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Behaviour Of Pedestrians At Mid-Block While Crossing The Road And Recommendations For Providing Exclusive Pedestrian Phase (Epp)At Those Locations.

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Abstract: Pedestrian crossing and the behavior of pedestrians in different conditions especially at uncontrolled crossings is a subject which needs in depth study and analysis. At uncontrolled junctions, the pedestrians and their behavior, safety of pedestrian crossing is neglected and no measures are taken to systematize pedestrian crossings at these junctions. Therefore a practical study of the pedestrian road crossing data is made in this study and statistical analysis of the data is done at uncontrolled crossing junctions in mixed traffic conditions of Indian scenario. The main objective of study is to analyze the pedestrian road crossing behavior at uncontrolled junctions. Adopting multiple regression technique the various parameters which effect the behavior of pedestrian. Vehicular gap, driver yielding behavior, frequency of attempts to cross, age and condition of pedestrian , rolling gap are some of the parameters that decide the pedestrian crossing time and other requirements. The surveys have been conducted at all junctions between Bowenpally to Kompally on national highway manually and analysis is made. The survey and statistical analysis concluded that at almost all junctions, the vehicular gaps and pedestrians behavior is not up to mark and the parameters considered indicate there is scope of accidents if suitable measures are not taken. It is concluded that counselling pedestrians and drivers for change of their behavior is very important. Providing visible marks for pedestrian crossing is to be done at all junctions. Traffic control devices are to be installed where ever possible. Considering the volume of pedestrian traffic all along the city, safe crossings for pedestrians has to be given.

Key words:*PedestrianCrossing-speed, Gap-acceptance, Delay, Safety, Mid-block crossing*

I. INTRODUCTION

A person walking on road is called pedestrian. They are required to cross the roads to go to other side. Foot paths and crossing facilities like Zebra crossings, foot over bridges are to be provided for them, to safe guard their lives and make them move safely without any fear, or hurdle to their destinations. It is responsibility of the Government and authorities to ensure their safety. On their behalf, the drivers

and pedestrians should behave properly and follow the traffic rules correctly. To achieve this objective, a study of behavior of drivers and pedestrians is very important. This paper makes such study.

A convergence is characterized as an at-level intersection of at least two streets. Convergences are the most bustling spots in the street way. Safety for pedestrians is very important in designing any traffic control system. Several necessities make people walk. Walking for health and good health is now considered as prime necessity. If a person has to go to his friends house which is nearby he will walk. A person requiring some goods to purchase for his daily needs will also walk. Persons having no vehicular support will walk for all their requirements even for long distances. Whenever a need arises in these endeavors, they have to cross the roads. When no traffic signals are available at near places, they will try to cross seeing the vehicular gaps. It is very difficult to predict the vehicle gaps in mixed traffic conditions. Therefore the pedestrians may try to run or behave improperly to cross roads in hurry leading to accidents. At intersections, this is very problematic as vehicles come in all directions.

1.1 Need for Present Study

Several problems like darting, dashing, age, intoxication of both pedestrians and drivers, lighting darkness, fog, are associated with pedestrian crossing. Each problem has its own effect on pedestrian crossing. Therefore multiple regression analysis is done on the data collection. Each road and city has got specific problems of pedestrian crossing and is to be studied separately having its own uniqueness. Therefore the problem of National highway 44(NH44) from Bowenpalli to Kompally is studied in this analysis and conclusions are drawn.

1.2 Objective and Scope of the Study

This study has been directed towards accomplishing the following goals:

- To study the walker crossing offices at convergences in Hyderabad City.
- To study passerby development design at some chosen crossing points and foot over scaffolds in our City.
- To recognize the issues related with person on foot crossing at convergences.
- To assess the need of restrictive walker signal stage at signalized convergence.

2. LITERATURE REVIEW

Only a few studies were done in the Hyderabad city, regarding pedestrian problems.

These investigations are chiefly centered around review of the summed up issues related with people on foot. In any case, none of them has estimated the condition of people on foot at convergences. To have better comprehension on the conceptualization on the issue, data identified with the exploration

were gathered from various accessible existing books/diaries, unpublished proposition, course papers, magazines, papers and so forth.

The different studies made on this issue are presented below to understand the problem and to serve as guide for our study.

ChaudhariAvinash[a]ShahJiten[b]ShriniwasArkatkar[a]JoshiGaurang[a]ParidaManoranjan, 2018.

This work explains the impact of encompassing elements on common intersection in various urban communities of India, explores the impact of person on foot qualities on strolling speed, hole acknowledgment conduct and deferral and it suggests 50th percentile (1.15 m/s) speed as configuration speed for mid-block intersections, especially for developing countries like India. A normal 6.2 s is suggested as mean speed for plan of walker office at mid-block crosswalks under blended traffic conditions, A normal 8 s is suggested where female or senior people on foot are available.

Saha et al. 2011;Pa sha et al. 2015;Ma lik et al. 2017;Anciaes and Jones 2018.

Dread of heights (Opdyke et al. 1995;Juan and Pérez 2009) and the nonattendance of sufficiently planned flights of stairs (Mutto et al. 2002;Rizati et al. 2013) essentially influence the rationale of the walkers toward utilizing raised offices. Walkers across various Asian urban areas generally favored utilizing at-grade offices instead of utilizing underpasses or bridges because of security concerns.

Malik et al. 2017;Saha et al. 2011;Das and Barua 2015;Pasha et al. 2015;Sinclair and Zuidgeest 2016.

Past investigations indicated that in any event, when such isolated offices were given, walkers were hesitant to utilize them and crossed unlawfully utilizing accessibility at-grade middle openings. Analysts over the globe had contemplated distinctive intersection offices to comprehend factors that prompted the utilization or non-utilization of such isolated offices.

Pasha et al. (2015)

Even the presence of merchants, diminished the compelling walkway width, which was further liable for the decrease in the utilization of the pedestrians, and this was as per the findings announced by Pasha et al. (2015). During the review, a lot of criticisms were acquired from respondents which additionally affirmed that the portability contact happened significantly.

TRB, National research council, Washington

A study was made by TRB, National research council Washington on pedestrian flow, speed, capacity relationships and gave their own equations. The level of service aspects was also studied.

Di Pietroand King& V. Himanen, R. Kulmala

Dr. pietroand and others studied decision making process and explained the same with a gap acceptance theory.

D.Sun, S.K.Ukku suri, R.F. Bene kohal, et al.

D. Sun et.al studied the gap acceptance theory and suggested suitable modeling for assessment of gap acceptance by pedestrians.

Transportation Research board meeting,2003.

The motorist-walker association at uncontrolled block cross sections was studied by TRB in 2003 and recorded during their 82nd proceedings and studies continued up to 2006.

C. Holland, R. Hill

The pedestrian, vehicular and roadway characteristics which influence the pedestrian crossing behavior was studied by Holland and others and concluded that gender and age influence the behavior to a large extent. The driver status will also influence the crossing behavior in risky situations.

G. Tiwari, S. Bangdiwala, A. Saraswat, et al.

Tiwari et.al concluded that Females will wait for longer time than males while crossing the road.

J. Oxley, B. Fildes, E. Ihsen, et al.

The studies on age were done by J. Oxley et.al and it was concluded that the elderly and old peoples crossing behavior is more safe compared to young people. This behavior is more predominant in roads without dividers and with small dividers.

Himanen and Kulmala, 1988.

The behavior of pedestrians and car drivers on pedestrian crossings was analyzed by Himanen and Kulmala, in 1988. And an application of logical models was developed.

3. METHODOLOGY

Information from just one source has been utilized for this examination. This study keeps up the stringent standards for the accomplishment and effective achievement of the proposed targets of the work. Field overview has led to distinguish the current walkers crossing offices beginning at Bowenpally Police Station and ends at Kompally X-Roads, Hyderabad on NH44. Existing walker crossing dat has been gathered physically. Walkers information has been gathered by manual checking some chosen crossing points where traffic interest and passerby exercises are exceptionally high. Heading passerby crossing information has been gathered for 7 sequential days starting from 7AM toward the beginning of the day till 7PM at night. Information investigation has been performed using MS Excel. Walkers data has been correlated with manual perception. From this perception, issues related with passerby crossing at convergences and mid-blocks have been recognized. Some signalized crossing points have been chosen to present selected walkers.

3.1 Data collection

The data on the parameters like driver behavior, pedestrian behavior, road condition was collected at all the junctions from Bowenapally to Kompally on National highway 44 and recorded with different teams. The data collection included the age, gender, condition of pedestrian, gap of vehicles, vehicle types, driver conditions, average speed, and number of vehicles. The data were recorded for a period of 7 days Starting from 7 AM to 7 PM on 7 consecutive days as explained above manually through different teams on all the parameters identified. A Proforma was furnished to the team and the team members were asked to collect the information and fill up the data in detail with remarks if any. They were advised to collect the information from different type of people like young, old male and female, pedestrians and drivers, traffic officials. They were also instructed to note down the road conditions

and existing facilities of pedestrian crossings at the junctions. The road sketch of the reach indicating the crossing locations where survey was conducted is shown in **Fig.1** below.

Fig.1: Intersections from Bowenpally P.S to Kompally X-Roads

The **Figure 1** shows the junctions between Bowenpally to Kompally on National highway 44.

The study is done through manual count. The following measureswere taken for manual count to get correct and accurate results.

- The time period(s) of count should cover the peak times of the pedestrian crossing activity of study. As counts are done from 7 AM to 7 PM, this is covered as peak time will be in the afternoon and noon times.
- A continuous period of 7 days were observed where there are no school holidays, no office holidays, no bank holidays, no early closing, and no special events were considered for this study.
- All the junctions were considered and selected which cover all strategic locations of the road stretch under consideration.
- The pedestrian facilities need to be provided to divert trips to walking, or increase the current pedestrian activities,at each junction were also studied.

3.2Data extraction

At the junctions, cameras are placed and the information of passerby crossings are recorded once in every 30 milliseconds. This data is extricated by utilizing AVS video editorial manager programming from each forward snap and is shown in Fig. 2. The manual tallying of data recorded by software at Dhulapally crossroads is shown in Fig 3. The traffic jams were usually not included in the data extraction process and the collected data are summarized in **Tables 1 and 2** for male and females respectively.

Fig 2: Data Extraction using AVS video

Fig.3: Dhulapally X-Roads Mid-Block Road Crossing
Morning Survey Timings - 7:00AM To 11:00AM

Table1: Time Vs number of persons crossing (extracted from camera)

TIME PERIOD (in Seconds)	Number of Persons crossing the road (Male)
10-20	5
20-30	18
30-40	24
40-50	11
50-60	25
60-70	13
70-80	2
80-90	1
90-100	6
100-110	17
110-120	26

Table 2: Time Vs number of persons crossing (extracted from camera)

TIME PERIOD (in Seconds)	Number of Persons crossing the road (Female)
10-20	12
20-30	17
30-40	21
40-50	26
50-60	15
60-70	8
70-80	3
80-90	8

The data points from manual counting are related to gap required for pedestrian crossing and the empirical equations are developed. These equations have demonstrated that age, gender and driver condition are most influencing factors.

4. CONCLUSIONS

Age, gender and driver condition effects the gap time required to be provided for pedestrian crossing and should be considered while fixing the pedestrian signals. Our Survey was based upon the pedestrians and the motorists.

In spite of the fact that traffic light gadgets can assist with traffic control, educating people on foot and drivers is principal to a safe control. Arrangement of noticeable cross stamping must be introduced in all the convergences. Considering the high thickness of walker traffic everywhere on the city, pedestrian foot crossing has to be provided. Middle Island with middle obstruction must be given in all the convergences to guarantee safe walker crossing. Road lighting around the intersection ought to be sufficient so that cross imprints are handily caught by the vehicle drivers to have halting sight separation to keep away from crash in evening. The executives of existing physical framework must be upgraded to empower more powerful utilization of crosswalks. Street marking signs, traffic lights, and channelization at convergences, turning limitations, partition hindrances, space for transport stops and leaving off of space for public vehicles should be given provision. Passerby intersection ought to be considered cautiously in rush hour gridlock designing and arranging of the convergences and mid squares. Strolling ought to be perceived as one of the predominant methods for movement all over Hyderabad city. Pedestrian wellbeing ought to be considred depending on traffic convergences, midblock plan contemplations, signal planning, sign boards, cross checking, isolated traverse paths, underpass and numerous other parameters. It is important to eliminate improper and illicit non-transport related traffic from the public traffic to ensure safety on the street. This may include the buildup of elective destinations. Demo-exercise activities ought to be taken to improve the capacity of passengers (drivers and walkers) to be more productive and more secure. Projects ought to be taken to adjust huhman mentalities and bring about eagerness among people to assist better traffic administrations. Set of traffic rules guarantee a more consistence compliance of conduct. Implementation activities can include formal policing to embrace traffic standards and code of conduct, ought to be incorporated into the common public. During foot crossings, vehicles are found to run with max throttle which poses a perilous danger to passersby. Therefore security must be beefed up and traffic police should adopt strict measures to control it. All the vehicles ought to be authorized appropriately to decrease speed at the zebra crossing in the whole signalized convergences.

5. RECOMMENDATIONS

A few suggestions are given considering modifications to encourage safe pedestrian transportation during strategy making. Restrictive passerby phase might be provided in some chosen convergences on pilot premise to improve pedestrian safety and give the walker a cordial ambience. These may be provided where passerby traffic volume is high and where pedestrians regularly violate crossing indiscriminately. Selective Pedestrian Phase (SPP) might be presented which will lessen vehicular movement in the convergences. Convergences, for example, in and around shopping zones and institutional zones are associated with higher volume of people on foot and therefore vehicular regulation time exerts a better flow of traffic. Pedestrian path regularization might be carried out in

different staging plans. At areas with hefty passerby volumes and weighty turning developments, it might be reasonable to give a select path to walkers. Unlawful stopping close to the crossings which obstruction walker crossing ought to be eliminated. Pedestrian regularization methods at intersection ought to be permitted through law. At grade crossing walkers should not be allowed to cross, aimlessly on account of profound traffic flood in most of the assemblies, considering high people thickness and high volume of traffic in the city. It will in general be communicated that introduction of prohibitive bystander signals and placards in the high business and shopping domains of the city will be prohibited.

6. FUTURE SCOPE

Colossal possibilities ought to be considered to suggest most ideal alternatives for determination of the convergence to the present EPP and propose for signal planning in setting of the whole stretch from Bowenpally P.S to Kompally X-Roads. Such exploration may improve the nature of traffic and assist policy makers of Hyderabad.

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