

Study for Human Powered Transportation and Its Consequences on General Traffic

Aadil Rashid Rather¹ Sonu Ram² Rayees Ahmad Ganie³

^{1,2,3}Department of Civil Engineering

^{1,2,3}Desh Baghat University, India

Abstract— In nations like India we for the most part can locate a mixed traffic for example a traffic flow establishing of all sort of vehicles like cycle, rickshaw, vehicle, transport and so on. In Indian urban areas the portion of non-motorised transport (NMT) at peak hours excessively high. Every public vehicle method of transport includes get to trips by NMT at each end. Therefore, non-motorised method of traffic assumes a significant job in fulfilling travel demand in nations like India. To structure a traffic facility it is important to comprehend the conduct of traffic stream. Understanding the conduct of a traffic stream with mixed traffic in very unpredictable. In this theory an attempt to contemplate the non-motorised vehicle attributes and impact on mixed traffic is made. This project work is separated into two sections. Initial segment is the experimental part and the last is the analytical part. In experimental part an investigation of central chart of information got from different streets of Kashmir city. It was seen that with increment in non-motorized vehicle (NMV) % the flow versus density chart is adversely influenced. Density diminishes at a specific flow rate when NMV % increments. Alongside this an examination on example of Lateral Occupancy of non-motorized vehicle (NMV) and motorized vehicle (MV) was finished as for different percentages of NMV and total density. It was considered that to be the percentage of NMV increases the both NMV and MV are very much circulated up and down the street stretch, with a higher concentration in the right hand side, obstructing the stream from the other way. In India it is left hand side drive, so it might prompt side way collision while over taking. Likewise at some point this may end with a traffic jam condition. In the experimental part an examination on variation of speed regarding different parameters was done. It was seen that speed decreases with increment in number of Passenger Car Unit (PCU) in a similar strip, speed decreases with increment in number of PCUs in the adjacent strips and speed increment when distance from the road edge increments. An attempt has been made to propose a model to mimic the speed of a NMV from the information obtained from test results. Fuzzy logic was utilized as a device for etymological grouping of the reason variable in this model. Most definitely it was seen that speed value got tentatively and got from the model are practically same. It was examined that all the three parameters significantly affect the speed of a non-motorised vehicle in a mixed traffic flow.

Keywords: Human Powered Transportation, General Traffic

I. INTRODUCTION

In nations like India we for the most part can locate a mixed traffic i.e a traffic flow comprising of all kind of vehicles like cycle, rickshaw, vehicle, transport and so on. In Indian urban areas the portion of non-motorized transport (NMT) at

top hours is practically more than 50 percent. This figure is much higher in medium-and little measured urban areas. Various urban communities have various patterns of NMT use. Each open vehicle method of transport includes get to trips by NMT at each end. In this way, non-motorised method of traffic assumes a significant job in fulfilling travel need in nations like India. The progression of heterogeneous traffic is very complicated. This mixed flow of vehicles prompts numerous issues like conflicts at crossing points when number of non-motorised vehicle increments and builds it influences the speed and flow of different vehicles. It altogether brings down the limit additionally prompts different security issues. So there ought to be a different track for stream of non-motorized traffic as utilized in different countries like USA, in nations like India this for all intents and purposes unrealistic. So all things considered a legitimate investigation of non-motorised vehicle qualities ought to be done alongside investigation of how these NMV influences the mixed traffic.

According to World Bank review (1990) around 53 % of needy people are there in Asian nations. These people rely upon non-motorized method of traffic for whole trip (for instance, driving, shopping). The interest for bicycles and rickshaws is in this manner impressive at present and is probably going to keep on being so. Consequently investigation of both NMVs development and its impact on motorized mode are considered in the project.

Class of vehicles to be of worried in the project are

- 1) Non-motorized vehicles
 - a) Pedal cycles (NMV).
 - b) Pedal rickshaws.
- 2) Motorized vehicles (MV)
 - a) Motor cycle.
 - b) Auto rickshaw.
 - c) Car
 - d) Bus/truck.

At whatever point terms like NMV and MV is there in this postulation, it alludes to non-motorized vehicle and motorized vehicles individually.

The term 'Non-Motorized Vehicles' (NMVs) is referred to various kinds of pedal powered vehicles utilized in the Indian subcontinent. These incorporate various shapes and sizes of bicycles and tricycles. Tricycles are utilized to convey products and passengers; these are regularly called as cycle rickshaws.

II. LITERATURE REVIEW

Xiao and et al (2011) made an examination for calculating straight path limit under mixed traffic conditions, in China. The First Discharge Headway (FDH) was applied as a novel to improve Stop Line Method model, and the affecting variables of FDH were investigated. To adjust the FDH

likelihood conveyance, examination information of four crossing points in Beijing were analysed. With this model, the paper breaks down conflicting pedestrian and non-engine volumes' effect on limit under mixed traffic conditions. The outcomes show that FDH is just identified with vehicle type and outside unsettling influence elements and there is no shared impact between one another. The traffic limit diminishes exponentially with the expansion of conflict recurrence between pedestrians, non-engines and motorised vehicles.

Dianhai and et al (2007) made an investigation on bicycle transformation factor alignment at two-stage crossing points in mixed traffic flows. Their examination depends on information gathered from eight areas from different urban communities in china. They proposed model to ascertain the through bicycle traffic and left-turn bicycle traffic transformation factors in crossing points where bicycle and engine vehicles share a similar road. The outcomes demonstrate that the through bike change factor is 0.28 and the left-turn bicycle conversion factor is 0.33. This end contrasts from the qualities utilized in China.

Rahman and et al (2004) led an investigation on impact of rickshaw and auto rickshaw on the limit of urban signalized crossing point. For limit examination, to change over the mixed traffic stream into fundamental traffic stream passenger vehicle counterparts assumes a significant job. This investigation likewise planned for building up an estimation technique for passenger vehicle equivalent of rickshaws and auto rickshaws at signalized intersection by a perceptible methodology. They utilized information acquired from four signalized intersection of Dhaka, Bangladesh. They found that evaluated PCE estimation of rickshaws and auto rickshaws of the examination were unique in relation to the accepted PCE values that were utilized by traffic designers of Bangladesh. They found a direct connection between PCE value and extent of rickshaws and auto-rickshaws. The nearness of rickshaws in the mixed stream conditions influence the limit of signalized crossing points more antagonistically at a lower extent than that of at a higher extent of rickshaws.

Rahman and et al (2003) made an examination on the impact of non-motorized vehicles on urban street traffic attributes. They gathered information from four mid-square areas of Dhaka, Bangladesh. They use time code reader programming for extraction of information. They presumed

that non-motorized vehicles have antagonistic impact on essential traffic parameters. A straight line relationship was found between overtaking and absolute volume because of information extend secured was uncongested district. They found a hazy example for overtaking and extents of non-motorized vehicles.

III. METHODOLOGY

A. Experimental part

- 1) To investigation the variety in speed of NMV regarding
 - Number of PCUs in a similar strip.
 - Number of PCUs in the Adjacent strip.
 - Distance of the test vehicle from the street edge.
- 2) To investigation of crucial outline of the traffic stream from the information got from different areas.
- 3) To investigation the impact of thickness and division of NMV on Lateral Occupancy of
 - Non-motorised vehicles.
 - Motorised vehicles

B. Analytical part

Advancement of a model (PC reproduction) for the speed variety of NMVs concerning

- Number of PCUs in a similar strip.
- Number of PCUs in the Adjacent strip.

C. Separation of the test vehicle from the street edge.

1) Data collection

Data collection alludes to the assortment of video inclusion from different areas. The whole task is about the information gathered for different areas of Kashmir city. All things considered five areas were chosen each with various roadway conditions and distinctive traffic compositions. The five areas on which the review work was done are as per the following;

- 1) Road near Pahalgam primary market j&k.
- 2) Road near Anantnag market, j&k.
- 3) Road near Ghanta ghar, Srinagar.
- 4) Road near Tagore hall, Srinagar.
- 5) Road towards Wanpoh chowk

A table indicating width, length of different areas alongside their season of information assortment is introduced underneath.

S.no	Location	Width of Section (in m)	Length of Section (in m)	Time of data collection	Date
1	Road towards Wanpoh Road	7.5	5.5	8:15 am to 8:45 Am	15.03.2019
2	Road near Tagore hall	7.5	5.5	10:00 am to 10:30 am	18.03.2019
3	Road near Anantnag market	9	5.5	9:00am to 9:30 Am	20.03.2019
4	Road near Pahalgam main market	7.5	5.5	5:00 pm to 5:30 Pm	21.03.2019
5	Road near Ghanta Ghar	10	7.5	9:15am to 9:45 Am	22.03.2019

Table 1: Measurements of different sections and timing of information collection.

All the information were gathered with a video camera for 30 minutes interval. A segment on every street was chosen which has adequate number of non-motorized traffic. A 5.5m long segment was chosen and utilizing some marking tools the four corners of the zone must be checked. Furthermore, the video of the segment was taken. All the information was recorded by utilizing a video camera and

later decoded in the PC by playing the video with the assistance of KM player. A cellophane paper was pasted of the PC screen. And the four corners were stamped and gotten together with assistance of a white board marker. This was done on the grounds that in spite of the fact that the real state of the area in rectangular however when caught in a camera its shape gets distorted.

At that point the information was decoded at every second rate or per outline rate (25 frames = 1 sec) according to the requirement.

2) Investigation of principal chart of the traffic flow

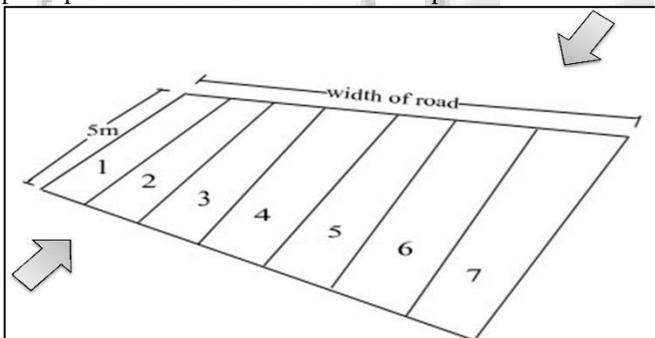
Major graph implies the diagrammatic representation of the connection between the different traffic parameters for example the connection between speed, flow and density. For this investigation information was gathered for four areas to be specific;

- 1) Road near Pahalgam main market, j&k.
- 2) Road near Anantnag market, j&k..
- 3) Road near Ghanta ghar, Srinagar.
- 4) Road near to Tagore hall, Srinagar.

In the event that the information acquired from a 2 way road, information decoding was accomplished for both way independently for example for upward flow or downward flow.

3) Strategy followed

Here the gathered video was played in KM player. A cellophane paper was pasted on the PC screen. Every one of the 4 corners were set apart on PC screen and joined. For each 1 min interval the progression of vehicles that is the quantity of vehicles of every class passing the line in the two bearings was noted. Likewise for each 10 sec interval the density inside the oppressed region was resolved for both motorized and non-motorized vehicles. Speed was determined with connection $u=q/K$. Lastly different principal charts for different areas were plotted.



4) Study of lateral occupancy

In this examination the point was to perceive how the NMV and MV differ along the side on a specific segment of street when level of NMV and density of all vehicles changes. For this investigation information was gathered for four areas in particular;

- 1) Road near Pahalgam primary market, j&k.
- 2) Road near Anantnag market, j&k.
- 3) Road near to Tagore hall, Srinagar.

Each of the 4 corners were checked and joined. The area was separated into 7 equivalent strips. Width of one strip relies upon width of the street. At like 10 seconds interim for each strip, number of vehicles of every classification of vehicles was noted down. According to their PCU comparable vehicles were changed over to NMV and MV. Relative total NMV and MV in each strip was discovered. Chart between relative lateral occupancy and strip number was plotted for NMV, MV, and absolute traffic. Additionally the impact of density and level of NMV on lateral occupancy was considered.

IV. RESULTS AND DISCUSSION

A. Tagore hall

The flow versus density and speed versus density charts for near Tagore hall. In this area NMV rate was seen as 17.03 % and density was 4.87 PCU/m. The points acquired are for uncongested area so the speed esteems are high.

B. Wanpoh chowk

The flow versus density and speed versus density diagrams for near Wanpoh chowk. In this area NMV rate was seen as 13.11 % and density was 7.93 PCU/m. Here motorized rate was high with substantial vehicles like bus, trucks and so forth. So a few points from the blocked area are likewise gotten. This is the explanation behind which the speed of the vehicles is of low range.

C. Pahalgam main market

The flow versus density and speed versus density diagrams for upstream side for Pahalgam main market. In this area NMV rate was seen as 48.03 % and absolute density was 5.87 PCU/m. The diagrams are true to form. As NMV rate is all the more so for motorized vehicles a few points of blocked flow was gotten.

The flow versus density and speed versus density charts for downstream side for Pahalgam main market. In this area NMV rate was seen as 33.75 % and density was 6.35 PCU/m. The charts are true to form. As NMV rate is all the more so for motorized vehicles a few purposes of congested flow was gotten. Additionally the speed esteems are less.

D. Anantnag market

The flow versus density and speed versus density diagrams for upstream side for road near Anantnag market. In this area NMV rate was seen as 33.64 % and density was 6.58 PCU/m.

The flow versus density and speed versus density charts for downstream side for road near Anantnag market. In this area NMV rate was seen as 18.89 % and density was 5.61 PCU/m.

V. CONCLUSION

In fundamental chart the plot is like it is being normal. The diagram shows partial density of the area, on the grounds that inside 30 min video getting the free and congested flow at a time is essentially impractical. In any case in one area some purpose of congested flow is likewise accomplished. While looking at the flow versus density curve for different area as for different level of NMV it was discovered that that with increase in NMV rate an adverse impact was seen on the progression of the mixed traffic. Density decreases at a specific flow rate when NMV rate increases.

In lateral occupancy diagram it very well may be seen that the NMVs attempting to remain in left hand roadside. As in India we follow left hand side drive the MVs attempt to overtake them and are found for the most part in the right hand roadside. Additionally the principal strip or 1 m from the left edge remains practically empty since vehicles regularly attempt to avoid from moving at the edge when there are no shoulders or raised bends are there.

Streets in which there are shoulders the vehicles are found in the primary strip from left hand side too.

Density information acquired from all the area are practically same, so it is beyond the realm of imagination to expect to foresee the pattern of lateral occupancy.

In any case, concerning level of NMV the expectations resemble with less NMV rate the non-motorized vehicles although discovered for the most part in the left side for example strip 1 and 2 yet are unevenly dispersed. With moderate NMV rate the non-motorized vehicle follow a pattern and are isolated in the left as well as discovered most extreme in the middle part of the street possessing strip 2 and 3. With high NMV rate the non-motorized vehicles are equally appropriated in the whole space and attempting to possess the right hand roadside hindering the route for flow from other directions.

With less NMV rate the motorized vehicles don't face any issue and are equitably circulated in the whole flow space toward that direction. With moderate NMV rate motorized vehicles are attempting to overtake the NMVs yet as there is a flow from other heading too so they are for the most part possessing the middle part of their stream space for example strip 3 and 4. When NMV rate is high at that point motorized vehicle attempt to overtake them and are found in right hand roadside for example strip 4, 5 and 6 consuming the space for the flow from other heading too.

From the speed versus different parameters diagram it tends to be presumed that speed of the non-motorized vehicles

- 1) Decreases when number of PCUs in a similar strip rise.
- 2) Decreases when number of PCUs in adjoining strip rise.
- 3) Increases when distance from the road edge rises.

Most definitely it was seen that speed value got experimentally and got from the model are practically same. So the model can be utilized for streets with mixed traffic in with single path of flow.

In this model course of the flow was not considered for that is other than the test vehicle might be from the other way of flow. So in future examination the speed value can be demonstrated significantly more accurately if the heading of flow is considered separately.

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