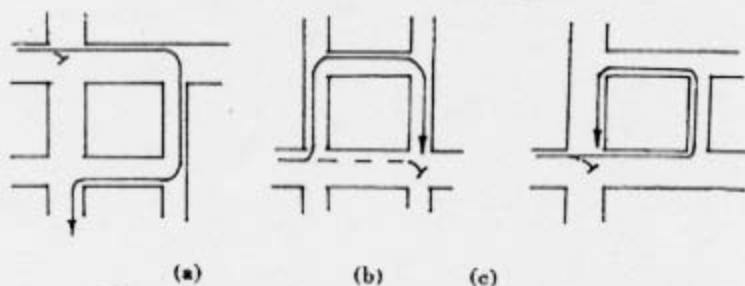


Figure 8 : Re-routing right-turning traffic.

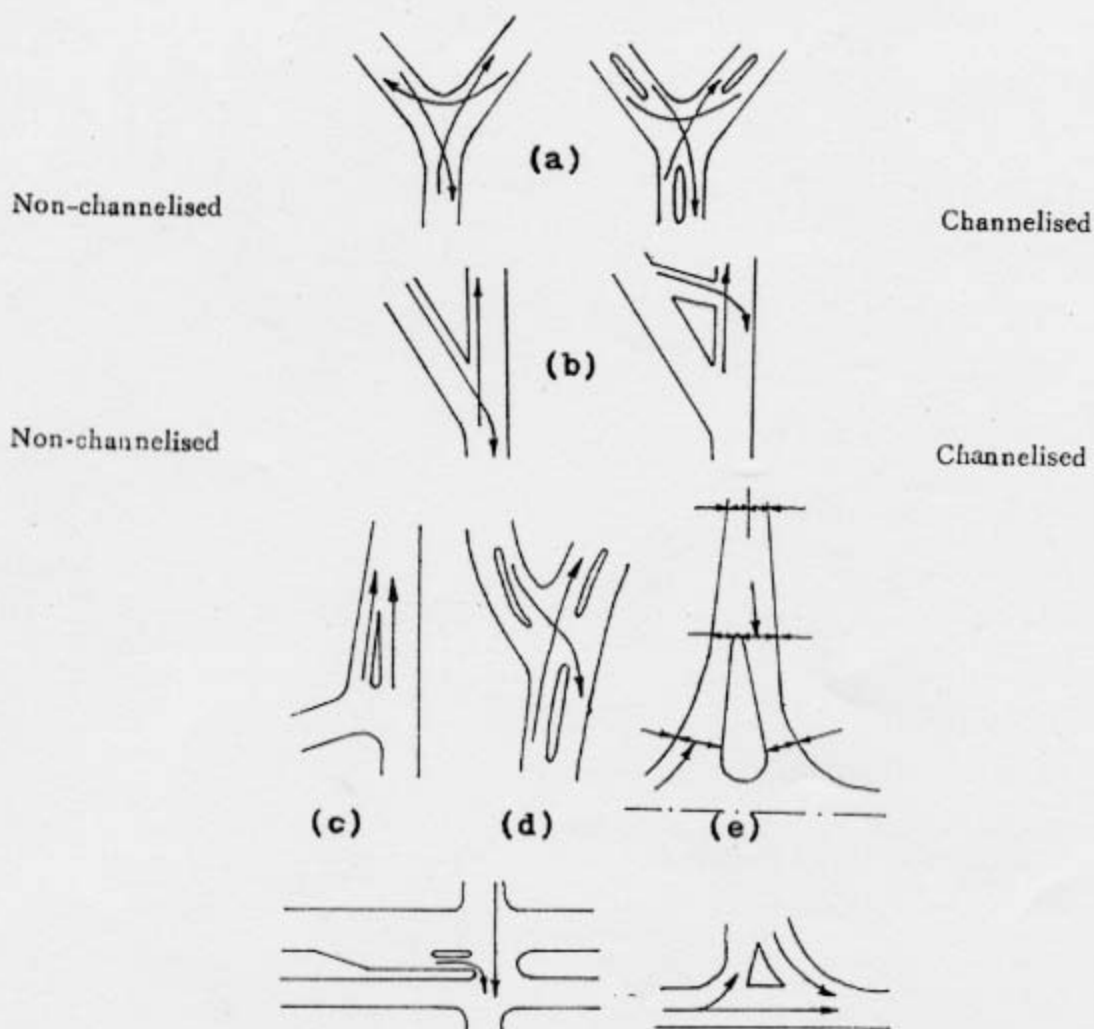


Figure 9: Techniques of channelisation at intersections.
Source Ref : 20

Above arrangements, however, may not be suitable for the existing roads of Dacca city. This arrangement is very much inconvenient for heavy transports.

Under existing condition, all the road junctions should be provided with automatic signalling device. Electronic control ⁽²⁷⁾ using radar which measures traffic flow and automatically gives signals to favour the bulk of traffic may be used. Cautionary signals should be placed at vulnerable points.

(n) Channelisation technique should be adopted in all the main intersections of roads. Following techniques may be used for this purpose (Fig. 9).

(o) Over bridges should be constructed at the rail crossings.

(p) We should remember that motorists are not always responsible for road accidents. Lack of road sense on the part of the pedestrians cause accidents in many cases. Microphonic mobile or police-box publicity together with other forms of the same on traffic codes may be done to develop road sense of pedestrians and to teach vehicular and pedestrians conduct on roads, etc.

4. CONCLUSION

Road accidents in the city roads should be minimized at any cost. It is being suggested to find out statistics of the number and severity of accidents, which takes place almost every day, with precise locations. A thorough investigation for areas of high rate of accident should be carried out to work out suitable steps thus increasing the safety and efficiency in the roadways operations. All roads should be designed and improved according to the empirical research performed in our soil, because adoption and application of foreign codes in our country may not prove fruitful and effective. Without proper research facilities we can never think

to eliminate road accidents. We should not be pessimists. However, there is no reason to be too much optimistic to think that within a short period Dacca city will be free from road hazards. In fact, socio-economic condition of our country is the key factor that regulates all our activities. A mass integrated planning approach may help us to a great extent in solving our problems. When Bangladesh is advancing through economic crisis such vast undertaking would seem to be expensive. Yet in fine, we can conclude that it is better to avoid accidents at the cost of money than to sacrifice valuable human lives.

5. ACKNOWLEDGEMENT

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