

Road Transport Management

Loshaka Perera

Road network is the backbone of the Sri Lankan transportation system as of now, and transportation is vital to economic development, trade and social integration in any country. Thus, identification of new road requirements and prioritization of maintenance or rehabilitation needs of the existing road network are key features in a basic highway management system.

Therefore, identification of relevant components and roles of a road transportation network is necessary to maintain a proper management system. Such components may include pavement structures, traffic control and management methods, road signs and markings, and other related facilities.

Sign Boards and Street Lighting

Road signs are the sign boards erected at the road sides. There are three main types of sign boards available in general, namely, regulatory sign boards, warning sign boards and informative sign boards. Regulatory sign boards appear in red colour and road users are bound to follow such rule indicated through a regulatory sign board.



Warning signs appear in a yellow coloured background with a black coloured marking, where road users are not legally bound to follow any rule, but warning is issued in advance through these signs to improve the safety of the road users.

Informative type sign boards may appear in blue or green colour. The intended purpose of this type of sign boards is to inform road users about facilities, services, distances, places, etc.

Sign boards play a vital role with respect to road safety. Past researchers have shown that sign boards and road markings have provided the highest benefit/cost ratio compared to any other method adopted to improve road safety.

Street lightings are important with respect to many aspects in a roadway, especially in relation to vehicle user aspect, pedestrian aspects, safety aspects, cost and maintenance aspects. It has been shown that during night time, unlit road conditions increase chances of accidents, especially of high severity type crashes. However, the danger of well lit road is the loss of night vision of drivers, and when moving from a well lit area to a darker area people's eye adjustment time period being high, would result in driving with impaired vision. Oncoming headlights are more visible against a black background than a grey one, and this contrast creates greater awareness of the oncoming vehicle. Therefore, most of the intersections are lit during the nighttime, where

drivers have to turn and enter the road way sections where no street lighting is provided generally. On the other hand, pedestrians may demand street lighting at every single corner of a road, but a balance between the two requirements can be obtained by creating walkways for pedestrians with lights not obstructing drivers. Maintenance, capital and operating costs are high when providing street lights, and therefore street lights may be provided only where the necessity is high.

Street lighting poles may create a safety hazard on the road by blocking the vehicle which may leave the road due to an accident or to avoid an accident situation. This may increase the severity of the crash.

Pedestrian Crossings

A pedestrian crossing or crosswalk, commonly known

as Yellow lines in Sri Lanka is a designated place on a road to assist pedestrians who wish to cross the road. Crosswalks are designed to assemble pedestrians together where they can be seen by motorists, and where they can walk safely across the flow of vehicular traffic. Pedestrian crossings are often found at intersections, but may also be located at other points on busy roads which would otherwise be too unsafe to cross without such assistance due to vehicle numbers, speed or road widths. They are also commonly located where large numbers of pedestrians are in need to cross (such as in shopping areas), or where vulnerable road users (such as school children) regularly cross.

The visibility of any sign board is important in order to achieve its intended purpose. It is commonly seen in Sri Lanka that many of

the traffic signs are defaced with posters, or covered by trees or other objects obstructing the vision of the sign boards to road users. Maintenance of road sign boards up to the standard is a responsibility of the relevant authority, nevertheless it is also a responsibility of the general public as well.

Traffic Signals and Time Allocation

There are various ways to control traffic at intersections. For example, STOP control, YEILD control, Right-of-Way control and Signalized control are very common control mechanisms practiced in the world. In Sri Lanka, many of the urban intersections are controlled by signal lights (traffic lights), and most of the other intersections are operated under the Right-of-Way control mechanism. The Right-of-Way rule is applicable



Pedestrian Crossing



Traffic Lights



Distance Information Board

where vehicles should give priority to vehicles coming from their right hand side at an intersection.

At present, traffic signals are increasingly used in Sri Lanka and are known to be very effective and efficient as a traffic management tool among engineers as well as general public. Traffic signals consist of two key elements, signal timing and phasing arrangement. The electronic device which can be seen on the road is the supporting tool which will indicate the output to road users. Phasing arrangement is where the sequence for green light is decided based on different vehicle movements as

well as how much time should be allocated to each green light.

An example of the phasing arrangement for a typical four leg intersection is given below.

For each leg, one separate phase has been allocated in this example for simplicity, and this could be considered as a very basic level phasing arrangement. When the number of phasing arrangements increase, the efficiency of the intersection will go down as a result of time

lost due to the change between phases. Therefore, it is advisable not to have too many phases, and thus some of the turning movements may be combined to reduce the number of phases at an intersection. In the above diagram, the green is given to vehicles coming from west and red light is given for all other vehicles in phase 1. Similarly, at phase 2, green is given to vehicles coming from north direction and red for others. Phase 3 and phase 4 will continue in a similar way as shown in the diagram and after phase 4, the system will come back to phase 1 again. This will be a continuous process unless a new phasing arrangement is introduced based on time of the day (one arrangement for peak



No Right Turn Sign



Stop Sign



No U Turn Sign



Parking Sign



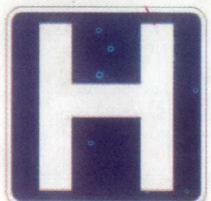
Downward Hill Ahead



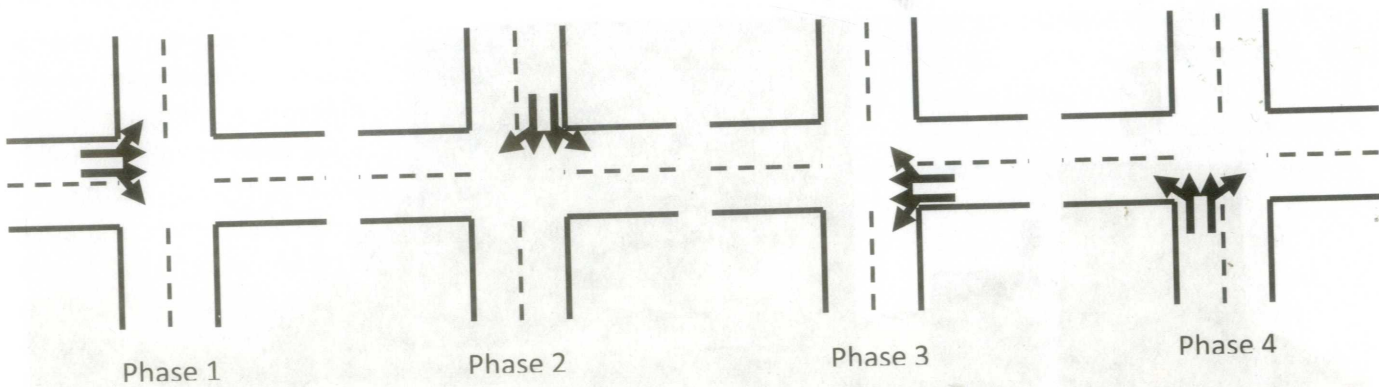
Sharp Right Turn Ahead



Roundabout Ahead



Hospital Sign



times and another arrangement for off peak times).

With respect to signal timing allocation for each red or green light, there are several internationally accepted methods. Primarily there are two mechanisms where individual vehicle delay is minimized and efficiency of a given intersection is maximized. In the first case, delay to any approaching vehicle to an intersection is minimized but this could result in low efficiency at intersection. In the second case, the efficiency of the intersection is maximized but delay for individual vehicles may increase consequently. These are the two different approaches a

traffic engineer would basically think of, but the implementation of such approach is decided by user requirements.

Generally, the timing for each signal phase has to be allocated based on the number of vehicles that need to pass through. In addition, pedestrian flow may also be considered when fixing timing, and sometimes additional green has to be given to accommodate high pedestrian flow at some locations. Real time processing would be the most efficient method to accommodate all these requirements, but the cost is high. On the other hand, pre measured traffic data can also be used for this analysis although efficiency

levels may go down compared to the previous case, but may be very cost effective. However, Sri Lanka continues to use the pre measured traffic data to calculate and fix signal timing mainly due to lack of resources. Nevertheless, this approach can be accepted to greater extent provided frequent updates are done to the system, since vehicle flows and other governing factors are subjected to change frequently.

Overhead Bridges

In a road network two types of over head bridges can be seen. One is to facilitate pedestrians and this is known as pedestrian bridge, while other is to overpass vehicles, commonly known as flyovers. Flyovers certainly improve the travel time and safety of road users at an intersection; on the other hand cost of construction and maintenance of such flyovers is high. As result it is not feasible to accommodate flyovers at each and every intersection, but there is a need to compromise.

Vehicle Parking Systems

Vehicle parking is of two types, viz., on street parking and off street parking. On street parking is allowed only at designated



Overhead bridge

parking bays unless there is an emergency. Parking at road side obstructing pedestrians or on pedestrians walk ways are not allowed by legislation. Off street parking is where parking facility is provided anywhere other than on street. For new development work such as construction of office buildings, shopping complexes, apartment complexes etc. it is a mandatory requirement to provide enough parking facilities for users and now people have gone to greater extents in this aspect where they provide mechanical parking spaces due to lack of space. Parking plays a vital role with respect to any facility or service in the modern world and in fact people used to avoid some places or services due to lack of parking facilities.



Vehicle parking systems



Loshaka Perera

(B.Sc., M.Sc., AMIESL, E.I.T. (USA))
Lecturer, Department of Civil Engineering,
University of Moratuwa

Southern Expressway

Tariff Schedule for Vehicle Category 1 in Sri Lankan Rupees

	8km	8km	21km	11km	24km	12km	16km	
	Kottawa	Kahatuduwa	Gelanigama	Dodangoda	Welipenna	Kurundugahahetekma	Baddegama	Pinnaduwa
Kottawa								
Kahatuduwa	100							
Gelanigama	150	100						
Dodangoda	200	150	150					
Welipenna	250	200	200	100				
Kurundugahahetekma	300	250	250	150	150			
Baddegama	350	300	250	200	200	100		
Pinnaduwa	400	350	300	250	250	150	150	

Distances between Interchanges

Vehicle category

Cars	
	All Cars
	All Jeeps
	All Salon and Station Wagon
Dual Purpose Vehicles	
	All kinds of Cabs (Single and Double)
	Passenger Vehicles- upto 9 seats
	Lorries and Trucks with Tare weight upto 3,500 kg
Light Motor Vehicles	
	2 Axle and Four tyre Lorries and Trucks

Emergency Hotline
1969

For a faster, safer and secured journey, abide by the rules and regulations