An Urban Transportation Perspective of Mumbai, The Maximum City

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India
Urbanization in India (2011)

No. of Cities with population more than shown

<table>
<thead>
<tr>
<th>Population in millions</th>
<th>No. of Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,5</td>
<td>91</td>
</tr>
<tr>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>
India is one of the fastest urbanizing country in the world at the moment.

By 2030, about 41% of India's population is expected to reside in urban areas. (Source: UN State of the World Population report in 2007)
Mumbai Metropolitan Region

- Region consisting of the financial capital of India - the metropolis of Mumbai, and its satellite cities and towns
- Spread over 4,355 sq. km.
- Consists of
  - 8 Municipal Corporations
  - 9 Municipal Councils
  - 1,000 villages
- Planning Authority – MMRDA
- Population (2011) – 23 million
Population of MMR

<table>
<thead>
<tr>
<th>Census Year</th>
<th>Population in Millions</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>14.5</td>
<td>2.90%</td>
</tr>
<tr>
<td>2001</td>
<td>19.3</td>
<td>1.77%</td>
</tr>
<tr>
<td>2011</td>
<td>23.0</td>
<td>1.62%</td>
</tr>
<tr>
<td>2021</td>
<td>27.0</td>
<td>2.33%</td>
</tr>
<tr>
<td>2031</td>
<td>34.0</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>2001</td>
<td>2011</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Mumbai</td>
<td>11.98</td>
<td>12.48</td>
</tr>
<tr>
<td>Thane</td>
<td>1.26</td>
<td>1.84</td>
</tr>
<tr>
<td>Kalyan</td>
<td>1.19</td>
<td>1.25</td>
</tr>
<tr>
<td>Vasai Virar</td>
<td>0.69</td>
<td>1.22</td>
</tr>
<tr>
<td>Navi Mumbai</td>
<td>0.70</td>
<td>1.12</td>
</tr>
<tr>
<td>Mira Bhayander</td>
<td>0.52</td>
<td>0.81</td>
</tr>
<tr>
<td>Bhiwandi</td>
<td>0.60</td>
<td>0.71</td>
</tr>
<tr>
<td>Ulhasnagar</td>
<td>0.47</td>
<td>0.51</td>
</tr>
</tbody>
</table>
Population Densities of Cities in MMR

<table>
<thead>
<tr>
<th>City</th>
<th>Density, persons/km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Mumbai</td>
<td>27,653</td>
</tr>
<tr>
<td>Thane</td>
<td>12,524</td>
</tr>
<tr>
<td>Kalyan-Dombivali</td>
<td>9,092</td>
</tr>
<tr>
<td>Vasai-Virar</td>
<td>11,638</td>
</tr>
<tr>
<td>Navi Mumbai</td>
<td>6,877</td>
</tr>
<tr>
<td>Mira-Bhayandar</td>
<td>9,115</td>
</tr>
<tr>
<td>Bhiwandi-Nizampur</td>
<td>25,079</td>
</tr>
<tr>
<td>Ulhasnagar</td>
<td>18,373</td>
</tr>
</tbody>
</table>
Expected Employment Growth in MMR

Year

2005

Employment in Millions

7.76

WFPR = 0.37

2031

15.3

WFPR = 0.45
Spatial Growth within MMR 1968 - 2001
Housing in MMR

- Apartment: 33.1%
- Ind. House: 3.3%
- Chawi: 21.5%
- Slums Type 1: 23.3%
- Slums Type 2: 18.0%
- Wadi: 0.9%
The **seven islands of Bombay** were Portuguese territories since 1534 after they were captured from Sultan of Gujarat.

- Handed over to England in 1661.
- Charles II rented the islands to the East India Company in 1668.
- By 1845, the islands had been merged into one landmass by means of multiple land reclamation projects.
- The resulting island of Bombay was later merged with the nearby islands to form Greater Bombay.
Population Trend of Mumbai

Population in millions

Census Year


0.93 1.80 8.24 12.44
319 route km
Three corridors – Western, Central and Harbour
36 stations on Western Corridor
51 stations on Central Corridor
28 stations on Harbour Corridor
2813 train services operated on these corridors daily
Carries over 8 million passengers on a week day
Improvements carried out by MRVC through MUTP-I and MUTP-II World Bank funded projects
Peak Hour Loadings on Suburban Rail Corridors

CODATU 2015 - ISTANBUL

Western
Central Suburban Rail Corridor
Harbour - Main
Harbour - Trans

PHPPD

160663
106545
34584
20500

Slow
Fast
Slow+Fast
4725 passengers per 12 car train
394 passengers per car
10 passengers per m²
Super Dense Crush Load

Legend:

0 - 20,000
20,001 - 40,000
40,001 - 60,000
60,001 - 80,000
80,001 - 100,000
100,001 - 120,000
120,001 - 140,000
140,001 - 160,000
> 160,000
Super Dense Crush Load
Access Mode to Suburban Rail Stations

- Walk: 65%
- Bus: 21%
- IPT: 14%
Bus Transport in Greater Mumbai

Brihanmumbai Electric Supply and Transport undertaking (BEST) runs public transport buses in Greater Mumbai

- Salient Features
  - Fleet size: 4680
  - No. of routes: 365
  - Employees per Bus: 8.2
  - Average Journey Speed: 12 km/hr
  - Daily passengers: 4.5 million
  - Average trip length: 6.5 km
## Mumbai Metro Rail Master Plan

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Corridor</th>
<th>Length (km)</th>
<th>Estimated Cost (Rs. Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Versova-Andheri-Ghatkopar</td>
<td>11.40</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Charkop-Bandra-Mankhurd</td>
<td>32.00</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Colaba-Bandra-SEEPZ</td>
<td>33.50</td>
<td>245</td>
</tr>
<tr>
<td>4</td>
<td>Charkop-Dahisar</td>
<td>7.80</td>
<td>47</td>
</tr>
<tr>
<td>5</td>
<td>Wadala-Ghatkopar-Thane</td>
<td>30.70</td>
<td>88</td>
</tr>
<tr>
<td>6</td>
<td>Wadala-Carnac Bunder</td>
<td>13.5</td>
<td>27</td>
</tr>
<tr>
<td>7</td>
<td>SEEPZ-Kanjurmarg</td>
<td>10.50</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>Andheri (E) – Dahisar (E)</td>
<td>18.00</td>
<td>108</td>
</tr>
<tr>
<td>9</td>
<td>Sewri-Prabhadevi</td>
<td>3.50</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>160.90</strong></td>
<td><strong>679</strong></td>
</tr>
</tbody>
</table>
Mumbai Metro One

- Length of Corridor : 11.4 km
- Design Headway: 3 minutes
- Project cost: Rs. 25 billion
- Train Composition: 6 cars
- Train Capacity: 2250 Pax
- Design Speed: 90 kmph;
- Operation Hours: 05.30 - 23.30 hrs
- Journey Time : 21 minutes
- No. of stations: 12 Stations
- Commencement: June 2014
- Present Demand: 300,000 pax / day
Mumbai Monorail

- Length of Corridor: 20 km
- Project cost excluding taxes: Rs. 25 billion
- Design Headway: 3 minutes
- Train Composition: 4 cars
- Passengers Capacity: 562 Passengers
- Design Speed: 80 kmph
- Operation Hours: 05.00 Hrs to 24.00 Hrs
- Journey Time: 54 minutes
- No. of stations: 17 Stations
Mumbai Trans Harbour Link (MTHL)

- 22.0 km 6 lane Trans Harbour link
- Provision for twin Metro track (16.5 km. creek bridge)
- Process of bid invitation on
Multimodal Virar – Alibag Regional Corridor

- 126 km rail cum road freight and passenger corridor
- Enhances access to the growth centres in the region
- Carry traffic to JN Port bypassing cities of Navi Mumbai, Thane and Mumbai
- Will help reduce traffic congestion in these cities.
- The travel time between Virar and Alibag will reduce by 50%.
Air and Maritime Transport

• Chatrapati Shivaji International Airport
  – Newly constructed International terminal T-2
  – handling capacity 40 million passengers per annum,
  – Around 700 flights a day

• Mumbai port and Jawaharlal Nehru Port (JNP) caters to significant amount of cargo trade of the nation

• JNP is the biggest container handling Port in India

• JNP is ranked 24th among the top 100 Container Ports in the World

• Navi Mumbai International Airport: the second airport in the region, will be operational in about 5 years
The existing airport will reach its capacity of 40 million passengers per year by 2020.
Proposed New Airport in MMR

- Two parallel runways for simultaneous and independent operations
- Aerodrome code: 4F
- Phase I: Year 2020 for 10 million passengers
- Phase II: Year 2025 for 25 million passengers
- Phase III: Year 2030 for 45 million passengers
- Phase IV: Year 2035 for 60 million passengers
- No. of Gates: 78
- Remote Gates: 29
- Total cost: Rs.150 billion
- Implementation Model: PPP
- Sponsor: CIDCO
Important Road Links Completed in the Recent Past

5.6 km 8 lane Bandra – Worli Sea Link

16.8 km 4 lane Eastern Freeway

11 km E-W Arterial

6.5 km E-W Highspeed Arterial
### Proposed Investments in MMR 2008 -2031

<table>
<thead>
<tr>
<th>Facility</th>
<th>Length km</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro System</td>
<td>450</td>
<td>1,10,095</td>
</tr>
<tr>
<td>Sub-Urban Railway System</td>
<td>241</td>
<td>30,978</td>
</tr>
<tr>
<td>Highway System</td>
<td>1660</td>
<td>57,412</td>
</tr>
<tr>
<td>Highway Corridors with BRT</td>
<td>77</td>
<td>1,670</td>
</tr>
<tr>
<td>Bus System</td>
<td>-</td>
<td>4,280</td>
</tr>
<tr>
<td>Passenger Water Transport</td>
<td>-</td>
<td>480</td>
</tr>
<tr>
<td>Truck, Inter-Bus and Rail Terminals</td>
<td>-</td>
<td>3,040</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,428</strong></td>
<td><strong>2,07,956</strong></td>
</tr>
</tbody>
</table>

US $ 50.72 Billion
Thank You