

CHAPTER 10: VEHICLE PRIORITY

10.1 INTRODUCTION

- 1 Priority can be given at signalised junctions to certain classes of vehicles. These typically include emergency and public transport vehicles.
- 2 Emergency vehicles, such as fire engines and ambulances, can be given priority to reach areas of distress in the event of a major emergency. In such cases, a continuous band of green would be provided for emergency vehicles. For minor emergencies, these vehicles would typically use their sirens to obtain priority.
- 3 Public transport vehicles can be given priority when it is desired to make public transport more attractive to passengers by reducing travel time. Under priority control, buses could travel under green wave conditions, whether or not this applies to other vehicles on the same route. This enables them to more easily maintain their schedules and also to reduce travel times.
- 4 The provision of priority control must be justifiable through actual time savings that can be achieved. For public transport vehicles, such time savings should ideally be of such a magnitude that there would be a modal switch from passenger cars to public transport with a concomitant reduction in congestion.
- 5 Priority control does not require the use of special signals and can be applied to any configuration of signals at any junction. Use can, however, be made of bus or tram signals in situations where lanes are reserved for buses or tram rails are provided.

10.2 DETECTION OF VEHICLES

- 1 A major problem in the application of priority control is establishing the time of arrival at any given junction. The arrival time of buses, for instance, is determined primarily by the time spent by passengers boarding or alighting at bus stops. Their arrival at any given junction thus tends to be random and a fixed time type of control is correspondingly impossible to apply.
- 2 Priority control therefore requires the detection of vehicles as they are approaching a junction. This can be done by means of devices installed in (or alongside) the roadway or onboard the vehicles.
- 3 The devices that can be installed in the roadway include inductive loops, pneumatic pads, piezo-electric detectors, etc. The electronic “signatures” of vehicles are used to differentiate between different vehicle classes.
- 4 The more satisfactory method is onboard transponders for communication with a central control system. Use is made of an antenna that is either embedded in the road surface, or mounted alongside or above the road to detect priority vehicles. Information is relayed to a centralised computer, which initiates whatever priority action is contained within its algorithm.

- 5 Detectors or antennas have to be installed sufficiently far upstream to allow for initiation of the priority strategy. It follows that bus stops cannot be permitted between the site of the detector and the junction.

10.3 PRIORITY STRATEGIES

- 1 Various priority strategies can be considered. An example is to provide a green phase on the approach as soon as the priority vehicle is detected. However, this cannot be done immediately, and the normal sequence of yellow and all-red light signals must be provided on non-priority approaches. A “pre-emption” or “hurry call” facility must be available in the controller to implement this strategy.
- 2 If a priority vehicle is approaching a green light signal, priority would also involve providing a sufficiently long extension of the phase to allow the vehicle to safely clear the junction.
- 3 Pre-emption and priority control can also be exercised at non-junction locations such as at approaches to one-lane bridges, work sites and metered freeway on-ramp terminals.
- 4 Some of the above strategies can be provided in traffic responsive control strategies. For emergencies, some form of interaction would be required to initiate specific signalisation plans to cope with the emergency. Other strategies would be based on the automatic detection of priority vehicles.

