A Review on Design of Public Transportation System in Chandrapur City

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Abstract

As we know the population of Chandrapur City has increased so far in this years and with that has increased the vehicles causing high traffic volume & rise in pollution. But the transportation system in Chandrapur City is still the same. To reduce the traffic volume & pollution, we have to study & design the new transportation system in Chandrapur City. The system would be as similar to Nagpur City with the implementation of Star City Buses. In this Study we would first compare the speed of various vehicles. Collection of population details of Chandrapur City, approximate number of vehicles running on road, collection of data with respect to Ticket fares in Nagpur City- whether it is according to Kilometers or places to be reached, calculation of Ticket Fares for Chandrapur City on the basis data collected. By all these, the best mode of transport in City can be studied. On the basis of above data collected from various respected fields, we will then proceed for the Design part of urban transport system in Chandrapur City. For Design purpose, firstly we have to mark the centre of the City, when the centre is decided; we will then select the Bus Terminus. From centre of the city, we would prefer to select the routes of the Buses. One route will be for the city side like Jatpura Gate, Pathanpura Gate. One route will be for Ballarpur going road. The other one for Mul going road, then next for Nagpur road. We could decide as many routes once we get the clear idea about all data. By getting all this details, the next step is to design the destination points of Buses. Then we have to design about the Bus bays, to reduce congestion in the particular intersections or Stops of bus. After the design also can suggest for Bus lanes. Implementation of Bus Rapid Transit System (BRT system) is the main aim behind to develop transportation mode of City. The design of the Transport System can be designed with the help of various software's like AutoCAD and Revit.
Keywords: Public Transportation System, Urban Transportation System, BRTS

I. INTRODUCTION

As per study, it is noticed that the Population in Chandrapur City has increased in very large number in last few Decades. Due to the increased population the Public need is also increasing. In this, the main need is about Transportation. The number of vehicles is increasing day by day. Due to this, the pollution in Chandrapur City is also increasing day by day. Also, the Traffic in City is creating many problems. To overcome these problems, we have decided to plan a Transportation System in Chandrapur City.

A. The Main Objectives are as Follows

1) To reduce the traffic.
2) To reduce the pollution caused by vehicles.
3) To make Transportation easier.
4) To reduce the cost for transportation.

B. *Reason for Selecting the Project*

Population has increased with that the numbers of Industries have also increased. Due to this, the number of vehicles has increased with that the traffic is also increasing. People are using their own vehicles for their transport purpose. The populations of various cities have also increased but they have implemented the no. of new Public Transportation Systems likewise BRT, LRT, Metro railways, etc. With reference to the present Population, we can implement BRT system in Chandrapur City. So, the name came "Design of Public Transportation System in Chandrapur City". Due to this Project various problems in our City can be solved out.

C. *Scope of Public Transportation System*

1) Public Transport is getting easier.
2) Urban Transport System is getting a new way.
3) Bio-gas buses lessen the pollution.
4) To reduce the congestion & pollution from the study parameter.

II. LITERATURE REVIEW

Partha Chakroborty, "Optimal Route Network Design for Transit Systems Using Genetic Algorithms", Engineering Optimization, 2002, Vol. 34(1) [1]: In this paper, an attempt is made to develop a procedure for designing effective transit route forming a transit route network for a given road network. Author Conclusion: In this paper, optimization procedure which evolves optimal or efficient transit route set (or transit route network) for given road network and transit demand data from initial set routes is developed. Our conclusion: We can get the best transit network design from author's research.

A. P. Singh, "A Review On Urban Public Transport System Of Bhopal City", International Journal of Advanced Engineering Technology, Vol.III/ Issue II/April-June, 2012[2]: Accordingly "Bhopal city link limited" (BCLL) was set up with Bhopal Municipal Corporation and Bhopal Development Authority as stake holders. The management of the company was entrusted to the Board of Directors headed by Collector. BCLL started its operation during October 2006, but the full fleet of 39 buses came into operation in Jan 2007 only with full operations starting from March 2007 onwards. The average scheduled vehicle utilization is 223km while the actual achieved is only 198km per day. The cancellation of kilometers account for about 11% and this is a measure for poor operational efficiency of the system. The average revenue per km is estimated at Rs.18.68 of which Rs. 16.00 is from fare box collection and the balance (14.35%) is indirect revenue from advertisement, monthly pass etc. Author Conclusion: Having the right network planning philosophy as well as applying the right network design principles can stand between outstanding success and complete failure for public transport in small and medium sized cities and regions. Our Conclusion from Study: The right of network design. To provide appropriate cost for transport.

Narendra M. Hatwar, "Impact Of New Public Transportation System In Nagpur City", IOSR Journal of Mechanical and Civil Engineering , Volume 11, Issue 3 Ver. IV (May- Jun. 2014) [3]: Improving Public Transportation which can improve by Bus Rapid Transit System, Parameters used: Traffic Volume count Software used HCS 2000 Author conclusion: Founded Level of Service on different route networks. Our Conclusion from study: The software is useful for finding Level of Service.

B. Vamsi Krishna, "Design and Development of Automated Public Transportation System and Traffic Guidance System", IOSR Journal of Electronics and Communication Engineering. Volume 12, Issue 1, Ver. II (Jan.-Feb. 2017) [4]: Hardware approaches to IPTS are too dependent on the quality of the sensors and the micro controllers used. Moreover flexibility of such approaches is also less along with the complexity involved in the bundling together of the various components into a single hardware framework. The hardware based methods also suffer from problems due to electrical noise, maintenance, wear and tear etc. Author Conclusion: The measurements are updated at regular intervals, every time the bus module sends an update to the server. It distributes this information on demand, to passengers who send request using a smart phone application. The issues with traffic can be constrained as more people will opt for the efficient and economical public transportation as a medium of travel on a frequent and regular basis. With the information on demand service, the drivers can plan their journey well in advance, hence saving a lot of time and making the individual more productive. Our Conclusion from research: The Author has tried to explain the software IPTS on traffic management.

Dr. Shailey Singhal, "Bio-Cng: A Suitable Choice for Green Transportation", Akshay Urja: February-April 2017[5]: Author has studied on CNG & biogas produced from different sources.

− Author Conclusion

Bio- CNG can be used as Transportation Fuel & can be available economically.

− Our Conclusion

Implementation of Biogas fuel can make the transportation more economical & lessens the pollution.

III. STUDY OF CHANDRAPUR CITY

A. Population

As per the study, the population has increased in last three decades in a regular manner. The survey done by Municipal Council & Censes Towns gives the clear idea about the growth of population in Chandrapur District. In 1991, the population was 1,771,994 which have increased to 2,071,101 in 2001. In 2011, it has been increased to 2,194,262. It clearly shows that the population will be increasing & goes above 3,000,000 in coming years.

The following chart shows the population in last three decades:
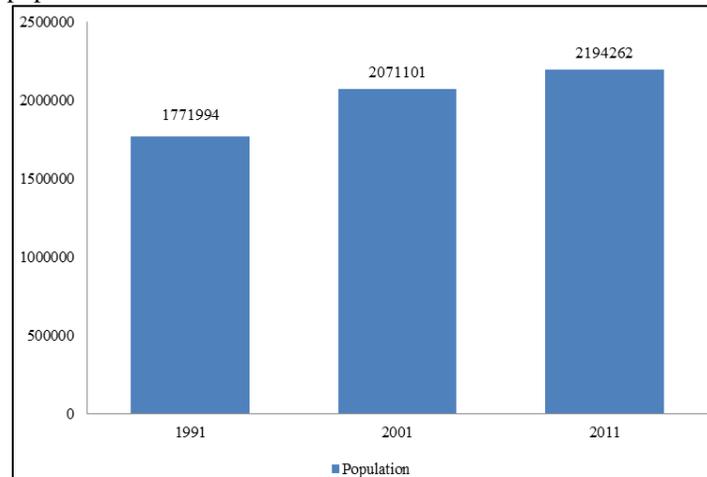
Chart 1: Population of Chandrapur District

- No. of cities & towns under 50000:- 20
- No. of cities & towns between 50000 -100000:- 2
- No. of cities & towns above 100000:- 1

B. Pollution

As per the study, the pollution in Chandrapur city has been increased in last years to a very extreme level. The survey done by Maharashtra Pollution Control Board shows that the various types of Pollution is affecting our city, namely Water Pollution, Air Pollution & Land Pollution. Various different Industries which have started earlier have an impact on air. In recent years the pollution has been under control due to measures taken into consideration. But still Vehicular Pollution which comes under Air Pollution has a bad impact on transportation in Chandrapur. Due to large numbers of automobiles plying on the road in the city vehicular pollution has become source of air pollution.

C. Biogas as a Transportation Fuel

As per the study, it has been found that compressed natural gas (CNG) is an important transportation fuel obtained by compressing natural gas to the pressure above 3,100 pounds per square inch. CNG is used as a substitute to gasoline, diesel, and LPG. Use of CNG is promoted worldwide as it is a clean fuel and CNG vehicles show an average reduction in ozone forming emissions to around 80 per cent as compared to gasoline vehicles. CNG has several advantages over conventional fuels, viz., petrol and diesel. It causes lesser corrosion and wears to the body of engine; it is environmentally benign due to lower emissions of carbon and particulate matter per equivalent distance travelled; and being lighter than air, it is safer in case there is a spill. Owing to its advantages, the use of CNG is increasing worldwide in the present scenario. This increase is even more expected when the governments of various nations including India have put a step forward for decreasing the use of diesel particularly for vehicular use due to environmental concerns. In some countries, the respective governments have decided to keep the prices of CNG lower than gasoline to promote its use as transportation fuel.

The Public Transport Bus operated on Bio- CNG is shown in fig. below

Fig. 1: Public Transport Bus Operated on Bio-CNG

In recent, a Kolkata- based company has designed a bus that will run on biogas produced from cow dung & will charge a flat rate of Re 1 for a 17.5 km route.

IV. MAP STUDY OF CHANDRAPUR CITY

A. *Types of Roads Network*

There are number of roads connecting Chandrapur District. Generally, roads are classified in 5 categories – National Highway (NH), State Highway (SH), Major District Roads (MDR), Other District Roads (ODR) and Village Roads (VR).
The following are the road networks connecting Chandrapur:
1) NH930: The National Highway connecting Warora to Chandrapur and further Chandrapur to Mul.
2) SH264: The State Highway which connects Chandrapur to Ballarpur.
3) MSH6: Connecting Chandrapur to Ghugus.
There are some new sanctioned State Highways which connects Padoli to Rajura, Warora to Shegaon Bk.

B. *Road Width*

The term road width refers to how wide a road is. It depends on what type of road is being measured.
1) For Single lane – 3.75 m
2) For Multilane – 3.5 m per lane
3) For MDR, the total road width should be 15 m
4) For ODR – 3.75 m
5) For MDR – 3.5 m

C. *Road Pattern*

Road Pattern generally describes which pattern of road is. There are in general 5 classifications of road patterns. They are
1) Rectangular or Block Pattern
2) Star & Block Pattern
3) Hexagonal Pattern
4) Star Circular Pattern & Star & Grid Pattern
In Nagpur, the road plan assumes 'Star & Grid Pattern'. But when we see about Chandrapur, there is no specified road pattern. In Bengali Camp, there is Circular Pattern, if we go to Indira Nagar there is Mesh Pattern.

V. TRANSPORT NETWORK

A. *Route Mapping*

1) *Origin*
By keeping all the above points in mind, we have decided to mark the origin in the side of Datala, where we can get easily access to our Destination.
The map shows the location of the origin of our project.

Map 1: Map Shows Location of City Bus Stand

2) *Routes*
After selecting the origin for our City Bus Stand, routes & stops were decided on the basis of study and data collected. The routes are given below:
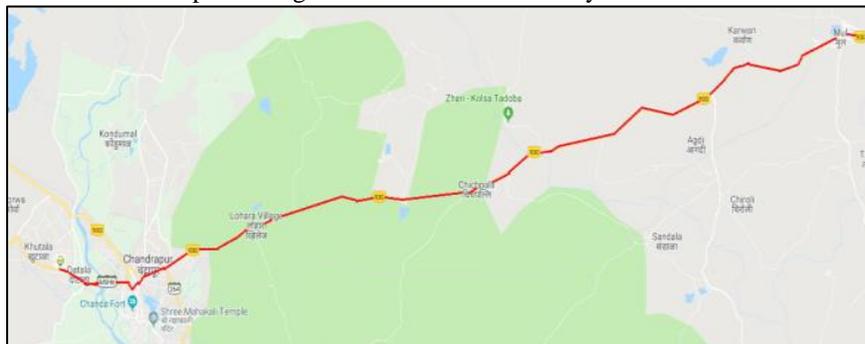 a) *City Bus Stand to Ghugus*
Center Bus Stand – T point agro Pvt. Ltd. – MIDC -Multi Organics Pvt. Ltd. –Hi-tech College of Pharmacy – Wandhari – Nagala –Refined Soya Oil Factory- Anturla – Nanda sq. – Panchamukhi Temple – Shegaon Road Sq. – Chandni Sq. – Ghugus

Map 2: City Bus Stand to Ghugus
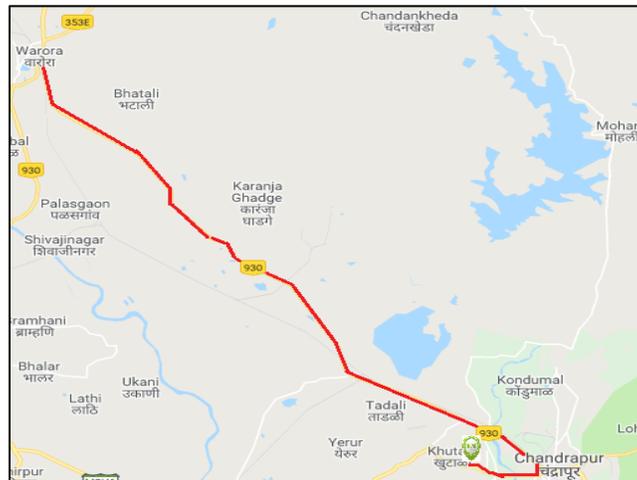
b) *City Bus Stand to Mul*

Center Bus Stand – Datala - Dewada Sq.- Balaji Temple – Chanda Public School – Ramnagar – Watertank – Sawarkar sq - Aadarsh Petrol Pump – Bengali Camp – Nehru Nagar T-point – Indira Nagar – MEL – Lohara – Ganta Chowki – Chichpalli – Ajaypur T-point –Gondsawar – Janala T-point – Agdi – Kesala Ghat – Railway Station – Tahsil Office Mul – Gandhi Sq Mul

Map 3: City Bus Stand to Mul
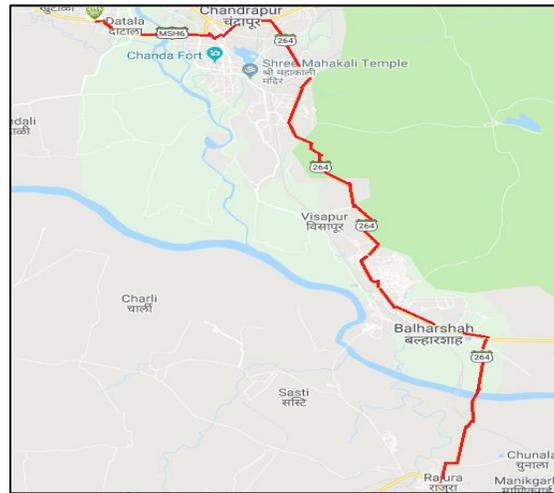
c) *City Bus Stand to Warora*

Center bus stand – Datala - Dewada Sq – Balaji Temple- Chanda Public School – Ramnagar – Warora Naka – Janta College – Bapat Nagar – Tristar Hotel – Yashwant Nagar – Padoli sq- Morwa – Tadali Sq.- Urjanagar -Ghodpeth – Lonara – SSCET College – Sumthana – Bhadrawati – Kesurli – Kadholi – Kiloni – Takli – Nandori – Sakhardoh – Ekarjuna – Borda – Warora - Anandwan Sq

Map. 4: City Bus Stand to Warora

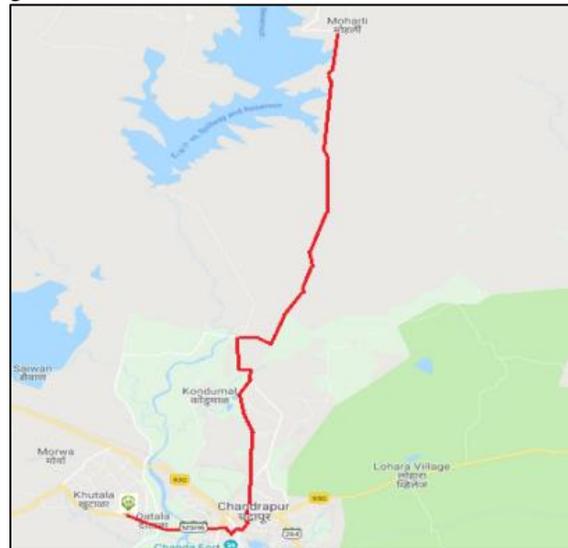*d)* *City Bus Stand to Rajura*

Center Bus Stand – Datala - Dewada Sq.- Balaji Temple – Chanda Public School – Ramnagar – Watertank – Sawarkar Sq – Aadarsh Petrol Pump- Bengali Camp – DRC Club – Babupeth – Junona Sq –GEC – APJ Garden – Sanmitra Sainik Vidyalaya – Visapur – Kala Bhavan – Ballarpur – Railway Station – Bamni –T- point – Hanuman Temple – Rajura – Gadchandur T-point.

Map 5: City Bus Stand to Rajura

e)   City Bus Stand to Moharli:

Center Bus Stand – Datala - Dewada Sq.- Balaji Temple – Chanda Public School – Ramnagar – Watertank – Sawarkar sq.-
Tadoba T-point – Dhande Hospital – Matoshri School – S.T. Workshop – Major Gate – Durgapur - Shakti Nagar – Urjanagar
Gate – Bhatadi Mine – Padmapur – Agarzari – Government Resort – Moharli

Map 6: City Bus Stand to Moharli

VI. METHODOLOGY

1) Study on Existing Transport facility
2) Study of various Public Transportation System in India:
   Pune Transportation System, Mumbai Transportation System, Nagpur Transportation System, Bangalore Transportation
   System, Indore Transportation System. We can select the best Transportation system which would be more efficient &
   reliable to us.
3) Study of Environmental issues in City:
   As discussed earlier, the vehicular pollution has a bad impact in City.
4) Study of less Polluting Transport facility:
   Implementation of less polluting buses such as Bio-CNG.
5) Data collection from various sources;
   Data Collection from Main Bus Stand, Data Collection from RTO, Road Width Data

VII. FUTURE WORK

A. *Planning*

- Scheduling
- Trip generation
- Trip distribution
- Ticket Fares

B. *Design model of Transport System*

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