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Priority to Emergency Vehicles at Rail-road Crossing (PERC assist)

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***Abstract:** At rail-road intersection, to manage the traffic jam and mitigate chances of accidents and to provide priority passage to the emergency vehicles we have provided PERC Assistant system at "chobari fatak", in Junagadh, Gujarat.*
***Keywords:** Road Accidents, Traffic Congestion, Rail- Road Intersection, traffic flow*

I. INTRODUCTION

Now a time with increasing population in urban areas, increment in number of vehicles are also happening. Which in result causes traffic congestion at intersection or crossings. Noticeably at rail-road intersection, because due to closing of gates the problem of traffic jam and unwanted congestion occurs. Which results in delay in for every road user, be it students, employee, law and enforcement personnel or any emergency vehicles which may have a patient with critical condition. And it must be given the first priority, so I have decided this topic to find the causes and give appropriate solution to give priorly easy passage to such emergency vehicles at any rail-road crossings. The site I have selected is "chobari fatak" in Junagadh. I have decided to choose this in particularly is because this road connects to the many hospitals. And hence the movement of emergency vehicles is often happening.

A. Need to study

As mentioned above just few distance ahead from this location there are many hospitals and this is the only route many emergency vehicles must have to take. So to provide them a much needed priority is must and to do so the research must have to be done on this problem.

B. Study area

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II. OBJECTIVES

Following are the important objectives: -

1) Improved road safety, traffic management, urban planning, and overall transportation system effectiveness
2) Reducing accidents at intersections results in lower healthcare costs, vehicle repair expenses, and congestion-related losses. Survey-based interventions can lead to substantial economic benefits
3) To manage traffic flow stream.
4) Providing priority to emergency vehicles at rail-road intersection.

III. METHODOLOGY

A. Traffic engineering studies and analysis

The traffic engineering studies carried out for collecting traffic data are also called traffic survey. Traffic engineering studies are carried out to analyse the traffic characteristics and their movements along the identified roads. The results of these studies are used for the design of geometric features and traffic control measures for safe and efficient traffic movement. The analyses of results of these studies are also useful for assessing the need of the proposed rad project with justification

The different traffic engineering studies generally carried out are:

1) Traffic volume studies
2) Spot speed studies

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3) Speed and delay studies
4) Origin and destination (O & D) studies
5) Parking studies
6) Accident studies

Traffic volume is a measure to evaluate the traffic stream. Traffic volume or traffic stream is communicated as the quantity of vehicles that go over a given transverse line of the street amid unit time. As the carriageway width of the streets may differ, the traffic volume is commonly communicated as number of vehicles every hour out of each day, per traffic path. Though the roadway width including the number of lanes decided based on the design traffic flow or volume, all the vehicles do not keep moving during the entire day. Some portion of traffic will need to stop or park at the desired locations for different durations.

B. *Passenger Car Units*

Passenger Car Unit (PCU) is a metric used in Transportation Engineering, to assess traffic-flow rate on a highway. A Passenger Car Unit is a measure of the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single standard passenger car. This is also known as passenger car equivalent. For example, typical values of PCU (or PCE) are:

[TABLE of Passenger Car Unit (PCU)]

Car	1.0
Motorcycle	0.5
Bicycle	0.2
LCV	2.2
Bus, Truck	3.5
3-wheeler	0.8

C. *Determination of PCU:*

Traffic in many parts of the world is heterogeneous, where road space is shared among many traffic modes with different physical dimensions. Loose lane discipline prevails; car following is not the norm. This complicates computing of PCU. Some of the methods for determining passenger car units (PCU) are following:

1) Modified Density Method
2) Chandra's method
3) Method Based on Relative Delay
4) Headway method
5) Multiple linear regression method
6) Simulation method

To collect accident data, first of all I take permission letter from the college. And visit all the police divisions for accident data but I did not get any data from all division they say we have no right share any accident data. So, I go to SP office Junagadh and request for accident data for my research, He will give me permission and suggest to get accident data from Junagadh District Traffic Office. Therefore, I go to the District Traffic Office of Junagadh with the permission of the SP office. I tell him, I want accident data of time of accident, vehicles involved, location and cause of accident etc. They ask me to give them me some time to collect accidental data as per my requirement After half a month they called me to collect accident data in hard copy from District Traffic Office Junagadh.

IV. DESIGN OF PERC ASSIST

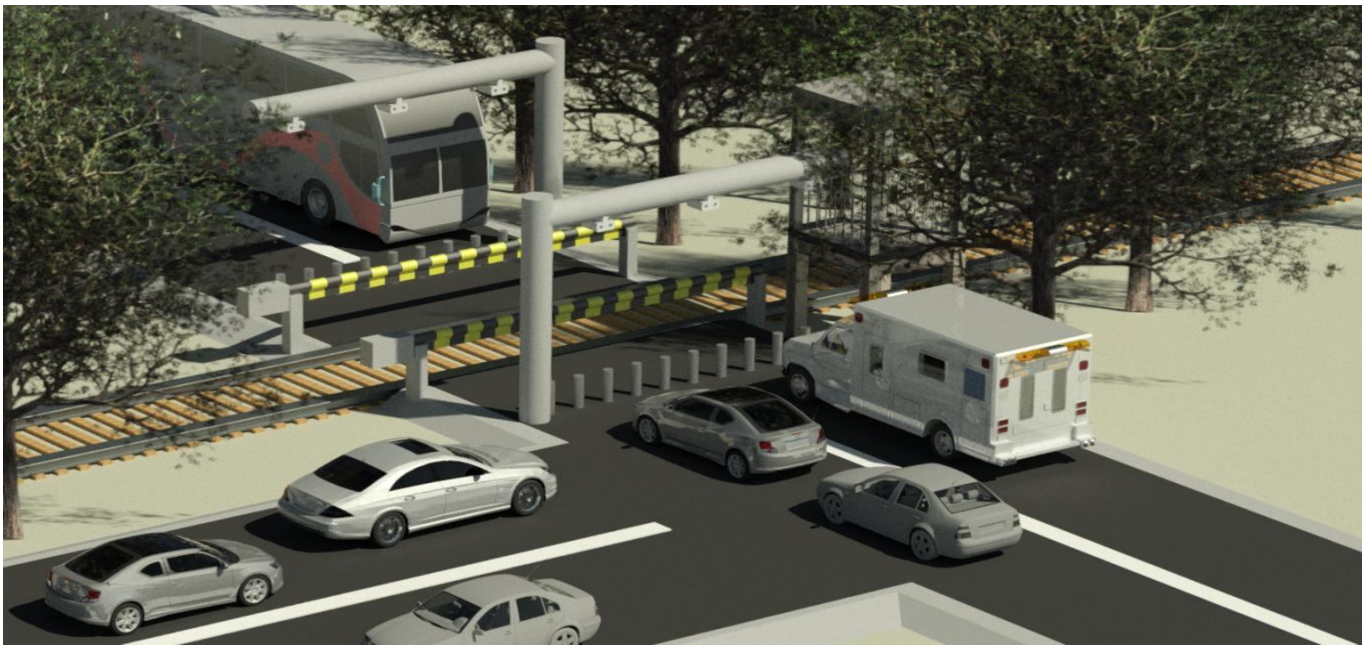
A. *Bollards*

A bollard is a short post used to create a protective or architectural perimeter. When installed primarily as a visual guide, they guide traffic and mark boundaries. As architectural elements they come in a wide variety of shapes and styles to accentuate or visually stand out in their settings. Bollards can also be constructed to physically block vehicle incursion, protecting people and property.

B. Surveillance cameras:

Providing this system will help in monitoring the movement of traffic, and making sure that all the vehicles maintain their respective lane of the road in the direction of their desired movement and for enforcement purpose.

C. Operating/ working of the PERC Assist.:





1) During passing of the train, the bollards will raise simultaneously to the closing of the crossing gates.
2) These bollards will be placed at such distance from the crossing gates that it will provide required space to the ambulance to pass easily.
3) Every vehicle must maintain their respective lane of the road, and only emergency vehicles are allowed to move to the opposite lane and wait for the train to pass.
4) and this operation can be monitored by the surveillance cameras which will make sure that no other vehicles is in the opposite lane by scanning the number plate; emergency vehicles will be provided with a specific type of number plate.
5) And when the gates are open, the bollards of the lane in which the emergency vehicle is waiting and the bollards of the other side of the crossing; the lane in which the emergency vehicle is supposed to go in will be lowered, and the emergency vehicle can be given an easy and priority pass.
6) After that the rest of the vehicles can be passed.

D. cost of installing of the PERC Assist.

Equipment / work	Price
Premium grade hydraulic round shaped bollards system (TRADE INDIA)	3 lacs
Traffic surveillance camera system (PRAMA INDIA)	1.50 lacs
excavation work	30,000 approx

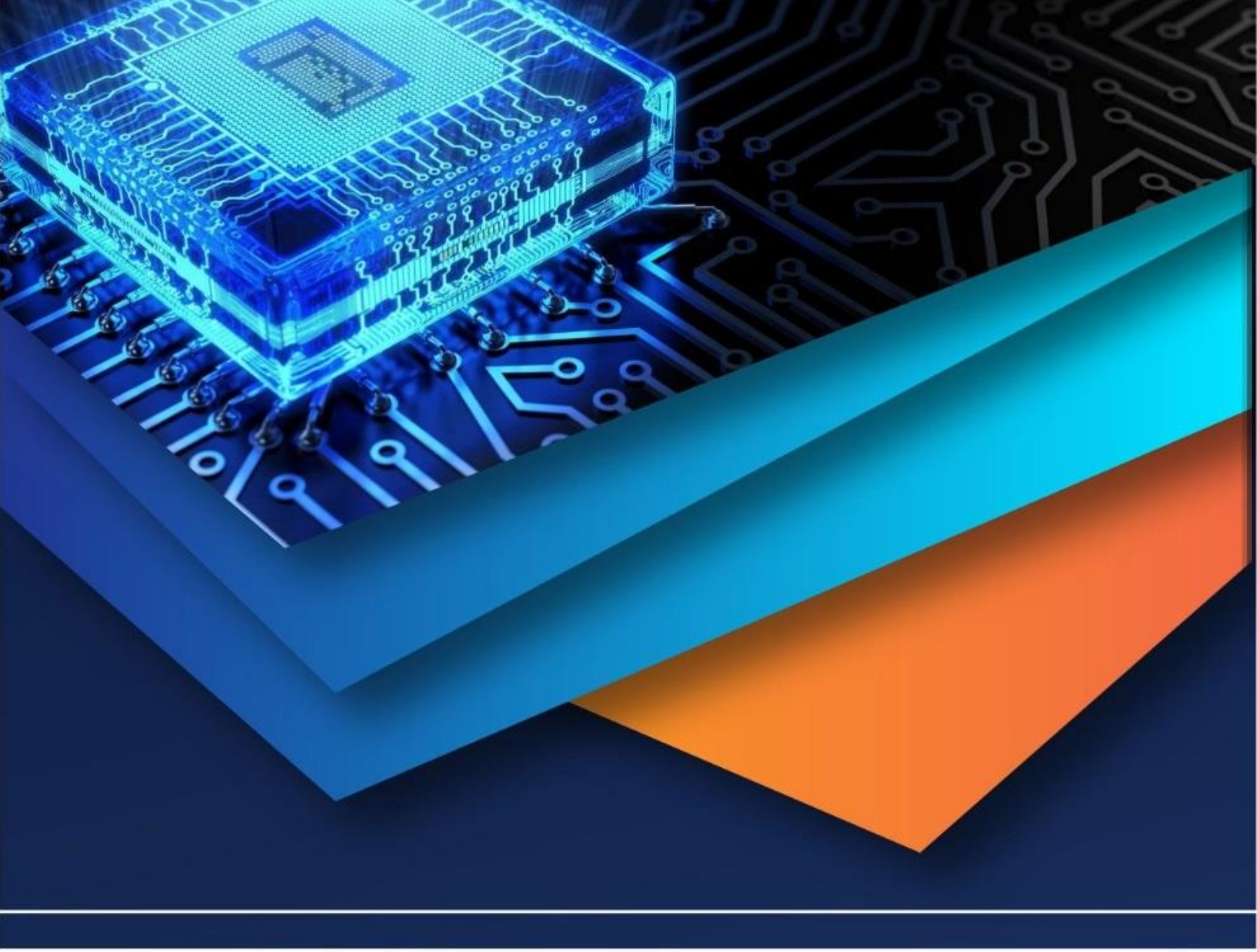
V. CONCLUSION

Providing this system can make an necessary impact not only in saving people's lives but also in maintaining day to day traffic flow at rail-road crossings, decreasing in the delays for all the vehicles and also mitigating chances of any accidents or road rages. Also it can help in reducing vehicle operating cost to an extent.

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