Traffic Volume and Signalization

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Abstract-The study conducted at the AUST-Flyover to Mangamuru Junction in Ongole city underscores the critical role of traffic engineering in ensuring safe and efficient movement of people and goods on roadways. By focusing on traffic volume analysis, the research illuminates key traffic characteristics essential for effective urban planning and traffic management. The increase in pedestrian and vehicle volumes over the past decade underscores the urgency for comprehensive solutions to address congestion and enhance mobility. Through manual traffic flow surveys and calculations of Passenger Car Units (PCU's), the study provides valuable insights into current traffic patterns and dynamics. These findings not only facilitate a better understanding of the present traffic situation but also serve as a basis for implementing traffic control measures and suggesting remedial actions to improve safety and efficiency at the junction. Recommendations such as road widening, lane expansions, and improvements in public transport infrastructure emerge as potential solutions based on the outcomes of the study. By leveraging these insights, authorities can enhance traffic management strategies and pave the way for sustainable urban development, ensuring that the city's road infrastructure can adequately meet the evolving needs of its inhabitants while prioritizing safety and efficiency.

Index Terms—PCU, traffic patterns and dynamics

I. INTRODUCTION

Mode of transport (or means of transport or transport mode or transport modality or form of transport) is a term used to distinguish substantially different ways to perform transport. The most dominant modes of transport are aviation, land transport, which includes rail, road and off-road transport, and ship transport. Other modes also exist, including pipelines, cable transport, and space transport. Human-powered transport and animal-powered transport are sometimes regarded as their own mode, but these normally also fall into the other categories.

Each mode of transport has a fundamentally different technological solution, and some require a separate environment. Each mode has its own infrastructure, vehicles, and operations, and often has unique regulations. Each mode also has separate subsystems. A subsystem is a group of many parts that make up one part. All modes of transportation have 6 subsystems. They are: Propulsion, Suspension, Control, Guidance, Structural, and Support. Transport using more than one mode is described as intermodal. Transportation that carries around many people and can be used by the public is known as Mass Transportation. The EU VAT directive refers means of transport to the actual physical vehicles of transport, referred to in this article. Generally speaking, high strength concrete is defined as having a 28-day cylinder compressive strength of more than 6000 psi, or 42 MPa. Heavy weights that Normal Strength Concrete is unable to withstand are resisted by High Strength Concrete. Thus, high strength concrete was needed. In addition to expanding the range of uses, high strength concrete

II. LITERATURE REVIEW

The literature review on traffic volume and signalization provides valuable insights into the complex relationship between these two critical elements of urban transportation. Each study contributes to our understanding of how signalization can be optimized to manage traffic flow effectively. However, there are critical reviews for each content:
Lee and Kim (2021) present an innovative approach by leveraging machine learning and artificial intelligence to develop predictive signalization models. While their work shows promise in preemptively adjusting signals based on historical traffic data, there may be challenges in accurately predicting volume fluctuations, especially in dynamic urban environments. Additionally, the scalability and adaptability of such models to varying traffic conditions need further exploration.

Chen and Patel (2020) advocate for a holistic approach to signalization that considers not only vehicular traffic but also pedestrian and cyclist dynamics. This

approach aligns with the principles of inclusive urban planning and safety. However, the practical implementation of such strategies may pose logistical challenges, particularly in densely populated areas where different modes of transportation intersect. Further research is needed to develop robust signalization frameworks that accommodate diverse user groups effectively.

Johnson and Wang (2019) highlight the potential of intelligent transportation systems in informing dynamic signal adjustments to alleviate congestion. While real-time data integration offers promising solutions for optimizing signalization, the scalability and interoperability of such systems across different urban contexts require careful consideration. Additionally, the reliability and privacy concerns associated with real-time data collection and processing necessitate further investigation.

Smith et al. (2018) emphasize the impact of traffic volume on signalization effectiveness and advocate for adaptive control systems. While adaptive systems offer flexibility in responding to fluctuating demand, challenges may arise in accurately calibrating these systems and ensuring seamless integration with existing infrastructure. Moreover, the cost-effectiveness and maintenance requirements of adaptive control systems need to be carefully evaluated to justify their implementation.

Overall, while the reviewed studies offer valuable insights into the optimization of signalization for managing traffic volume, further research is needed to address the practical challenges and implications of implementing these strategies in diverse urban environments.

III. METHODOLOGY

Here are concise summaries for each traffic volume survey method:

1. Toll Plaza Ticketing:
Toll plazas serve not only as revenue collection points but also as potential sites for traffic surveys. By analyzing the receipts issued to vehicles passing through, authorities can determine the types and numbers of vehicles entering and leaving the area, aiding in traffic flow analysis.

2. Registration Offices:
Vehicle registration records maintained at district-level offices provide insights into the influx of new vehicles onto the roads. However, limitations arise when vehicles are sold or relocated, affecting the accuracy of data regarding vehicle movements.

3. Statistical Approach:
Utilizing statistical methods on past traffic records enables predictions about future traffic flow patterns. This approach relies on effective record-keeping and data analysis to generate accurate forecasts.

4. By Interviewing:
Conducting interviews with commuters at various entry points of a city yields valuable data on daily traffic densities and routines. However, this method can be labor-intensive and may encounter reluctance from some transporters to stop for interviews.

5. Check Posts:
Check posts at city or provincial entry and exit points serve dual purposes of maintaining legal compliance and facilitating traffic surveys. By maintaining records of vehicle movements, authorities can monitor traffic flow and implement measures to mitigate congestion and ensure security.

6. Global Positioning System (GPS):
GPS technology offers real-time tracking of vehicles, providing precise data on their locations and movements. Automated surveillance techniques utilizing GPS chips enable efficient and accurate traffic surveys, facilitating comprehensive analysis and management of traffic flow.

IV. RESULTS AND ANALYSIS

TRAFFIC VOLUME IN ONGOLE:
There are so many junctions like mangamur road, addanki busstand, kottapatnam and church center, ongole bus stand We calculated the traffic volume at these junctions

4.1 CHURCH CENTER

@ 9:00 am to 10:00 am

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	215	1.0	215
2	Motor Cycle	3268	0.5	1634
3	Auto rickshaw	1556	1.0	1556
4	Bus	15	3.0	45
5	Agricultural Tractor	12	3.0	36
6	Lorry	5	3.0	15
7	Pedal cycle	124	0.5	62
8	Hand carts	29	6.0	174

@ 3:00 pm to 4:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	450	1.0	450
2	Motor Cycle	3984	0.5	1992
3	Auto rickshaw	1620	1.0	1620
4	Bus	10	3.0	30
5	Agricultural Tractor	2	3.0	6
6	Lorry	5	3.0	15
7	Pedal cycle	180	0.5	90
8	Hand carts	43	6.0	258

@ 5:00 pm to 6:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	306	1.0	306
2	Motor Cycle	3671	0.5	1835.5
3	Auto rickshaw	1900	1.0	1900
4	Bus	12	3.0	36
5	Agricultural Tractor	0	3.0	0
6	Lorry	0	3.0	0
7	Pedal cycle	202	0.5	100.5
8	Hand carts	150	6.0	900

@ 7:00 pm to 8:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	273	1.0	273
2	Motor Cycle	4084	0.5	2042
3	Auto rickshaw	1445	1.0	1445
4	Bus	8	3.0	24
5	Agricultural Tractor	0	3.0	0
6	Lorry	0	3.0	0
7	Pedal cycle	100	0.5	50
8	Hand carts	75	6.0	450

4.2 MANGAMUR ROAD JUNCTION:

@9:00 am to 10:00 am

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	648	1.0	648.00
2	Motor Cycle	2691	0.5	1345.50
3	Auto rickshaw	743	1.0	743.00
4	Bus	74	3.0	222.00
5	Agricultural Tractor	6	3.0	18.00
6	Lorry	297	3.0	891.00
7	Pedal cycle	95	0.5	47.50
8	Hand carts	21	6.0	126.00

@ 3:00 pm to 4:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	797	1.0	797.00
2	Motor Cycle	1750	0.5	875.00
3	Auto rickshaw	661	1.0	661.00
4	Bus	76	3.0	228.00
5	Agricultural Tractor	5	3.0	15.00
6	Lorry	347	3.0	1041.00
7	Pedal cycle	28	0.5	14.00
8	Hand carts	16	6.0	96.00

@ 5:00 pm to 6:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	935	1.0	935.00
2	Motor Cycle	2617	0.5	1308.50
3	Auto rickshaw	718	1.0	718.00
4	Bus	154	3.0	462.00
5	Agricultural Tractor	15	3.0	45.00
6	Lorry	479	3.0	1437.00
7	Pedal cycle	15	0.5	7.50
8	Hand carts	14	6.0	84.00

@ 7:00 pm to 8:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	1156	1.0	1156
2	Motor Cycle	2106	0.5	1053.
3	Auto rickshaw	562	1.0	562.00
4	Bus	214	3.0	642.00
5	Agricultural Tractor	11	3.0	33.00
6	Lorry	624	3.0	1872.00
7	Pedal cycle	8	0.5	4.00
8	Hand carts	0	6.0	0.00

4.3 ONGOLE BUSTAND:

@ 9:00 am to 10:00 am

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	642	1.0	642.00
2	Motor Cycle	3122	0.5	1561.00
3	Auto rickshaw	918	1.0	918.00
4	Bus	37	3.0	111.00
5	Agricultural Tractor	5	3.0	15.00
6	Lorry	373	3.0	1119.00
7	Pedal cycle	64	0.5	32.00
8	Hand carts	24	6.0	144.00

@ 3:00 pm to 4:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	726	1.0	726.00
2	Motor Cycle	2039	0.5	1019.50
3	Auto rickshaw	607	1.0	607.00
4	Bus	62	3.0	186.00
5	Agricultural Tractor	6	3.0	18.00
6	Lorry	338	3.0	1014.00
7	Pedal cycle	120	0.5	60.00
8	Hand carts	25	6.0	150.00

@ 5:00 pm to 6:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	872	1.0	872.00
2	Motor Cycle	2447	0.5	1223.50
3	Auto rickshaw	728	1.0	728.00
4	Bus	74	3.0	222.00
5	Agricultural Tractor	9	3.0	27.00
6	Lorry	410	3.0	1230.00
7	Pedal cycle	75	0.5	37.50
8	Hand carts	29	6.0	174.00

@ 7:00 pm to 8:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	1136	1.0	1136
2	Motor Cycle	3180	0.5	1590
3	Auto rickshaw	946	1.0	946.00
4	Bus	84	3.0	252.00
5	Agricultural Tractor	12	3.0	36.00
6	Lorry	615	3.0	1845.00
7	Pedal cycle	50	0.5	25.00
8	Hand carts	19	6.0	114.00

4.4 ADDANKI BUSTAND:

@ 9:00 am to 10:00 am

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	578	1.0	578.00
2	Motor Cycle	1960	0.5	980.00
3	Auto rickshaw	1723	1.0	1723.00
4	Bus	104	3.0	312.00
5	Agricultural Tractor	3	3.0	9.00
6	Lorry	113	3.0	339.00
7	Pedal cycle	156	0.5	78.00
8	Hand carts	47	6.0	282.00

@ 3:00 pm to 4:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	747	1.0	747.00
2	Motor Cycle	2652	0.5	1326
3	Auto rickshaw	1387	1.0	1387.00
4	Bus	95	3.0	285.00
5	Horse drawn vehicle	1	4.0	4.00
6	Lorry	130	3.0	390.00
7	Pedal cycle	96	0.5	48.00
8	Hand carts	18	6.0	108.00
9	Bullock cart	2	8.00	16.00

@ 5:00 pm to 6:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	428	1.0	428.00
2	Motor Cycle	1453	0.5	726.50
3	Auto rickshaw	1629	1.0	1629.00
4	Bus	104	3.0	312.00
5	Agricultural Tractor	5	3.0	15.00
6	Lorry	142	3.0	426.00
7	Pedal cycle	64	0.5	32.00
8	Hand carts	27	6.0	162.00

@ 7:00 pm to 8:00 pm

S No	Vehicle	No. of vehicles	Equivalency factor	PCU
1	Car	642	1.0	642
2	Motor Cycle	1743	0.5	871.5
3	Auto rickshaw	2280	1.0	2280
4	Bus	156	3.0	468
5	Agricultural Tractor	15	3.0	45.00
6	Lorry	198	3.0	594.00
7	Pedal cycle	15	0.5	7.50
8	Hand carts	6	6.0	36.00

Therefore the total PCU at 9:00 am to 10:00 am:
1. Church center jn : 4041 PCU
2. Mangmur road jn : 3337 PCU
3. Ongole bustand jn : 4542 PCU
4. Addanki bustand jn : 4301 PCU

Therefore the total PCU at 3:00 pm to 4:00 pm:
1. Church center jn : 3727 PCU
2. Mangmur road jn : 4461 PCU
3. Ongole bustand jn : 3780 PCU
4. Addanki bustand jn : 4311 PCU

Therefore the total PCU at 5:00 pm to 6:00 pm:
1. Church center jn : 4997 PCU
2. Mangmur road jn : 5117 PCU
3. Ongole Bustand jn : 4514 PCU
4. Addanki bus stand jn : 3730 PCU

Therefore the total PCU at 7:00 pm to 8:00 pm:
1. Church center jn : 4284 PCU
2. Mangmur road jn : 5322 PCU

3. Ongole Bustand jn : 5944 PCU
4. Addanki bus stand jn : 4844 PCU

CONCLUSION

As from the study we observed the problems in the traffic status in ongole. There are some particular junctions with heavy traffic due to development of the city ongole like Church center, addanki bustand, ongole bus stand Jn, kothapatnam bustand, mangamur road, trunk road, Etc….. The junctions are very floated. So we have reduce the traffic by signalization and by lane control methods.

1. We have to increase the green time in the lane which the volume is more.
2. Placing traffic lights at kothapatnam bustand road.
3. Seeing the further development we have to control the traffic.
4. Implementation of foreign techniques is some what better to control traffic.
5. By segregating the vehicles by the way of passing & by keeping time for the heavy loaded vehicles to enter into city.
6. By segregating we can save our time and economy for using less cost instruments.
7. By using sound system signals and pedestrian signals was better.
8. We should increase amber time.
9. The conflicts should be decreased.
10. By providing a 2 lane road with a divider at trunk road junction towards ongole Bustand.
11. By placing no entry at kotapatnam junction towards ongole Bustand.

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