

## **PMC-Nanded city Monorail to make Pune SMARTER**

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**Abstract:** *All the developed cities face transportation as a major problem along with municipal solid waste and sewage disposal. The level of pollution is also a serious matter. While becoming a smart city Pune cannot go by a single solution to such problem and there is a need to have integrated and environment friendly system that will make us (PUNE) unique in the world. In this paper an effort is made to push forward a monorail system on one corridor Nanded city to PMC. As the system like METRO and BRT are not feasible on routes on which turns and gradients are stiff. In Pune there is a possibility to run a monorail along 'MULA' and 'MUTHA' rivers considerable length and it can help connect all the other corridors of the city. Its economically, cost effectiveness, technical feasibility is discussed in the paper to come to a conclusion that MONORAIL can be an effective augmentation to other transportation systems on this particular corridor.*

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### **I. Introduction:**

Monorail is one of the best alternative systems for urban transportation. There are many opportunities for us to introduce monorail systems the world over; not just in India, but also in China, South-east Asian countries, etc... India, with its congested cities, where alignment of metro routes is not always possible, monorail is the most obvious alternative. Today, nine Indian cities have a population of more than 5 million and, by 2051, more than 35 cities will reach that figure. To cater to such a large urban population, India needs a comprehensive, sustainable and integrated rail transportation system. With 40 per cent of India's population set to live in urban areas, there will be a need for extensive transportation infrastructure: more metro and railway lines, roads, sidewalks, foot over bridged and cycle tracks. It is not possible to acquire large tracks of land by displacing people in thickly populated areas for a mass rapid transportation system such as the metro. Various types of transportation modes are viable, economically and technically feasible based on the traffic and routes or any city one mode cannot be the answer. PMC to Nanded city is presently high density traffic area. In this route there is no scope for any widening of the road. The proposed metro routes also do not reach to Nanded city. Hence there is a need to augment this traffic corridor by some alternative mode of transport and in this paper monorail as a suitable mode is discussed. Also the river bed road has been demolished based on the order green tribunal there remains an alternative to go for elevated monorail along river side. One practical solution is to create connectivity to existing suburban railheads with monorail, which requires less space," Looking at all aspects it can be said that, Metros and Monorail are complimentary to each other and one is not a substitute for the other; each has its own advantages and disadvantages. PMC to Nanded city is presently high density traffic area. In this route there is no scope for any widening of the road. The proposed metro route also do not reach to Nanded city. Hence there is a need to augment this traffic corridor by some alternative mode of transport and in this paper monorail as a suitable mode is discussed. Also the river bed road has been demolished based on the order green tribunal there remains an alternative to go for elevated monorail all river side. A monorail is usually confused with cable car, light rail or tramways. A monorail, in simple terms, is an electric-powered bus that runs on an elevated concrete beam. We can say that, for cities that have a population of less than three million, monorail is the ideal mode of transport. For denser cities, monorail can ideally serve as the feeder line that brings passengers in and takes them out of the Metro network Monorails can be built very quickly and can extend into outer areas. Monorail is ideal for building a regional network. But within the city, the system will reach its capacity very fast. Monorail follows the lines of green transportation, as its coaches move on rubber tyres on concrete operation, and is powered by electric motors which are silent, efficient and clean. In Mumbai Monorail, It is estimated to save approximately 200 tons of CO<sub>2</sub> a day.

Table 2. Comparison between metrorail and monorail

Comparison	Metrorail	Monorail
Cost/Km	175 crores	125 crores
Speed	80-120 kmph	30-90 kmph
Passenger Capacity/hr.	40,000	20,000
Fare Structure	Rs..8-30	Rs.6-22

### 2.1 Suitability of monorail for Pune

To understand the problems being faced by the city, a development plan of MMRDA was studied along with the proposed development plan of the Pune Mono. The experience of various persons associated with the MUMBAI mono is taken into consideration with concerned The problems being faced for Pune PMPML were also discussed. For the traffic problems, traffic department of Pune was visited and the details regarding the Pune metro and the problems it will pose on the traffic were discussed. The proposed phase of the Pune monodies not pose a problem for land acquisition and the existing structures because suggested route is going through the river.

### 2.2 Pre-Feasibility survey:

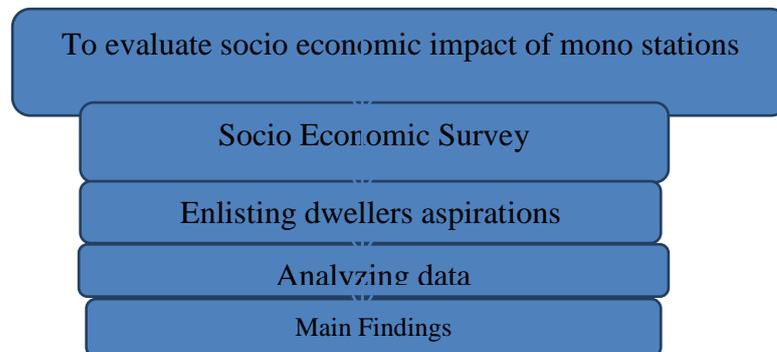


Fig.1. Flow chart pre feasibility survey

### 2.3 Traffic Congestion in the study area.

Construction of mono rail is being troublesome due to Elevated mono and insufficient road width for today's 6,190 pphpd (person per hour per direction) Daily Ridership (2014). In phase (i.e. PMC – Nanded city) the sufficient road width is available from PMC to Deccan for Elevated mono and from Deccan to Warje many bridges are there that's why insufficient road width is available for elevated mono. Continuous traffic flow cannot be achieved in Pune due to the jam packed roads. Focusing on PMC to Nanded city area, it suffers from traffic problems as it connects Warje, Malwadi, Kothrud, Anandnagar, Karvenagar, Hingne etc. That's why we choose the river route from PMC to Nanded city.

It is found that the people in this area suffer problems during travelling. The total population in this area is about more than 9.00 lac which is required to be moved with proper transport system.

## II. Justification for monorail route:

- As we go through the topographical conditions of PUNE it is found that the rivers Mula and Mutha run across the city and thus it will help to connect all the corridors of the city.
- Thus there is a great opportunity for waterway in Pune.
- If this is taken into consideration it will not face any traffic problem nor its gonna affect other transport means like private cars, bikes etc.
- Thus Monorail will be another option which ensures fast and safe journey of Pune-kars.
- The corridor that is from PMC to Nanded city is a densely crowded area and Deccan being the heart of city faces traffic problems at peak hours.
- Thus the public transport has to be planned with proper mode of Rapid transit for the commuters in this area.
- Also the proposed Metro route has not reached till the Nanded city thus there is need to connect the people to the fastest mode of transport we have planned that Monorail will cover the following stations.

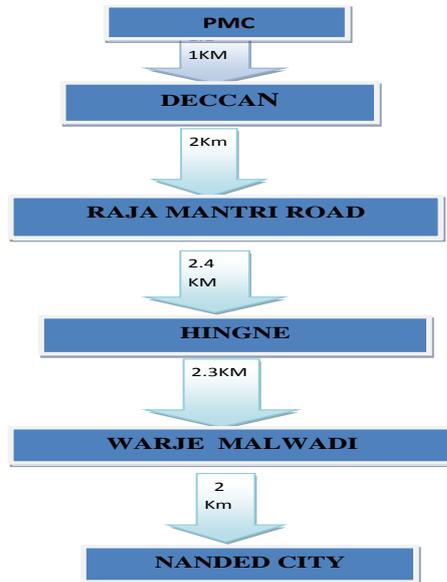


Fig. 2: Flow chart of monorail route

**III. Basic principle of monorail:**

The rubber tire Urbanaut applies high pressure pneumatic noiseless load and guide wheel tires. The tires have run-flat safety inserts to prevent deflation. The load traction tires are spaced apart to provide additional stability of the vehicle. The inclined guide wheels provide guidance, and prevent overturning, derailment and uplift of the vehicle. They are automatically spring loaded to allow for steeper climbs and stability.

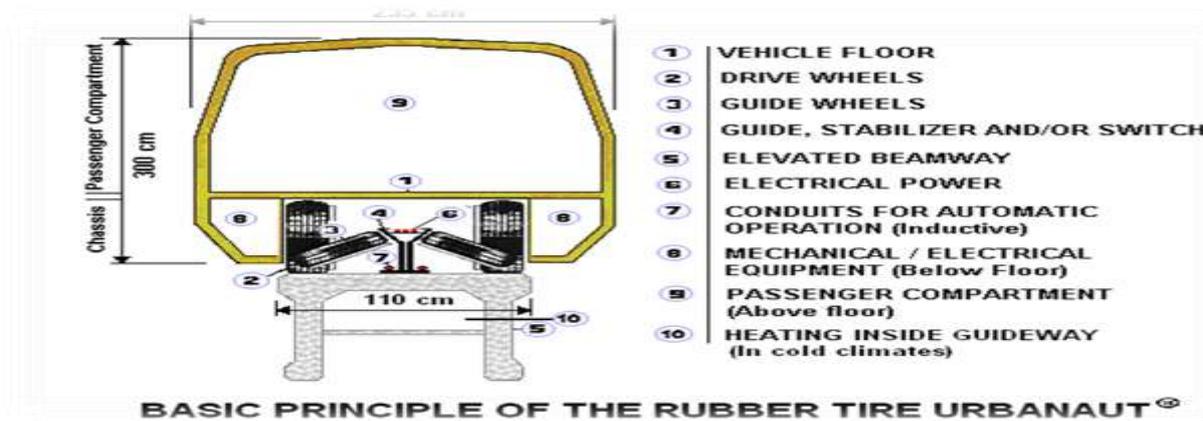


Fig .3. Basic principle of monorail

**5. Monorail stations:** Stations are many times custom designed, but by standardizing stations for a specific project, the costs can be reduced. For an elevated station, the access is by stairs and elevators. Automatic ticketing is available, or with a season or electronic card pass you walk directly into the vehicle with no delay.



Fig.4. Monorail station

#### **IV. Comparison of monorail over existing transport in pune**

Pune is a city in the west of India in a state of Maharashtra and is roughly 160 km east of Mumbai. The city lies approximately 5 kms along the river. The heart of the city is much older than rest of the city. It has winding roads many of which follows the natural slope of mountain terrain in end the river feeding the cities. There are various modes of public transport system in Pune. Public Buses within cities and its suburbs are operated by PMPML. The PMPML operates the Pune Bus Rapid Transit System in which dedicated bus lanes where suppose to allow buses to travel quickly through the cities. However in reality the project has turned out to be failure receiving to no patronage form the local citizenry. PMPML has just 350 buses against the 700 it requires. Despite the failure of its pilot project on the Katraj-Swargate-Hadapsar route, **PMPML** plans to introduce four new routes. For this, it will have to procure a fleet of at least 700 special buses will be required, but as of now, PMPML has just 350 such buses.

The BRT system introduced in Pune is run under JNNURM. The **BRTS** lane constructed on Katraj-Swargate-Hadapsar route was based on the old design in which all the bus stops fall on the left side, so any bus model can be plied on this route. However, the **new routes** on Alandi Road, Nagar Road and Sangamwadi Road have been constructed on the lines of Ahmedabad BRTS which has bus stops on both sides. These routes will, therefore, require buses which have doors on both sides. PMPML thus can't use the old buses on the routes.

Also the availability of local train connect Pune to the industrial town of Pimpri-Chinchwad and hill station of Lonavla. There is no connectivity across the rest of the cities. Thus people suffer from problems during transport a Rapid Transit System has been proposed in Pune and its scheduled to begin operation 2013. Pune Metro rail project is also being planned to connect the various corridors of cities. Thus Monorail as an alternative mass transit system is well suitable for the urban transportation in Indian cities like Pune. The monorail system can overcome problem like accidents, congestion, pollution, etc. with its high passenger capacity option it is feasible to construct Monorail.

#### **V. Conclusions:**

Considering the above discussion it is felt that PUNE CITY can be smarter by introduction of the monorail on PMC-WARJE route. Actual implementation will give a further guideline for such projects elsewhere in India. So on pilot basis this projects should be taken for implementation.

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**References:**

- [1]. The Feasibility of Monorail by Ermann Steffen Diekmann Botzow. JR. B. S., Princeton University (1958)
- [2]. Kina, K. and Kuroshima, T., 1998, The Okinawa Urban Monorail, Automated People Movers VI, 202-213.
- [3]. Lindsey, H., 1998, Operational Characteristics of Urban Monorail System, Automated People Movers VI, 193-201.
- [4]. Stone, T.J., Kimmel, J. and Banchik, C., 1998, The Las Vegas MGM Grand to Bally's Monorail System, Automated People Movers VI, 284-296
- [5]. Nima, M. A., M. ASCE, P.E. et al. 2002, Constructability Concepts in Malaysia, between Two Station Design and Targeted Route Issues