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Corridor Management - A realistic solution to the Traffic and transportation problems in Kavali Town

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Abstract

Traffic and transportation problems in Kavali Town have not been commensurate with the increasing demands for its usage. The city expanded dynamically without any planning and control due to the rapid socioeconomic changes. Kavali Town is the south end of Costa Andhra region in Andhra Pradesh which is 190 kms away from Chennai and it is located in between the two district headquarters (Nellore and Ongole). Kavali is the only source of various resources such as Education, Government offices, Shopping etc for the surrounding villages (Nearly 5 Mandal). And Kavali is more popular for its academic institutions and cloth business, which created more employability to the people either directly or indirectly. Because of Academic institutions in Kavali the population (4200 people / Sq.km) of Kavali town is rapidly increasing.

The present transportation infrastructure is inadequate to cater to the increasing traffic. Improper design of junctions, inadequate carriageway width and irregular parking on the carriageway are reducing the flow rate on the corridors. In order to alleviate all these problems corridor management is necessary

The corridor, from MRO Office to BPS junction is much need of immediate improvements and hence are taken for the study. Detailed surveys, both physical and traffic are organized all along these links. Level of service analysis with the volume capacity ratios is carried out. Along with this delay analysis is also carried out at junctions.

In this study an attempt has been made to assess the delay and capacity from the developed models. By using v/c ratio level of service is predicted. Depending up on these parameters critical sections are identified, where the problems are acute, so that the restrictive and alternative measures could be suggested to solve at least some of the traffic problems in Kavali Town.

Keywords: Kavali, Traffic, Transportation, Corridor, Carriageway, Delay analysis.

Introduction:

Taken in a long historical sense, traffic congestion has been around forever. Periods without significant congestion of some kind have probably been relatively limited. Current congestion levels may be higher than desired, but they may not be all that un usual. When everyone walked, cities were rarely more than a lakhs population; houses were close together and small. As the existing towns grew too large, office and commercial centers developed farther from city centre, the need for travel increased enormously. As houses moved to the suburbs, the commuter trips gone up considerably. The rapid growth in industrialization and commercial hubs, created a steep increase in travel demand there by need for the construction of new facilities. After independence, transportation infrastructure improved in leaps and bounds, but still the congestion problems exist and it is growing continuously. The growth in population and travel needs will continue and the challenge is for the growth to be handled in ways that don't make travel time considerations an undue burden. While congestion in traffic, transit, or other forms will not be eliminated, there are many improvements that can make congestion easier to deal with. This work deals with some of the ways that are used to reduce congestion and improve the present day travel on a transport corridor.

The concept "transport corridor" lacks a precise definition. It has both a physical and functional dimension. In terms of physical components, a corridor

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includes one or more routes that connect centers of economic activity. These routes will have different alignments but with common transfer points and connected to the same end points. These routes are composed of the links over which the transport services travel and the nodes that interconnect the transport services. The end points are gateways that Allow traffic with sources or destinations outside the corridor and to enter or Exit the corridor, the following factors is likely to attributes for inclusion in the corridor definition.

- Broad geographic area or band, with no predefined size or scale, that follows a general directional flow – essentially a linear transportation service – connecting major sources of trips (e.g., population and employment centers; flow of people, goods and services) at both trip ends.
- Defined by logical, existing, and forecasted travel patterns; includes a particular travel market or markets that are all affected by the same or similar transportation needs and mobility problems.
- Composed of various adjacent modes (e.g., freeway / arterial streets, transit, bicycle,pedestrian pathway, waterway), constituting a pathway for the flow of people and goods, that provide the same function or provide complementary functions.
- Availability of good connector routes between the facilities and modes throughout the corridor, thereby allowing route and mode shifts without severe mileage and/or travel time penalty to the travelers.
- Located within a metropolitan area, with the need to operate as a system.

CORRIDOR PERFORMANCE EVALUATION

The performance of a transport corridor is evaluated based on the capacities and volumes on different links, speeds and delays along the corridor. The volume to capacity ration is measured to get the level of congestion. The speed flow relationships and intersection delay analysis will be helpful tools to indentify the deficiencies and bottlenecks. These tools will enable to evaluate the performance of a given corridor and subsequently to suggest remedial measures for improvements. Generally Corridor Performance is evaluated based on three perspectives.

- Infrastructure
- Quality of Service
- Movement of goods

Infrastructure

This considers the physical capacity of the links and nodes in a corridor and the utilization of these components. This approach is often used when deciding on requirements for additional capacity but provides little insight into the effect of corridor performance on trade.

Quality of Service

It provided for the goods moving on the various routes. Performance is measured in terms of average time and cost for transport units moving through this corridor. These may be broken down into the time and cost for specific links and nodes.

Movement of Goods

In this perspective again cost and time are measured but this time for each of the principal supply chains. The costs and time can be disaggregated for the transport services on the links and the processing services at the nodes.

NEED FOR THE STUDY

Traffic planners and motorists continually face increased levels of traffic congestion and operational inefficiencies. The major contributors are population growth and increased vehicles use, combined with the inadequate growth (if any) in capacity. Transportation officials are struggling to keep up with the increases in travel demand, but have thus far been unsuccessful. Transportation officials often must overcome political and economical barriers when implementing transportation improvements. Funding for transportation improvements has not historically matched the growing transportation needs. It seems unlikely that this trend will change. Funding is likely to continue to lag behind the growth in demand.

Transportation officials need to make the most efficient use of the infrastructure that is in place and they need to continue to investigate new, low-cost alternatives. They also need to focus on the operations of the transportation system, to modify their perspective from a construction mentality to an operations mentality. In other words, instead of determining the best construction projects in which to invest capital funding, they need to determine how best to allocate their resources to provide an operational system the best determine to allocate their resources to provide an operational system the best meets the needs of the users of the system. Investing in properly designed and operated transportation corridors will help to meet the needs of the travelling public and will help to get the most efficiency out of the existing transportation infrastructure. The can be achieved by applying proper management techniques on the transport corridor. Mainly, the adverse impact of the steadily increasing traffic is felt at road intersections, where delay and vehicle queues keep increasing till handling capacity is augmented. Very often it is seen that the delay at intersections constitutes nearly one third of the total travel time. The resulting economic losses considering the excess fuel consumption, noise, accident etc. are enormous. As more and more junctions are brought under signal control, such economic losses will get compounded. While signalization is essential for ensuring automatic right of way assignment with safety, there is a simultaneous need for finding out ways to minimize the delays. Signalization serves no purpose when drivers held at one signal as it just turns red and watching wasted green at downstream signals.

The purpose of a corridor management study is to bring local, regional, and state officials together to examine existing and future conditions along this corridor, and to identify ways to maximize capacity, improve safety, and ensures that the public benefit from investment in the highway infrastructure is maintained. A primary goal of the Corridor Management Study is to maximize the potential of the corridor to serve economic development the aim is to develop recommendations for short and long term strategies to prevent or reduce future traffic problems as growth occurs in the area. One focus of this study is to identify any structural improvements that are needed now or that are likely to be needed in the future, before growth along the corridor further limits options. The second is to identify management techniques which can be used by communities along the corridor to reduce conflicts between local and through-traffic. The third is to identify strategies to reduce the growth in the numbers of single occupant vehicles, especially at peak hours, to maintain the level of service of the corridor as commuter shed communities continue to grow.

Related Work:

Principles of traffic management (kadiyali l.r.).Urban traffic in India is heterogeneous in character. It consists not only of fast moving motor traffic but also of primitive modes such as animal drawn vehicles. Motor traffic itself consists of cars, light vans, different kinds of commercial trucks, buses, scooters, autorikshaws and motor cycles etc. Animal drawn vehicles could be bullock carts, camel carts or horst drawn vehicles. There is considerable volume of cycle traffic and in some towns cycle rickshaws also ply. Pedestrian traffic is very heavy in urban streets due to high density of population. The very wide variety of traffic units with their great disparity of size and speed creates a number of problems and areas of conflict.

Sarna et al. developed capacity norms by conducting a location study in Delhi and Bombay in their work entitled Capacity of Urban Roads- a Case Study of Delhi and Bombay. In this study they used the results of speed-flow relationships to arrive at appropriate capacity norms for understanding the speed-flow relationships. Urban roads were categorized broadly into two groups, namely, divided roads and un-divided roads. In divided group, roads with fourlanes, six-lanes and eight-lanes were considered. While in un-divided groups, roads with tow-lanes and six-lane were considered to represent the generally available urban roads.

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Chari et al. developed capacity norms by conducting locational study at Hyderabad and Kavali in their work titled development of standards for highway capacity under mixed traffic conditions. In their study they developed digital simulation models MORTAB-I, MORTAB-II AND MORTAB-III for three highway systems namely, single lane one-way, two-way one-way and two-lane two-way, respectively.

Kyte and Marek (1989) estimated the capacity and delay at a single lane approach in a stop controlled intersections. Through this study, capacity and nature of delay/flow rate relationships were arrived at and a methodology for analyzing the operational performance was also proposed.

Salter and Ismail (1991) developed a number of digital computer simulation models representing the vehicles interactions at highway intersections controlled by two and four way stop control. Outputs of these models are queue lengths and average total delays.

Madanat et.al (1994) developed a probabilistic delay model for stop controlled intersections. This work described the cube of logit modeling to predict the probability and randomly chosen the motorist would accept a given gap in the conflicting traffic stream based upon the characteristics of the gap. The gap acceptance functions were then used in a stochastic queuing model to predict vehicle delay. The specific methodology presented by him is applicable to right turning traffic.

Aggarwal et.al (1994) developed a simulation model interaction of flows for mixed traffic. In this study, an attempt has been made to simulate the mixed traffic flow for a four legged right angled uncontrolled intersections, to estimate the total delay and queue lengths of all approaches.

Methodology

The methodology begins with the identification of the study area for corridor analysis, the physical properties of the existing facility, such as road widths at intersections, approach widths at intersections, the sight distances available, radius of curvature at curves and the setbacks along the road stretch etc, are assumed. The traffic volume data on the road stretches, the turning movement data at intersections, the cruise speed and delay along the corridor are collected for further analysis.

The collected data is analyzed to assess the current situation on the corridor. After preliminary analysis, the peak periods and the peak hour traffic at intersections and mean travel times on the intersections are established. Also the average delays at over saturated intersections are summarized. The problematic locations such as bottlenecks, critical intersections and unsafe locations are identified by the outcome of preliminary analysis.

All the available alternatives for the problem dissemination such as providing additional capacity, removing on-street parking, making the road as one way, intersections improvements, are studied to select the best alternative for each problem. The alternative selected should be such that it should be cost effective measure and also should be an effective one in treatment the problem.

After applying the most suitable measure out of the alternatives discussed above, it is advisable to check the improvements in the field by suitable evaluation techniques such as volume to capacity ratio, speed flow analysis and delay study at intersections etc. If the improvements are not up to the desired level the improvement alternative can be revised for better results.

Study Corridor

The corridor selected for the study is from MRO Office junction to BPS junction. This corridor comprises of three important junctions namely MRO Office junction, Udayagiri Bridge junction and BPS junction.

Physical Inventory and Data collection

In these studies the width of the carriage way, footpath and medians are taken at every 50m interval and where

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ever these features change all along corridors. At all intersections the details such as length, width is taken.

Delays

Separate methods have been adopted to estimate delays at intersection and midblock.

a) Delays at Intersection

The delay studies are carried out at intersections. The cycle time for conducting the delay is taken as one minute. This cycle time is spitted in to the intervals of 20 seconds each. The vehicles arriving in these intervals are noted. Simultaneously traffic volume studies are conducted. Then finally the average delay is calculated by dividing the delay in seconds by the total number of delayed vehicles.

Model development

Choice of influencing Variables Taking into account the factors that are generally influence the delay caused to vehicles at uncontrolled intersections and considering other relevant aspects to mixed traffic environments. The following variables are considered for developing the model.

- Average Equivalent traffic volume
- Percentage of right turning movement
- Percentage of heavy vehicles
- Percentage of cars
- Percentage of auto rickshaws

As the approach roads of the uncontrolled intersection considered for the study, had different widths and varied traffic volumes, the intensity of interaction between the different vehicles in mixed traffic streams, which influence the delay caused to vehicles depend upon the traffic volume relative to the available road space. If the vehicle interaction is used as a variable, it is necessary to calculate the volume of the traffic for a constant approach width in all cases. For this purpose width of (3.5m) single is taken as unit. Accordingly, the equivalent traffic volume on approach was calculated as approach traffic volume multiplied by 3.5m and whole is divided by the actual width of approach. Then the average traffic volume (AET) was arrived at as the average of equivalent traffic volume of all the approach of intersections. Multi variable delay model of exponential form was decided to be developed to estimate the delay. The average delay to the vehicle can then be related to the exponent of the independent variable as

$$D = e^{((a_o + a_1(PHV) + a_2(PCAR) + a_3(PAR) + a_4(PRT) + a_5(AET))}$$

b) Delays at Mid block

Moving car method is used to calculate the delays at mid block. The following relations are Used

$q_1 = (X_1+Y_1) / (t_1+t_2)$

$T_1 = t_1-(Y_1/q_1)$

Journey speed = l_1/t_1

Running speed = l_1 / (t_1-delay)

q_1 = traffic volume (veh/unit time)

t_1 = journey time for the test vehicle

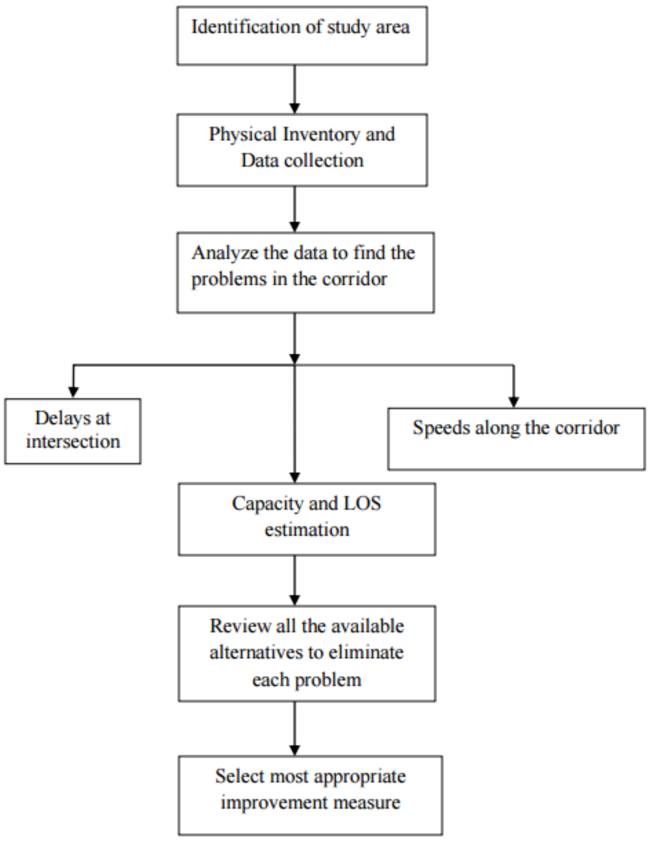
T_1 = mean journey time of the vehicles

X_1 = opposing traffic volume

Y_1 = no of vehicles over taking- over taken

l_1 = length of the link.

The suggested methodology is presented below through a flow chart as shown in figure



Study Methodology

ISSN No: 2348-4845
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ANALYSIS AND PRESENTATION OF RESULTS

It is the first phase of study synonymous to the preliminary survey, the study includes the collection of the existing features of the corridor like width of pavement and shoulder, existence of junction etc. This gives a brief physical layout of the corridor taken up for study.

Road width

The items studied include

a) Pavement and shoulder widths

b) Intersection, location and spacing

a) Pavement and shoulder widths Measurement

The width of pavement and shoulder are measured at the important sites of the corridor, especially one at least with in two major junctions. These are measured with a tape directly during the early hours of the day when the traffic is very low.

Physical Inventory (width of pavement and Shoulder)

segments	width of pavement		shoulder width
	maximum	minimum	
MRO office to Udayagiri Bridge	6	5	0.5
Udayagiri Bridge to BPS junction	11	7	0.9

b) Location and spacing of the intersection

Location of intersections on the corridor are identified and the spacing between them are presented in the table below

Junctions

Major Junctions	Distance between the junctions
MRO office to Udayagiri Bridge	3850
Udayagiri Bridge to BPS junction	4550

TRAFFIC VOLUME

The traffic volume study was carried out during morning (9:00 A.M to 12:00 PM) and evening hours (4:00 PM to 8:00 PM) with manual count method. The traffic volume count for every 15 minutes count interval was conducted to obtain exact peak hour. The data collected was converted into one common unit i.e., Passenger Car Unit commonly know as PCU.

$$A = P\,(1+r)^{(n+10)}$$

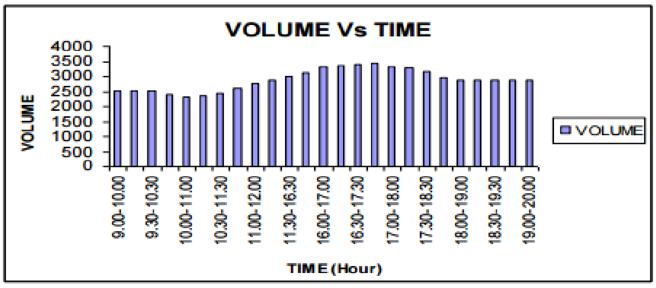
Based on the study the traffic in the future can be predicted by the following formula and results indicated in tabular form below

Predicted Traffic Volume

Intersection	Present Traffic Volume in PCU/Hr	Predicted Traffic Volume in PCU/Hr
MRO office	6406	16616
Udayagiri Bridge	2568	6660
BPS Junction	3863	10019

UDAYAGIRI BRIDGE JUNCTION

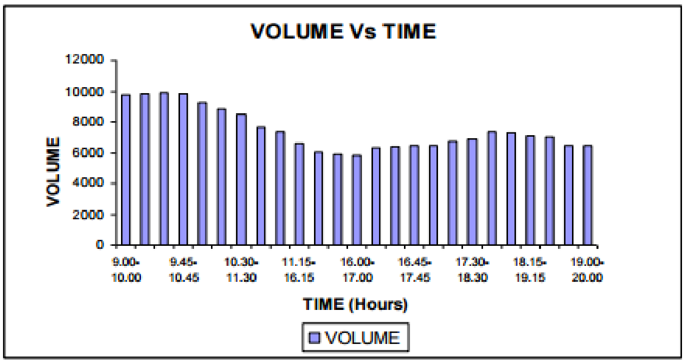
The table reveals that the peak hour is in between 16:45 PM to 17:45 PM with traffic volume 3439 vehicles per hour as shown in graph below.



Peak hour volumes for Udayagiri Bridge junction

MRO OFFICE JUCTION

The table reveals that the peak hour is in between 9:30 A.M to 10:30 A.M with traffic volume of 9879 vehicles per hour as shown in graph below.



Peak hour volumes for MRO office Junction

BPS JUNCTION

The table reveals that the peak hour is in between 9:15 AM to 10:15 AM with a traffic volume of 12343 vehicles per hour as shown in graph below.

ISSN No: 2348-4845
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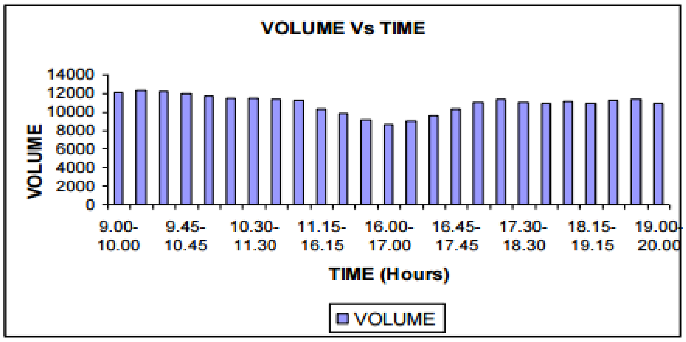
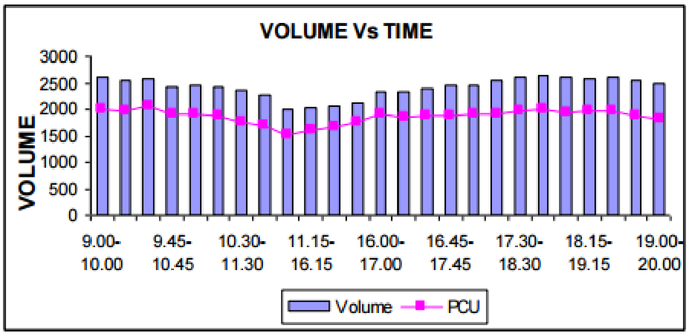


Peak hour volumes for BPS junction

MRO OFFICE JUNCTION TO UDAYAGIRI BRIDGE JUNCTION

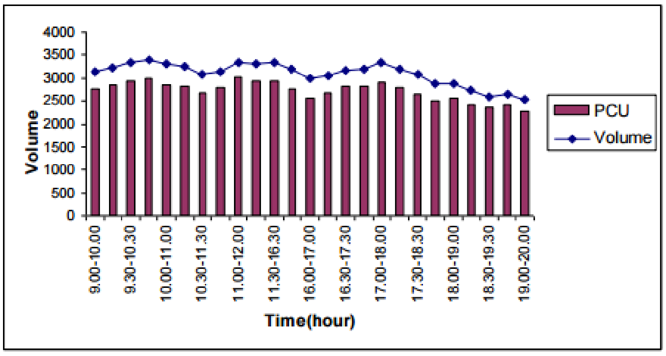
The table reveals that the peak hour is in between 17:45 P.M to 18:45 PM with a traffic volume of 2627 vehicles per hour as shown in graph below.



Peak hour volumes for MRO office to Udayagiri Bridge

UDAYAGIRI BRIDGE TO BPS JUNCTION

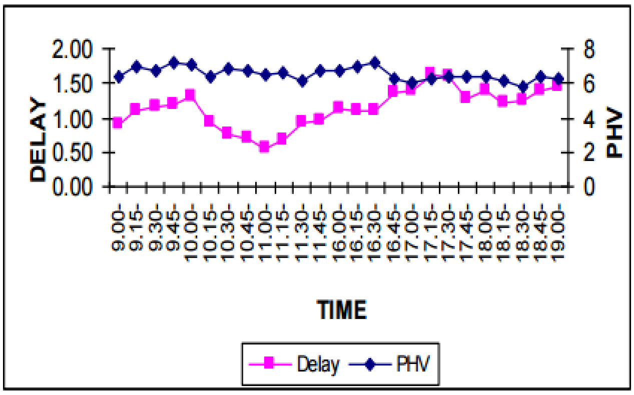
The table reveals that the peak hour is in between 09:45 P.M to 10:45 PM with a traffic volume of 3387 vehicles per hour as shown in graph below.



Peak hour volume for Udayagiri Bridge to BPS junction

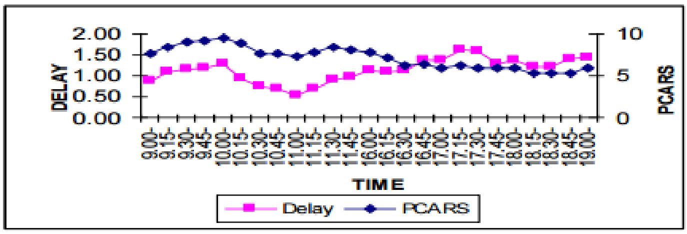
DELAYS FOR INTERSECTION

The below graph it revels that in peak hours delay is caused due to the presence of heavy vehicles, maximum delay is caused at 5:15 PM to 6:15PM where the percentage of heavy vehicles is also maximum.



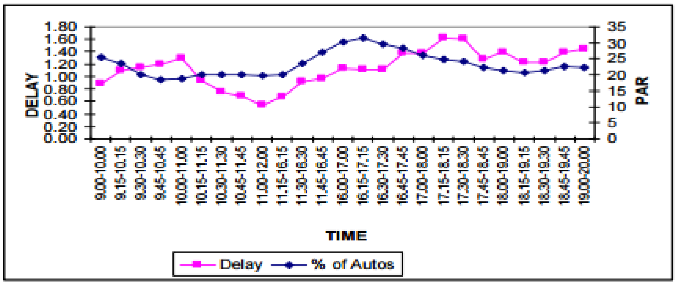
Delays vs. PHV

The below graph reveals the relation between Delay – Time – Percentage of cars; the delay is maximum where the percentage of cars are almost maximum.



Delays vs. PCAR

The below graph reveals the relation between Delay – Time – Percentage of Autos, the delay caused by the autos are very much high in peak hours.



Delays vs. PAR

The below graph revels the relation between Delay – Time – Percentage of Right turning vehicles, in peak hours the increase in right turning vehicles results in heavy delay in peak hours.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
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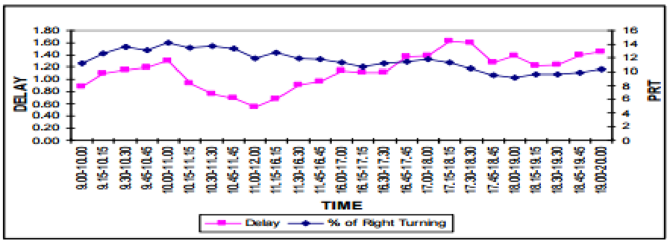
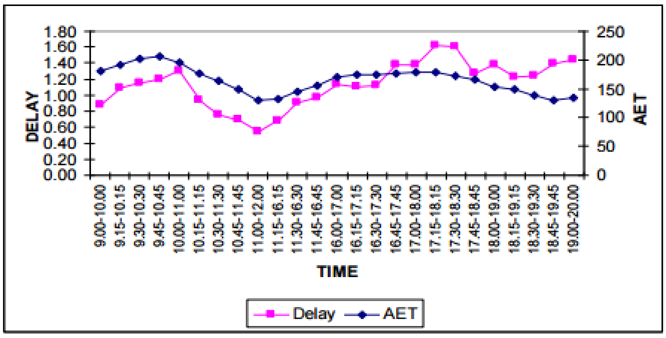


Delays vs. PRT

The below graph reveals the relation between Delay – Time – Average Equivalent Traffic, in peak hours delays are more when the AET is also more



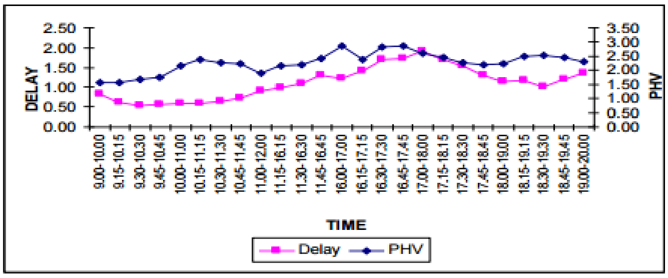
Delays vs. AET

Equation Developed

DELAY = 1.73 - 0.043 (PHV) - 0.121 (PCAR) - 0.0104 (PAR) - 0.0625 (PRT) + 0.00910 (AET)

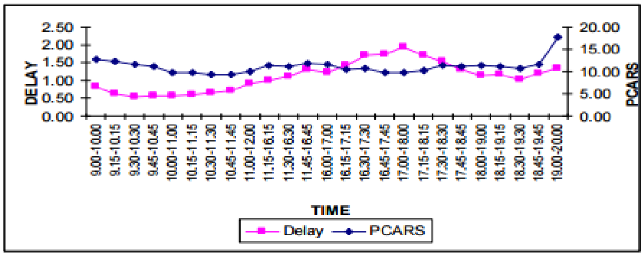
R-Square = 67.4%

The below graph reveals the relation between Delay – Time – Percentage of Heavy vehicles, In peak hours the delays are caused due to the presence of heavy vehicles. So, the delays are maximum when the percentage of heavy vehicles is maximum



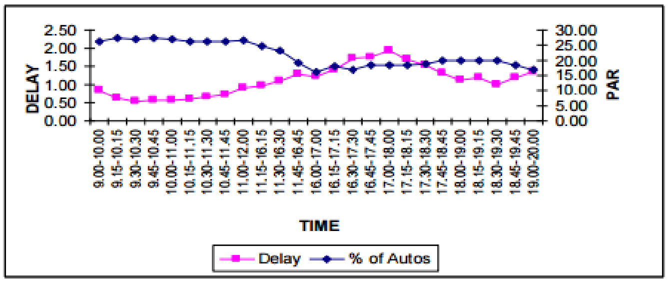
Delays vs. PHV

The below graph reveals the relation between Delay – Time – Percentage of Cars, the percentage of cars has not much influence in the delay causing at MRO office junction.



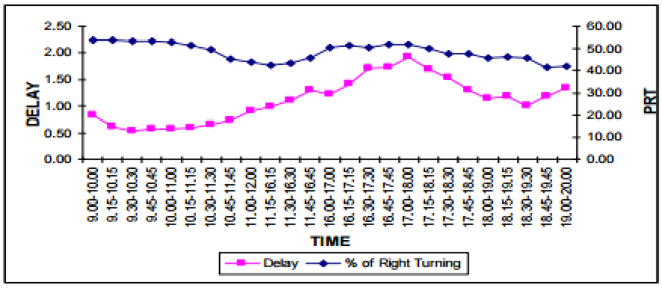
Delays vs. PCAR

The below graph reveals the relation between Delay – Time – Percentage of Autos, In morning hours there is not much influence of autos in causing delay where as in evening peak hours much delay is caused due to the presence of autos.



Delays vs. PAR

The below graph reveals the relation between Delay – Time – Percentage of Right turning vehicles, The right turning vehicles causes delay in evening peak hours than morning hours.



Delays vs. PRT

The below graph reveals the relation between Delay – Time – AET, the AET has much influence in evening peak hours.

ISSN No: 2348-4845
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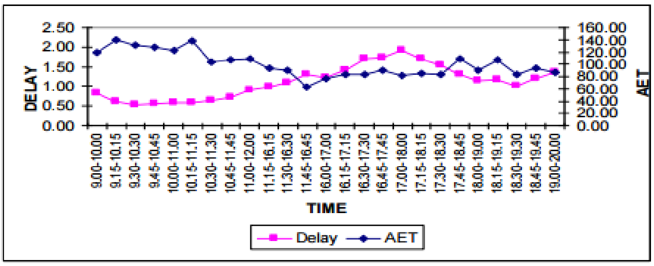
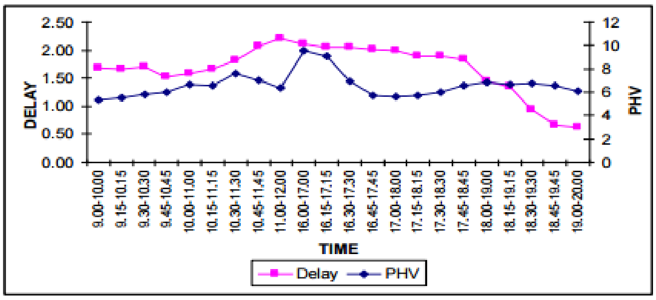
A Peer Reviewed Open Access International Journal



Delays vs. AET

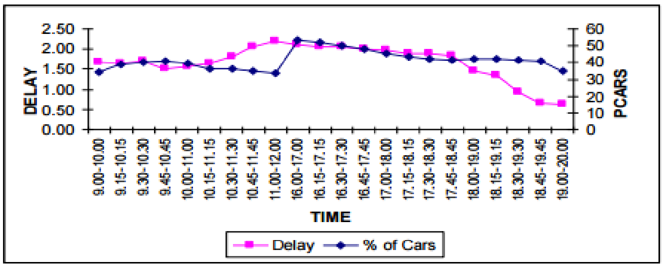
Equation Developed DELAY = 4.39 - 0.264 (PHV) - 0.0568 (PCAR) - 0.0977 (PAR) + 0.0101 (PRT) - 0.00406 (AET)
R-Square value = 81.5%

The below graph reveals the relation between Delay – Time – PHV, the delays are high when the percentage of heavy vehicles are high.



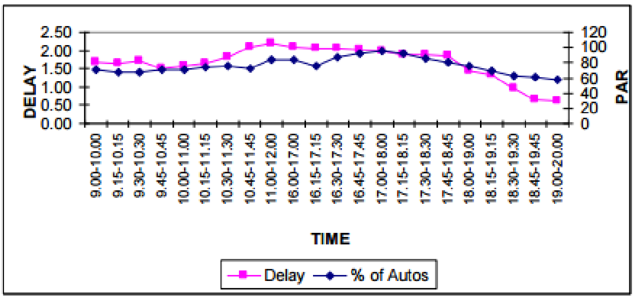
Delays vs. PHV

The below graph reveals the relation between Delay – Time – Percentage of Cars, the PCRS has considerable effect in BPS junction which causes heavy delay in the junction.



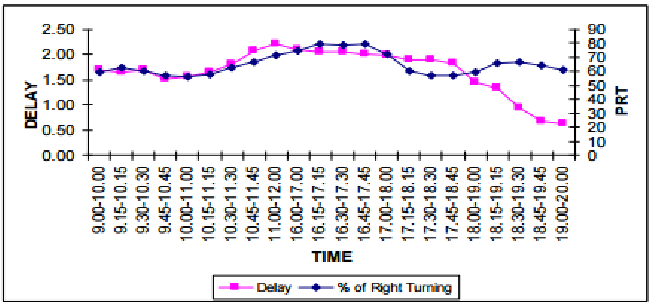
Delays vs. PCARS

The below graph reveals the relation between Delay – Time – PAR, the junction is experiencing delays due to the presence of autos though out the day.



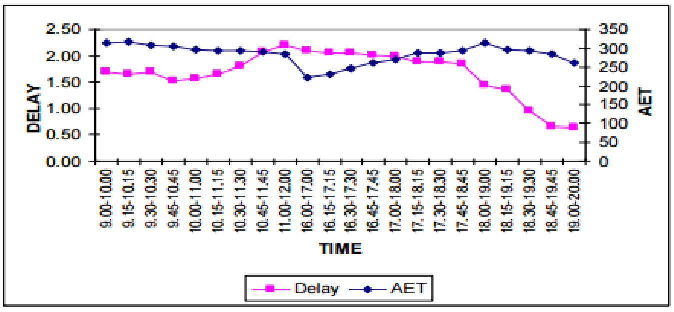
Delays vs. PAR

The below graph reveals the relation between Delay – Time – PRT, the percentage of right turning vehicles are causing considerable delay at the intersection throughout the day.



Delays vs. PRT

The below graph reveals the relation between Delay – Time – AET, the average equivalent factor has considerable effect on the delay occurring at the intersection.



Delays vs. AET

Equation Developed DELAY = - 4.59 + 0.191 (PHV) - 0.0400 (PCAR) + 0.0452 (PAR) + 0.0208 (PRT) + 0.00662 (AET)
R-Square value = 80.8%

CAPACITY OF INTERSECTION

Capacity of Intersection is determined by using IHCM (Indonesian Highway Capacity

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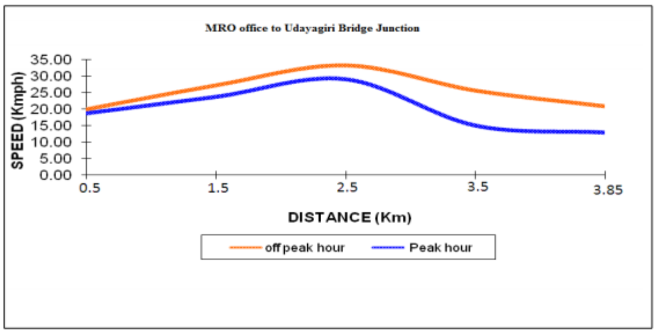
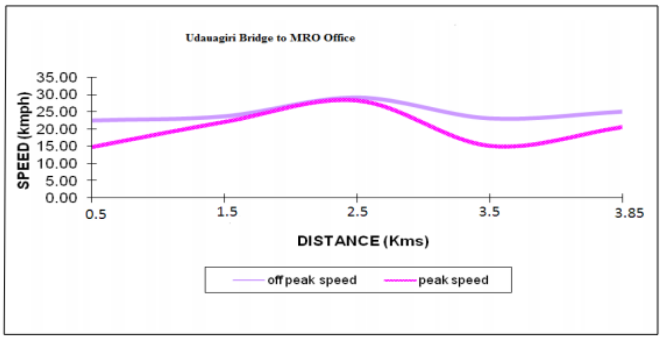
A Peer Reviewed Open Access International Journal

Manual). The calculation is executed in a number of steps as shown below.

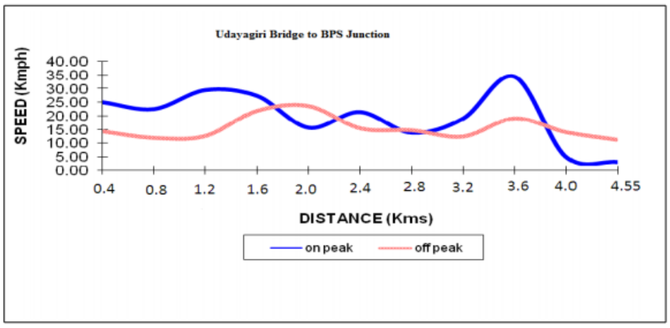
STEP 1: Base capacity value (Co)
STEP 2: Entry width correction factor (Few)
STEP 3: Major road median correction factor (Fm)
STEP 4: City size correction factor (Fcs)
STEP 5: Road environment type and side friction correction factor (Frf)
STEP 6: Left turn percentage correction factor (Flt)
STEP 7: Right turn percentage correction factor (Frt)
STEP 8: Split correction factor (Fsp)
STEP 9: Actual Capacity



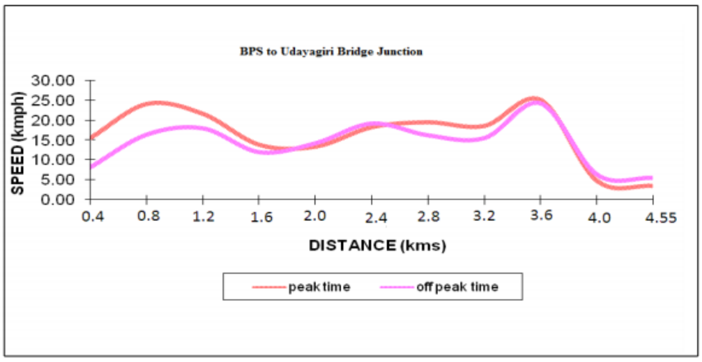
Speed Profile for MRO office to Udayagiri Bridge



Speed Profile for Udayagiri Bridge to MRO office



Speed Profile for Udayagiri Bridge to BPS junction



Speed Profile from BPS junction to Udayagiri Bridge junction

SUMMARY AND RECOMMENDATIONS

Kavali town is experiencing several problems like congestion, delay, increased travel times, accidents and environmental deterioration due to noise and air pollution. To ease the flow of traffic, the above problem should be addressed on an urgent basis. First chapter presents the problems associated with the urban area and also the actual traffic conditions in Kavali area. For efficient movement of vehicles and people on corridor, corridor management actions have to be suggested.

The major corridors are identified based on the volume in Kavali road network and also problems associated with the parking in CBD area, To asses the present traffic conditions on these corridors and in CBD area, and also to identify the prevailing bottle necks in the system the following surveys are organized on all the corridors and in CBD areas.

1. Traffic volume survey
2. Speed and Delay study
3. Road Inventory survey
4. Speed profile method

The data collected during the surveys are analyzed in detail and numerous problems are identified both related to the corridors and to CBD area. Corridor analysis includes V/C ratio analysis, speed and delay analysis etc; the analysis identifies the problematic locations on the corridors and gives the relevant information regarding the corridor. Immediate measures that are to be taken up for the corridor improvement are discussed. These include widening of existing carriageway widths on selected routes, segregating the traffic providing pedestrian crossing, bus bays are design.

Delay caused to vehicles is important measure to evaluate the performance of urban uncontrolled intersections under mixed traffic conditions. The vehicular composition, apart from traffic volume and proportion of turning traffic, is vital factor is influencing the extent of delay caused to vehicles. Most of the earlier studies on delay to vehicles at urban uncontrolled intersections having been conducted under homogeneous traffic conditions, and the few studies that have been conducted under mixed traffic conditions being limited in scope, there is a need to comprehensively analyses the delay cause to vehicles at urban uncontrolled intersections and develop a appropriate models to estimate the delay.

In this study a multivariable model of delay caused to vehicles at urban uncontrolled into resections has been developed taking the set of three uncontrolled intersections located in different parts of Kavali town, as a case for a study. The model was calibrated using data collected at three intersections by multiple linear regressions analysis; and the calibrated model was sound.

Conclusions

The corridor type of analysis enables the traffic engineer to understand different types of traffic problems in a comprehensive manner such that compatible solutions can be arrived at. This approach is in contrast to solving traffic problems in an isolated manner as per the corridor type of analysis, gives a better inside to understand traffic problems by correlating the bottle neck situations by measuring various types of traffic parameters. Thus comprehensive solution in the form of management measures attempt is made for the first time to stream-line the flow of traffic on the busiest road of the Kavali town. This has registered high growth rates of population and traffic adopting a corridor type of analysis approach.

In future these facilities could be updated following a similar approach in order to reduce delays accidents and geometric related parameters. This exercise enables implementing agencies to evolve traffic management programs on a time schedule basis. The following are the measures listed in order of priority:

1. Paving intersection areas and their approaches
2. Pavement markings and traffic sings at intersections
3. Activation of signals at every intersection.
4. Widening of road segments on the corridor, which includes paving of the widened portions and removal of all obstructions such as electric poles, telephone poles.
5. Contractions of Bus Bays.

For the past few decades, population has shifted in urban areas, where some of the most difficult transport problems are found. However, for future planning a critical question is whether or not this pattern of population and activities will continue. Many older cities have experienced declines in population growth. Population is on high soar in the developing cities of which Kavali is one. Perhaps we are entering a period different from the past in the pattern of population migration and hence in Transportation requirements. One thing is certain the future will be different from the past. A myriad of Knows and Un-Knows will influence transport requirements and capabilities of the future. The argument on the present pattern, perhaps future too, of population migration, human activity etc., is absolutely true for the city of Kavali and hence its transportation needs/Hopefully the few proposals regarding improvements of the MRO Office – Udayagiri Bridge – BPS Junction are to be taken up. As these are the heart of the Kavali town, these will serve in meeting the challenges off the future of the city.

Recommendations

MRO Office Junction

The traffic volume is considerably high, Pavement width should be increased at the junction for movement of heavy vehicles such that delay causing due to heavy vehicles at peak hours can be reduced.

MRO Office to Udayagiri Bridge Junction

The traffic volume is very high. The road has 2 bottle necks where the delay causing is very high, it can be reduced by stopping encroachment by on street parking vehicles. In this stretch bus bays should be provided by which it can ensure the smooth flow of vehicles. Also road width should be increased.

Udayagiri Bridge

The traffic volume is very high in the junction, Bus stop at petrol pump junction should be shifted, and separate lane should be provided for autos such that the stopped autos will not interrupt the traffic flow. Signals should be activated at peak hours i.e. 9:00 AM to 11:00AM and in evening 6:00 PM to 8:30 PM because volume of traffic increases the capacity of intersection and thus leading to more delays at peak hours.

Udayagiri Bridge to BPS Junction

Here the traffic volume is almost equal to the capacity; this stretch has level of service C, the road width should be increased in some locations. Pedestrian crossings are proposed and sufficient median opening should be provided to change the lane. On street parking should be restricted where the width of the pavement is less.

BPS Junction

Here the traffic volume is more than the capacity of the intersection at peak hours; Signals should be activated at peak hours such that delays can be reduced at peak hours. Separate lanes should be provided for autos such that the flow interruption can be minimized.

Also, the above done work may also be utilized by the Kavali Municipal Corporation official's for reducing traffic congestion in Kavali town up to certain extent.

Future scope of the work

In the present study only three intersections are considered. If we consider all the junctions in the corridor, then we may get more traffic details which will be helpful to give better improvements to reduce traffic congestion for the above said corridor. In addition to this, by considering all the corridor's in Kavali town , after making traffic survey, one can able to give more suggestions to reduce traffic congestion in Kavali town.

REFERENCES

1. Kristine M. Williams, "Guide for Analysis of Corridor Management Policies and Practices", Center for Urban Transportation Research Florida, May 2007.
2. "Corridor Management Summary", Lamoille Country Planning, November 2004.
3. "Capacity and Level of Service", Finish Road Administration, October 2004.
4. Jonathan Rees, "U.S. Corridor Management", Lowa State University, October 2003.
5. Sioux Falls Public Works Department-Engineering Division and Sioux Falls Planning Department, "Corridor Management Efficiency Report" January, 2003.
6. Devid Husch and John Albeck, Evaluation Procedure for Intersection, Edition 2003.
7. "Parks Highway Corridor Management", Alaska Department of Transportation and Public Facilities, November 2002.
8. Tim Lomax, "Traffic Congestion and Travel Reliability", Texas Transportation Institute, September 2001.
9. Nevada Department of Transportation (NDOT), "Access Management System and Standards", Final Pyramid Master plan Oct 2001
10. A.W. Brennand, Manager Transport Policy Wellingtion Regional Council, "The Traffic Management Workshop Technical Conference", May 2001.