Emergency Vehicle Priority System (EVPS)

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Abstract – Emergency Vehicle come across obstacles on the road such as intersections, roundabouts traffic jams and it these things which cause delay to the emergency vehicles in arriving and carrying at its intentional tasks.

I. INTRODUCTION

It has been noticed that there are associate risks involving emergency vehicles, which travel on the roads during emergency situation [1]. The main problem is the layout of the intersection. The layout gives no room to manoeuvre the vehicle around cars that are standing still at a red light as well as one of the approaches has restricted visibility due to the terrain. The view that a driver of an emergency vehicle would have is depicted here below demonstrating that the risks that emergency vehicle drivers must take in order to reach their destination. Looking at the picture, the drivers of the emergency vehicle cannot see the traffic of cars coming from the right. This direction is main direction from which traffic originates. Therefore if the driver of the emergency vehicle cannot see the incoming traffic nor can they get around the cars, which are standing still waiting for the red light, this forces the emergency vehicle to wait at the intersection.

Figure 1 shows the actual vision of the intersection from an ambulance driver’s perspective.

This paper outlines how the above situation has been solved. Based on the knowledge gained through this development, a complete road network solution to improve safety and mobility of the emergency vehicles will be developed.

II EVPS: ONE - OFF SOLUTION

A solution was developed by the use of two transceivers, one inside the controller box at the intersection and the second mounted on the emergency vehicle. The basic operation of the system would allow the driver to select the required direction. Once the selection was made the transceiver would then transmit this message to the intersection requesting the required direction to be freed.

The selected intersection (which has been known to cause the emergency services some problems in the past) has been equipped with the radio transceiver. It allowed the ambulance drivers to communicate with the intersection, receive an information about the current regime of the intersection i.e. the traffic flow direction. It also allowed the ambulance driver to influence and control the desired traffic flow direction at the intersection by controlling a frequency of the green and red lights interchange.

(Figure 2). The equipment to transmit the signal from the vehicle to the intersection.

(Figure 3) depicts the wiring of the system from the intersection.

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Above is a picture of how the Intersection unit will be wired. The circuitry takes into account the conversion from 240 Volts for the controller to 12 Volts for the Emergency Priority System. The Ambulance Priority System was devised to meet the safety, social, environmental and economic requirements of the end user. The actual cost of the System is very acceptable.

Although the Emergency Vehicle Priority System may from time to time temporarily impede normal traffic flow, the actual number of occasions when it may be utilised is sufficiently minimal so as not to cause unnecessary congestion or delay. Looking at the overall picture of the road network, the ambulance may be travelling to an incident site. If the ambulance can travel more quickly to the site, it may help resolve large congestion problems at the site. This will allow the traffic to return to normal at a much faster rate. It is also designed such that it does not compromise safety.

This Emergency Vehicle Priority System is quite unique. It provides a safe and clear passage through the intersection, as well as providing the ambulance officers with the necessary information about the status of the intersection. This system is also unique in that it is the first system ever to be tried on such a road network as the Gold Coast.

There is immense potential for this priority system to be utilised by other emergency vehicles such as the Fire Brigade and the Police, and of course to be available at other localised intersections where traffic lights are installed if the need arises. This system can be removed very simply, if it produces too much delay, or gets abused by the operators.

Deployment of EVPS provided the Ambulance Service staff with a safer transporting environment and the reduced number of car collisions at that particular intersection.

The patients involved will also receive medical care much sooner, providing a better opportunity for recovery and improved quality of life.

III EVPS: A COMPLETE ROAD NETWORK SOLUTION

A complete solution for an emergency vehicle priority system is being expanded from this localised concept and broadened towards meeting the road traffic requirements at any signalised road intersection [2], [3]. A concept that is being developed, involves GPS, microcomputer and a transceiver.

By using GPS, and having it connected to a microcomputer, the computer will be to sample the GPS coordinates at regular intervals such as every second.

By sample at regular intervals the direction and speed can be calculated. Therefore the microcomputer knows which direction the vehicle is travelling as well as the speed. The transceiver would be configured to be in “listening mode” listening to the GPS coordinates of the intersection; so that it can calculate the distances in which the vehicle needs to travel to that intersection.

Once this information is known the vehicle will know where the intersections are. A threshold distance will be set between the intersection and the vehicle, so that when the vehicle falls inside the threshold, the probability of the vehicle travelling through that intersection will be high. At this point, the Vehicle’s equipment will be required to transmit a “change of phase” command, for the approaching direction of the vehicle. As the vehicle reaches the intersection, the intersection will have changed and will favour the direction, which the emergency vehicle is coming from.

The concept design is make the system completely autonomous so the drivers don’t need to think about the system.

II. CONCLUSIONS

The research is intended to develop a system that will assist the emergency vehicle to autonomously pass intersection while allowing the intersection to remain operating efficiently and effectively.

REFERENCES

[1] Correspondence between Emergency Services and the Department of Main Roads 2001
