Integrating DEMU/MEMU Services
A step to decongest Bangalore

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National Academy of Indian Railways
Presentation Overview

- Bangalore Metropolitan Region - Relevant stats
- Importance & need of Suburban Rail system for Bangalore
- Present situation of PT & Suburban Rail in Bangalore
- DEMU services & infrastructure
- MEMU services & infrastructure
- New Developments & integration drivers
- Integration plan for DEMU & MEMU services
- Advantages of Integration
- Way Forward
Rail Against The Traffic

Bangalore will soon be unliveable for many reasons, but the worst are its choked roads

AJAY SUKUMARAN
Literature Review

• Implementation of Commuter Rail System for Bangalore Table of Contents - RITES 2012
• Comprehensive Traffic And Transportation Plan For Bengaluru - RITES June 2011
• National Transport Development Policy Committee Report - 2014
• RMP (Revised Master Plan) 2015, BDA
Bangalore - Key statistics

• Bangalore Metropolitan Region

<table>
<thead>
<tr>
<th>No</th>
<th>District</th>
<th>Area (Sq. Km)</th>
<th>Population</th>
<th>Decadal Growth Rate (%)</th>
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• Third most populous city & fifth most populous urban agglomeration in India
Population growth - Projections

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<td>% of total BMR Pop</td>
<td>27%</td>
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<td>28%</td>
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Bangalore
Metropolitan
Region
Traffic Situation

- 6 million vehicles in a city of 10 million people
- Modal Split

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<td>3</td>
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<tr>
<td>4</td>
<td>Auto</td>
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<tr>
<td>5</td>
<td>Maxi Cab</td>
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<tr>
<td>6</td>
<td>Two Wheeler</td>
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<td>7</td>
<td>Car/Van</td>
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<td><strong>Public Transport</strong></td>
<td><strong>30.0%</strong></td>
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In comparison in NYC, 55% people use Public Transport
- NYC is comparable in population and size
Present situation of PT

• Predominantly Busses
• Suburban Rail to some extent
• Metro Phase 1 recently completed
  • Is already running over crowded
  • Fear of flooding
• LRT/Monorail also proposed
Transport Demand

• Somewhat distant suburbs
  • Nelamangala, Anekal, Yelahanka, Hosur, Sarjapura, Bidadi etc

• Cars and buses coming in from its outskirts

• People come into the city for work

• People traveling to/from transit hubs like Majestic and KR Puram

• Low-rise and single-plot dwellings in older areas

• High-rises in newer “IT” areas,

• Suburbs mix of individual houses and apartment buildings
A trip of 5.7 km from Mahadeva-pura to KR Puram station in East Bangalore would take 44 minutes by car.

76% decline in vegetation cover & 79% decline in water bodies

Housing has already become unaffordable in Bengaluru for the lower and middle classes which is going to form a major portion of the workforce of the future.
One key solution

- Frequent, low cost connectivity between Bangalore and suburban growth centers

- With 6 Routes connecting 6 growth centers at a frequency of 24 trains per day per route, 375 kilometers and 50 lakh people can be covered*

*Suburban Rail System

*RITES 2012 report
Advantages of Suburban Rail System

- Decongest the city
- Increase commute time efficiency & reliability
- Reduce dependency on & number of cars/ buses
- Help long-distance travelers to reach train terminals
- Lower real estate rates and hence cost of living
- Optimum utilization of railway real estate
- Lower capital expenditure on transport infrastructure
- Help develop a public transit culture
Suburban Rail vs Metro Coverage

Namma Metro Coverage
Network – 115 Kms
Cost – 38,000 Crs

Commuter Rail Coverage
Network – 405 Kms
Cost – 8,000 Crs
Suburban Demand & Present Situation

• Total projected Commuter Rail Trips by 2031 (@ 30% of public transport trips): 2.97 million*

• Current (2011) daily trips on Bangalore commuter rail network is estimated as 0.15 million*

• Current percentage trips by rail is about 5% of 2031 demand

* RITES 2012 Report
Railway Network in Bangalore

- Extensive network of Indian Railways cutting right through the city
  - B.G. line from Chennai on east
  - B.G. line from Mumbai-Pune on north-west
  - B.G. line from Guntakal on the north
  - B.G. line from Salem / Trivandrum from east
  - B.G. line from Mysore from south-west

- Connects all important extended suburbs
  - Hosur, Bangarapet, Kolar, Chintamani, Chikballapur, Doddaballapur, Tumkur, Nelamangala, Mysore Road
Rail Map of Bangalore Division of IR
Present Bangalore Suburban Rail

- Being serviced by DEMU & MEMU rakes
- Suburban Rail Corridors
  - YPR-TK (Yeshvantpur - Tumkur)
  - SBC-MYA (Bangalore City - Mandya and beyond )
  - YNK-DBU (Yelahanka - Dodballapur)
  - YNK-CBP (Yelahanka - Chikballapur)
  - BYPL-HSRA (Baiyyappanahalli - Hosur)
  - BYPL-BWT (Baiyyappanahalli - Bangarapet)
  - SDVL - Kunigal (Soldevanahalli - Kunigal)
- About 440 kms of network
Constraints for Suburban Rail System

- Lack of line capacity
  - Path for running commuter trains not available
- Lack of commuter train stations (e.g. Tannisandra)
- Less no. of platforms per station
- Inadequate rake maintenance infrastructure and stabling lines
- Unavailability of rakes (train sets) for commuter trains
DEMU

- DEMU stands for Diesel Electric Multiple Units
- Diesel engine driven self propelled train sets
- 1 DEMU set consists
  - 1 Diesel Power Car (DPC) and 3 Trailer Cars (TCs)
- One DEMU rake is made of two such units
- Bangalore has 50 TCs and 17 DPCs running in 6 rakes
- Designed for commuter services
DEMU Services

• 14 sets of train services
  • 9 sets of train services are operated using 3 DEMU rakes in SBC-BNC-BWT-MKM-KQZ-DPJ-RMGM sections.
  • 3 sets of train services are operated using 1 DEMU racks in YPR-HSRA-DHL section.
  • 2 sets of train services are operated using 1 DEMU rake in SBC-KQZ-CPT section
DEMU Infrastructure

- Maintenance shed in Bangalore Cantt. (BNC)
- Maintenance schedule
  - 7 days trip/monthly A/Quarterly B/ 9 monthly Overhauling
- Limitations
  - Was designed for loco maintenance
  - Stabling line is short (6.5 coach length instead of 8)
MEMU

- MEMU stands for Mainline Electric Multiple Unit
- Self propelled train sets
- Get tractive power from overhead electric cables
- MEMU services were introduced in 2006
MEMU Services

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MEMU Infrastructure

• Maintenance was earlier being done at Bangalore city station (non-electrified facility)

• Banaswadi shed commissioned in Nov 2016 for maintenance (electrified facility)
  • Can maintain 15 rakes of 12 cars
  • Present holding 7 Rakes of 8 cars

• 14 Motor Cars + 42 Trailer Cars
Developments

- Yelehanka YNK - Dharmavaram DMM electrified
- Bangalore City SBC- Mysore MYS completing electrification
- MEMU services extended with 12 car rakes in SBC- BWT (Bangarpet) section
- Conventional passenger trains being replaced with MEMU trains
  - Higher capacity
  - Designed for commuter traffic
Electrified Railway Map of BMR
MEMU - DEMU

• **Commonalities**
  - Both are self propelled train sets
  - Designed for rapid transit commuter services
  - Hardware for propulsion, rolling, braking, superstructure, passenger amenities etc. are similar
  - Similar driving controls

• **Differences**
  - Internal Motive power system and fuel used
  - Requirement of Overhead Cables
Key Drivers of Integration of MEMU- DEMU

- Electrification of rail network in Bangalore and its suburbs
- Requirement of additional commuter trains
- Lead time in development of infrastructure
- Lead time in acquisition of new rakes
- Spare maintenance capacity at Banaswadi Maintenance Shed
- Complimentary facilities at DEMU/ MEMU Sheds
Integration Plan

- Repairs & Maintenance of both rolling stocks under one roof, with common command control structure to manage materials, machinery, tools, human resources, etc.
- Integrated maintenance plans
- Integrated rake links
- Integrated operational competency of crews who run these self propelled units
Advantages of Integration

- **Net efficiency** of integrated Repair & Maintenance facilities for MEMUs and DEMUs will be **much more** compared to an exclusive facilities
- Operations & Administration Cost savings
- More commuter train services
Way Forward

• Development of Integrated Management Structure
• Development of Maintenance plan & Manpower redistribution
• Training Plan
  • Familiarization course for the crew
  • Short - term cross-training to Maintainers of each stock
• Roll-out
• Stations - co-located with Metro
Thank you