

Situation of Mumbai Public Transport

Design Research Seminar
MVDSPL - 26

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**INDUSTRIAL DESIGN CENTER
INDIAN INSTITUTE OF TECHNOLOGY
BOMBAY 2016**

DECLARATION

I declare that this written report represents my own idea in my own words, and where others, ideas or words have been included, I have mentioned the original source. I also declare that I have adhered to all principles of academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea, data, facts or source in my submission. I understood that any violation of the above will be cause for disciplinary action by the institute and can also penal action from the source from which proper permission has not been taken, or improperly cited.

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APPROVAL SHEET

This Mobility and Vehicle Design project report entitled “ Situation of Mumbai Public Transport”, by Shreyas Ganesh Barve is approved in partial fulfilment of the requirements for Master of Design degree in Mobility and Vehicle Design.

Project Guide:-

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ACKNOWLEDGEMENT

I would firstly like to thank my guide, Late Prof. K Ramchandran for the support and valuable inputs that he has provided during the course of project. I also thank Prof Nishant Sharma for his inputs on the project.

Last but not the least, I would like to thank my family and all my dear friends at IDC and from other places for being a constant source of support and inspiration throughout the project.

Shreyas Ganesh Barve

Date:-

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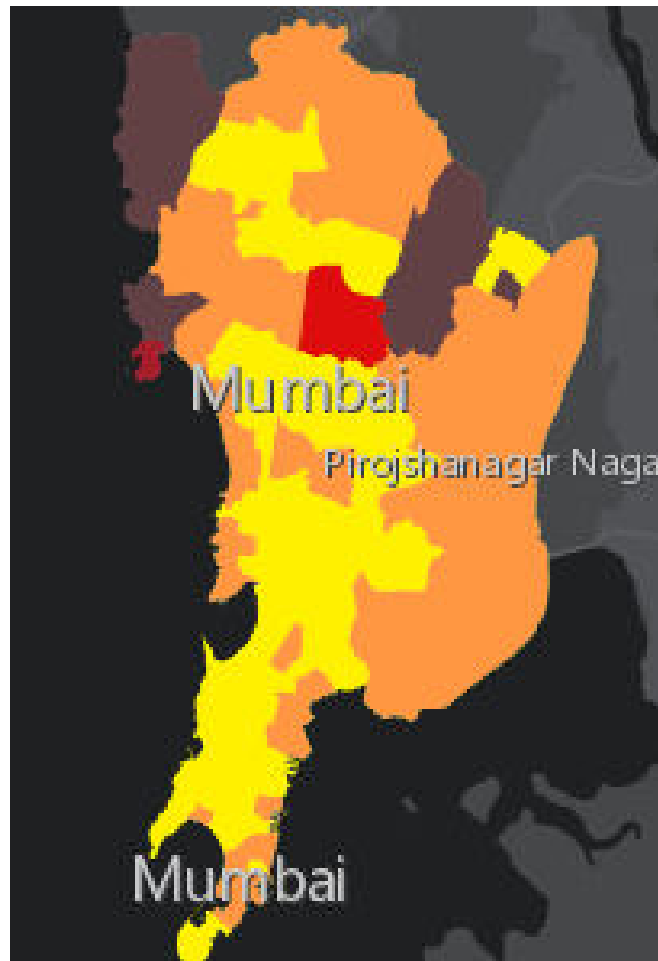
Introduction

In this study I looked at existing situation of public transport in Mumbai city. There are many factors which influences the public transport in Mumbai.

It is very important to understand these key players which are affecting the public transport in Mumbai , to understand the route causes of the same.

The city is said to be on the limit of its saturation. All the resources including water, land, train etc. are at their limits. The number of vehicles on road is putting the stress on the road network and eventually on the public transport.

Population Density



In any public transport system the study of population is important. To understand the situation in Mumbai please refer the image.

Different suburbs in Mumbai can be differentiated based on residential area and commercial area. As shown in the map we can see that population density very high on the costal areas of Mumbai. South and central Mumbai are considered to be the areas where most of the commercial activities take place.

The northern suburbs are mostly residential areas from where most of the population travels towards the south and central Mumbai during the office hours.

In Mumbai due to high prices of land it is not possible for people to buy a place to stay close to the work place, in most of the cases people make sure that access to public transport is easily available form the residence so that it takes less time to reach the public transport pickup location.

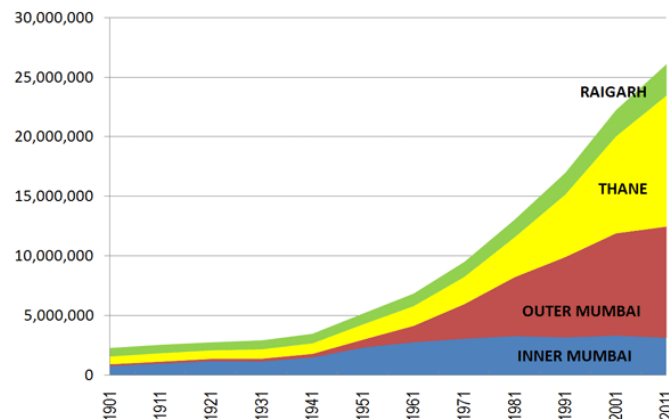
Mumbai_Population_Density

Population Density



Population Density

F3: Population by District: 1901-2011
MUMBAI LARGER METROPOLITAN REGION



If look at the history of the city we do see consistent rise in the population of the city. The maximum rise was from 1981 to 1991. During last ten fifteen years we can see drop in the growth of population in Mumbai. It is considered that drop in population growth indicates that city is at saturation point. The limited resources available to the city are over stretched. It also proves that working in Mumbai and staying there is not profitable enough for many people who come from outside Mumbai. The graph shows the same pattern. The increase in population is observed in outer Mumbai and Thane region.

This situation puts more load on public transport as people have to travel longer distances.

Growth of Population in Mumbai		
Census	Population	Growth in %
1971	5970575	-
1981	8243405	38.1%
1991	9925891	20.4%
2001	11914398	20.0%
2011	12478447	4.7%

Current Population of Mumbai in 2015	22 million
Population of Mumbai in 2014	21.5 million
Population of Mumbai in 2013	21 million
Population in 2012	20.5 million
Total Male Population (2011)	6,736,815
Total Female Population (2011)	5,741,632
Rank	2nd

Geography



As shown in the map the shape of Mumbai city is like an island. The shape is similar to a cone converging as we go towards the south Mumbai.

There are some advantages associated with these kind of geographical conditions.

Advantages.

- 1) Sea cost available on both sides. Sea cost can provide cheapest transportation where ferry or water taxi system can be provided at very low cost.
- 2) Due to linear development of the city it is possible to cover larger areas with less number of roads or rail networks. In Mumbai most of the suburbs can be linked with 3 rail lines.

Disadvantages.

- 1) Due to linear development of the city distance to be travelled for passengers is comparatively high.
- 2) There cant be any alternative routs as the city is surrounded by sea and there is space to built new roads and railway lines.

Travel Pattern



To understand the travel pattern it is important to understand what kind of jobs does city provide to its people.

Mumbai is considered as a commercial capital of India, it is basically because it was used by British government as a important port for export of raw material and import of finish goods in India. The stock exchange is also stationed in India. Most of the big companies in India have their commercial offices in Mumbai.

There are many government offices also situated in south Mumbai.

These commercial activities provide many of the jobs in Mumbai.

As most of the people are associated with commercial activities it is important to consider office times in Mumbai. For most of the people working hours start in the morning and finish in the evening. This can be proved by looking at stress developed in the transportation system during these hours.

Due to high population jobs in service sector are also increasing. People associated with these activity usually have to travel to residential areas.

Public transportation Systems



Public transportation Systems

Comparison User POV

	Train	Bus	Metro	Taxi	Rickshaw
Time taken	Low	High	Low	Medium	Medium
Cost	Low	Low	Medium	High	High
Comfort	Low	Medium	High	High	Medium
Reach	Medium	High	Low	High	High
Flexibility	Low	Medium	Low	High	High

Mumbai Suburban Railways

History



Western line started working in 1867. Church gate station opened in year 1870. DC powered locomotives started working in year 1928 between Colaba and Borivli. 9car trains were introduced on 2nd march 1961. 12car trains were introduced in year 1986. In case of Mumbai the population pattern is to a certain extent is defined by proximity of place to mostly south Mumbai suburbs.

Due to developed western rail line after independence for initial few decades the growth of population was concentrated in the suburbs facing the sea and laying on the western line.

Following are some landmarks in the history of Mumbai suburban railway network.

- 1867 – Bombay to Kurla section of the GIP – 9.5 miles
- 1928 – Bombay to Borivli, BB&CI – 22.5 miles
- 1929 – Bombay to Kalyan, GIP, - 33 miles
- 1929-1930 – Kalyan to Igatpuri, GIP, - 52 miles
- 1929-1930 – Kalyan to Poona – 86 miles (incl. Ghat section)
- 1930 – Madras beach to Tambaram, Madras Railway Co., meter gauge – 18 miles
- 1936 – Borivli to Virar, BB&CI – 16.5 miles.

Mumbai Suburban Railways

Hourly Distribution of Suburban Train Passenger Travel

Up	Time	Slow Service	Fast Service	Total	%
	7:00 to 8:00	1,61,791	76,723	2,38,514	10.4
	8:00 to 9:00	3,62,893	2,20,395	5,83,288	25.5
	9:00 to 10:00	3,63,050	2,44,796	6,07,846	26.5
	10:00 to 11:00	3,12,230	1,72,641	4,84,871	21.2
	After 11:00	2,25,054	1,60,415	3,85,469	16.8
	Total	14,25,015	8,66,361	22,91,376	100

Down	Time	Slow Service	Fast Service	Total	%
	16:00 to 17:00	1,69,892	51,664	2,21,556	9.9
	17:00 to 18:00	3,31,270	1,19,155	4,50,425	20.1
	18:00 to 19:00	3,81,422	2,06,015	5,87,437	26.2
	19:00 to 20:00	3,27,490	2,02,868	5,30,358	23.6
	After 20:00	2,86,495	1,66,683	4,53,178	20.2
	Total	14,96,564	7,46,384	22,42,948	100

Mumbai Suburban Railways

Hourly Distribution of Passengers Travelling on Western Line

Up	Time	Slow Service	Fast Service	Total	%
	7:00 to 8:00	49,131	51,428	1,00,559	9
	8:00 to 9:00	1,43,312	1,28,785	2,72,097	24
	9:00 to 10:00	1,47,109	1,52,209	2,99,318	27
	10:00 to 11:00	1,17,087	1,25,015	2,42,102	21.5
	After 11:00	92,881	1,17,215	2,10,095	18.5
	Total	5,49,519	5,74,651	11,24,170	100

Down	Time	Slow Service	Fast Service	Total	%
	16:00 to 17:00	44,897	37,961	82,858	8
	17:00 to 18:00	1,25,805	77,588	2,03,393	20
	18:00 to 19:00	1,51,478	1,23,384	2,74,862	27
	19:00 to 20:00	1,17,460	1,14,953	2,32,413	23
	After 20:00	1,23,171	1,01,201	2,24,372	22
	Total	5,62,810	4,55,087	10,17,897	100

Mumbai Suburban Railways



As mentioned in the previous pages the numbers are nothing but the reflection of nature of jobs the city provides. More than 50 % load is handled during the time window of 2 hours. The reason behind is the working hours across the Mumbai usually start at 9:00 in the morning and end at 5:00 in the evening. This puts immense pressure on the train system because the infrastructure available during the day remains the same.

The carrying capacity of 9 cars is close to 1,200 but same trains handle a load of 4,200 people. The numbers show the extent of overloading on the system. These stress poses danger to the safety of passengers. On an average 2000 people die every year, that means 5 passengers never go home every day. The reason is not just lack of infrastructure and safety arrangements but also the lack of awareness among the passengers for safety. There are also other passive factors which pose threat to the safety of passengers such as spread of epidemic. As most of the trains are so crowded that many people are breathing in a confined space which can spread the disease at a very high speed. Due to limitations of trains and train stations there is always a possibility of stampede.

Mumbai Suburban Railways

Social Aspect



Mumbai local is also considered as a identity of Mumbaikars. It is a system which provides transportation to the people of all classes. It is a common thread connecting all the people of the city. It also provides a place for the people to socially interact with each other. For many people they are friends with someone only because they travel in the same compartment every day. Many of them consider the fellow passengers as a part of their family. Enthusiastic people also use it as a platform to celebrate different festivals. The cost of transportation is very low as it handles such high loads. It also allows small venders to travel and carry goods at a very low cost. The ratio of time taken and distance travelled is better compared to other means of transport. Passengers have also formed a association which takes care of passengers needs and communicates them with the Mumbai railway authorities. Fast services are also provided for the people travelling for longer distances.

BEST Transport division

Background

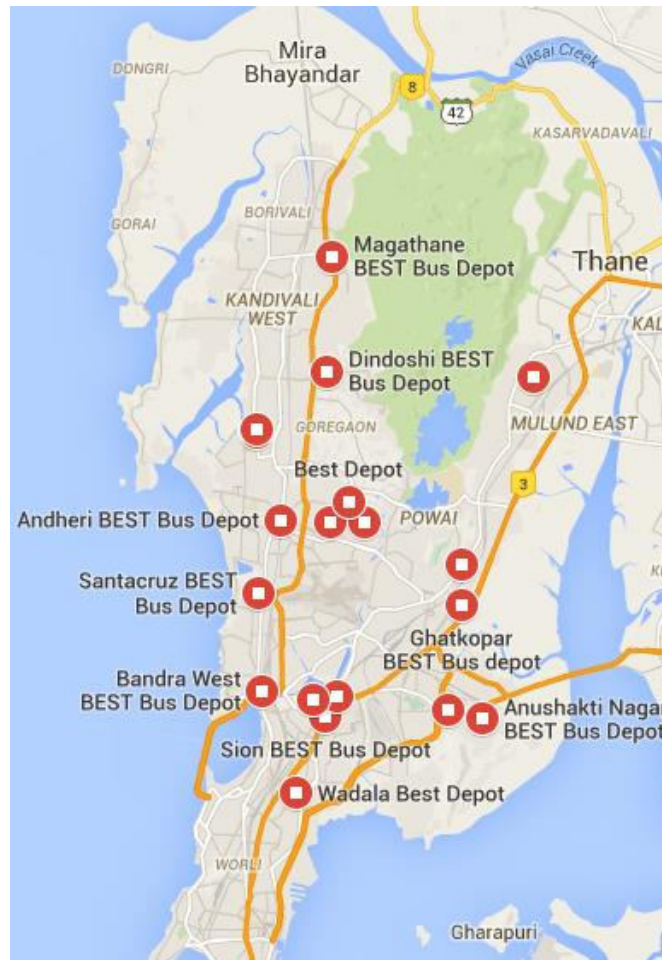


BEST Undertaking provides public transportation service throughout the city of Mumbai and also offers some services in suburbs. It is owned by the Municipal Corporation of Mumbai and was first established in 1873. BEST's transport wing is considered one of the best in the world, carrying 5 million passengers daily through 64,000 trips, operated on 500+ bus routes with 4200 buses. BEST is one of the largest public transportation companies in India.

First bus ran between Afghan Church and Crawford Market on 15 July 1926. For many years it coexisted with tram transport system available in Mumbai. Best service was considered to be for the people from upper middle class. Double decker busses were introduced in year 1937. The reason behind introduction of double decker buses was to cope up with growing traffic.

BEST Transport division

Infrastructure



In year 2015 the Best in total runs 3600 buses. Serving around 4.8 million passengers over 365 routes. Best have a work force of 38000. It includes 22000 bus drivers and conductors. On average there are 11.2 employees per bus.

The Best service also serves as secondary to the Mumbai train service. Best provides ride to passengers from train station to the home location.

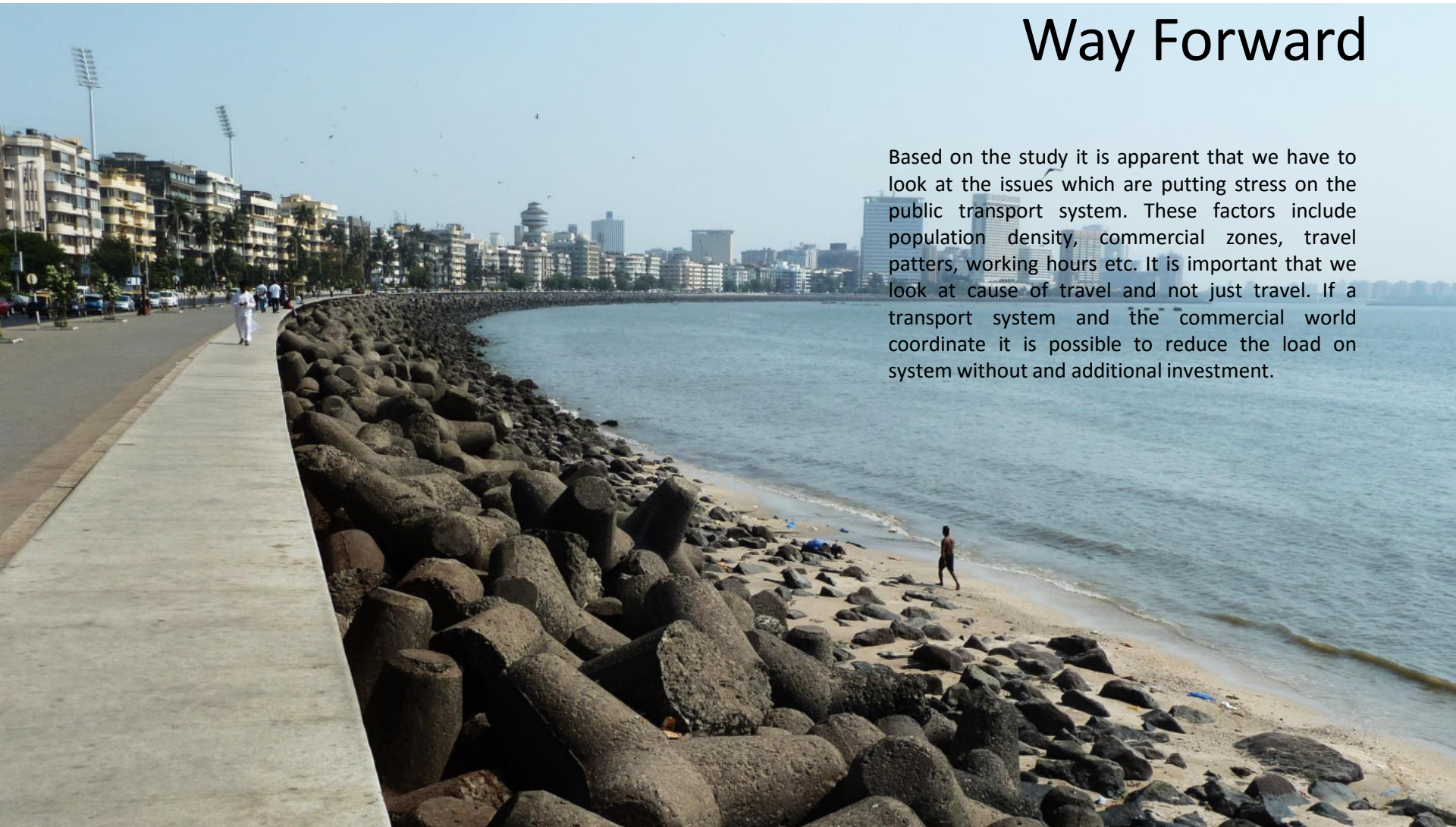
Along the western and central line railway network is very efficient and provides a quick transport to its passengers. Due to this fact Best is not in a position to provide alternative to the existing train network because the road infrastructure is already under a lot of stress. The time taken by road transport is much more than rail.

That's why best mainly targets the areas which are not covered by train network. It also provides connecting ride between the two railway lines.

Most of the work associated with bus manufacturing , repair and maintenance is done in house across all the depots provided in different parts of Mumbai.

Way Forward

Based on the study it is apparent that we have to look at the issues which are putting stress on the public transport system. These factors include population density, commercial zones, travel patterns, working hours etc. It is important that we look at cause of travel and not just travel. If a transport system and the commercial world coordinate it is possible to reduce the load on system without and additional investment.



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